A descriptive process analysis and comparison of game modifications in junior netball and basketball

Andrew Watt
Edith Cowan University

Edith Cowan University

Copyright Warning

A DESCRIPTIVE PROCESS ANALYSIS AND COMPARISON OF GAME MODIFICATIONS IN JUNIOR NETBALL AND BASKETBALL

BY

Andrew Watt

A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor of Education with Honours at the Faculty of Education, Edith Cowan University

Date of Submission: 14/5/93

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

A DESCRIPTIVE PROCESS ANALYSIS AND COMPARISON OF GAME MODIFICATIONS IN JUNIOR NETBALL AND BASKETBALL

The amount of time participants spend successfully engaged with skill content has been found to have a high correlation with skill learning and achievement. For children to learn motor skills it is clear that they must be provided with sufficient opportunities to exhibit skill responses, during practice and game sessions. For this to occur, activities must be designed to cater for the developmental requirements of the children, whilst maintaining high levels of active involvement for all participants. In response to these needs, basketball and netball associations have employed modifications to game structures.

This study provides a descriptive analysis of junior basketball and netball settings, with a specific focus on the rates of successful motor skill engagement achieved by participants of different skill abilities, in coach directed practice sessions and game play situations. The behaviours of high and low skilled basketball and netball participants playing in modified (under 10 age) and full game designs (under 12 age), were observed and recorded, for the purpose of comparison, during

four practice and four game sessions using two systematic observation instruments:

(a) *Revised Academic Learning Time - Physical Education/ Sport*, (ALT-PE/SPORT), which measures time spent by participants in process behaviours

(b) *Revised Systematic Observation of Student Opportunities to Respond* (SOSOR), which measures the rates of specific skill occurrence by an individual in a sport session.

The findings from game observations were as follows:

(a) High skilled players in both netball and basketball were involved in activity far more often than low skilled players and made more frequent responses in all ball skill categories, with the high skilled players in the under 10 and 12 netball and under 10 basketball, being successfully engaged in skill content over twice as often as the low skilled players. Skill response rates were far more equitable in the under 12 basketball settings.

(b) The restrictive court structure in netball did not affect the equity of involvement for high and low skilled players, when compared to the basketball (non restrictive game structure).

(c) In netball, low skilled netball players spent far more time waiting during games than high skilled players, mainly as a function of spending more time in positions which had greater restrictions on court movement and a subsequent lack of access to ball possessions.

(d) Low skilled basketball participants spent considerably more time as a reserve in games than high skilled players, this reflected game conditions failing to ensure equity of game play time for participants.

(e) In both junior basketball age groups, between 23 and 26% of game time was used for knowledge and transition episodes, mainly as a result of time outs and substitutions during game time.

Results from training sessions reinforce earlier findings that the level of active involvement is primarily a function of the organisation and planning by the coach. In both netball and basketball age groups high skilled participants made more frequent skill responses in each skill area during training, though they were actively engaged only slightly more often than the lower skilled participants. Low levels of involvement were found in activity behaviours and in successful ball skill engagement in the under 10 and 12 netball and under 10 basketball training sessions. Only in the under 12 basketball training sessions, conducted by the most experienced and accredited coach, were there frequent opportunities for ball skill responses.

A high degree of success in skill performance during game and practice sessions for high and low skilled players in under 10 and 12 basketball and netball was found, indicating that the equipment and rules used in both sports suits the physical requirements of the participants, and that modifying

equipment for the under 10 participants has been warranted. Despite this, greater attention must be paid to adapting rules in junior basketball and netball to promote greater equity in participation for participants of differing skill levels and in developing coach expertise in providing high levels of successful skill response opportunities during practice sessions.

Declaration

" I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my ability it does not contain material previously published or written by another person except where due references are made in the text."

Signature___

Date_____ *18/11/1993.* _____

Acknowledgements

My sincere thanks are extended to the following people for their assistance, guidance, and support during the course of this research project.

Table of Contents

IX   **Appendices**

List of Tables

List of Figures

CHAPTER 1

INTRODUCTION

Research into the developmental requirements of children involved in physical education activities has increased in the last twenty years, leading to a recognition by educators that children have specific needs and are not merely miniature adults. More recently there has been an increased community and academic interest in the nature of child sport experiences and the ability to cater for the perceived needs of children.

Research in junior sport is now recognised as important in itself and not just an adjunct to an adult sporting perspective. Taggart (1986) supports the increased interest in researching junior sport, stating

> This recent emphasis recognises not only the significance of junior sport in the sporting culture, but more importantly, recognises the influential place of sport in the wider culture. Hence it is a worthy form of research in and of itself. (p.1)

Children now have greater access to, and participate in, a greater variety of sporting and recreational programmes, in comparison to past generations and commence playing in a formal sport setting at a younger age (Martens, 1978). Descriptive studies can provide indicators of the suitability of youth sporting programmes to cater for the needs of such

participants, and from this we can develop better strategies to promote learning and enjoyment of games. Such improvement can only be maintained through research that consistently evaluates and re-evaluates current practices and theories.

Research over the past twenty years in child learning (Berliner, 1979; Fisher, Berliner, Filby, Marliave, Cahen and Dishaw, 1978) and in particular studies in Physical Education (Phillips and Carlisle, 1983; Siedentop,1982 and 1983; Silverman, 1985) strongly support the conclusion that children who spend more time actively engaged in relevant and meaningful content, whilst achieving a high rate of success, will master skills more readily and subsequently gain greater enjoyment from their involvement in junior sporting programmes. Metzler (1983) concludes that physical education and sporting programmes with an emphasis on high levels of appropriate motor skill engagement should "...seemingly lead students to greater skill achievement and thus heighten positive attitudes towards themselves and physical education." (p.21)

Learning motor skills and enjoyment in participation should be major considerations in planning and implementing junior sport programmes. Skills can be adapted to a variety of settings and need to be mastered for successful game play to occur. Participants must, as Metzler (1983) explains, make overt motor responses to acquire motor skills. Subsequently it is imperative that many opportunities to exhibit such skill responses are provided in practice and game sessions. High opportunity to respond (i.e., plenty of chances to pass and catch

the ball) promotes skill development. When game skills are developed, approach tendencies to the formal game and immediate enjoyment are more likely to occur. (Taggart, 1986, p.3)

The use of time has in fact been found to be an exceptionally important process variable effecting learning. As Metzler (1989) surmised in his review of research on time in sport pedagogy, "At least eleven studies completed to date, reported moderate to strong correlations between student functional time and increased learning." (p. 95).

Studies in physical education and sport settings reveal, however, that time allocated to skill practice in game and practice sessions is generally quite low, with participants spending large amounts of time in non functional activities, which subsequently inhibits the opportunity for skill learning to occur. (Godbout, Brunelle and Tousignant, 1983; Harrison, 1987; Metzler, 1980; Placek and Randall, 1986; Placek, Silverman, Shute, Dodds and Rife, 1982; and Silverman, Dodds, Placek, Shute and Rife, 1984;). This is especially evident in team game situations (during practice and game sessions), where children often spend an inordinate amount of time being involved in managerial tasks, listening to instructions, moving from one activity to another (transition), or actually waiting for an opportunity to participate, thus resulting in a small percentage of the allocated session time being devoted to the performance of relevant motor tasks. Studies have also shown that there is often an inequitable involvement of players of

differing ability, with high skilled participants generally accruing greater rates of successful skill engagement than lower skilled participants (Beauchamp, Darst and Thompson, 1990; Cousineau and Luke, 1990; Grant, Ballard and Glynn, 1989; Mancini and Wuest 1984; Placek, Silverman, Dodds, Shute and Rife, 1986; van der Mars, Mancini, Wuest and Galli, 1984; Wuest, Mancini, Frye and Murphy, 1985; Wuest, Mancini, van der Mars and Terrillion, 1984).

A prime motivation for children joining sporting teams is to learn skills. Research indicates that children often drop out of sport if they are not actively and successfully involved during game and practice sessions (Morton and Docherty, 1980; Orlick and Botterill, 1975; Pooley, 1979; and Robertson, 1981). Coaches can influence the functional time of the participants, through their planning of practice sessions. These sessions provide a significant opportunity for children to practice and master skills. Coaches and teachers can maximise activity time by reducing managerial and transitional episodes,whilst also endeavouring to minimise time devoted to knowledge transference (Siedentop, 1983). The establishment of activities that engage children in tasks appropriate to their skill level, should also be of prime consideration. With greater understanding of the child and his/her developmental stages have come concerns that adult game models and previously used methods of sporting instruction may not fully meet childrens' needs. In response, many sporting bodies have developed modified game structures, which include such changes as restrictions on player movements around the court,

the number of players per team, and changes to equipment and game rules. There is now far greater emphasis on designing relevant activities that provide active and equitable involvement, in an effort to better cater for children's developmental skill levels, and game play maturity levels.

> By simple modifications, many sports can equalise the opportunity for each child to participate, increase mastery of skills, protect children from anxiety and physical pain and, overall, increase the enjoyment and desire to remain in sport. (Hobart Division of Recreation, Education Department and Tasmanian State Schools Council,1983, p.7).

Netball, a sport which has consistently achieved the highest level of female participation of all sports in Australia, is one sport that has been modified for children aged nine and ten years. The current modified version is called 'Netta- Netball'. Basketball, the game presently experiencing an enormous explosion of participation rates, and the very game from which Netball is derived, has also had a modified game designed for children under the age of eleven, called 'Mini-Ball'. As is the case in many modified sports, many of the modifications employed have occurred more through the good intentions and ideas of administrators, coaches and parents, than through the use of research to determine objectively the most appropriate game design changes. Unfortunately this is partly due to the dearth of research in junior netball and basketball. Studies in basketball have focussed mainly on equipment modifications,

with only a few studies analysing the actual activity levels of participants. (Parkin, 1980; van der Mars, Mancini and Frye, 1984; Wuest, Mancini and Frye, 1984). Whilst the only significant netball study (Plaisted, 1990) did not consider rates of active engagement when comparing modified and adult game designs.

Despite the lack of research into junior netball and basketball, both modified games have been widely accepted throughout Australia, with Netta-Netball played in all states and a variety of variations of Mini-Ball played in most community basketball associations. As Pang (1980) suggests, it is essential that game modifications are consistently monitored and evaluated to observe whether changes are actually effective and whether other problems emerge as a result of the change. Modifications are often instituted with the aim of increasing successful skill responses for participants. However, what may seem to be an improvement or good idea may actually have minimal effect on the amount of opportunities a child has to exhibit a skill response, such as reducing the size of a soccer pitch, changing the type of ball used in volleyball (Siedentop, 1985) or equalising amount of turns in batting and bowling in cricket (Taggart, 1986). By studying and comparing results from children participating in the modified game and children participating in the adult game version, a better understanding of the suitability of each game design in achieving successful motor engagement may be found. Netball and basketball are two games that have a common skill basis (with the only major differences being dribbling, the backboard lay-up in basketball

and methods of defence) but have differing rules on court restrictions for players, with netball confining players to set regions on the court. Basketball is a game that is very nomadic in nature allowing players to roam all over the court, whilst netball restricts players to selected regions.

Court restrictions have been adopted by other sports e.g. hockey, football and Lacrosse, for use in their modified game design with the intention of equalising children's opportunity to respond, whereby high skilled players are restricted from dominating the game. An objective, comparative analysis of participant involvement levels in basketball and netball may provide an indication of whether court restrictions are effective in providing equitable involvement for all participants.

A descriptive analysis of both sports must demonstrate valid and reliable findings, if it is to encourage game administrators, coaches and parents to accept and implement it findings, and thus promote game developments that will increase the active involvement of participants. To achieve appropriate findings, valid and reliable research tools should be selected that have been recommended for use in physical education and sport settings. Academic Learning Time - Physical Education (ALT-PE) (Siedentop, Tousignant and Parker, 1983) and the modified ALT-PE/SPORT (Wilkinson and Taggart, 1989) are such research tools presently used in physical education and sport settings that promote objective

evaluation of junior sport programmes, by providing a descriptive data base.

The Academic Learning Time model is based on research indicating that the more time spent successfully involved in activity related to the subject matter, the more learning occurs. (Berliner, 1979; Fisher, Berliner, Filby, Marliave, Cahen and Dishaw, 1978; Metzler, 1985; Parker and O'Sullivan, 1983; Phillips and Carlisle, 1983; Siedentop, 1982 and1983; Silverman, 1985; and Smyth, 1981). ALT-PE can be formally defined as "The percentage of activity time during which students are effectively and successfully engaged in physical education content activities." (Godbout et al., 1983). Successful motor engagement has received strong support as a proxy for learning, and thus as a proxy measure on the effectiveness of the physical education and sporting programmes (Harrison, 1987; Lee and Poto, 1988; Phillips and Carlilse, 1983; and Siedentop, 1982 and1983). Using ALT-PE levels as a proxy measure for learning and achievement is especially useful in physical education and sport environments where physical movements and performances are difficult to quantify with precision, and there is a lack of permanent products upon which to base assessments.

The instrument 'Systematic Observation of Student Opportunities to Respond' (SOSOR) (Brown,1989) is another research tool that provides specific data on the amount of skill responses exhibited by a player during a sport session. It also determines whether the skill responses are topographically

acceptable or unacceptable and specifies whether the results of the response are successful or unsuccessful.

This tool was designed specifically for evaluating the effectiveness of games to provide opportunities for skill responses, but can also be used in practice sessions observations, and when triangulated with the Basic ALT-PE, it will provide a richer description of how participants use their time and how often they are successfully motor engaged when participating in sport sessions.

It is acknowledged that other variables do indeed effect motor skill learning, however this study will investigate the variables of effective use of time in providing maximum skill learning opportunities for participants as these variables have been recognised as having great effect on skill mastery and the subsequent enjoyment experienced by children participating in sport programmes. Such variables are to a large degree controlled by teachers and coaches.

Significance of the Study

Time spent successfully engaged in activity is significant to skill learning, therefore it is imperative that junior sporting programmes reflect this understanding by providing game structures and practice sessions that ensure maximum opportunities for children of all skill levels to be actively and successfully involved. Improvement and development of game

structures and coaching techniques can best occur through objective description and evaluation.

Junior basketball and netball programmes have experienced little objective analysis within their specific settings. A descriptive process analysis of the behaviour of high and low skilled participants in both sports, should provide a better understanding of how players spend their time in practice and game sessions. From this an accurate assessment can be made of the netball and basketball programmes effectiveness in providing opportunities for skill learning. The findings can be used as a basis for new developments in game structures and also in designing coaching strategies to provide optimum skill response opportunities and equity of involvement for all participants.

With basketball experiencing the biggest explosion of participation rates of all sports in Australia, and Netball still being the most popular female sport, (Clough and Trail, 1989), it is important that these programmes are described , assessed and further developed, to better cater for the needs of the many participants.

Modified game structures have been implemented in both basketball and netball throughout Australia. By studying and comparing results from children participating in the modified game and children participating in the adult game version, a better understanding of the suitability of each game design in achieving successful motor engagement may be found. Studying

netball and basketball also provides a unique opportunity for comparison of game designs. Both sports have a comparable skill structure (with the only major differences being dribbling, the backboard lay-up in basketball and the methods of defence) but differing rules on court restrictions for players. Objective analysis of the involvement of low and high skilled players in both netball and basketball should indicate which game design provides the best opportunity for active involvement.

All major sporting bodies now strongly encourage junior coaches to be accredited through coaching courses, with the aim being to provide a higher quality of sporting instruction to all children, with the Western Australian Ministry of Sport and Recreation providing a range of courses for coaches. Large portions of sporting association's budgets are often provided for such coaching training courses. The Western Australian Basketball Federation for example has allocated $325,000 over a three year period for training basketball coaches . (W.A. Basketball Federation, 1992). Obviously with such financial outlays being afforded to coach education, it is essential that the training courses reflect research findings on the most effective methods of promoting skill development. Descriptive research on coaches' ability to provide skill learning opportunities for participants can be of great use to co-ordinators of such courses, as it will provide information on which they can base the objectives and content of their programmes. If the descriptive research shows that low rates

of active involvement occur in sessions taken by coaches, then courses can be adapted and developed to address this situation.

In summary the study through the use of systematic observational instruments-ALT-PE/SPORT (Wilkinson and Taggart, 1989) and the SOSOR (Brown, 1989), will provide a greater understanding of junior netball and basketball settings, and a subsequent research base upon which further process improvements can be made.

Purpose of the Study

The purpose of the study is to provide a descriptive process analysis of how children spend their time in community basketball and netball programmes. With successful skill engagement, being recognised as the major process variable effecting motor skill learning, this study will focus on the suitability of practice sessions and specific game designs, of both sports, to provide maximum opportunities for participants of differing skill levels to make successful skill responses. Both the modified and adult game designs of each game will be evaluated and compared to conclude whether they actually provide sufficient opportunities for successful skill engagement for all participants.

As netball and basketball are games with a similar skill basis, but differing game design, they also will be compared to determine which provides more opportunities for participants of different skill levels to make successful skill responses.

Statement of the Problem

Major Research Question

What process behaviours are observed from participants, of differing skill levels, involved in junior basketball and netball programmes?

Specific Research Questions

1. What level of successful motor skill engagement, is provided for high and low skill participants, in junior basketball and netball programmes?

2. What level of successful motor skill engagement is provided in the adult and modified game structures and practice sessions in junior netball and how do the differing game designs compare?

3. What level of successful motor skill engagement is provided in the adult and modified game structures and practice sessions in junior basketball and how do the differing game designs compare?

4. How do the two sports of basketball and netball, with a similar basis, but differing game design, compare in levels of successful motor skill engagement?

CHAPTER 2

REVIEW OF LITERATURE

Over the past fifteen years a great deal of research has been conducted on junior sport. This has led to a higher degree of understanding of what children require to improve their skills and create enjoyment in participating in sporting activities. These studies have considered the developmental needs and motivating factors for children in junior sporting programmes resulting in many modifications to both game structures and specific game equipment.

The following review of literature will discuss the modifications made in junior sport settings and participant use of time within the junior sport environments.

Modifications In Junior Sport

Growth in Junior Sport

There has been an unprecedented growth in children's' sports since the early 1970's (Gibson, 1982). "Improved facilities, better equipment, and an increase in the number of adults volunteering their services has resulted in large numbers playing and also in children being introduced to a formal sport setting at a younger age." (Gibson, 1982, p.3) This is especially evident in basketball and netball which are exceptionally popular sports with children. (Over 32,000 junior club

basketballers, and more girls participating in netball than any other sport in Australia) (Clough and Trail, 1989). An apparent bi-product of this, is community and academic interest in the perceived needs of children, the nature of junior sporting experiences and the outcomes of participation in adult organised sporting sessions.

Modifications in Junior Sport

Many researchers over the last 15 to 20 years have provided evidence that highlights that the adult game structure and rules may be unsuitable for young children. They implore the need for modifications or adaptions to games so that they can better cater for the physical capabilities of children. The Hobart Division of Recreation, Education Department and the Tasmanian State Schools Sports Council (1983), in their report on modified approaches to sport for Australian children, summarised the major problems that existed in junior sport at the time as:

  (a) the excessive demands made on children using adult equipment and grounds;
  (b) the unsuitability for children using adult rules;
  (c) the emphasis on competition rather than skill development;
  (d) the failure of many children to develop skills adequately due to emotional pressure induced by competitive games;
  (e) the concentration by coaches and teachers on the most talented children who often monopolise grounds and

equipment to the exclusion of those who really need more practice and teaching;

(f) the lack of enjoyment experienced by many who play in teams because the game is dominated by the physically stronger children and real participation is not experienced;

(g) the failure of sporting administrators to take into account different rates of maturation in children so that grades are determined solely by chronological age and not height, weight and current skill level;

(h) the hostility by some adults to the idea of changing sport rules to suit children,on the grounds that it will no longer be a proper game;

(i) the piecemeal modification of sports without adequate thought and planning based on research and experience.
(p.8)

There has been a consistent expression of dissatisfaction with the adult game model to adequately cater for the physical, mental and social needs of child participants. Ewens (as cited in Evans, 1980) suggested that the ..."evidence is reasonably conclusive that, from the physiological, psychological and sociological perspectives, young children are not equipped to handle a major sport in its accepted sense." (p.13).

Research shows that by placing children in situations which are too complex and before they are ready for them, they tend to regress to immature patterns, and in fact

may never develop mature patterns. In this way player potential may be limited. (Robbins, 1979, p.38).

Benham (1986) also emphasises the need to cater for children's needs, stating "Even though children are not miniature adults, they are treated as such when participating in many sporting activities." (Abstract)

The physical attributes of children have been seen as vital considerations in properly planning junior sports, as children can often be expected to participate in an adult game situation despite their far smaller body size and strength. Many physical educators have recommended that junior sport settings be adapted in accordance with the physical characteristics of the participants (Allsopp, 1981; Evans,1980; Gibson, 1982; Haywood, 1984; Lamb, 1985; Masschette,1989; Nettleton and Sands, 1985; Orlick and Botterill, 1975, Parkin, 1980 (a and b); Potter, 1984; Reynolds, 1990; Robbins,1979; Rokosz, 1981; Sleap,1981)

> Children are often asked to play on full sized grounds
> which are not suited to their size or skill level...They are
> often required to throw, kick or hit over distances which
> are not commensurate with either physical skill or their
> strength level. These unrealistic requirements are
> certainly not conducive to learning and development of
> skills. (Gibson, 1982, p.5)

It is unreasonable to expect children to perform skills adequately using equipment disproportionate to their size. Children need to experience success when practicing skills and be afforded a good chance of being actively involved throughout the game. Morris (1977) believes that the game design dictates the amount of success the children have. Haywood (1984) explains " The only way a young child can learn to execute many of the skills of the adult game is with adapted dimensions and equipment." (p.182)

Evans in a summary of studies in junior sport states "Adult rules and game structure are quite inappropriate for young children and, as a consequence, there is a need to modify or adapt the game so that it more closely caters for the physical capacities of the children." (Evans, 1980, p.13)

Skill development is vitally important in junior sport. This can only be achieved through maximum involvement of all participants during game and practice sessions. Unfortunately less talented players, who obviously need the most practice, often receive less of an opportunity to practice their skills. (Beauchamp, Darst and Thompson, 1990; Cousineau and Luke, 1990; Grant, Ballard and Glynn, 1989; Mancini and Wuest 1984; Placek, Silverman, Dodds, Shute and Rife, 1986; van der Mars, Mancini, Wuest and Galli, 1984; Wuest, Mancini, Frye and Murphy, 1985; Wuest, Mancini, van der Mars and Terrillion, 1984).

Children's Attitudes To Sport

Involvement Levels

Lamb (1985) recommends that a major objective of modified sports should be to provide equal opportunities for all participants. He demands that less talented players should not be "...asked to sit patiently on the 'reserves bench', quietly maintaining concentration for long periods of time while they watch more talented (or earlier maturing) friends doing and enjoying the very things for which they are dressed up." (p.56)

Children who experience low amounts of active involvement in games are easily discouraged and soon lose interest in in the game. Morton and Docherty, (1980) explain that research at universities in Western Australia and Canada indicate that the following factors are major causes of children dropping out of sport:
(a) unequal opportunities to play in games;
(b) insufficient enjoyment from game and training activities; and
(c) a lack of physical activity in games and practice sessions.

Orlick and Botterill (1975) support the notion that many dropouts from sport occur mainly due to a lack of opportunity to be actively involved. Pooley (1979) in his survey of soccer dropouts found similar characteristics, where primary aged children most commonly suggested equal time for all and better distribution of talent as ways of improving their soccer

experiences. They also cited inactivity as the major reason for boredom during practice and the majority wanted more emphasis on teaching skills of the game. Longhurst and Spink (1987) also found that children wanted to improve their skills, rating this as the most important motive in participating in sport. Kleiber (1981) in discussing what creates enjoyment for children in sport states that "A child must have a personal investment in the game to be enjoying it, and nothing creates that investment quite as well as being part of the action." (p. 80).

Parkin (1980) found in discussions with children, that a criticism of many sports, including basketball was that there were limited opportunities for skill responses and that the children felt that some children (usually the more gifted or physically more developed) dominated the game to the exclusion of others. Robertson (1989) blamed poor organisation of training sessions and programs as a major reason for children dropping out of sport. Children are not going to tolerate having to wait long periods of time to be involved and nor should they, as it inhibits their mastery of skills."If we want children to improve their skill, it is important that they touch the ball, puck or whatever as many times as possible." (Robbins, 1979, p.38)

Competition In Junior Sport

Passer (1988) in an analysis of child motivational and cognitive readiness research recommended that children not

younger than 7 or 8 years of age be involved in organised youth sport, stating that children do not seek social comparisons nor understand the competitive process prior to this age. Coakley (cited in Passer, 1988, p.71) proposed that organised sport for children younger than eight should focus almost entirely on developing individual physical skills and that a competitive emphasis should be gradually introduced during the ages 10 to 12. Accompanying this belief that developing skills is the most vital ingredient for beginning sport programmes is a corresponding concern that there historically exists an over emphasis on winning a competition in junior sports. Gibson (1982) states that an overly competitive environment "...tends to cater for the exceptional performer with winning being the primary goal, and the needs of only the most capable being served." (p.4). However in the last decade there has been an attempt at de-emphasising the importance of winning with the advent of modification in junior sports, and a greater emphasis on enjoyment, participation, and equal opportunities. For example finals and premierships have been disregarded in many junior sports, as have trophies for best players. The W.A Netball Assoc. supports this policy, however it differs from one basketball association to another.

Research has shown that winning is not a highly motivating factor for children, they are more interested in their own performance and being with friends, though unfortunately winning is still perceived as important by many adults involved in junior sports. (Australian Sports Commission, 1991;

Longhurst and Spink, 1987; Orlick and Botterill, 1975; Pooley, 1980; Robbins, 1979; Robertson, 1981).

In an extensive research report completed on sport for young Australians in 1990 it was found that

> In a very strong and consistent reaction, kids stated that winning to them was a bonus, but by no means a reason for them to do sport. Neither was it something they liked to see as representative of their sport. (Australian Sports Commission, 1991, p.56).

Most sporting associations also endeavour to address another major factor leading to children dropping out of sport - 'being cut from a team because they're perceived as not being good enough.' By equalising individuals' opportunities to make skill responses in games, it is hoped to avoid low skilled participants being discouraged from participating due to a lack of involvement or success.

> Kids in focus groups who had been through this experience spoke with hurt, bitterness and a sense of unfairness about the time they were dropped from the team, or not selected, or lost one race too many, or whatever. Having once been judged not good enough, they will avoid exposing themselves to risk, and most of them will not participate in organised sport again. (Australian Sports Commission, 1991, p.83)

Other factors that have been recognised as influences in children dropping out of sport include:

-conflict with peers;

-inappropriate behaviour of coaches;

-poor instruction (i.e. - unrealistic expectations, lack of effectiveness in developing skills, lack of effort and empathy);

-Lack of positive feedback or praise;

-excessive pressure from parents.

(Australian Sports Commission, 1991; Longhurst and Spink, 1987; Pooley, 1980; Robbins, 1979; Robertson, 1981).

Barriers To Modifications In Junior Sport

Modifications in sport have not received universal support. Mandle, in (Mandle and Pang, 1981) expressed the concern that those children exposed to modified versions of the sport will not be as well prepared for sport at a senior competitive level. It is hypothesised that children must learn to cope with the stresses of competition at an early age. "Modification would maintain a child's false hopes since the majority will never be an elite levelled performer." (Department of Youth, Sport and Recreation, cited in Plaisted, 1990, p.388). In response to this argument Allsopp (Mandle and Pang,1981) remarks that modified games better prepare performers by "...first equipping them with a range of individual techniques automatically performed and by providing prior experience in the skilful use of these techniques." (p. 4). He also believes that performers can progress to the competitive versions of the game when

ready, and if they cannot survive they are not lost to junior sport completely because there are alternatives.

Adults, who as children learnt the game using the unmodified game form are often reticent to accept modifications to games to suit the needs of children. This can often be seen as an unwarranted dilution of a well accepted game. Potter (1984) sees the opposition to modifications on the basis of "it's always been done that way " as a major obstacle to their acceptance. Evans (1987) feels that adults who have had a long association with the game often have entrenched perspectives about how the game should be played, and will therefore be less tolerant of rule changes designed to increase the involvement of less skilled players by limiting the contribution of the highly skilled. However, Laurie and Corbin (1991) in their study of parental attitudes concerning modifications in baseball for children, found that parents were willing to accept and support game modifications if clear reasons were given for why the changes were required. Gray and Cornish (1985) in their study of junior coaches' attitudes and values, also found considerable support for modifications which bring about increased involvement and a de-emphasis on winning. However, they noted a significant disparity between what the coaches advocated and what they actually implemented during the pressures of a game situation.

This raises the concern that while coaches are removed from the game competition situation they make rational judgments regarding their philosophy and approach to

coaching children, but this may change in 'the heat of the moment' during a game. (p.40)

It appears necessary that steadfast rules are designed that will ensure fair and equal participation for all players in junior sports, thus circumventing coaches manipulating player involvement for the purpose of winning.

Potter (1984) regards facilities as a major barrier to the implementation of modifications. Many organisations are either unable or unwilling to make, what could very well be, expensive changes to the existing facilities to accommodate the requirements of modified sports. This problem will be alleviated over time, as new centres are built and equipment is upgraded, but in the short term it is a major concern. In fact presently in Western Australia, where this study is to be conducted, there are not enough basketball centres to cope with the demand of junior players.

Potter perceives the final barrier to modifying sport as the lack of communication, accessibility and use of research completed on junior sport by administrators. Much of the research is never published or can only be found in obscure publications seldom viewed by sports administrators. "This lack of access to information is partly the responsibility of youth sport administrators who must ask questions and seek the answers." (Potter, 1984, p.208). Many sports have overcome prejudices to modifications implementing the changes carefully, engendering support by providing a more enjoyable

game design for children. National basketball and netball associations have both instituted recommended modified versions of the adult game. It is important to consider the findings of studies in modifying these sports before analysing the modifications that have been decided upon for present use in junior basketball and netball competitions.

Modifications in Basketball and Netball.

<u>Studies on Equipment Modification</u>

Many studies, of relevance to basketball and netball settings, have been completed on the effects of modifying equipment for junior participants. Much of this research has looked at aspects related to the size of the ball used in junior games. Haywood (cited in Haywood,1984) found when comparing the use of small basketballs (5cm smaller in circumference and 57g lighter than a normal sized ball) and normal basketballs that children performed much better in ball handling tests using the smaller ball. It was hypothesised that this was due to the children having a greater grasp over the circumference of the ball, making it comparable to the grasp achieved by adults using the normal sized ball. Haywood also found that shooting skills were better facilitated for children under the age of 10.5 years using the smaller sized ball. Juhasz and Wilson (1982) investigated the effect of ball size on shooting characteristics of junior basketballers in comparison to adults and found that juniors performed better using the smaller ball (28 inch) than the larger ball (30 inch), demonstrating an

increased velocity of release, decreased height of release, increased maximum velocity of wrist and and increased maximum vertical hip and ankle displacement compared to adults using the larger ball. When using the larger ball the juniors demonstrated a smaller velocity of release and less control.

Zankovich and Husak (cited in Benham, 1986) reported a general trend of improved performance with the smaller ball, but only on one occasion achieved statistical significance of improvement on the pass and foul shot. Wright (1967) studied the effects of light and heavy equipment on skill performance and concluded that "The learning of sport type skills by young children of limited strength may be facilitated by the use of lighter equipment." (p.705)

The height of the goal has also been of interest to many researchers over a long period of time. Bunn (1933) studied the opinions of 16 state basketball supervisors on what height the goal should be and suggested that a graduated goal height system be introduced to better cater for the size of the players involved at different levels. With elementary children using a 8 foot goal and college students a 12 foot goal. (cited in Henry, 1979, p.67). Fait (1971) suggested a goal height of 2.4m for students below seventh grade, while Hailsley and Porter (1963) and Schon (1948) recommend a goal height of 2.70m for elementary students. (cited in Juhasz and Wilson, 1982). Isaacs and Karpman (1981) tested 8 to 9 year old American children on shooting at both 8 foot high (2.4m) and 10 foot (3.05m) high

goals. They concluded that the effect of the 8 foot goal compared to the 10 foot goal is: (1) to double the odds of making the shot verses hitting the rim; (2) to more than double the odds of hitting the rim verses missing the shot; and (3) to increase more than five times the odds of making the shot verses missing the shot. They also found that both males and females had greater problems hitting the rim of a goal without a backboard, while 69% of females and 45% of males failed to even hit the 8 feet high structure, while 89% of females and 70% of males failed to hit the 10 feet high goal (cited in Benham, 1986, p.7).

Davis and Kennedy (cited in Juhasz and Wilson, 1982, p.19) when looking at the 3m high goal as compared to the 2.4m and 2.6m goal, discovered that the subjects were less likely to hold the ball in the recommended position prior to shooting, took more time in movements prior to the shot, tended to use a two handed set shot rather than the more efficient one handed shot, and jumped forward a greater displacement with a decrease in the height of the jump. Morris (1976) looked at the effects of ball colour on the catching performance of elementary school children, finding that blue and yellow balls produced the best catching scores. He also suggested that ball colour was of greater influence with less skilled catchers and younger children.

Despite many studies advocating the usefulness of modified equipment, little has been indicated on specific requirements for different age groups. Benham (1986) indicates that the

following concerns have not been fully addressed :-

(a) What is the optimum ball weight and size for performance in different age groups?

(b) As players become more skilled will changing from smaller to larger balls affect their performance?;

(c) When would the transfer from larger to smaller goals be most effectively made? (p.8)

Evans (1980) supports the above concerns stating "We urgently need more objective information about precisely what changes need to be made." (p.14). Because of this, many modifications have been introduced based solely on the belief that smaller is better, without establishing any empirical data on which to base the modifications.

Netball Modifications

The need for modifications in netball has long been recognised, with Ranger (cited in Hobart Division of Recreation, Education Department, et.al., 1983) stating in her submission on modifying netball to the All Australian Netball Association,

> Although many children are able to competently handle the adult netball game, many others drop out of the game through lack of ability and lack of achievement and enjoyment,and others who survive this continue to play but lack certain skills, possibly because their introduction to the game was not geared to their ability. (p.74)

Owing to the perceived need to cater for the needs of children, Netta Netball has been introduced, which is a modified version of netball. In Western Australia where this study is to take place, they have only this year adopted compulsory modifications for all associations after a long period of trialing changes. There have been changes made to junior netball, with most changes being instituted in the 9 and 10 year old divisions. The 9 year olds play the full version of 'Netta Netball', whilst the 10 year olds have all of the 'Netta Netball' rules, except they play with a larger goal and ball. In games for 11 and 12 year old children, adult netball rules and equipment apply.

The major changes to the games for 9 and 10 year old children include:-

(a) 2.4m goal post (9yrs only) 3.5m (all other years)

(b) size 4 ball (9yrs) size 5 (all other years)

(c) Players allowed 6 seconds to throw the ball (9 and 10 yrs)

(d) Strict 'one to one' defence;

(e) Shuffling on the spot allowed without being called for stepping (travelling);

(f) Only standing shots for goal, (no running or jump shots). Plus no defending in the goal circle;

(g) A team of 10 players may interchange at intervals. Each player must play at least one half of the game;

(h) All players may rotate at the completion of each quarter;

(i) No finals, non competitive (no recorded scores), no trophies. (W.A. Netball Association Inc., 1991)

Interestingly no set guidelines are given on compulsory rotation of positions, it is only recommended, despite Otago (1982) finding in her analysis of activity patterns of netball players that each position has vastly different amounts of opportunity to respond. Otago found that centres averaged 97passes per game, Wing attacks 73, goal attacks 53 and the other positions ranged from 25-33.

Other findings included :-

    (a) The Wing Defence guarded the most;

    (b) The goal keeper defended many more shots than the goal defence;

    (c) The positional rankings in time spent in activity are - Centre(C), Goal Defence(GD), Goal Attack(GA), Wing Attack(WA), Wing Defence(WD), Goal Keeper(GK), and Goal Shooter(GS).

No recommendations are given in the Western Australian Netball Association rules regarding reduction in court size, as is the case in many other modified sports (e.g. - football, soccer, sofcrosse, hockey and cricket). Nor is there justification for why the modifications are made, how they were developed (i.e. what research was used) and why they are different for various age groups.

In a study of modified sports (Australian Sports Commission, 1989) the findings in relation to netball were as follows:-

(a) All states used modified equipment, recommended rotation of players and employed shorter
playing time;

(b) Only Queensland employed smaller playing areas;

(c) No states reduced the number of players on court.
* (Western Australia did not provide any details)

Other suggestions for modifications in netball include:-

(a) The use of larger netball rings;

(b) The use of a standard size court as two modified courts or a court size which is two thirds the length of a standard court; and

(c) The regular rotation of players so that they gain experience in different positions, including interchange and reserves. (Modifying sport for children, cited in Hobart Division of Recreation, Education Department and Tasmanian State Schools Sport Council, 1983)

There has been little research relevant to this study completed on any aspect of netball apart from the work done by Plaisted (1990) who studied the comparative effectiveness of the modified game in comparison to the traditional model. She found that both the adult version and the modified version had educational merits. Though importantly she found that a significantly better performance in the skills of pivoting and

shoulder passing of children who play modified netball than the non modified version. Plaisted (1990), concluded

> The modified approach may improve its participants'
> skills to a greater extent than the traditional programme,
> but the latter does not appear to inhibit the development
> of desirable levels of self esteem, self confidence and
> attitudes in players. (p.396

Basketball Modifications

In Australia there is no strict set of modified rules for the various basketball associations to adhere to. The rules differ from state to state, and from association to association within that state. According to Warren Kuhn, the W.A. Basketball Director of Coaching, (personal communication, 1992) there has been great controversy in many basketball associations about what sort of modifications should be implemented. Some centres do not even reduce the height of the goal ring for any age group, as is the case in Victoria. Basketball associations in Western Australia presently produce their own rules and guidelines, often based purely on good intentions with little reference to empirical data. 'Mini Basketball' has been recommended for many years throughout Australia. "The modified rules are intended to provide for the children without altering the spirit of the game, and to ensure a shorter transition to senior conditions." (A.B.U.A., 1974, cited in Hobart Division of Recreation, Education Department, et.al., 1983, p.95)

The rules for mini basketball were designed for primary school aged children and included the following modifications:

(a) Maximum of 8 players, who each play 15 minutes;

(b) Playing time to be reduced to 15 minute halves;

(c) Court size is smaller so that children play across a full size court;

(d) Smaller equipment, with a basket height of 2.6m, and a ball 66-70cm in circumference.

'Mini basketball' rules have been recommended, for the under 10 and 12 age groups by the Western Australian Ministry of Sport and Recreation (1990), However there are differences to the original rules. They include the following:

(a) 2.6m goal for under 10 only;

(b) At least 10 minutes play per player in each game;

(c) Ball reduced to 68-74cm in circumference. (size 5);

(d) There is no reduction in court size; and

(e) four 10 minute quarters.

Many other adaptions have been recommended . These include:-

(a) A maximum of four dribbles to stop skilled players from dominating the game and produce a higher opportunity to respond. (Gibson, 1985)

(b) "Design the playing region so that players are restricted to areas, thus no one player is able to dominate the game. (N.B. this is part of any netball game)

(c) Interchange players regularly so that all players receive equal time." (Gibson, 1982, p.7)

(d) Distance from the ring when shooting free throws to

be reduced (Potter, 1984).

    (e) <u>No press rule.</u>

This change requires the defensive team to wait on the offensive half of the court, allowing the offensive team to throw the ball in bounds and advance up the court unpressed. Youth league officials found that one team could press another to the point that the ball was in one half of the court for almost the entire game and the outcome was an extremely lopsided score. (Haywood, 1984, p.184)

    (f) "Eliminate jump balls and instead trade possession on tied balls." (Haywood, 1984, p.184)

    (g) Allow an extra step when dribbling;

    (h) No penalty for passing backwards across the centreline;

    (i) Change the "3 seconds in the keyway' to 6 seconds." (Modifying sport for children, cited in Division of Recreation, Education Department, et.al.,1983, p.78)

Parkin (1980) completed a study on equalising children's opportunity to play. He investigated the effects of self designed modifications of both basketball and softball in equalising play amongst participants.

In basketball he made the following changes:-

    (a) 6 players per team;

    (b) 2 players per third of the court (restricted areas);

    (c) rotation of players through each third (each 5 mins. in a 30 min. game); and

    (d) lowering the ring to 8 feet (2.4m).

Parkin had hoped to bring about an equity in participation, but despite an overall increase in involvement for the unskilled group, the same children in the skilled group tended to still dominate the game in a sense, but not to the same degree. However he still made some important conclusions:

One of the significant changes was in the percentage of shots that scored with the unskilled group. Playing the adult game they managed 10.3% conversion rate, compared with 19.4% in the modified version using the lower ring. (p.15)

Modifications in games are well supported, however it would lack prudence to fully accept any model as being the definitive answer to the problems of participant equity and thus research undertaken on present junior sporting programmes can only be of benefit to future planning within these settings.

Participant Use of Time: Academic Learning Time and Opportunity to Respond

For any educational programme to be considered effective, positive learning outcomes must occur. Researchers have long been concerned with the factors that effect and contribute to learning outcomes. In physical education, time has become recognised as a powerful process variable in assessing the effectiveness of instruction and educational setting.

Rosenshine (1979), proposed that the more time a child spends engaged with the content, the greater likelihood that learning will occur. Researchers in physical education have looked

closely at motor-on-task behaviours and have continually attested to its importance as an influential variable in effecting learning outcomes. Phillips and Carlisle (1983), state that " The amount of engaged learning time and success time during engaged skill learning time are best indicators of student achievement gain." (p. 66). Lee and Poto (1988) support this. "Instruction time is one variable over which teachers (and coaches) have control, it will therefore continue to be a useful indicator of successful teaching learning." (p. 70).

The first major research application of instructional time as a student based process variable was the 'Beginning Teacher Evaluation Study.' (BTES) (Fisher et al., 1978). This provided a more specific focus on time measure as a proxy for student achievement. It became known as Academic Learning Time (A.L.T.). Daryl Siedentop (Siedentop, Birdwell and Metzler, 1979), was the first physical educator to develop and use ALT specifically for research in physical education. Its adaption is referred to as Academic Learning Time Physical Education (ALT-PE).

"ALT-PE is a unit of time in which a student is engaged in relevant physical education content, in such a way that he or she has an appropriate chance (80%+) of being successful." (Siedentop, 1986, p. 27).

It is imperative that any research investigating the effectiveness of instruction be focussed on the child's behaviour, not simply the instructor's. This reflects Berliner's

(1979) belief that "Learning outcomes are more related to how students spend instructional time than do teachers." (Cited in Metzler 1989, p. 90).

It is essential that children receive a high opportunity to respond in both games and practice sessions to assist in skill mastery. However it is just as important that when a child is engaged in motor activity he/she needs to experience a high degree of success. A factor well recognised in ALT-PE instrumentation. Silverman (1985, p.19) in his study of 'Engagement and Practice Trials' found that..."practice at an appropriate level produced related gains in skill, and practice at an inappropriate level was negatively related to achievement." Ashley, Lee, and Landin, (1988), support the belief that success or correct performance of a motor skill is a significant predictor of achievement in physical education. ALT-PE has received substantial support as a precursor to participant achievement. Physical movements and performances are difficult to quantify with precision. "The lack of permanent products in physical education has led to the adoption of ALT as a proxy for student achievement." (Parker and O'Sullivan, 1983, p. 8).

Siedentop (1986) stated that "ALT is the biggest single instructional variable in predicting student achievement." (p.267). Barry and King (1988) supported this expressing that "...pupils who have a higher level of time on task or engaged time tend to achieve higher than pupils who have lower levels of time-on-task or engaged time." (p. 296)

Metzler (1989), reporting on the studies he had reviewed on the relationship of functional time variables and achievement, indicated there was moderate to strong correlation between some constructs of student's functional time and increased learning. "No reports in our literature show a negative relationship between student engagement time and learning; and, given our propensity at times to search for such refuting evidence, that is a strong argument by itself." (Metzler, 1989, p.95). McLeish (cited in Siedentop, 1983, p. 3) concluded that "It is one of the major impressions received in the use of the ALT-PE system that this supplies the missing element, or indeed the major component for evaluating effective teaching in physical education. "

Phillips and Carlisle (1983, p. 63) in their study on least and most effective teachers found that the teachers in the most effective group "Provided their students with more than twice the amount of engaged skill learning time and success time during engaged skill learning time than the least effective teachers."

Godbout, Brunelle and Tousignant (1983, p.17) concluded after using the ALT-PE instrument in observing physical education classes that " The ALT-PE research tool was found to be reliable and easy to use."

Previous Findings in ALT-PE

There has been a large amount of research utilising the ALT-PE instrument. A summary of findings on the levels of ALT-PE achieved in a variety of settings will be discussed with reference to this research, followed by findings more specific to areas under investigation in this study.

General Findings

A great deal of research has been conducted on the ALT-PE levels of children in school based physical education programmes. Many studies have found that engaged time and ALT in physical education is quite low, and in fact is often outweighed in time spent in lessons by other aspects such as management and transition tasks. "Far less ALT was found in physical education than had previously been imagined, and much of it was cognitive rather than psychomotor in nature." (Harrison, 1987, p.45)

A variety of studies have found in traditional physical education programmes that the actual time children are actively engaged is quite minimal. ALT-PE rates range from 10% to 38%, despite a reasonable range of 65.7% to 85%, of content time being appropriated to physical education content. (Beauchamp, Darst and Thompson, 1990; Godbout, Brunelle and Tousignant, 1983; Placek and Randall, 1986; Placek, Silverman, Shute, Dodds and Rife, 1982; and Silverman, Dodds, Placek, Shute and Rife, 1984).

In summarising elementary school ALT-PE findings up to 1986, Placek and Randall (1986, p.158) stated that

> Although teachers provided time for the student to participate in physical education content through activities such as drills, lectures games and demonstrations, students either did not or were not able to participate and be successful in many instances.

In their summary of studies completed between 1978 and 1983 Siedentop et al., (1986), reported that 22%-32% of time was spent on waiting to participate or have a turn, 6-22% on management and transition activities, 15%-25% in receiving information and only 21%-30% of allocated time on motor engagement. It was found that ALT in physical education classes was typically quite low, with students often having only three to five minutes of ALT per half hour lesson. This is a grave indictment on physical educators and perpetuates the need for greater understanding of what strategies and behaviours are required to precipitate learning. One of the most salient factors derived from these studies is that low rates of ALT-PE occur mainly due to poor planning and structure of practice and game sessions. The time children spend waiting for a turn is one factor that can be quickly remedied by instructors by ensuring there are small group activities, a low ratio of equipment to children and by manipulating game play contexts to maximise participation. "The more students wait the less they are engaged in p.e. content, thus have less of a

chance to have an opportunity to practice a skill at an easy difficulty level (ALT-PE)." (Paese, 1985, p.13)

Based on their findings using the ALT-PE instrument, Placek and Randall (1986) supported the concept of modifying games for children, stating that game modifications must be made to increase the engagement of children participating in games. Graham, Soares and Harrington (1983) found in their study of 'Experienced Teachers' Effectiveness', that the most significant difference between more and less effective teachers was in the amount of waiting students had to do. " Students in less effective teachers' classes spent an averageof 438.75 seconds waiting while students in the more effective teachers' classes averaged only 58.75 seconds of waiting time." (p.9)

Very few studies have been completed on engagement levels of participants in sessions conducted by coaches. Results from studies that have been completed in sport (training) indicate that coaches achieve higher levels of ALT-PE than physical education teachers. "Results from studies on time to learn in sports training (coaches) generally yield higher percentages of productive engagement when compared to the percentages of ALT observed in physical education classes." (Tousignant, Brunelle, Pieron and Dhillon, 1983, p.29)

Metzler recognises that differences in demographic, contextual, motivational and performance ability of participants may make comparisons of coaches and physical

education teachers difficult and of decreased validity. "However our use of teaching-based variables in coaching studies make this comparing difficult to resist." (1989, P.97)

Pieron and Goncalves (1987), in their study of engagement and feedback of coaches and teachers found that in coaching, motor engagement of players was higher and that players waited less during coaching sessions (31.5%-teaching and 23.3%-coaching). They also found that teachers spent more time in full-game situations than coaches (21.1% compared to 14.9%), but less time in scrimmage settings (4.6% compared to 19.2%). Not surprisingly, considering the higher involvement levels achieved by coaches, their participants were in contact with the ball more often than those instructed by teachers.

> The higher motor engagement time of players may be partially explained by presuming higher motivation in players. However, strategies used in coaching and the perceived higher intensity and energy coaches seemed to facilitate maximising of time spent during practicing specific learning tasks. (Pieron and Concalves, 1987, p.252)

It is also important to consider that the coach of junior athletes performs the same function as a teacher, as the children are just beginning to learn the skills of the game. Therefore a great deal of teacher based research is relevant to coaches and they must use this "...to remain well informed

about the development of game skills and devise suitable activities to sequentially develop these skills." (Gibson,1985).

Researchers have investigated the effects of other variables on the amount of ALT-PE accrued by children in sport sessions. One variable that can effect ALT-PE is the type of activity taken. Research has indicated that individual activities generally produce higher levels of ALT-PE than team games, with the exception of gymnastics (Metzler, 1990; Placek et al.,1982; and Silverman et al., 1984).

Metzler (1989), expressed that time used by participants is often a function of the specific activity taken. He found that participants in team games definitely have less ALT-PE than participants in individual sports. Silverman et al. (1984), support this, finding that team sports had the lowest level of ALT-PE of all activity types in their study of 'Academic Learning Time in Elementary School Physical Education for Student Subgroups and Instructional Units.' Beauchamp, (et al.,1990) found that

> Sport activities either individual or team provided a good context for the learning of motor skills (over 65% of lesson time) and most of the lesson content was devoted to playing the game. However in the team sport lessons students spent most of their time waiting (30%) when they were not involved in the game. Less student wait time occurred in the individual sport lessons. (7%) (p.94)

Placek (et al., 1982), offered an explanation for low levels of engagement for participants in team sports, citing poor organisation of activities as a major contributing factor. In the team sports they observed children were organised into

> ...practice groups of 5-6 or in teams to play the ' real game', thus giving children fewer opportunities to respond. The lower percentages of MOTOR EASY (5% success for psychomotor skills only) in team sports raises serious questions about using team size groupings for practice when the goal is psychomotor skill achievement. Since ALT-PE data indicate severely limited opportunities to practice in game and scrimmage situations, other organizational strategies may more appropriately provide more practice time per child." (p.45)

Student sex has been investigated as a variable in effecting ALT-PE rates of children. Research indicates however that there is little difference in the ALT-PE of boys and girls (Placek et al., 1982; Shute, Dodds, Placek, Rife and Silverman, 1982; Silverman et al., 1984). Research findings also indicate that the presage variables have little to do with the ALT-PE levels of children. Who the teacher is seems to make little difference in the amount of functional time in physical education. Whether the teacher is one in a lead up methods lab, a student teacher, an under graduate elementary education major, a classroom teacher, or a certified physical education

specialist, his or her students are likely to show very low amounts of functional time. (Metzler, 1989, p.95).

Findings on Levels of ALT-PE and Opportunities to Respond of High and Low Skilled Participants

There has been quite a number of studies in physical education focussed on comparisons of children of different skill abilities, covering aspects such as activity levels, rates of success and expectations of coaches and teachers. When studying the activity levels of children of different skill levels, researchers have produced some contradictory findings, as to whether they achieved different amounts of ALT-PE. Shute et al., (1982), reported that opportunities to learn were almost equal for students of different ability levels in an elementary teacher's movement class. Placek et al., (1982), found that high skilled participants in elementary physical education settings were movement engaged 28% of the time in comparison to medium skilled 21% and low skilled participants 19%. They also found that high skilled participants were engaged at an 'easy difficulty level' for 24%, medium skilled 17% and low skilled participants 15%. They concluded however that these differences were not significant, though conceding that the data indicated that "...the rich get richer in physical education as in other subject matters, high skilled students perhaps learning how to learn better, even when poorer skills classmates are provided with equal opportunities to practice skills." (p.44).

Pieron (1983) however, found that high skilled participants had far greater opportunities to participate and achieved higher rates of ALT-PE than lower skilled students. He suggested that the gap in performance between participants of different abilities would widen as high skilled participants were more productively engaged than their lower skilled counterparts.

Findings in a variety of sport settings reinforce Pieron's beliefs. Wuest, Mancini, van der Mars and Terrillion (1984), in an investigation of the 'ALT-PE of High, Average, and Low Skilled Female Intercollegiate Volleyball Players' and Thomas, Mancini, and Wuests' (1984) comparison of of ALT-PE of low and high skilled male and female intercollegiate lacrosse players, found that lower skilled players had fewer opportunities to actively participate than high skilled players, experienced less success and subsequently accrued far less ALT-PE. Telama, Varstala, Heikinaro-Johansson, and Utriainen (1987), found that high skilled participants in physical education (ball game lessons) were on task more than low skilled students, but found surprising disparities of waiting time in skill groups, when comparing boys and girls. They observed that low skilled boys spent far more time waiting for a turn than high skilled boys (25.7%-low skilled and 7.2%-high skilled). Whereas low skilled girls spent far less time waiting (10.5%), than high skilled girls (19%).

The most relevant findings for this study were made by Wuest, Mancini, Frye and Murphy (1984) who studied the comparisons of ALT-PE of high, average and low skilled basketball players

during stages of the season, and by van Der Mars, Mancini, Wuest and Galli (1984) who studied the ALT-PE of a high-skilled basketball player and a low-skilled college basketball player. Wuest et al. (1984) found a definite disparity in the amount of ALT-PE accrued by high and low skilled participants (36.3% for high skilled, 25.6% for average skilled and 21.3% for low skilled participants). They too found that high skilled players spent less time waiting than their lower skilled teammates. van der Mars et al. (1984) found some slightly contradictory results. They reported no real differences in the amount of ALT-PE of the high and low skilled players, and surprisingly found that high skilled players spent more time waiting than lower skilled players. They did find however that high skilled players were more actively engaged during practice and spent more time in game situations.

Mancini and Wuest (1987) also investigated coaches interactions with their high and low skilled athletes and produced similar findings to Thomas et al. 1984; Wuest et al. 1984; and Wuest and Mancini 1984. They also found that coaches interacted more and exhibited a greater variety of behaviours towards high skilled participants.

> They provided their high skilled players with more feedback to improve their performance... In contrast, not only did the lesser skilled athletes receive less feedback, but the coaches tended to these athletes performance without comment for extended periods of time. (p.234).

Mancini and Wuest (1987) found that the rate of inappropriate behaviour to appropriate behaviour of the participants observed was about 1:1. Probably due to lack of planning to cater for the different skill levels that exist between participants. Children need to be actively involved if they are to remain motivated and on task throughout a session.

> How motivating is it for a lesser skilled athlete to fail
> so frequently, and how much is learned in the process?
> Coaches should consider designing practices so that some
> segments of practice can be used to work with the lesser
> skilled athletes in smaller groups, focussing on the
> skills they have not mastered. The use of appropriate
> progressions for one skill development warrants mention
> as well. (p. 236)

In their analysis of game play in volleyball, focussing on participants opportunity to respond, Buck and Harrison (1990), found that low skilled participants had far less opportunities to respond with all skills and subsequently backed off in game play often avoiding hitting the ball. If they were required to hit the ball they appeared to panic. Buck and Harrison termed them 'competent bystanders'. "They looked like they were in the game, but they rarely hit the ball." (p.47). Their findings reinforced one of the major underpinnings of ALT-PE, that experiencing success when performing a motor task is an important variable for learning to be promoted. They found that immediately after instruction the students in all ability groups were willing to attempt even the most complex skills, however

The low success rate followed by a decrease in attempts the following day, indicates that after not being very successful the students decided not to attempt the skill, except for those who had been fairly successful or who expected to succeed in the given situation. (Buck and Harrison, 1990, p.47)

Their findings also provide major support for the prior discussed concept of modifying games, to adapt to the developmental level of participants, believing that such strategies need to be devised so that they

...increase the total contacts per serve for the low ability group, as well as improving the percentage of successful trials so that these students will be willing to attempt hits without fear of failure and embarrassment in front of their peers. (p.48)

Buck and Harrison cite equipment and rule modifications as effective methods of providing better chance of success in performing skills and that reducing team numbers would have the effect of forcing the low ability student to to be involved, thus providing more opportunities to respond.

Effect of Expectations of Coaches on Participants' ALT and Opportunity to Respond.

Research has also indicated that the coaches' expectations of an athlete's level of ability or performance may have some effect on the ALT-PE that the athlete accrues.

In their study of the relationships between teacher expectations and ALT-PE in sixth grade physical education basketball classes, Cousineau and Luke (1990) found that high expectancy students were given more opportunities to learn than low expectancy students, and received more feedback, praise and encouragement.

> ... the high expectancy student had higher amounts of ALT-PE (76%) than the low expectancy student (23%) and that the teacher provided more subject matter knowledge to the high expectancy student (67%) than the low expectancy student (32%). Overall the high expectancy student was found to be actively engaged in many more aspects of the physical education class than the low expectancy student. (p.263)

Martinek and Karper (1982) (as cited in Martinek and Karper, 1983), made similar findings, with ALT-PE levels of 76% for a high expectancy student and 23% for the low expectancy student. They believe that instructors should provide for low expectancy students by allocating more functional time to them and by designing activities that have small, achievable

steps. In evaluating the studies completed in a variety of sports, it appears low skilled or low expectancy participants often experience low rates of successful motor engagement and subsequently are unable to fully acquire many of the motor skills taught. Telama et al., (1987), believe this occurs because

> Teaching is mostly carried out the same way for all pupils and mainly in accordance with the skill level of average or high-skill students. Although low-skill students somehow manage to participate in the instruction, they do not find it as psychologically interesting or pleasant as do high skilled students. (p.246)

From the findings made in physical education and community sport environments it can be confidently concluded that there is generally too little time spent by participants actively involved in skill practice and that low skilled players are not catered for properly through the design of activities that suit their rate of development and provide maximum opportunities to respond for all participants.

ALT-PE/SPORT and SOSOR Methodological Studies
Relevant to Junior Basketball and Netball

Studies Using ALT-PE/Sport Instrument.

The ALT-PE/Sport Instrument has been used previously to provide objective, descriptive data of a modified sport setting

- Kanga Cricket (Taggart, 1986). This study looked at the appropriateness of the modified game design in providing sufficient opportunities for participants to be actively involved during the game play. Taggart found that despite a more equitable distribution of opportunities amongst players being achieved in the modified game, there was still far too much inactive time for all players, with an inordinate amount of time attributed to waiting for an opportunity to respond (81% for participants in batting team).

From his findings Taggart recommended a complete overhaul of the game structure, such as six-a-side, instead of twelve and adopting features of a single wicket competition, in an effort to avoid children waiting for an opportunity to be involved. Taggart's findings reinforce the need for evaluation of junior sport settings, so as to avoid passive acceptance of a game design based purely on good ideas and little substantiative data.

Findings on Engagement Levels in Basketball and Netball

There are no available studies on engagement levels of participants in netball programmes though there are two major works on basketball, as stated previously. The first study was completed by van der Mars et al.,(1984) which compared the levels of academic learning time of one high skilled basketball player and one low skilled basketball player from a central New York high school basketball team, to see if any differences existed in the amount of ALT they accrued. One player was

randomly selected from the top 33% of skill rankings made by the coach and one player from the bottom 33% of players. The player from the top third was designated the high skilled player, whilst the player from the bottom third as the low skilled player. Each player was videotaped for a period of 20 practice sessions, which were divided equally into four separate stages:

(1) both players taped for five practice sessions prior to the first game of the season;

(2) and (3) consisted of five practice sessions taped following winning and losing games respectively;

(4) five practice sessions taped during practice of a post season competition.

From these observations the information was coded and analysed using the ALT-PE instrument.

They found that the low skilled player spent far greater amounts of time involved with knowledge and not-engaged activities than the high skilled player. They also found that both players spent approximately 85% of the time in content - PE, but that the high skilled player spent far more time in active engagement during practice sessions and was able to spend far more time in game situations. Their findings also supported the surprising conclusions that the high skilled player spent more time waiting during activity episodes and that there was no difference between the players in the amount of time spent in an easy difficulty level of motor responses. The study by Wuest et al., (1985) compared the ALT-PE of high,

average and low skilled students throughout different phases of a season. In this study one male basketball coach and his team were videotaped during three phases of a basketball season, (beginning, middle and end of season). Data was collected from 21 taped sessions, seven from each phase. At the end of the season the coach ranked the players according to ability, and from this the team was divided into equal proportions to establish the three different groups. The revised ALT-PE instrument was used, with target players being randomly selected from those groups. They found that the high skilled players were motor engaged more often, and accrued more ALT-PE than the lesser skilled players. However, contradicting van der Mars et al., (1984) they found that low skilled players spent more time waiting than the higher skilled players. Their analysis of the ALT-PE data revealed little difference in the amounts of general content over various stages of the season, though the coach did spend more time relating knowledge during phase I than in phase II and III.

Interestingly they found that the amount of motor engaged time was least at the beginning of the season and increased in the later stages of the season, and that the level of ALT-PE for high and average skilled students remained quite constant over the season, whilst the level changed slightly for low skilled students.

These studies support a hypothesis that higher skilled players in basketball accrue higher rates of skill involvement and achieve more success than lower skilled players.

CHAPTER 3

THEORETICAL FRAMEWORK

A theoretical framework is of great importance as it provides a foundation of understanding that permeates the research conducted, and upon which analysis and interpretation of the phenomenon studied, can be justified. Primary research variables need to be identified and described and their relationship with other variables explained. The theoretical framework assists in defining and focusing the research to be conducted.

The theoretical framework for this study, as presented diagrammatically in figure 3.1, has been developed in the belief that the following variables have the most significant effect on motor skill learning and participant enjoyment:
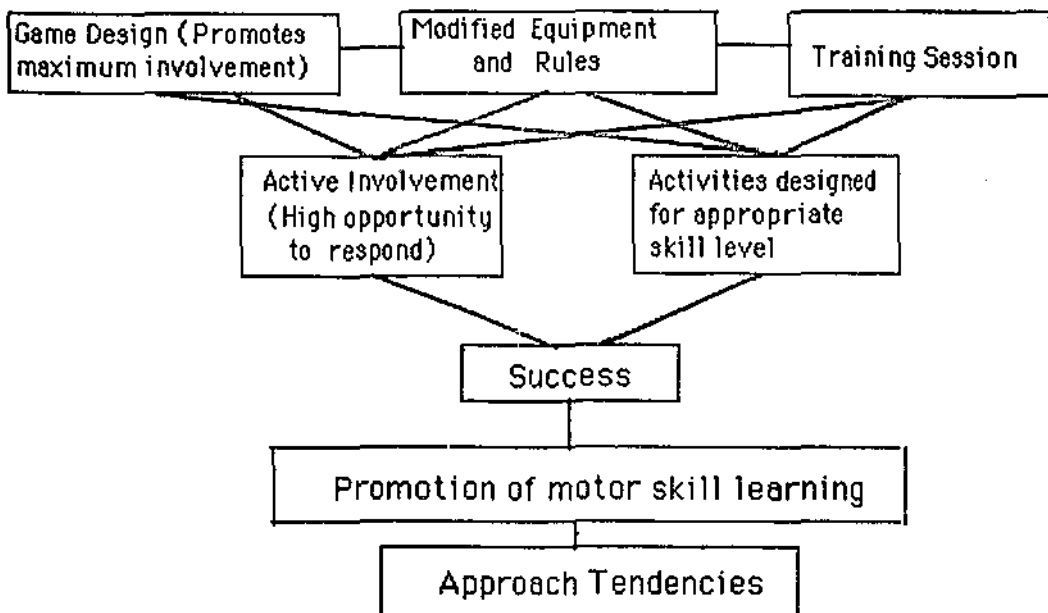
Figure 3.1 Theoretical Framework

1. High rates of active motor involvement, with maximum opportunities to make skill responses

This variable is the key area upon which the research is based. A descriptive analysis of how often participants are engaged in activity and more specifically the amount of ball skill engagement time will determine the appropriateness of the observed junior netball and basketball training settings in facilitating learning. This is based on the premise that children only learn physical skills by performing them, therefore the greater the number of high quality performances, the greater the learning.

Figure 3.1 demonstrates that high active involvement can only be assured if game and training designs facilitate maximum skill responses for participants. The incorporation of modified equipment and rules in junior game and training settings can assist in ensuring higher rates of active involvement (i.e reduction of team sizes and court sizes).

2. Activities designed to cater for the skill and maturation level of the children

The design and organisation of activities used in training and game sessions has a direct effect on the active involvement levels of participants. The implementation of modifications to suit the developmental level of the participants should also have an affect in providing success in performing skills. The

greater the match between the developmental requirements of the participants and the activities, equipment and rules instituted, the greater the level of learning for participants.

3. High degree of success when making skill attempts.

For participants to acquire skills they must experience a high degree of success when performing the skills, thus reinforcing the physical response and developing a willingness to perform that skill again in the future. Success in skill responses can only be achieved if the activities suit the developmental requirements of the participant. The greater the frequency of successful skill emissions, the more rapid the skill development.

Nixon and Locke's (1973) description of critical events in motor learning, describes how participants acquire motor skills through specific learning phases that occur only through emitting motor responses and in evaluation of performance in relation to the activity goal. Below is a delineation of the sequence of critical events that participants follow in motor learning.

(1) Goal behaviour activated
(2) Identifies relevant stimulus
(3) Formulates motor plan
(4) Emits response
(5) Processes feedback (visual/tactile/auditory)

(6) Decides nature of next response

(7) Emits response 2

In his model the coach acts as a facilitator ensuring quality practice, by providing activity experiences relevant to the specific stage of development, through adherence to research in the following elements:

(a) Equipment and environment

(b) Group sizes

(c) Special Training

(d) Ability grouping

(e) Planning

(f) Schedules

Nixon and Locke's (1973) conceptual model reinforces the major theoretical underpinning of this study, that maximum opportunities be provided for participants to emit quality motor responses during practice and game sessions to ensure motor skill acquisition.

It is hypothesised that if a child is frequently and successfully engaged in skill experiences, then learning will be promoted and will assist in the development of positive approach tendencies towards participation in the sporting activities. Conversely it is assumed that if there are low rates of participant involvement, poor game and practice designs, and little success when attempting skills, then motor skill learning will be hindered. Findings from the study will based on the understanding of the above concept.

CHAPTER 4

METHODOLOGY

Aspects pertaining to the methodology and procedures will be delineated in this chapter. The Revised ALT-PE/SPORT and Revised SOSOR instruments will be utilised to provide a descriptive data analysis and comparison of high and low skilled participants in junior basketball and netball programmes.

In this chapter the characteristics of both methodological instruments will be discussed in conjunction with the selection subjects used in the study. The specific aspects to be detailed in this chapter are as follows:

research design and procedure of observation;

the subjects and the selection process;

the observation instruments;

validity and reliability;

limitations of the study.

Research Design

This study was a descriptive analysis of participant behaviours in junior basketball and netball settings. The study used naturalistic observation methods (i.e. to record and study behaviour as it naturally occurs) utilising systematic observational instruments to record behaviours.

Children aged 9-11 years of age were observed in netball and basketball practice and game sessions, with data being collected using the Modified ALT-PE/Sport instrument (Wilkinson and Taggart,1989) which provided time sampled data that indicated the approximate percentage of time spent in a particular behaviour, and the Revised Systematic Observation of Student Opportunities to Respond (SOSOR) (Brown, 1989), which determined the rates and type of motor skill engagement achieved by student skill sub-groups (high and low skilled participants).

Subjects

Netball

A suburban community netball club that has teams in each of the two target years (under 10 and under 12) was utilised for study. The children were placed into teams on an age criterion. The under 10 netball team were in their first year of competition with the team consisting of seven girls and one boy. The coach has been coaching for over five years, is the co-ordinator of the Netball Club and has been accredited in the Level 0 coaching course.

All of the members of the under 12 team were in their third year of competition. The team originally consisted of nine members, however one member dropped out just prior to the commencement of the season, resulting in the team consisting of eight members, with seven girls and one boy. The coach has

been coaching for two years, and has attended non accredited coaching courses.

The children of both teams trained once a week and played a game at a large community netball centre on Saturday mornings. The under 10 team played fully modified 'Netta-Netball'. The under 12 team played the adult version of the game, which incorporates standard netball rules and equipment.

Basketball

A suburban basketball centre that has teams in the target age groups of 9 and 11 years (under 10 and under 12) were used for practice and game observations. Both teams consisted of boys only. The children of both teams trained once a week and played a game once a week.

The coaches had varied experience and accreditation. The coach of the under 12 side has been coaching for over eighteen years, including ten years as coach of state teams of various age groups. This coach is also the present coach of a womens' State Senior Basketball League team and is completing his level 3 coaching accreditation. The coach of the under 10 team has coached three years in under 10 basketball and has coached two years of senior basketball. He has not completed any coaching accreditation courses. The under 10 years team played a modified game version, whilst the under 12 age group played the adult version, which incorporates full basketball

rules with the exception of time differences and compulsory
man-to-man defence

Selection of Subjects

Student Sub-Groups

Coaches were requested to assess the playing ability of each
player in his/her team and rank order them on a continuum
from high to low skill. The rankings were then divided into
three groups e.g. The top third being classified as high skilled,
the next third as average skilled, and the remaining third as
low skilled. This system of subject selection has been
successfully utilised by van der Mars et al.,1984; Wuest et
al.,1985; and Rush,1985; in the study of skill sub-groups in
basketball and diving.

Observations and recording of behaviours of one high skilled
and one low skilled player were conducted each training and
game session. These target students were randomly chosen
using a random number table (Gay, 1990, p. 520-539) from the
high and low skilled groupings prior to each observation.

Procedure

Coaches were approached for permission to study their team
by the researcher, and from this were given verbal and written
information on the basic intent of the study, prior to any
commitment in participation (See Appendices 1 and 2). Coaches
were asked to delineate the nature of the study, from the

information given, with the parents of the children, to gauge support.

Coaches were contacted again to arrange a final meeting to arrange:

(a) parent permission forms for children to be observed and video taped;

(b) list times of games and practice sessions;

(c) rank order players; and

(d) list experience and training of coaches.

The children were advised that they were to be videotaped for the purpose of observing what they do during practice and game session. Coaches were requested to take normal coaching sessions and not to make any changes to normal routines.

Four practice sessions and four game sessions were observed for each of the netball and basketball teams, making a total of 32 periods of observation.

Each practice and game session was observed and analysed using the Revised ALT-PE / SPORT instrument and the Revised SOSOR instrument. All game sessions and practice sessions were videotaped, using two video cameras (two observers). One camera followed the high skilled player the other camera followed the low skilled player, thus ensuring a permanent visual record. This also enabled two separate systematic observational tools to be applied, post event. Observations took place throughout the duration of a fourteen week season.

Instruments

The instruments used in this study were 'Revised Academic Learning Time/ SPORT' (based on the instrument designed by Wilkinson and Taggart, 1989) and 'Revised Systematic Observation of Student opportunities to Respond' (based on the instrument designed by Brown, 1989).

This section on research instrumentation will be divided into two sections:

(a) Rationale of instrument selection;

(b) Description of instruments.

Rationale of Instrument Selection

The Revised ALT-PE/SPORT instrument has been selected as an appropriate observational tool on the basis of the quality of descriptive time and duration data that it provides from sport settings. (Beauchamp et al., 1990; Godbout et al., 1983; Lee and Poto, 1988; Metzler, 1989; Placek and Randall, 1986; Placek et al., 1982; Shute et al., 1985; Silverman et al., 1984; Tousignant et al., 1983; Siedentop, 1983; Wuest et al 1984). The instrument delineates the amount of time spent in specific behaviours, thus allowing comparison between high and low skilled participants on how they use their time in practice and game sessions.

There have been two major versions of ALT-PE instrumentation. The first being devised by Siedentop,

Birdwell and Metzler (1979). Siedentop, Tousignant and Parker (1982) who further developed the instrument, modifying its basic structure, whilst maintaining similar recording categories. This is commonly known as 'ALT-PE Version II'. Wilkinson and Taggart (1989), developed the ALT-PE/Sport instrument which is a single tier recording system (as opposed to Version 1-three tier and Version II- 2 tier). This version is a very manageable and appropriate instrument for use in team sport observations, as it focusses on variables most important in team game settings and can be easily adapted to the activity being observed.

Like many observational tools ALT-PE has some limitations. Being a systematic observational tool it can be prone to problems that are inherent to such systems, that require human interpretations of events. Darst, Mancini and Zakrajesk (1989) delineated problems that occur with such instruments, these include:

(a) <u>Observer Drift</u>: The degree to which accuracy of data collection decreases as a result of changes in interpretations of category definitions or other coding procedures;

(b) <u>Observer Expectancy</u>: Degree to which observers who expect certain behaviours to occur are more likely to find them, even though the behaviours may not have even occurred;

(c) <u>Observer Reactivity</u>: The degree to which an observer's accuracy of observation is influenced by the awareness of being checked over time.

Through the use of self and inter observer reliability checks, it is hoped that such problems can be avoided.

Parker and O'Sullivan (1983) in discussing modifying ALT-PE for game play contexts expressed a concern that "ALT-PE provides us with a quantity of time the students spend responding appropriately, it does not discriminate the frequency of opportunities or the type of skill employed." (p.8).

To alleviate such problems Templin (1983) encourages triangulating ALT-PE with other methods to gain a greater understanding of what occurs in sport settings. By triangulating research methods the weaknesses of each method may be compensated for and it can provide a greater richness of data for analysis. Dobbert (cited in Templin, 1983) advocates the use of between-method triangulation stating: "Multiple methods enhance validity and reliability through increasing the number of perspectives employed. Multiple perspectives permit cross checking of all types of data for accuracy and completeness. They also add depth and breadth to the interpretation." (p.83).

The 'Systematic Observation of Student Opportunities to Respond' (SOSOR) (Brown, 1989) is an appropriate instrument to use in triangulation with the 'ALT-PE/SPORT' instrument (Wilkinson and Taggart, 1989), as it records all of the the opportunities provided to participants to produce specific skill responses, categorising them as being acceptable or unacceptable, and either successful or unsuccessful.

The original instrument was used to analyse video tapes of fifth grade children playing volleyball and soccer game modifications...The assumptionwas that the most efficient game modification, in terms of student learning would provide more OTRs and more acceptable/ successful responses. (Brown,1989, p.189)

Through using SOSOR it was possible to compare the rates of specific motor skills performed by participants of differing skill levels in practice and game sessions. Combined with the data from ALT-PE/SPORT which provided an indication of how the participants spend their time in the activity sessions, it provided a comprehensive descriptive analysis of what actually occurs within these junior sport settings.

Revised ALT-PE/SPORT Instrument - Description

The ALT-PE/SPORT instrument is an interval recording device that identifies what a participant is doing throughout a session. The Revised ALT-PE / SPORT instrument has a choice of six key behaviours that can be recorded during any one interval. For the purpose of this study adaptions are required to the original instrument to supply a better delineation of exactly what type of activity is being performed in each sport at the time the target student is engaged in activity. The original ALT-PE/SPORT instrument does not differentiate between motor activity that contributes to skill learning and motor activity that has no effect on skill acquisition.

Previously the instrument coded any movement response as activity, however adaptions have been devised for the activity section that will indicate the nature of the motor engagement. The activity section has been divided into motor skills and non motor skills.

The motor skills section contains the categories of:

(a) Ball skills: which are coded as successful(+)/ unsuccessful(-), depending on the quality of the performance of the skill.

(b) Non ball skill: Performing or practising a motor skill that does not involve the possession of the ball. e.g. practising footwork movements or defending (zoning) a player with the aim of preventing the player being given the ball.

Activities such as warm-up exercises, moving in a game and helping during an activity session, are still be coded as activity, however do not contribute to motor skill acquisition.

Behavioural Recording Categories - Revised ALT-PE/SPORT

Management Time (M)

Management time is the time that no instruction is given, nor is there any demonstrations or practice undertaken. The time is spent in organisation and is devoid of any opportunities for the participant to learn the content.

Examples of management episodes include discussions about a topic unrelated to the instructional activities, moving out onto court at the start of practice or collecting money.

Transition (T)

Transitional episodes are another aspect of management. A transition is an organisational period within or between activities. A transition may occur when players move from one activity to another, when substitutions are made in games, or when equipment is changed over for a new activity. Stoppages in a game such as an umpire addressing a player or signalling a foul, or players setting up position around the keyway in basketball for a free throw are all coded as transition. Transition episodes are related to instructional activities.

Knowledge (K)

Knowledge is subject related and refers to the time that the participant is receiving knowledge from the coach, discussing skills with peers, watching a demonstration or discussing rules and alike. It refers to the times that the participant is involved with instructional behaviours of teachers. Such instructional behaviour includes demonstrating, explaining and lecturing. (Time out in basketball games is coded as knowledge, if the subject remains on task). It does not include such behaviours as giving instructions and directions on non substantiative matters (these would be included as managerial or transition behaviours).

Waiting (W)

Waiting refers to the time spent by the participant during practice and game sessions in which they are not involved in activity, but are waiting for the next opportunity to respond. Waiting occurs after an activity has begun, with examples being: standing in line, standing on the sideline waiting to get a game, or being on a playing team but not actively involved.

Waiting Reserve (W2)

Waiting Reserve refers to the time a player spends off the court as a reserve, waiting to become involved in the game

.

Off Task (O)

Off task refers to the participant engaging in an activity which he/she should not be participating, or performing an activity other than the one he/she should have been participating. This includes behaviour disruptions, misbehaviour and general off task behaviour such as talking when the coach is talking, misusing equipment, fooling around, fighting and disrupting the activity through inappropriate behaviour.

Injury (I)

Refers to the time spent by a participant being treated for an injury.

Activity (A)

Activity refers to the time that the participant is engaged in the subject matter - motor engaged time. Motor engaged time is when the participant is actively involved in practice, drills,

fitness, warm ups, scrimmages, supporting (e.g. feeding balls to thrower) and game play. Just being involved in a game is not sufficient to accrue activity time. The participant must actually be emitting a skill response, defending or backing up a team mate to be coded as activity. This is the most important category as it is recognised that a participant learns new skills through the practice of them. If a skill is too difficult or the participants are involved in repetitive practice of skills already mastered, then this sort of activity has little relevance. The level of involvement can be too easy, too difficult or at the right level of difficulty.

This study has modified the activity category, devising sub-categories that provide greater delineation of the type of activity performed. The following three activity categories are deemed not to influence motor skill development however represent time spent in active involvement.

(A/w) - <u>Activity warm up:</u> Participant involved in warm-up drills such as runninng laps of the court, stretches and relay running.

(A/s) - <u>Activity support :</u> Participant involved in activity, however the major purpose of the activity is to assist others learn or perform the activity , such as collecting goals shot by partner.

(A/m) - <u>Activity movement</u> : Participant moving/ running

during practice or game without coming into contact with the ball. (e.g. running to position to make a lead for the ball)

The following categories are deemed to be 'skill response categories'.

Skill responses:
(a) Participant in contact with the ball

(A/s) - Motor skill response: In contact with ball (e.g. passing, catching, dribbling or shooting the ball)

(+) - Successful skill performance : criterion skill performed with moderate to high success.
(-) - Unsuccessful skill performance: participant performs skill with little or no success.

(b) Participant not in contact with ball

(A/n) - Motor skill responses: (e.g. footwork drills, positioning for rebound or defensive guarding)
N.B. For the (A/n) category there is not an assessment of (+) successful or (-) unsuccessful. It was decided that it would be too difficult to assess such activities as defending, as the results of such actions cannot be interpreted objectively.

Recording - Revised ALT-PE/SPORT

The ALT-PE/SPORT instrument utilises an interval recording technique to describe what an individual participant is doing throughout a practice or game session. The instrument adheres to the conventions of interval recording procedures in that it:

(a) maintains consistent intervals ;

(b) observes before recording; and

(c) utilises a pre-programmed audiotape as an observe/record cue.

In the first five second interval the target participant is observed. In the next five second interval the observer records the key behaviour that best represents what was just observed. This procedure is then repeated until the end of the observation period.

e.g. Observe behaviour- (5 seconds)

Record behaviour - (5 seconds)

Observe behaviour - (5 seconds)

Record behaviour - (5 seconds)

- Repeat-

If there is more than one key behaviour observed during an interval, then the key behaviour of greatest duration is recorded. If activity is observed, then this is recorded regardless of duration within the time interval. Any additional relevant, anecdotal information can also be recorded in the

space provided in the session analysis sheet. (e.g.- size of groupings used in skill practices, what non engaged students actually do, describe when the student is on the court or the reserves bench, or the score of the game).

Refer to Appendix 4 for Revised ALT-PE/SPORT Instrument Record Sheet.

Refer to Appendix 5 for example of coded Revised ALT-PE/SPORT Instrument Record Sheet.

(2) Revised Systematic Observation of Student Opportunity to Respond (Revised SOSOR)

The Revised SOSOR instrument measures the effectiveness of the game to provide opportunities for the child to participate. In the original model (SOSOR)"The skills for each game were chosen and defined in such a way that they formed a facet, that is, all discrete skill responses were codable into one of the selected defined skills." (Brown, 1989, p.189)

Categories

Opportunity To Respond (OTR): Players have OTRs when the game puts them in situations in which they could emit a discrete skill response. These OTRs have to be categorised using the following headings:-

Skill Response : When a player has an OTR, the player chooses either to exhibit a discrete skill response or no skill response. When used previously (Brown, 1989) the instrument only

recorded general skill categories, without delineating the specific types of each skill performed. (e.g. only kicking in soccer, without listing the different types of kicks used). For this study specific skills were coded to give an indication of exactly what type of skills were exhibited by low and high skilled players during games. (e.g. all types of passing - chest, bounce shoulder, hook and overhead).

Acceptable (A)/Unacceptable (UA) Skill Response : Each skill has a set topographical criteria to evaluate whether the skill response is acceptable or unacceptable. In addition any inappropriate skill response (i.e., the chosen skill is not the one that should have been omitted) is considered unacceptable.

Successful/Unsuccessful Responses : Each skill response has either a successful or unsuccessful outcome. If the intended results occur (e.g., the flow of the game continues) the response is successful. If unintended results occur, then the response is unsuccessful.

No Response: When given an OTR a child may choose not to respond . This may be signified by avoidance behaviour. This is therefore not coded or tabulated as a response. For the purpose of identifying an OTR, categorising skill responses and qualifying the responses, each discrete skill response must be defined and its topographical and results criteria determined. The following table (4.1) supplies an example of the skill definition and performance criteria for the chest pass. Each of

the skills listed above will have its own skill definition and performance criteria.

Table 4.1

Example of Skill Definition and Performance Criteria For SOSOR Netball/Basketball(Chest Pass)

Code: P1

Definition: The ball is propelled by two hands from chest for the purpose of moving ball to a teammate to catch.

Topography

1. Ball is held on chest with two hand finger grip at the back/side of ball.

2. Head up, knees slightly bent, elbows up and out to side of the body, weight on balls of feet.

3. Elbows fully extended, outward snap of wrists, with palms out, to propel ball.

4. Ball follows a relatively flat trajectory.

Outcomes

The *successful* chest pass travels to another teammate in front of body, for ease of catching. The *unsuccessful* chest pass does not reach its intended target.

Recording

The SOSOR provides a chronological list of a series of OTRs, for each target student throughout the duration of the game. When an OTR is identified , the time of occurrence is recorded (using a stop watch, or viewing the time counter on the V.C.R.) in the 'sequence' column.

For each OTR the discrete skill exhibited must be identified and its code placed in the 'Code' column. The skill codes are as follows for netball and basketball:

Table 4.2

Revised SOSOR Skill Categories

Passing	Shooting	Catching	* Dribbling
P1 - Chest	S1- Set shot	C1 - from pass	* D1 - Speed
P2 - Bounce	S2 -Lay up	C2 - Rebound	* D2 - Control
P3 - Shoulder/baseball	S3 - Field	C3 - Intercept	Other
P4 - Hook		C4 -Off Ground	J - Jump/toss
P5 - Overhead	* = Basketball only		N - No response
			I - Intercept
			X - uncodable

N.B. The intercept category under 'catching' refers to catching ball from an opposition pass, whereas the interception category under 'other' refers to the player deliberately patting or pushing a ball away from an opposition player when unable to reach for a catch.

If there is no response emitted, 'N' is recorded.

If a discrete response is emitted, the topography needs to be assessed as acceptable or unacceptable according to the criteria used for the topography of each skill, and recorded in the corresponding column. Finally it needs to be determined if the skill response was successful or unsuccessful, and subsequently record a tally in the corresponding column. If no

response was emitted, then no tallies are recorded for topography or results.

Refer to Appendix 5 for example of Revised SOSOR Record Sheet.
Refer to Appendix 6 for example of coded Record Sheet.

Method of Analysis and Interpretation of Results

Revised ALT-PE/SPORT

The data was checked and analysed in accordance with the procedures on interval recording data analysis and summary suggested by Metzler (1983). The intervals recorded from each observation period are tabulated and recorded for each category and from these totals, percentages are calculated to indicate the duration of time spent in specific behaviours. For example a percentage of 23.2% for the category of 'transition', indicates that the target participant spent this percentage of the observed time in transition behaviours.

The procedure used was as follows:

1. Scrutinise the data sheets for errors.
2. Tabulate the data. The frequency of occurrence for each behaviour category is counted and recorded, then converted to a percentage.

i.e.   FREQUENCY

     NUMBER OF INTERVALS

3. Determine the percentage of occurrences for each recorded category.

Standard deviations were calculated for each category to provide a stable measure of variability across sessions.

Systematic Observation of Student Opportunities to Respond (SOSOR)

The totals for each category are divided by the total game/practice time, to provide rates per minute. An example of a rate given in a table may be 1.27 minutes. This signifies that a skill response occurred every one minute and twenty seven seconds. The lower the rate, the more frequently the behaviour occurred.

In a game situation the time that a participant spends on the court involved in game play is calculated as the game time for the rates. The time that a player spends on the interchange bench or off injured is not calculated as game time, otherwise it would not supply a true indication of the rate of opportunities to respond provided by different game designs. This is important, as the focus of this instrument is on the time spent responding when having the opportunity to be involved. However in the calculation of training sessions rates, if a player is sitting off as a reserve during practice games, this is calculated in the overall time, as the purpose of evaluating training sessions is to observe what rate of opportunities to respond coaches provide, based on the

activities they implement. If the coach chooses such an activity that requires a player to sit off, the effect of such an activity on observed behaviours must be fully recognised. Injury time is still not calculated in the Revised SOSOR rates as this is not directly related to the type of activity instituted by the coach of the team, and is not within the coach's control. The rates calculated for the low and high skilled players for each sport and each age group are compared to identify any differences between students of high and low skill level and of different game designs and practice activities.

Specific skill categories will be compared in each age group and sport, enabling discussion as to the rates of specific skill practices of high and low skilled players in game and practice sessions. In the goal shooting category, percentages of successful shots will be given as well as the rates, to enable a more conclusive judgment about the success of modifying the equipment in enhancing success in shooting.

In the areas of successful/unsuccessful responses and acceptable/ unacceptable responses, a percentage will be given as well as a rate, to supply an indication of the proportion of successful to unsuccessful responses and acceptable to unacceptable responses made by the target subjects.

It is important to note that ball skill success results in Revised SOSOR and Revised ALT-PE/SPORT may not be congruent because the Revised SOSOR instrument records all

skill responses even when a participant is not performing the task as required (e.g. dribbling a ball when the task set is shooting). In Revised ALT-PE/SPORT, the instrument identifies the intent of the response, and such responses as off task behaviour and supporting (i.e. throwing - feeding the ball to a shooter) are not recorded as ball skill. It is also prudent to consider that Revised ALT-PE/SPORT supplies a sample of ball skill behaviour and Revised SOSOR provides an analysis of each ball skill response, thus in a five second interval in Revised ALT-PE/SPORT more than one skill response may occur. The Revised ALT-PE/SPORT instrument records 'ball skill' activity regardless of how many skill responses are exhibited within the five second observational interval, whilst the Revised SOSOR instrument is able to record all skill responses as it is not an interval device.

Summary of Data Presentation and Analysis Procedures

For each of the following areas of discussion relevant tables and graphs for data from the Revised ALT-PE/SPORT and Revised SOSOR instruments will be provided in Chapter 5. Results will be presented and discussed in direct reference to the research questions posed in this study.

When interpreting the tables and graphs for Revised ALT-PE it must be remembered that the higher the percentage the more time spent in that specific behaviour. Conversely for Revised

SOSOR tables and graphs, the lower the rate number (or bar in graphs) the more frequent the behaviour occurred.

Discussion will be led through a focus on areas of difference existing between the skill, age or sporting groups and consideration of why this phenomenon eventuated, whilst also delineating the areas of equivalence between the groups. The combined data from the Revised SOSOR and Revised ALT-PE/SPORT instruments will be used to consider and discuss the suitability of the differing game designs and practice activities to provide sufficient opportunities for high and low skilled participants to exhibit skill responses. Based on the findings, recommendations will be outlined that will help to improve the existing contexts.

The suitability of each research instrument to provide a valid and reliable measure of participant game behaviours will also be discussed in detail and in respect to their use in further studies. Below is an outline of the results to be presented and discussed in the results section.

1. Under 10 netball, analysis and interpretation of Revised ALT-PE/SPORT and Revised SOSOR data, comparing high and low skilled participant outcomes in game play and training contexts.

2. Under 12 netball analysis and interpretation of Revised ALT-PE/SPORT and Revised SOSOR data, comparing high and low

skilled participant outcomes in game play and training contexts.

3. Discussion and comparison of results under 10 and under 12 netball results in Revised ALT-PE/SPORT and Revised SOSOR for high and low skill participants in game play and training contexts.

4. Under 10 basketball analysis and interpretation of Revised ALT-PE/SPORT and Revised SOSOR data, comparing high and low skilled participant outcomes in game play and training contexts.

5. Under 10 basketball analysis and interpretation of Revised ALT-PE/SPORT and Revised SOSOR data, comparing high and low skilled participant outcomes in game play and training contexts.

6. Discussion and comparison of results under 10 and under 12 basketball results in Revised ALT-PE/SPORT and Revised SOSOR for high and low skill participants in game play and training contexts.

7. Comparison of netball and basketball game and practice results in Revised ALT-PE and Revised SOSOR for high and low skill participants in specific age groups and with age groups combined.

8. Recommendations based on the findings.

9. Discussion of methodological considerations.

Reliability of Data Collection

The aim of any observation made in research studies is to provide data that are an accurate reflection of what really happened. Systematic observations rely on human judgment and interpretation and therefore it is crucial that users of such instruments ensure that they are able to use that instrument reliably so that consistent and stable measurements can be made. Johnstone and Pennypacker (cited in Darst et al., 1989, p.54) defined reliability as "The capacity of the instrument to yield the same measurement value when brought into repeated contact with the same state of nature."

To establish reliability in data collection the following measures were undertaken:

1. Observer Training

Observers underwent training for use of the Revised ALT-PE/SPORT instrument by using the practices set out in the Physical Education and Sport Coding Manual for the ALT-PE/SPORT (Taggart, 1991) and further practices specific to the coding categories in the Revised ALT-PE/SPORT instrument. Mastery of the Revised SOSOR instrument was achieved through sufficient practice with video taped sessions and checked through intra and interobserver reliability checks.

2. Intra observer reliability check. (Self Reliability)

"Intra observer agreement refers to the situation in which one observer makes an observation and of events on one day and then comes back at a later point in time to observe the same events." (Darst et al., 1989, p.54)

Trial tapes of basketball and netball were coded and recorded and then re-recorded and compared to establish reliability for each individual recorder. The Scored Interval method (Darst et al., 1989, p.55) was used to compare the recordings made by the researchers with the Revised ALT-PE/SPORT instrument, with a minimum level of 85% accuracy needing to be achieved prior to work on the study.

Steps taken in applying the Scored Interval method are as follows:

1. Intervals that are recorded the same for both observations are identified as scored intervals.

2. Intervals that do not correlate between the two recordings are known as unscored intervals.

3. The amount of scored intervals compared on an interval-by-interval basis determine the number of agreements.

4. The number of agreements and disagreements are placed into a reliability formula to calculate the Scored Interval percentage for that variable.

Method for calculating scored interval reliability (Darst et al., 1989, p.55)

Agreements

Disagreements + Agreements   x 100   = % of agreement

Reliability for the Revised SOSOR instrument is calculated using the same equation. Again a minimal level of 85% was required before commencement of recordings for the study.

An intra observer accuracy level of 88.3% was established for Revised ALT-PE/SPORT and 94.6% for Revised SOSOR prior to the commencement of data recording. Further checks during the period of data analysis resulted in accuracy levels of 87.4% and 91.8% for Revised ALT-PE/SPORT and 96.6% for Revised SOSOR

The reliability check procedure for the Revised SOSOR instrument is as follows:

    1. The total OTRs are compared between the two recordings.

    2. Line by line comparisons are made for the responses in the code column.

    3. Each line that has matching times and response codes is counted as an agreement. Each line that has matching times and different response codes is counted as a disagreement.

    4. Each line in which only one of the recordings has recorded a time is counted as an omission. Omissions are designated as disagreements.

    5. No responses (N) are not included in the calculations.

    6. For each skill response, comparisons of the corresponding tallies recorded for acceptable/unacceptable and successful/

unsuccessful responses are made. For each pair of columns, matching tallies are agreements.

It is possible to make separate reliability checks for acceptable/ unacceptable and for successful/unsuccessful responses. (Adapted from Brown, 1989)

3. Inter-Observer Reliability

This reliability check indicates the " ...degree to which two observers, using the same definitions, looking at the same person, at the same time record the same behaviour." (Taggart, 1991, p.56)

A satisfactory interobserver reliability level (85%+) was established for both instruments prior to the study with the master coder. Inter-Observer reliability was established for both instruments by using the 'Scored Interval method', (Darst et al., 1989, p.55) whereby the same session was coded and recorded by two separate observers and their findings compared. Again trial tapes were utilised to establish 85 +% accuracy prior to commencement of the study. The initial accuracy level was 86.3% for Revised ALT-PE/SPORT and 93.3% for Revised SOSOR Continual Inter-Observer reliability checks were maintained throughout the process of the study to ensure ongoing reliability. The other checks produced levels of 89.4% and 86.7% for Revised ALT-PE/SPORT and 97.4% for Revised SOSOR.

All games and practice sessions were video taped using a videotape recorder for each target student. The predominance of recorded sessions allowed for checking of behaviours by rewinding, pausing and placing the tape in slow motion. It also allowed for easy inter observer checks and alleviated any possibility of missing a behaviour when live coding.

Validity of Data Collection

Validity refers to the extent to which an instrument measures what it is supposed to measure. The events recorded should match as closely as possible the true events as they occur in the environment.

The ALT-PE/SPORT Instrument has been found to be valid in naturalistic studies in the junior sport setting (Taggart 1986, 1991; Walker 1991) as has the SOSOR instrument (Brown, 1989), thus enabling confidence that the instruments will elicit the information required to accurately represent the environment studied and subsequently address the research questions. To eliminate the possibility of any invalid findings, the following procedures were undertaken:

1. Subject Choice
The teams chosen have been taken from the same clubs, with both the netball and basketball clubs coming from the same metropolitan region.

2. Triangulation of Methods

When observing game and practice situations both the Revised ALT-PE/SPORT and Revised SOSOR instruments were used in recording and analysing behaviours of target participants. This supplied a thorough record of critical incidents that occurred within the setting and supplied a more valid measure of the participants opportunity to be actively and successfully involved in the sessions.

3. Choice of Target Participants

Target participants were chosen randomly from the high and low skilled groupings. Coaches were not made aware of who the target participant would be, so as to avoid any unwarranted change in their behaviour. The coaches were also not made aware in advance which sessions the observer would be present.

4. Session Times

Training and game session times remained consistent throughout,(i.e. each team trained and played at the same time each week) and times were not be altered to suit the study timetable.

Limitations of The Study

It is important to recognise the limitations of a study before analysing the data, to avoid deriving any spurious conclusions. Gay (1990) describes a limitation as " an aspect of the study that the researcher knows may negatively affect the results or generalizability of the results, but over which he/she probably has no control." (p. 86)

The limitations of this study are as follows:

1. The study was based on the results from participants in two netball and two basketball teams, from one netball club and one basketball club.

2. Coaches of the teams had varying degrees of experience, training and accreditation. However findings from the different coaches and their ability to provide opportunities to make skill responses, will be compared to see if experience and accreditation does have some effect on the amount of active involvement provided for participants.

3. Data collected using the Revised ALT-PE/SPORT instrument uses a five second recording interval, which in effect means that only half of the session is observed, as it takes five seconds to record behaviours. Despite this, the interval recording measure is recognised as a valid observation strategy, provided there is a suitable sample size and the

intervals are short, so as to limit the amount of behaviours possible in one observation period (Siedentop et al., 1982). This was the case in this study.

Varieties of ALT-PE research tools have been used by researchers throughout Europe, Canada, Australia and the United States of America (Tousignant et al., 1983), each receiving solid support as a valid and reliable instrument for use in physical education and sport settings. (Beauchamp et al., 1990; Godbout et al., 1983; Paese, 1985; Placek et al., 1982; Placek and Silverman, 1986; Seidentop et al., 1982; Rife et al., 1985; Walker, 1991; Wilkinson and Taggart, 1986 and 1989; Wuest et al., 1984)

Through the triangulation of Revised SOSOR with Revised ALT-PE/SPORT, when analysing games and practice sessions, allskill responses were observed and recorded, thus alleviating any chance of an important behaviour being missed.

4. The Revised ALT-PE/SPORT instrument uses five second interval recording. The behaviour that takes up the majority of time for the interval is recorded. However, in the case of a participant practising a skill, where it may only take a second to pass or catch a ball, activity is still recorded. The key behaviours are represented as a percentage of lesson time.

5. The number of participants in each team is not consistent, with the basketball teams both having 7 players and the netball teams having 8 players. (Resulting in two participants

of a basketball team being an interchange reserve at any one time during a game and only one netball player during a netball game).

The basketball participants are all boys whilst in in each netball team there are seven girls and one boy. However, research has shown that the sex of the participants is not a significant variable in the amount of ALT-PE they accrue. (Placek et al., 1982; Shute et al., 1982; Silverman et al., 1984)

6. The researcher was responsible for collecting and analysing much of the data. Appropriate steps were taken to prevent prejudicing the data. (i.e. inter and intra observer checks).

7. The designated position participants play in games can effect the opportunities to respond and display a full range of

skills. However positions will be noted and their effect on involvement levels referred to, in discussion of results.

8. The success of each team varied. The under 10 basketball team won three of the four games. Two games were won convincingly and the other two games were decided by less than 5 points. The under 12 basketball team won all four games convincingly as did the under 10 netball team. The under 12 netball team won two games convincingly and lost one game marginally and another by over 5 goals.

9. Coaches and parents were advised of the nature of the research, prior to the commencement of the study. If in the unlikely event, coaches' behaviour altered positively because of their awareness of the aim of the study, then such changes could only be of benefit to the participants involved and should be considered as a positive outcome of the study, but still a limitation.

10. Teams may not have had an equal proportion of high and low skill players. However through consultation with the coach, players should be accurately grouped. The difference in skill levels between high and low skilled participants was also different for each team.

11. Age differences of the children participating in the modified game and children playing the unmodified versiondiffer, as do their experience in playing the game, and this needs to be considered and explained in the data analysis, when comparing the two game designs.

Ethical Considerations

To ensure the protection of the participants in the study and to reassure them of the integrity of the researcher, and the importance of the study, the following measures were undertaken:

1. The identity of the clubs, coaches and children remained confidential at all times. All participants had the right of withdrawal from the study at any time.

2. Coaches and parents of the children participating in the study were clearly informed of the nature of the study and its benefits. Written parental permission was required before children were permitted to take part in the study. (Refer to Appendices 1 and 2)

3. Video recordings were viewed only by the researcher, the research assistant and thesis supervisors. Videos were made available to coaches on request.

4. Findings from the study were be forwarded to the coaches of the respective teams.

5. In the event of any injury, the researcher was not liable as the participants were deemed to under the care of the coaches.

CHAPTER 5

RESULTS and DISCUSSION

This chapter presents data pertaining to the behaviours observed from high and low skilled participants in under 10 and 12 netball and basketball games and practice sessions. The results obtained from the Revised ALT-PE/SPORT and Revised SOSOR instruments, in conjunction with anecdotal comments made during observations, will be used in answering the research questions. Results are presented in tables containing percentages for Revised ALT-PE/SPORT and rates of responses for Revised SOSOR Graphs are used in the concluding discussion section to allow visual inspection of selected data and to highlight areas of difference and similarity across the different teams and sports. For more specific investigation of results from specific target groups within the study refer to Appendices 8 to 39.

Four practice sessions and four game sessions for the high and low skilled participants in each of the two netball and two basketball teams provide the results to investigate each of the research questions stated in chapter 1. The results from each netball age group will be delineated in detail, with game and training data outlined separately. The game and training results for each team will then be discussed in turn.

Following individual analysis of each team's game and training results, a comparison of results will be made from both

netball age groups, based on summary tables from both team's game and training results. Again game and training results will be treated separately. Relevant areas of difference and similarity will be highlighted and discussed in turn. The same process will then be applied to the analysis and interpretation of the basketball results.

At the completion of the separate treatment of netball and basketball results, results from both basketball and netball will be compared and discussed with reference to overall summary tables and graphs. From this discussion, conclusions and recommendations will be made in regards to game design, training activities and future studies in chapters VI and VII.

Analysis and Interpretation of Results

The analysis and interpretation of data will be presented with direct reference to the research questions. The results from the Revised SOSOR instrument and the Revised ALT-PE/ SPORT instrument will be displayed in table form for each netball and basketball team.

The data for each netball team will be presented first. Following this, summary tables showing both the under 10 and under 12 game and training results will be presented for the Revised SOSOR and Revised ALT-PE/ SPORT instruments. These summary tables will provide the basis upon which an overall interpretation and discussion of netball results can be made. The discussion will compare the results for high and low

skilled participants for netball as well as comparing the game and training results for both age groups. This format will then be repeated for the basketball results.

To conclude the interpretation and discussion of the results, summary tables and Graphs of the Revised ALT-PE/ SPORT and Revised SOSOR instruments for each netball and basketball team will be presented. Relevant differences and similarities between the different sports will then be delineated, with the discussion comparing the rates of involvement for high and low skilled players for each sport and each age group, with direct reference to previous findings from related studies.

.

Major Research Question

What process behaviours are observed from participants, of differing skill levels, involved in junior basketball and netball programmes?

Specific Research Questions

1. What level of successful motor skill engagement, is provided for high and low skill participants, in junior netball programmes?

2. What level of successful motor skill engagement is provided in the adult and modified game structures and practice sessions in junior netball and how do the differing game designs compare?

Analysis and Interpretation of Results From Under 10 Netball Observations

Results of the study of under 10 netball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. observation instruments are presented in table 5.1, 5.2, 5.4 and table 5.5.

Game Results

Results from the four games observed using the Revised ALT-PE/SPORT instrument (Table 5.1) indicate some major differences in the percentage of time high and low skilled participants spend in different behaviours in under 10 netball.

Table 5.1
Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 10 Netball Game Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	1.27	1.79	0.96	1.13
transition	17.37	4.17	17.50	3.95
knowledge	0.00	0.00	0.00	0.00
wait	23.83	3.86	40.88	9.19
wait(reserve)	12.60	13.26	12.70	14.66
Off Task	0.00	0.00	0.00	0.00
Non Activity Total	55.08	8.38	72.04	8.46
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00
movement	22.67	3.55	13.13	5.33
Activity - Non Skill Total	22.67	3.55	13.13	5.33
Activity - Skill				
ball skill + (positive)	11.86	5.01	4.91	3.57
ball skill - (negative)	4.03	1.43	2.77	1.99
non ball skill (i.e. defending)	6.36	2.15	7.15	5.41
Activity - Skill Total	22.25	5.53	14.83	4.13
OVERALL ACTIVITY TOTAL	44.92	8.38	27.96	8.46

When assessing the non activity categories, the major difference between high and low skilled participants was in the amount of time they spent waiting to gain possession of the ball. Low skilled players spent 40.88% time waiting, compared to 23.83% for high skilled players. However the high and low skilled players spent almost exactly the same amount of time off the court as reserves, with high skilled players accruing 12.60% in this category and low skilled players 12.70%.

Low skilled players spent far less time positively involved in ball skill activity (4.91%) than higher skilled players (11.86%). This indicates that the high skilled participants spent more than double the amount of time successfully engaged in ball skills than the lower skilled participants. High skilled players spent 15.89% of time involved in ball activity, of which only 4.03% was unsuccessful compared to a total of 7.68% for low skilled players of which 2.77% was unsuccessful. Low skilled players also spent less time in non-skill activity (13.13%) than high skilled players (22.67%). The lower skilled participants however, spent slightly more time in non ball skill activities such as defending. (7.15% - low skilled, 6.36% - high skilled).

Results from the Revised SOSOR (table 5.2, p. 101) further demonstrate the difference in the amount of opportunities to make ball skill responses for high and low skilled participants in games.

Table 5.2

Revised SOSOR Data - Rates of Responses (1/ Minutes)
Under 10 Netball Game Data

SESSION	High Skill				Low Skill			
RESPONSES	Tot OTR	X OTR	St Dev	Rate(1/Min)	Tot OTR	X OTR	St Dev	Rate(1/Min)
Passing								
chest/shoulder	147	36.75	10.87	0.56	50	12.50	7.55	2.44
Bounce	0	0.00	0.00	0.00	0	0.00	0.00	0.00
hook	0	0.00	0.00	0.00	0	0.00	0.00	0.00
overhead	0	0.00	0.00	0.00	1	0.25	0.50	136.20
underarm	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Passing Total	147	36.75	10.87	0.56	51	12.75	8.02	2.40
Shooting								
set shot	30	7.50	6.61	4.35	17	4.25	4.92	8.01
lay-up	0	0.00	0.00	0.00	0	0.00	0.00	0.00
field	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Shooting Total	30	7.50	6.61	4.35	17	4.25	4.92	8.01
				Success (53.3%)				Success (41.2%)
Catching								
from pass	131	32.75	17.06	1.03	49	12.25	14.06	2.47
rebound	13	3.25	2.87	10.34	5	1.25	1.89	27.16
intercept	21	5.25	4.03	6.33	4	1.00	1.41	34.05
groundball	28	7	2.45	4.55	25	6.25	3.30	5.27
Catching Total	193	48.25	21.53	0.43	83	20.75	15.9	1.39
dribbling	0	0.00	0.00	0.00	0	0.00	0.00	0.00
time/toss	7	1.75	1.50	19.39	2	0.50	0.50	68.10
Intercept	14	3.50	2.08	9.49	4	1.00	1.41	34.05
TOTAL RESPONSES	391	97.75	37.96	0.22	161	40.25	25.88	0.50
No Response	0	0.00	0.00	0.00	3	0.75	0.96	45.27
Uncodable Response	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Acceptable Response	361	90.25	34.04	0.22 (92.35%)	117	29.25	16.88	1.10 (72.6%)
Unacceptable Response	30	7.50	4.43	4.35 (7.7%)	44	11.00	9.59	3.06 (27.4%)
Successful Response	318	79.50	31.81	0.26 (81.3%)	117	29.25	21.52	1.10 (72.6%)
Unsuccessful Response	73	18.25	6.40	1.53 (18.7%)	44	11.00	5.50	3.06 (27.4%)

High skilled players passed the ball nearly three times more frequently than low skilled players. (High skilled - 1 pass every 56 seconds, low skilled - 1 pass every 160 seconds).

The catching rates show that high skilled players made a catch or gained possession every 43 seconds, compared with every 99 seconds for low skilled players. It is significant to note that the high skilled players received a far greater proportion

of catches (85.5% of possessions) than low skilled players (69.9% of possessions). Thus the low skilled player received a far greater proportion of possessions from picking up the loose ball off the ground than the higher skilled player.

Despite the low skilled players spending seven of the sixteen observed quarters, in the position of goal shooter they shot slightly over half the amount of shots at the goal (one every 8.01 minutes) than the high skilled players (one every 4.35 minutes).
(Refer to Appendix 7 for summary of positions)

Inspection of game data sheets reveal that the high skilled players when in the position of Goal Attack still had more shots at goal than the low skilled player who was playing goal shooter. High skilled players were successful in 53.3% of all shots, compared to 41.2% for the low skilled players.

The high skilled players gained more than double the amount of rebounds (one every 10.34 minutes) than the lower skilled player (one every 27.16 minutes) when playing in goal positions. High skilled players also made far more frequent acceptable ball skill responses during the game (one every 22 seconds as opposed to one every 70 seconds for low skilled players) and accrued more frequent rates of successful execution of these skills. (One successful response every 26 seconds as opposed to one every 70 seconds for low skilled players).

Overall the low skilled players made less skill responses than the high skilled players in every skill response category.

Training Results

Results from the Revised ALT-PE/SPORT instrument (Table 5.3) indicate that high skilled participants spend more time positively engaged in ball skill content (12.73%) than low skilled participants (10.12%) and spent more time in all activity categories, except for warm-ups and unsuccessful ball skill responses.

Table 5.3
Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 10 Netball Training Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	7.06	3.46	6.84	2.56
transition	20.70	2.58	19.03	3.42
knowledge	10.42	4.29	8.84	2.35
wait	25.38	5.16	28.87	6.10
wait(reserve)	0.00	0.00	4.49	9.10
Off Task	1.33	1.29	0.93	0.92
Non Activity Total	64.90	7.02	69.00	2.03
Activity - Non Skill				
warmup	4.83	2.45	5.27	3.17
support	1.68	1.75	0.57	0.66
movement	8.25	1.81	6.56	2.76
Activity - Non Skill Total	14.76	5.10	12.40	1.43
Activity - Skill				
ball skill + (positive)	12.73	3.66	10.12	3.01
ball skill - (negative)	3.22	0.99	4.70	0.83
non ball skill (i.e. defending)	4.41	2.42	3.78	1.55
Activity - Skill Total	20.35	4.78	18.60	1.42
OVERALL ACTIVITY TOTAL	35.10	7.02	31.00	2.97

The results also show that low skilled players spent 28.87% of time waiting to be involved in activity whereas high skilled players spent 25.38% of time waiting. This disparity also occurred in the waiting (reserve) category where the low skilled player spent 4.49% of training time as a reserve during practice games with the high skilled player spending no time in this category. Low skilled players spent marginally less time involved in knowledge content, management and transition episodes than did high skilled players.

Results indicate that only 35.1% and 31.0% of time respectively for high and low skilled players was spent involved in activity. Much of the time lost was in transition episodes with both high and low skilled players spending over 17% of time in this category.

Results from the Revised SOSOR instrument (Table 5.4, p105.) indicate that the frequency of skill responses by low skilled players was twice as great in practice as they were in the game, but were still lower (one every 25 seconds) than high skilled participants (one every 20 seconds). This disparity is further reinforced by the fact that high skilled players made a total of 705 skill responses during the practice sessions, as opposed to 605 for low skilled players.

Table 5.4

Revised SOSOR Data - Rates of Responses (1/_ Minutes)
Under 10 Netball Training Data

SESSION / RESPONSES	High Skill				Low Skill			
	Tot OTR	x OTR	St Dev	Rate(1/_Min)	Tot OTR	x OTR	St Dev	Rate(1/_Min)
Passing								
chest/shoulder	272	68.00	29.94	0.53	233	58.25	24.66	1.04
Bounce	24	6.00	8.16	9.56	25	6.25	8.66	9.54
hook	0	0.00	0.00	0.00	0	0.00	0.00	0.00
overhead	2	0.50	0.58	119.10	2	0.50	0.58	123.50
underarm	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Passing Total	298	74.5	36	0.48	260	65	32.1	0.57
Shooting								
set shot	28	7.00	4.83	8.31	27	6.75	4.03	9.10
lay-up	0	0.00	0.00	0.00	0	0.00	0.00	0.00
field	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shooting Total	28	7.00	4.83	8.31	27	6.75	4.03	9.10
				Success (46.6%)				Success (27.9%)
Catching								
from pass	290	72.50	40.29	0.51	266	66.50	37.83	0.56
rebound	20	5.00	3.27	11.55	3	0.75	0.50	82.33
intercept	13	3.25	2.75	18.20	5	1.25	2.50	49.32
groundball	40	10.00	4.24	5.58	28	7.00	2.71	8.50
Catching Total	353	88.25	36.81	0.40	302	75.5	34.9	0.49
dribbling	0	0.00	0.00	0.00	0	0.00	0.00	0.00
jump/toss	17	4.25	6.55	14.01	14	3.50	3.70	17.41
intercept	9	2.25	1.26	26.29	4	1.00	1.15	61.55
TOTAL RESPONSES	705	176.25	63.85	0.20	604	151	63.39	0.25
No Response	2	0.50	0.58	119.10	1	0.25	0.50	247.40
Uncodable Response	5	1.25	1.89	47.40	4	1.00	2.00	61.55
Acceptable Response	633	158.25	58.11	0.22 (89.8%)	491	122.75	54.32	0.30 (81.3%)
Unacceptable Response	72	18.00	9.35	3.19 (10.2%)	113	28.25	9.46	2.12 (18.7%)
Successful Response	610	152.50	63.01	0.23 (86.5%)	502	125.50	67.72	0.30 (83.1%)
Unsuccessful Response	95	23.75	4.99	1.46 (13.5%)	102	25.50	5.45	2.26 (16.9%)

Obvious contrasts between high and low skilled participants can be seen in the rate of passes made at training, with the high skilled players making a pass every 48 seconds, as opposed to the low skilled players who made a pass every 57 seconds.

Goal shooting was practised very little by the team. The rates of skill responses for shooting were almost identical for high

and low skilled participants, with high skilled players actually making only one more shot during training than low skilled players. However, the high skilled participants were successful in 46.4% of shots compared to only 27.9% of successful shots for the low skilled participants.

Disparities were also found in all rates of catching, resulting in the high skilled players making a catch every 40 seconds, whilst the low skilled players made one every 49 seconds. The greatest difference in the types of catching occurred in the rebound category, where the high skilled player made a rebound every 11.55 minutes, compared to every 82.33 minutes for the low skilled players. High skilled players also made a caught interception every 18.20 minutes as opposed to every 49.32 minutes for low skilled players.

In summary the differences in the amount of skill responses made by high and low skilled players in each category was not high, however, low skilled players made fewer responses in each major category than the high skilled players. Results indicate that greater equity of involvement for high and low skilled participants occurred during practice sessions than in the game context, however the imbalance favouring high skilled participants in skill performance areas was still evident.

Discussion of Under 10 Netball Results

Game Results

The results from both Revised ALT-PE/SPORT (Table 5.1) and Revised SOSOR (Table 5.2) show that the low skilled players had far fewer opportunities to respond than the high skilled players. The low skilled players spent less time in activity than the high skilled players. These results can be mainly attributed to the positions that the high and low skilled players were assigned during these games. (Refer to Appendix 7). In every quarter, except one, the low skilled participants played either goal keeper or goal shooter. These two positions restrict the players movement to only one third of the court, resulting in the players spending more time waiting and less time involved in activity. High skilled players were only positioned in either of these two positions for one quarter (G.K.), with the rest of the time being positioned at Goal Defence, Goal Attack, (which enables the player to move in two thirds of the court) or Centre, which allows the player to move in all thirds of the court, except in the goal circles. The low skilled player when playing at Goal Keeper, often did not come into contact with the ball for long periods of time because the team was consistently winning and the ball did not come down to that end often.

The data from Table 5.1 shows that lower skilled participants spent more time in non ball skill activities, such as defending than in ball skill response activities such as passing, catching

and shooting. This was mainly due to the lower skilled participants spending more time in the position of goal keeper, which has a greater emphasis on preventing the opposition player form gaining possession than accumulating personal possessions. The positions of Goal Attack, Goal Defence, and Centre, played by the high skilled players allow the player to link up the play moving up and down the court and subsequently gain more possessions. These positions allow the player to pass the ball to another player then receive it further down the court. Playing Goal Keeper or Goal Shooter, usually means that the player either initiates the start of a pattern of possessions down the court or is at the end of the pattern to shoot, thus allowing less opportunity for the player to pass and receive. Quite often the low skilled player is not even involved in the pattern of play. In fact Otago (1982) found that the positions of G.K. and G.S. make the least amount of skill responses of all positions and that G.D. and G.A. make the most skill responses, with the exception of the Centre player.

The data from table 5.2 highlighted that high skilled players received a far greater proportion of catches from the ball being passed to him/her than the low skilled player, whilst the low skilled player received a far greater proportion of possessions from picking up the loose ball off the ground. This indicates that the players in the game tend to pass to the high skilled player where possible, whereas the low skilled player has to seek possession more often by his/her own means.

Analysis of individual game data sheets show that the high skilled players when in the position of Goal Attack still had more shots at goal than the low skilled player who was playing Goal Shooter. This can partly be attributed to the high skilled player gaining more than double the amount of rebounds than the lower skilled player and subsequently shooting from that position. It is also poignant to note that the high skilled player often made better position for the pass and fellow players looked for that player much more, thus enabling them greater opportunities to respond with a shot a goal.

Both percentage rates are quite acceptable for the difficult skill of shooting, suggesting that the lowered height of the ring helps to facilitate shooting success.

It is salient to consider that in every category the low skilled players made fewer skill responses than the high skilled players. This indicates that the game design for the junior players in the under 10 level is not sufficiently well modified or adapted to address imbalances in the number of skill response of high and low skilled participants.

Training Results

The results from Table 5.3 and Table 5.4 display a more equitable involvement in skill practices during training sessions than occurred in game situations. However, some specific skill areas such as passing and catching showed greater involvement for high skilled players.

An interesting result was that low skilled participants greatly improved their rates of involvement in training sessions, when compared to game results, though their rates of responses were still less frequent than the high skilled participants. High skilled players did not spend a greater percentage of time involved in activity and skill practice in training sessions than they did in games, despite the coach being able to manipulate the environment to ensure greater active involvement.

The type of activity employed by the coach dramatically effects the rates of a participant's active involvement. The triangulation of the results from Revised ALT-PE/SPORT and Revised SOSOR reinforce the case that low levels of opportunity were provided for high and low skilled participants to exhibit skill responses at the practice sessions. The coach tended to employ small group practices infrequently, and too often had lines of children waiting for a turn, as one ball was shared amongst the team members for skill practice. As mentioned previously, too much time was spent in transition and management episodes, thus limiting the amount of time available for skill practice. The coach would devote time to a practice game in all sessions, and in two of the sessions the team played another team from the club, who were playing in the year above them. This practice definitely affected the rates of involvement of all participants in the under 10 team, as the other team tended to maintain possession for much of the time. The low skilled players were further disadvantaged in these situations as they were again mostly restricted to the positions of Goal Keeper or Goal

Shooter where they were restricted to one third of the court, whilst the high skilled players were more often able to play in positions which enabled greater court coverage.

The rather high standard deviations for both catching and passing indicate a high degree of variability in the percentages and rates across training sessions. (e.g. compare results from session 1 and session 2 in Appendix 12). This is due to some practice sessions involving small group or pair work resulting in high involvement rates, whilst other practice sessions mostly involved practice games or whole group activities. (Refer to Appendices 12,13,14 &15 for training session by session results).

Analysis and Interpretation of Results From Under 12 Netball Observations

Results from the Revised ALT-PE/SPORT and Revised S.O.S.O.R. instruments used in the observation of under 12 netball participants are presented in table 5.5, 5.6, 5.7 and 5.8.

Game Results

The results from the Revised ALT-PE/SPORT data (Table 5.5) indicate that the percentages for the behavioural categories of injury; management; transition; knowledge; wait (reserve) and activity movement are similar for both high and low skilled participants.

Table 5.5

Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 12 Netball Game Data

ALT/PE CATEGORIES	High Skil (%)	SD	Low Ski (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	0.11	0.25	0.11	0.25
transition	13.45	3.96	14.64	3.37
knowledge	0.00	0.00	0.00	0.00
wait	33.90	9.68	36.78	10.81
wait(reserve)	6.67	12.39	6.70	12.45
Off Task	0.00	0.00	0.00	0.00
Non Activity Total	54.12	16.57	58.23	7.06
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00
movement	20.45	10.49	19.75	8.76
Activity - Non Skill Total	20.45	10.49	19.75	8.76
Activity - Skill				
ball skill + (positive)	13.45	5.31	6.58	2.23
ball skill - (negative)	4.86	2.56	3.63	1.79
non ball skill (i.e. defending)	7.12	3.91	11.80	3.69
Activity - Skill Total	25.42	7.49	22.02	7.58
OVERALL ACTIVITY TOTAL	45.88	16.57	41.77	7.06

Differences occur mainly within the activity category. Interestingly both high and low skilled players spent over a third of their time in wait episodes, with low skilled participants spending 36.78% of time, 2.88% more than high skilled participants.

When analysing the activity categories from table 5.5 it is evident that there is little difference in the non skill areas and that the greatest imbalance between high and low skilled

participants occurred in the skill areas. High skilled players achieved over twice as much time positively involved in ball skills (13.45%) than low skilled players (6.58%). The high skilled players also spent greater amounts of time in unsuccessful skill responses (4.86% - high skilled, 3.63% low skilled), indicating the increased opportunities to respond for the high skilled players. However, a greater amount of the time was used by low skilled players in non ball skills, such as defending (11.80%) than high skilled players (7.12%). The low skilled players spent six of the sixteen quarters in the position of Goal Keeper, five at Wing Defence, two at Wing Attack and two at Goal Shooter. The high skilled player spent eight quarters at Goal Attack, two at Wing Attack, two at Centre and three at Goal shooter. (See Appendix 7)

The results from the Revised SOSOR instrument (Table 5.6, p114) are consistent with the Revised ALT-PE/SPORT data and further delineate the imbalance of opportunities to make skill responses between high and low skilled players.

Table 5.6

Revised SOSOR Data - Rates of Responses (1/_ Minutes)

Under 12 Netball Game Data

SESSION RESPONSES	High Skil				Low Skil			
	Tot OTR	X OTR	St Dev	Rate(1/ Mn)	Tot OTR	X OTR	St Dev	Rate(1/ Mn)
Passing								
chest/shoulder	108	27.00	16.78	1.29	86	21.50	7.19	1.36
Bounce	0	0.00	0.00	0.00	0	0.00	0.00	0.00
hook	0	0.00	0.00	0.00	0	0.00	0.00	0.00
overhead	10	2.50	5.00	13.46	0	0.00	0.00	0.00
underarm	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Passing Total	118	29.50	14.15	1.10	86	21.50	7.19	1.36
Shooting								
set shot	51	12.75	11.53	2.42	2	0.50	1.00	68.30
lay-up	0	0.00	0.00	0.00	0	0.00	0.00	0.00
field	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Shooting Total	51	12.75	11.53	2.42	2	0.50	1.00	68.30
				Success (54.9%)				Success (0%)
Catching								
from pass	135	33.75	11.53	1.01	46	11.50	3.87	2.58
rebound	32	8.00	6.93	4.10	13	3.25	4.27	10.32
intercept	5	1.25	1.89	27.32	6	1.50	1.91	22.50
groundball	22	5.50	2.38	6.15	17	4.25	2.22	8.04
Catching Total	194	48.50	13.48	0.43	82	20.50	3.11	1.40
dibbling	0	0.00	0.00	0.00	0	0.00	0.00	0.00
bmp/toss	2	0.50	0.58	39.33	2	0.50	0.58	68.30
intercept	10	2.50	1.29	13.46	1	0.25	0.50	137.00
TOTAL RESPONSES	375	93.75	29.86	0.22	188	47.00	10.78	0.43
No Response	0	0.00	0.00	0.00	3	0.75	1.50	45.40
Uncodable Response	2	0.50	1.00	39.33	1	0.25	0.50	137.00
Acceptable Response	335	83.75	26.04	0.25 (89.3%)	141	35.25	9.11	0.58 (75%)
Unacceptable Response	75	18.75	2.39	3.42 (10.7%)	47	11.75	2.87	2.54 (25%)
Successful Response	297	74.25	25.14	0.28 (79.2%)	135	33.75	9.11	1.01 (71.8%)
Unsuccessful Response	77	19.25	6.85	1.47 (20.8%)	53	13.25	1.71	2.35 (28.2%)

There are some significant differences demonstrated in Table 5.6, with the most outstanding being the rate of opportunities to shoot at goal. The opportunities for lower skilled players were greatly limited because they only spent two quarters in a shooting position, during the four games, (12.5% of game time), even so they still managed only two shots at goal (both unsuccessful) in this time, whilst high skilled players had fifty one shots at a rate of on every 2:42 minutes, during the eleven quarters in a shooting position with a success rate 54.91%.

High skilled players achieved a superior rate of passing during the game (one every 1.10 minutes) than low skilled players (one every 1.36 minutes). They also had a far greater frequency of catching (one catch every 43 seconds) than low skilled players (one catch every 100 seconds). High skilled players received nearly three times as many passes from teammates and collected nearly three times as many rebounds than did low skilled players. Only in the categories of caught interceptions and gaining possession from the ground was there any equity between the high and low skilled players.

Significantly, high skilled players made a successful skill response every twenty eight seconds, whereas low skilled players made one every sixty one seconds.

Training Results

In investigating the Revised ALT-PE/SPORT data (Table 5.7) from under 12 netball training sessions, some imbalances between high and low skilled players are evident. However it is important to consider that the percentages of time spent in specific behaviours for low skilled players are affected by the 7.40% of time spent injured and receiving treatment. The time spent in this capacity obviously effects the participants percentage accrual in other behavioural categories. In contrast to this the high skilled players spent only 0.34% of time injured.

Table 5.7

Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 12 Netball Training Data

	High Skill		Low Skill	
ALT/PE CATEGORIES	(%)	SD	(%)	SD
Non Activity				
injury	0.34	0.63	7.40	13.75
management	8.87	3.96	8.68	4.73
transition	23.53	4.37	19.99	1.18
knowledge	15.96	3.96	14.27	3.30
wait	17.33	5.40	20.46	8.38
wait(reserve)	0.00	0.00	0.00	0.00
Off Task	0.89	0.83	0.47	0.33
Non Activity Total	66.92	5.85	71.27	7.39
Activity - Non Skill				
warmup	0.95	0.77	1.01	0.77
support	0.27	0.42	0.40	0.70
movement	8.12	1.82	9.56	3.19
Activity - Non Skill Total	9.35	1.93	10.97	4.13
Activity - Skill				
ball skill + (positive)	13.51	3.57	9.49	2.33
ball skill - (negative)	3.68	0.69	2.89	0.80
non ball skill (i.e. defending)	6.55	2.69	5.38	1.57
Activity - Skill Total	23.74	4.43	17.77	4.34
OVERALL ACTIVITY TOTAL	33.08	5.85	28.73	7.39

In the non-activity categories the only areas of discrepancy between high and low skilled players occurred in the wait category, where low skilled players spent 20.46% of time waiting, compared with 17.33% by high skilled players. Conversely, high skilled players spent 3.54% more time in transition behaviours, spending 23.53% of time, compared to 19.99% for low skilled players. In the activity behaviours, low skilled players spent marginally more time (10.97%) in nonskilled activity than high skilled players (9.35%). However

in all areas of skilled behaviour, high skilled players were involved for a greater percentage of time than low skilled players. This is most evident in ball skills (positive) where they accrued 13.51% compared with 9.49% for low skilled players.

The contrasting opportunities provided for high and low skilled participants to make ball skill responses is demonstrated in specific skill areas in the Revised SOSOR data in Table 5.8.

Table 5.8
Revised SOSOR Data - Rates of Responses (1/_ Minutes)
Under 12 Netball Training Data

SESSION	High Skill				Low Skill			
RESPONSES	Tot OTR	% OTR	St Dev	Rate(1/_Min)	Tot OTR	% OTR	St Dev	Rate(1/_Min)
Passing								
chest/shoulder	202	50.50	13.43	1.12	209	52.25	3.30	1.06
Bounce	7	1.75	2.87	34.54	1	0.25	0.00	229.20
hook	1	0.25	0.50	241.00	-	0.00	0.00	0.00
overhead	9	2.25	1.71	27.09	8	2.00	3.37	28.40
underarm	24	6.00	9.35	10.11	3	0.75	0.96	76.27
Passing Total	243	60.75	6.08	1.00	221	55.25	5.62	1.02
Shooting								
set shot	76	19.00	7.02	3.13	32	8.00	8.12	7.10
lay-up	0	0.00	0.00	0.00	0	0.00	0.00	0.00
field	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Shooting Total	32	8.00	7.02	3.13	32	8.00	8.12	7.10
				Success (38.2%)				Success(56.2%)
Catching								
from pass	239	59.75	10.21	1.01	184	46.00	2.45	1.15
rebound	43	10.75	4.50	5.41	15	3.75	0.96	15.17
intercept	8	2.00	1.41	30.32	3	0.75	0.96	76.27
groundball	51	12.75	2.63	4.47	45	11.25	3.30	5.05
Catching Total	341	85.25	12.42	0.43	247	61.75	6.45	0.56
dribbling	0	0.00	0.00	0.00	0	0.00	0.00	0.00
turns/toes	3	0.75	0.96	74.47	2	0.50	0.00	0.00
intercept	14	3.50	1.73	17.27	10	2.50	1.73	22.56
TOTAL RESPONSES	676	169.00	19.05	0.22	510	127.50	18.16	0.27
No Response	0	0.00	0.00	0.00	4	1.00	0.82	57.20
Uncodable Response	4	1.00	1.41	61.05	1	0.25	0.50	229.20
Acceptable Response	623	155.75	17.56	0.24 (92.2%)	419	104.75	23.41	0.33 (82.2%)
Unacceptable Response	53	13.25	4.65	4.37 (7.8%)	91	22.75	9.95	2.31 (17.8%)
Successful Response	553	138.25	18.46	0.27 (81.8%)	433	108.25	16.01	0.31 (84.5%)
Unsuccessful Response	123	30.75	2.50	2.30 (18.2%)	77	19.25	2.63	2.59 (15.1%)

The data shows that high skilled participants had more opportunities to respond in every skill category and made a skill response every 22 seconds as opposed to every 30 seconds for low skilled players. They were successful in more of these responses (81.8%) than the low skilled participants (71.8%), making a successful response every 24 seconds compared to every 33 seconds for low skilled players.

There was little difference in the passing category with high skilled players making a pass every minute as compared to every 1:02 minutes for low skilled players. However in this category one major difference occurred, in the rates of underarm passes made. High skilled players made an underarm pass every 10:11 minutes, whilst low skilled players only made one every 76:27 minutes.

The most striking difference between high and low skilled participants occurred in the goal shooting opportunities. High skilled players made a shot at goal every 3:13 minutes, whilst low skilled players only shot every 7:10 minutes. Interestingly the low skilled players were successful in 56.2% of shots compared to 38.2% for high skilled players. Another major difference occurred with the gaining of possession (catching). High skilled participants made a catch every 43 seconds, whilst the low skilled participants made one every 56 seconds. Of the catching categories, the most striking difference was evident in rebounding, where the high skilled participants made almost three times as many responses than did the low

skilled participants, attempting a rebound every 5:41 minutes as opposed to every 15:17 minutes for low skilled participants.

In summary, the high skilled player made more frequent skill responses in each major category than low skilled participants, with the most significant disparity occurring in the response rates of shooting at goal, and in catches (especially rebounds).

Discussion of Under 12 Netball Results

Game Results

The results from Table 5.5 and Table 5.6 reveal that the major difference between high and low skilled players occurred in the activity-skill categories. High skilled players spent over double the amount of time positively engaged in ball skills than the lower skilled players. However, a greater amount of the time was used by low skilled players in non ball skills, such as defending (11.80%) than high skilled players (7.12%). This may be due to the positions played by the low and high skilled players, as the low skilled players spent far more time in defensive positions and in positions that were more restricted in their area of allowed movement. Obviously with the low skilled players spending more time in defensive positions, they are more likely to spend time engaged in the skill of defence. Also the positions such as Goal Attack, Wing Attack and Centre which were assigned to high skilled players in twelve of the sixteen quarters, accrue greater rates of skill

possessions than do the positions of Goal Keeper and Wing Defence in which the low skilled player spent eleven of the eighteen quarters (Otago, 1982).

The low skilled players spent only two of the sixteen quarters in a shooting position, in which they did not make one successful shot. Whereas the high skilled players spent eleven quarters in either of the shooting positions, making 51 shots at goal in this time. The coach tended to place children in specialised positions, which fairly well negated sufficient practice of the skill of shooting for low skilled players. By combining the shooting success rates of high and low skilled players, an overall shooting success percentage of 52.8% was achieved.

Another interesting difference occurred in the rate of rebounding by high and low skilled participants (See Table 5.6). Despite the low skilled players spending Ten quarters in a goal circle position, (defensive and attacking) one less than high skilled players, they only made a rebound from the goals every 10:32 minutes, while the high skilled players made one every 4:18 minutes. Anecdotal records show that the low skilled players would often not follow the shot to the ring, or appeared apprehensive in rebounding, often leaving this skill up to another player from their team.

As was the case with the under 10 participants, higher skilled players received a greater proportion of their catches from a pass (70%) than did low skilled players (56%) indicating that

players are more likely to pass the ball to the high skilled player, be that a function of the position they are playing or a judgment made on the skill ability of the player.

Training Results

The results from Table 5.7 show that over two thirds of high and low skilled participants' time was spent in non-activity behaviours. Over 20% was spent in waiting episodes and over 20% in transition episodes. The coach tended to spend a great deal of time in explaining and demonstrating skills to the players, resulting in 15.96% of high skilled players' time and 14.27% of low skilled players' time being spent in knowledge content. This amount of time is greater than the amount of time that players were positively involved inball skill practice (High skilled players - 13.12 %, low skilled participants - 9.49%).

The structure of the training sessions greatly effected the opportunities to respond for participants. When the coach employed pair or small group work for skills practice, the players achieved much higher rates of responses. This however tended to dissipate when whole group games were employed, which was often, especially effecting lower skilled players, as the high skilled players tended to dominate possessions during these activities.

Table 5.8 demonstrates how the higher skilled participants achieved greater skill response rates in all major skill

categories, with the major differences being in the frequency of shooting and catching responses. The contrast in shooting opportunities is mainly due to the reliance by the coach in spending much of each training session in modified games or scrimmage activities. As a result, the participants were often placed in positions similar to those played during the weekend game, with the high skilled players being positioned in goal scoring positions more regularly. This also explains why the shooting success was higher for low skilled players as the majority of their shots were taken from close range in shooting practice exercises, whereas the majority of the high skilled participants' shots were taken during game/scrimmage play.

The coach did not appear to have an understanding of the need for utilisation of time nor the strategies to increase active involvement. Too little time was supplied for practice of specific skills, nor was the use of more than one or two balls in a practice session employed, despite the availability of enough equipment to reduce the equipment/child ratio.

Comparison and Analysis of Results For Under 10 and 12 Netball

A comparison of the results of the study of under 10 and under 12 netball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in summary tables 5.9 and table 5.10 for game results and tables 5.11 and 5.12 for training results.

Game Results

When analysing the data from both age groups some interesting contrasts and similarities can be made. It is evident from Table 5.9 that in both year groups the low skilled participants achieved far less successful ball skill contact than high skilled participants.

Table 5.9
Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Under 10 and Under 12 Netball Game Data

ALT/PE CATEGORIES	High Skill U/10	High Skill U/12	MEAN (X̄) OF U/10 & U/12	Low Skill U/10	Low Skill U/12	MEAN (X̄) OF U/10 & U/12
Non Activity						
injury	0.00	0.00	0.00	0.00	0.00	0.00
management	1.27	0.11	1.14	0.96	0.11	0.95
transition	17.37	13.45	15.41	17.50	14.64	16.07
knowledge	0.00	0.00	0.00	0.00	0.00	0.00
wait	23.83	33.90	28.86	40.88	36.78	38.83
wait(reserve)	12.60	6.67	9.64	12.70	6.70	9.65
off Task	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	55.08	54.12	54.60	72.04	58.23	65.14
Activity - Non Skill						
warmup	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00
movement	22.67	20.45	21.56	13.13	19.75	16.44
Activity - Non Skill Total	22.67	20.45	21.56	13.13	19.75	16.44
Activity - Skill						
ball skill + (positive)	11.86	13.45	12.66	4.91	6.58	5.74
ball skill - (negative)	4.03	4.86	4.44	2.77	3.63	3.20
non ball skill (i.e. defending)	6.36	7.12	6.74	7.15	11.80	9.48
Activity - Skill Total	22.25	25.42	23.84	14.83	22.02	18.42
OVERALL ACTIVITY TOTAL	44.92	45.88	45.40	27.96	41.77	34.86

The percentage of time spent positively involved in ball skills was higher in both low and high skilled categories for under 12 players (13.45% & 6.58%), than under 10 players (11.86% & 4.91%).

In both age groups, the low skilled player spent significantly more time in wait episodes, with an overall mean for the two ages of 38.83%, compared to 28.86% for high skilled players, indicating that the low skilled children spent well over a third of game time just waiting to be involved.

In both the under 10 and 12 teams low and high skilled players spent equitable times as a reserve. The difference in the percentages in the wait reserve category for the under 10 and under 12 teams was simply an occurrence respective to sampled data collection, whereby not all of the season's games were observed, and by chance, games observed in the under 10 team involved two quarters spent as a reserve per player, compared to one quarter in the under 12 observations.

The difference between the amount of activity experienced by high and low skilled participants was significantly broader in under 10 netball than in under 12 netball, (9.54% difference between under 10 high and low skilled participants and 0.70% difference in under 12 netball). Low skilled players in under 12 netball also spent 4.68% more time in non ball skill activity than the high skilled players, whilst low skilled under 10 netball players only spent 0.79% more time in this area.

The greater difference in skill response opportunities between under 10 high and low skilled players is further highlighted by the Revised SOSOR results in Table 5.10.

Table 5.10

Revised SOSOR - Rates of Responses (1/_ Minutes)
Under 10 and 12 Netball Game Data Summary

RESPONSES	HIGH SKILL			LOW SKILL		
	u10	u12	MEAN (X̄) OF U/10 & U/12	u10	u12	MEAN (X̄) OF U/10 & U/12
Passing						
chest/shoulder	0.56	1.29	1.06	2.44	1.36	2.01
Bounce	0.00	0.00	0.00	0.00	0.00	0.00
hook	0.00	0.00	0.00	0.00	0.00	0.00
overhead	0.00	13.46	27.31	136.20	13.46	273.20
underarm	0.00	0.00	0.00	0.00	0.00	0.00
Passing Total	0.56	1.10	1.02	2.40	1.36	2.00
Shooting						
set shot	4.35	2.42	3.23	8.01	68.30	14.23
lay-up	0.00	0.00	0.00	0.00	0.00	0.00
field	0.00	0.00	0.00	0.00	0.00	0.00
Shooting Total	4.35	2.42	3.23	8.01	68.30	14.23
Catching						
from pass	1.03	1.01	1.02	2.47	2.58	2.52
rebound	10.34	4.18	6.07	27.16	10.32	15.11
intercept	6.33	27.32	10.11	34.05	22.50	27.20
groundball	4.55	6.15	5.30	5.27	8.04	6.30
Catching Total	0.43	0.43	0.43	1.39	1.40	1.33
dribbling	0.00	0.00	0.00	0.00	0.00	0.00
jump/toss	19.39	39.33	30.34	68.10	68.30	48.20
intercept	9.49	13.46	11.27	34.05	137.00	11.53
TOTAL RESPONSE	0.22	0.22	0.22	0.50	0.43	0.47
No Response	0.00	0.00	0.00	45.27	45.40	45.33
Uncodable Response	0.00	39.33	137.35	0.00	137.00	273.20
Acceptable Response	0.22	0.25	0.24	1.10	0.58	1.04
Unacceptable Response	4.35	3.42	3.59	3.06	2.54	3.02
Successful Response	0.26	0.28	0.27	1.10	1.01	1.05
Unsuccessful Response	1.53	1.47	1.50	3.06	2.35	2.49

The total responses for the high skilled competitors in both under 10 and under 12 are the same (one response every 22 seconds), whilst the rate for under 10 low skilled players was

one response every 50 seconds, as opposed to one every 43 seconds for under 12 low skilled participants.

Other interesting comparisons can be made using the Revised SOSOR data. Results show that in the catching category for high skilled players that both year levels achieved the rate of one response every 23 seconds. In under 10 netball the high skilled players made more disposals by passing every 56 seconds, whereas the under 12 high skilled players made a pass every 70 seconds. However, the under 10 high skilled players made less shots at goal (1/4:35 mins) as compared to 1/2:42 mins for under 12 teams.

Catching results were also very similar for low skilled under 10 and under 12 players. (1/39 secs - U/10 and 1/40 secs - U12). Interestingly in both age groups the low skilled players made significantly less rebounds than high skilled players and had to achieve a much a higher proportion of possessions from loose balls on the ground than their higher skilled counterparts.

Under 10 low skilled players were less frequent in their passes than under 12 low skilled players (1/2:40 mins- Under 10 and 1/1:36 mins - Under 12) though had a superior rate for shooting (1/8:01 mins -U/10 and 1/68:30 mins - U/12).

When assessing the difference in the shooting means of high and low skilled players over both teams it demonstrates a major inequity in favour of the high skilled player. They

received over four times as many shooting opportunities than the low skilled player, with a rate of one shot every 3:23 minutes compared to every 14:23 minutes for low skilled players.

The closeness in the overall skill responses of high skilled players in both age groups and low skilled players in both age groups, make for interesting comparisons. The high skilled under 10 players made a successful skill response every 26 seconds with 81.3% of all skill responses being successful, compared with a rate of one every 28 seconds and percentage of 79.2% for under 12 high skilled players. Low skilled under 10 players made a successful skill response every 70 seconds with 72.6% of all responses being successful, whilst under 12 low skilled players made a successful skill response every 61 seconds with a percentage of 71.8% for successful responses.

Training Results

Results from the Revised ALT-PE/SPORT instrument indicate that in both teams little time was spent in activity, with much more time spent in non-activity behaviours such as waiting and transition episodes (see table 5.11, p. 128).

Table 5.11

Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Under 10 and Under 12 Netball Training Data

ALT/PE CATEGORIES	High Skill			Low Skill		
	U/10	U/12	MEAN (X) OF U/10 & U/12	U/10	U/12	MEAN (X) OF U/10 & U/12
Non Activity						
injury	0.00	0.34	0.17	0.00	7.40	3.70
management	7.06	8.87	7.96	6.84	8.68	7.76
transition	20.70	23.53	22.12	19.03	19.99	19.51
knowledge	10.42	15.96	13.19	8.84	14.27	11.56
wait	25.38	17.33	21.36	28.87	20.46	24.66
wait(reserve)	0.00	0.00	0.00	4.49	0.00	2.24
off Task	1.33	0.89	1.11	0.93	0.47	0.70
Non Activity Total	64.90	66.92	65.91	69.00	71.27	70.14
Activity - Non Skill						
warmup	4.83	0.95	2.89	5.27	1.01	3.14
support	1.68	0.27	0.98	0.57	0.40	0.48
movement	8.25	8.12	8.18	6.56	9.56	9.06
Activity - Non Skill Total	14.76	9.35	12.06	12.40	10.97	11.68
Activity - Skill						
ball skill + (positive)	12.73	13.51	13.12	10.12	9.49	9.80
ball skill - (negative)	3.22	3.68	3.45	4.70	2.89	3.80
non ball skill (i.e. defending)	4.41	6.55	5.48	3.78	5.38	4.58
Activity - Skill Total	20.35	23.74	22.04	18.60	17.77	18.18
OVERALL ACTIVITY TOTAL	35.10	33.08	34.09	31.00	28.73	29.86

transitional behaviours and over 26% in waiting. Similar
results were found for the under 12 participants with over
22% of time spent in transitional behaviours and 18% in
waiting. The under 12 participants actually spent more time in
receiving knowledge (14% of time) than in successful practice
of ball skills.

Revised SOSOR response rates (Table 5.12, p. 129) for under 10
participants were marginally better than the under 12
participants in most skill areas.

Table 5.12

Revised SOSOR - Rates of Responses (1/ Minutes)

Under 10 and 12 Netball Training Data Summary

RESPONSES	HIGH SKILL			LOW SKILL		
	u10	u12	MEAN (X) OF U/10 & U/12	u10	u12	MEAN (X) OF U/10 & U/12
Passing						
chest/shoulder	0.53	1.12	1.01	1.04	1.06	1.05
Bounce	9.56	34.54	15.34	9.54	229.20	18.21
hook	0.00	241.00	482.40	0.00	0.00	0.00
overhead	119.10	27.09	43.53	123.50	28.40	47.17
underarm	0.00	10.11	20.07	0.00	76.27	159.00
Passing Total	0.48	1.00	0.53	0.57	1.02	1.00
Shooting						
set shot	8.31	3.13	4.38	9.10	7.10	8.05
lay-up	0.00	0.00	0.00	0.00	0.00	0.00
field	0.00	0.00	0.00	0.00	0.00	0.00
Shooting Total	8.31	3.13	4.38	9.10	7.10	8.05
Catching						
from pass	0.51	1.01	0.56	0.56	1.15	1.04
rebound	11.55	5.41	7.40	82.33	15.17	26.30
intercept	18.20	30.32	23.59	49.32	76.27	59.37
groundball	5.58	4.47	5.18	8.50	5.06	6.32
Catching Total	0.40	0.43	0.41	0.49	0.56	0.52
dribbling	0.00	0.00	0.00	0.00	0.00	0.00
jump/toss	14.01	74.47	24.08	17.41	0.00	20.44
intercept	26.29	17.27	20.59	61.55	22.56	34.04
TOTAL RESPONSE	0.20	0.22	0.21	0.25	0.27	0.26
No Response	119.10	0.00	241.20	247.40	57.20	95.24
Uncodable Response	47.40	61.05	53.32	61.55	229.20	95.24
Acceptable Response	0.22	0.24	0.23	0.30	0.33	0.31
Unacceptable Response	3.19	4.37	3.52	2.12	2.31	2.20
Successful Response	0.23	0.27	0.25	0.30	0.31	0.31
Unsuccessful Response	1.46	1.59	2.30	2.26	2.59	2.40

High skilled under 10 participants made a successful skill response every 23 seconds, compared to every 27 seconds for high skilled under 12 participants. Low skilled under 10 participants made a successful skill response every 30 seconds and under 10 low skilled players made a successful skill response every 31 seconds.

The most strident difference between the two age groups occurred in the amount of shooting practice. High skilled under 10 participants made a shooting response every 8:31 minutes, compared to every 3:31 minutes for high skilled under 12 participants. Low skilled under 10 participants made a shooting skill response every 9:10 minutes and under 12 low skilled participants every 7:10 minutes. The shooting rates in the high and low skilled under 10 participants was quite similar, though the high skilled participants shot successfully on 46.40% of occasions, compared to only 27.90% for low skilled participants. The under 12 high skilled players shot far more frequently than the low skilled participants, though were 18% less successful in their shooting percentage. The amount of extra shooting responses made by the under 12 participants was compensated by the more frequent passing practice that the under 10 players had. Catching rates were consequently marginally higher for under 10 participants.

Another contrast that can be made be made between the two teams is in the amount of wait time that participants endured. The wait time percentages were quite high for participants of both teams, however, it was worse for under 10 participants who spent over 8% more time waiting than the under 12 participants.

Other differences occurred in the categories of warmup and receiving knowledge. The under 10 participants spent approximately 5% of time in warmup activities, whilst the

under 12 participants spent only about 1% of time in such activities at the start of training sessions.

The participants in the under 12 team spent over 5% more time involved in knowledge content than the under 10 participants. Interestingly, the low skilled participants in both teams received less knowledge content than high skilled players. (1.56% less in under 10 and 1.69% less in under 12).

Discussion of Under 10 and 12 Netball Results

Game Results

The results shown in tables 5.9 and 5.10 demonstrate a great inequity in skill involvement for high and low skilled players. In both age groups the low skilled player spent less time in activity and made less responses in all type of skills. Too much time was lost by low skilled players in non-activity behaviours. A major difference was evident in the amount of wait time spent by each skill group, with low skilled players of both ages spending considerably more time in wait episodes. This combined with the time spent as a reserve, and in transition and management behaviours, demonstrates that low skilled players were not sufficiently involved in activity during a junior netball game.

High skilled players in the under 12 games spent 10.07% more time in wait episodes than the under 10 high skilled players. This is mainly a function of the positions assigned to the

respective team members, with under high skilled 12 team members spending two more quarters in the restrictive G.S/G.K. positions, than the under 10 high skilled players. The relative success experienced by the team. (i.e. under 10 team not losing a game and under 12 team losing two games) may have also effected the results, with the under 12 high skilled player spending thirteen of the sixteen quarters in attacking positions in a less successful team.

The under 10 high and low skilled players spent less time in activity than their under 12 counterparts. This may be explained by the greater amounts of time they spent in transition and management episodes. Such a situation may be expected as under 10 players are just learning the procedures of the game.

In both the under 10 and 12 teams low and high skilled players spent equitable times as a reserve as both coaches instituted a roster system of appointing reserves.

The range in the amount of activity experienced by high and low skilled participants was significantly broader in under 10 netball than in under 12 netball, (9.54% difference between under 10 high and low skilled participants and 0.70% difference in under 12 netball). Much of this can be attributed to the difference in time spent in movement episodes as a result of the positions assigned to under 10 low skilled participants, whereby they spent fifteen of the sixteen quarters in either Goal Keeper, Goal Shooter or as reserve,

compared to only three quarters for high skilled under 10 players. Low skilled under 12 players spent nine quarters in these roles, compared to four for high skilled under 12 players.

Low skilled players in under 12 netball spent 4.68% more time in non ball skill activity than the high skilled players, whilst low skilled under 10 netball players only spent 0.79% more time in this activity. This was mainly due to the low skilled under 12 players spending more time in defensive positions than the under 10 low skilled players.

The total responses for the high skilled competitors in both under 10 and under 12 were the same, whilst the rate for under 10 low skilled players of one response every 50 seconds as opposed to one every 43 seconds for under 12 low skilled participants. This difference in the low skilled responses may be as a result of players by the age of under 12 having a greater proficiency in the skills, with less of a range of abilities. In under 10 games it was obvious that the high skilled children had mastered many of the skills, whilst the low skilled children were still beginning to learn many of them. It may also be the case that by the time children reach the higher age groups, some of the lower skilled participants have dropped out, (Robertson ,1981), due to lack of response opportunities, thus leaving less of a range of skill abilities in older age groups.

Revised SOSOR results show that high skilled under 10 netball players made more passes than the under 12 high skilled

players. However, the under 10 high skilled players made less shots at goal than the under 12 teams. Again this appeared to be primarily a function of the positions played during the game, with the under 12 high skilled players spending more time in shooting positions.

The modification of equipment in the under 10 age group has resulted in both high and low skilled participants achieving comparable successful skill responses rates with the under 12 participants, which indicates that the equipment suits the developmental level of the children. Despite the under 10 players shooting a lower percentage of shots than the under 12 players, the difference was negligible, indicating the lowering of the ring facilitated a satisfactory level of shooting success.

The minor game modifications such as the six second ball holding rule and equipment modifications such as reduction in the ball size and goal height assist in achieving satisfactory levels of success in performing skills, but in no way address the disproportionate number of opportunities to respond that occur between the differing skill levels. It appears that despite the game of netball being played in restricted areas for different positions, the current game design does not seem to assist in providing equitable involvement for players of different skill ability.

Training Results

The results taken from training observations indicate that neither coach was able to provide sessions that utilised the majority of the allocated time for skill practice. Low skilled players were successfully engaged in skill content less than higher skilled participants, though the difference was not considerable.

The organisation of the training session and the choice and design of the activities employed by both coaches led to high percentages of non-active time for all participants. When skill practices were completed in pairs or small groups, participants were able to execute numerous skill responses in a short space of time. However this was done infrequently with the available equipment not being properly utilised. Both coaches preferred to institute practices on many occasions that relied on the use of one ball for the whole team. The predominance of whole group practices and half court or full court trial games produced the high amounts of wait time, and directly attributed to the lower skill response rates and percentages for low ... ed players compared to high skilled players. These findings reinforce the conclusions made by Placek et al., (1982, p.45) who stated that the low skill success rate in team sports

> ...raises serious questions about using team-size groupings for practice, when the goal is psychomotor skill achievement. Since ALT-PE data indicate severely limited opportunities to practice in game and scrimmage

situations, other organisational strategies may more appropriately provide more practice for the child.

The under 12 coach spent over 14% of time in demonstrating skills and in discussing game strategies. This appears to be somewhat excessive, given that less time was spent in successful ball skill involvement. The under 10 participants had to endure long lines waiting for activities resulting in over a quarter of the allocated training time being spent in wait episodes.

Coaches of both teams did not seem conscious of how much time was lost in non-activity behaviours and the training sessions followed a similar pattern throughout the season. Strategies to maximise participant involvement were not implemented by either coach, with the training sessions only providing limited opportunities for ball skill responses, especially so for low skilled participants.

Specific Research Questions

1. What level of successful motor skill engagement, is provided for high and low skill participants, in junior basketball programmes?

3. What level of successful motor skill engagement is provided in the adult and modified game structures and practice sessions in junior basketball, and how do the differing game designs compare?

Analysis and Interpretation of Results From Under 10 Basketball Observations

Results of the study of under 10 basketball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in tables 5.13, 5.14, 5.15 and 5.16.

Game Results

In investigating the results from the Revised ALT-PE /SPORT observations (see Table 5.13), the most obvious difference between the high and low skilled players occurs in the amount of time low skilled players spent off the court as a reserve.

Table 5.13
Revised ALT-PE/SPORT - Behavioural Category Percentages Under 10 Basketball Game Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	0.82	0.75	0.74	0.50
transition	18.56	3.28	12.75	6.88
knowledge	8.72	3.15	8.61	3.68
wait	12.21	1.94	6.80	4.76
wait(reserve)	5.44	6.68	39.74	32.85
Off Task	0.00	0.00	0.00	0.00
Non Activity Total	45.74	5.52	68.65	18.87
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00
movement	25.85	7.12	21.89	12.87
Activity - Non Skill Total	25.85	7.12	21.89	12.87
Activity - Skill				
ball skill + (positive)	14.67	1.51	3.93	4.16
ball skill - (negative)	4.82	0.60	2.55	1.95
non ball skill (i.e. defending)	8.92	1.27	2.98	1.27
Activity - Skill Total	28.41	2.06	9.46	6.58
OVERALL ACTIVITY TOTAL	54.26	5.52	31.35	18.87

The low skilled players spent 39.74% of game time as a reserve, 34.30% more than the high skilled player. The amount of time low skilled players spent off the court reduced percentages of time accrued in other categories. The result of high skilled players spending 5.81% more time in transition episodes is indicative of how the specific categories have been affected by different amounts of time spent on the court .

Another major area of imbalance between the high and low skilled players was evident in the skill activity section. High skilled players were successfully engaged in skill activity for 14.67% of the time, with low skilled players only being successfully engaged for 3.93% of the time. High skilled players also spent 2.27% more time involved in unsuccessful skill responses, due to the far greater amounts of skill responses they made. High skilled players also spent much more time in non-ball skill activities (8.92%) than did low skilled players (2.98%). The high skilled players spent 18.95% more time in skill activity than did low skilled players. Despite the differences in the ball skill responses and the far greater amount of time spent off the court by low skilled players there was little difference in the amount of time spent in non-skill activity. High skilled players spent 25.85% and low skilled players 21.89% of time in non-skill activity behaviours.

Results from the Revised SOSOR in Table 5.14 further reinforce the imbalance in ball skill involvement between the two skill groups.

Table 5.14

Revised SOSOR Data - Rates of Responses (1/ Minutes)

Under 10 Basketball Game Data

SESSION	High Skill				Low Skill			
RESPONSES	Tot OTR	Ż OTR	St Dev	Rate(1/ Min)	Tot OTR	Ż OTR	St Dev	Rate(1/ Min)
Passing								
chest/shoulder	135	33.75	8.85	1.07	36	9.00	7.35	2.34
Bounce	9	2.25	3.30	16.53	1	0.25	0.50	92.23
hook	2	0.50	1.00	75.33	1	0.25	0.50	92.23
overhead	1	0.25	0.50	152.46	1	0.25	0.50	92.23
underarm	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Passing Total	147	36.75	12.42	1.02	39	9.75	7.59	2.22
Shooting								
set shot	5	1.25	0.96	30.32	0	0.00	0.00	0.00
lay-up	15	3.75	1.71	10.11	2	0.50	1.00	46.12
field	60	15.00	4.24	2.33	8	2.00	2.71	11.33
Shooting Total	80	20.00	2.83	1.55	10	2.50	3.70	9.14
				Success (34.6%)				Success (0%)
Catching								
from pass	116	29.00	4.97	1.19	21	5.25	3.77	4.24
rebound	28	7.00	2.58	5.27	11	2.75	1.26	8.24
intercept	36	9.00	3.56	4.15	7	1.75	2.87	13.32
groundball	36	9.00	5.42	4.15	13	3.25	2.87	7.05
Catching Total	185	46.25	16.21	0.42	52	13.00	9.38	1.47
dribbling	136	34.00	3.56	1.07	16	4.00	4.24	5.46
jump/toss	2	0.50	0.58	76.23	1	0.25	0.96	30.48
intercom	0	0.00	0.00	0.00	1	0.25	0.50	92.23
TOTAL RESPONSES	581	145.25	18.68	0.16	121	30.25	23.89	0.46
No Response	2	0.00	0.58	76.32	0	0.00	0.00	0.00
Uncodable Response	4	1.00	1.41	38.16	0	0.00	0.00	0.00
Acceptable Response	506	126.50	21.55	0.18 (87.1%)	95	23.75	20.84	0.58 (78.5%)
Unacceptable Response	75	18.75	2.99	2.02 (12.9%)	26	6.50	4.43	3.38 (21.5%)
Successful Response	481	120.25	15.13	0.19 (82.0%)	86	21.50	17.25	1.04 (71.1%)
Unsuccessful Response	100	25.00	4.24	1.32 (17.2%)	35	8.75	7.37	2.38 (28.9%)

The Revised SOSOR results only report on the time a participant is on the court, thus are not affected, like the Revised ALT-PE/SPORT instrument, with the time a player spends as a reserve. Despite only calculating involvement during court time, there was still a major imbalance between high and low skilled players.

The data indicated that high skilled players made a pass every 1:02 minutes compared to the low skilled players rate of one pass every 2.22 minutes. The most obvious difference occurred in shooting rates. High skilled players made a shot at goal every 1:55 minutes, compared to the low skilled player's rate

of one every 9:14 minutes. In the four games played, the low skilled players only made ten shots, of which <u>none</u> were successful, whereas the high skilled players made eighty shots at a success rate 34.6%.

High skilled players made a catch every 42 seconds whilst the low skilled players made one every 107 seconds. The high skilled players achieved a higher rate in all types of catching, but the low skilled players had to gain a greater proportion of their catches from the ground. Low skilled players only received a pass from team mates every 4:24 minutes, whilst high skilled players received one every 1:19 minutes.

There was also a great inequity in the rate of dribbling by the players. Results show that the low skilled players only dribbled the ball every 5:46 minutes compared to the high skilled players' rate of one dribble every 1:07 minutes. Results indicate that upon gaining possession of the ball the high skilled player would dribble on over 70% of occasions, whereas the low skilled player would dribble on only 31% of occasions after possession. Overall the high skilled players had nearly three times more opportunities to respond than the low skilled players and made a successful response every 19 seconds, whilst low skilled players made a successful response every 64 seconds.

Training

Results from the Revised ALT-PE/SPORT (Table 5.15) show that the majority of training time was spent in non-activity behaviours.

Table 5.15
Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 10 Basketball Training Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	2.60	2.16	2.38	1.65
transition	19.02	5.34	16.95	2.92
knowledge	19.27	8.51	22.11	6.73
wait	29.59	3.24	31.29	3.19
wait(reserve)	0.57	1.11	0.00	0.00
Off Task	3.74	3.56	1.31	0.95
Non Activity Total	74.80	6.36	74.04	5.89
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.89	0.66	1.15	0.63
movement	5.61	3.63	5.81	3.12
Activity - Non Skill Total	6.50	3.08	6.88	2.92
Activity - Skill				
ball skill + (positive)	11.14	2.45	10.57	1.67
ball skill - (negative)	3.41	0.68	5.41	1.99
non ball skill (i.e. defending)	4.15	2.11	3.03	2.01
Activity - Skill Total	18.70	4.13	19.08	3.37
OVERALL ACTIVITY TOTAL	25.20	6.83	25.96	5.89

Low skilled participants spent 74.04% of time and high skilled participants 74.80% of time in such behaviours. Many variables contributed to this large percentage of time. High skilled participants spent 19.02% of time in transitional episodes and

low skilled players 16.95%. The amount of time spent in receiving knowledge accounted for much of the time spent in non-activity behaviours. The coach spent slightly more time in delivering knowledge to low skilled participants (22.11%) than high skilled players (19.27%). Results from Table 5.9 also demonstrate that both high and low skilled participants spent nearly a third of their time waiting to be involved in activity. High skilled participants spent 29.59% of time on waiting episodes compared to 31.29% for low skilled participants.

The Revised ALT-PE/SPORT results (Table 5.15) showed that there was no marked difference in the amount of time spent by the high and low skilled players in the ball skill categories, though it must be recognised that the amount of time spent in making ball skill responses accounted for little of the overall training time, with high skilled players spending 11.14% of time engaged in successful ball skill practice and low skilled players 10.57%.

Revised SOSOR rates (Table 5.16, p143) indicate a greater difference in the success achieved in ball skill responses for high and low skilled participants, than shown in the Revised ALT-PE/SPORT results, with high skilled players making a successful ball skill response every 22 seconds and low skilled players every 29 seconds.

Table 5.16

Revised SOSOR Data - Rates of Responses (1/_ Minutes)
Under 10 Basketball Training Data

SESSION RESPONSES	High Std				Low Std			
	Tot OTR	X OTR	St Dev	Rate(1/ Min)	Tot OTR	X OTR	St Dev	Rate(1/ Min)
Passing								
chest/shoulder	147	36.75	2.99	1.24	153	38.25	9.54	1.22
Bounce	21	5.25	4.57	9.52	5	1.25	0.96	42.08
hook	7	1.75	1.71	27.35	6	1.50	2.38	35.06
overhead	4	1.00	0.82	51.46	1	0.25	0.50	210.38
underarm	8	2.00	1.83	25.53	11	2.75	1.26	19.09
Passing Total	187	46.75	3.30	1.09	176	44.00	12.52	1.12
Shooting								
set shot	25	6.25	8.10	8.17	25	6.25	7.41	8.26
lay-up	36	9.00	6.63	5.45	11.05	2.76	6.86	11.05
field	37	9.25	2.22	5.35	22	5.50	2.38	9.34
Shooting Total	98	24.50	15.55	2.07	66	16.50	10.41	3.11
				Success(45.0%)				Success(31.8%)
Catching								
from pass	182	45.50	6.86	1.09	165	41.25	11.35	1.16
rebound	45	11.25	12.09	4.36	27	6.75	3.86	7.48
intercept	7	1.75	1.71	27.35	6	1.50	0.58	35.06
groundball	50	12.50	1.29	4.09	45	11.25	2.50	6.41
Catching Total	284	71.00	13.44	0.43	243	60.75	10.69	0.52
dribbling	131	32.75	10.90	1.35	107	26.75	9.81	1.58
jump/toss	1	0.25	0.50	207.05	1	0.25	0.50	210.38
intercept	8	2.00	1.83	15.53	4	1.00	1.41	52.40
TOTAL RESPONSE	687	171.75	27.94	0.18	597	149.25	30.59	0.21
No Response	1	0.25	N/A	207.05	5	1.25	1.50	42.08
Uncodable Response	89	22.25	10.90	2.19	33	8.25	6.95	6.23
Acceptable Response	554	138.50	16.20	0.22 (80.6%)	422	105.50	19.84	0.30 (70.7%)
Unacceptable Response	218	54.50	19.49	1.33 (19.4%)	175	43.75	17.73	1.12 (29.3%)
Successful Response	571	142.75	20.02	0.22 (83.1%)	447	111.75	23.87	0.29 (74.9%)
Unsuccessful Response	116	29.00	9.90	1.47 (16.9%)	150	37.50	7.72	1.24 (25.1%)

The high skilled participants made more frequent skill responses during the games (one every 16 seconds) than in practice sessions (one every 18 seconds), though the low skilled player was able to make a skill response every 21 seconds during training as opposed to every 64 seconds during the game.

When analysing the skill responses in Table 5.16 some disparities are evident between high and low skilled players.

Rates for passing were quite equitable (High skilled - 1/1:06 minutes, low skilled - 1/1:12minutes), though high skilled participants made far more frequent bounce passes, completing one every 2:48 minutes compared to every 9:12 minutes for the the low skilled player, as was the case during game play.

A major area of difference came in the frequency of the shots made during training. Though the difference was not as marked as during game play, the high skilled participant was still able to make a shot every 2:07 minutes (45% success) compared to a shot every 3:11 minutes (31.8% success) for the low skilled participants.

High skilled participants made a catch every 43 seconds, with the low skilled players making a catch every 52 seconds. There was no significant contrasts between the high and low skilled groups in any of the catching categories, however the high skilled participants made marginally more frequent responses in each of the specific catching categories. High skilled players dribbled the ball more frequently (1/53 seconds) than the low skilled players (1/65 seconds), though this is not the same level of difference as observed in game play.

The high level of uncodable responses came about due to the practice of skills that were not directly related to game skills. These exercises were considered in the Revised ALT-PE/SPORT data as skill responses, but could not be coded with the Revised SOSOR instrument.

Discussion of Under 10 Basketball Results

Game Results

The large difference in the amount of time spent as reserve between high and low skilled players is the area of greatest disparity and concern from the results in Table 5.13. The 34.30% difference is even more striking when it is considered that in one of the four observed games there were no reserves, due to player absences, and the participants had to play the entire game. The last game observed was a finals match. In this match the high skilled player spent no time as a reserve, whilst the low skilled player spent 79.56% of the time off the court.

It was also observed that the low skilled player was often removed from the court when the game became close and that usually he only returned if the result of the game was secure. The ability to substitute players at any time in junior basketball allows this situation to occur. Interestingly, despite the low skilled player spending so much time off, the high and low skilled players spent a similar amount of time in 'activity movement' behaviours. This situation was characterised during the games where the low skilled players were often observed moving up and down the court following the play without coming into contact with the ball, whereas the high skilled player would often make position, wait, and be confident of receiving possession. This situation, combined with the fact of how much extra time the high skilled player

spent on the court, accounts for the high skilled player spending 5.41% more time in wait episodes during the game than the low skilled player.

Transition episodes for high skilled players of 18.56% demonstrates the amount of time lost in junior basketball games in player movements on and off the court for substitutions and in moving to and from the coach's area during time-out episodes. During these breaks, the game clock is still running (this does not occur in the adult game), resulting in less time available for actual game play. Nearly 9% of game time was lost for time-outs for high and low skilled players, where the coach delivers knowledge to the players.

The high rates of success in performing skills (82.8% - high skilled and 71.1% - low skilled), with even higher rates of acceptable skill responses, indicates that the equipment modification is successful in adapting to the physical needs of the participant. However the extreme inequity in the amount of ball skill responses made by high skilled players in comparison to low skill players indicate that the modifications to the rules have had little effect in providing greater equity of participation.

The rule that requires a 'no press' situation in the back court, usually only resulted in the high skilled players bringing the ball in and up the court to the half way line, passing off and receiving the ball back again. Low skilled players were rarely used in the process of bringing the ball up the court after a

goal. The three dribble rule was not as successful as would be hoped, with the high skilled players usually passing the ball off after a few dribbles then quickly receiving it back. Rarely was the ball passed to the low skilled player in this situation.

Training Results

The results from Tables 5.15 and 5.16 vividly demonstrate that the allocated practice time was not sufficiently well utilised to provide maximum skill involvement for all participants. Indicative of this is the data indicating that both high and low skilled participants spent over 74% of time in non-activity behaviours and of the 26% spent in activity behaviours, only 11.14% for high skilled and 10.57% for low skilled participants was spent positively engaged in ball skill practice.

The coach spent a great deal of time demonstrating and explaining skills and game strategies to the group, resulting in the high skilled participants spending 19.27% of time receiving knowledge compared to 22.11% for low skilled participants. The coach seemed more inclined to pull the lower skilled players aside to supply knowledge than the high skilled players, resulting in the higher percentages in knowledge for lower skilled participants. The coach would often spend over 5 minutes explaining a skill practice to the group resulting in the transition percentages being 16.95 and 19.02 respectively for low and high skilled participants.

There was not any significant inequity between the different skill groups in any skill category as shown in Table 5.16, though high skilled players made slightly more frequent skill responses in all skill areas.

The organisation of the practice activities contributed to the high amounts of non-activity time for all participants. The practices rarely involved pairs (each pair with a ball), and were often characterised by two lines and the use of only one ball for the whole group. Two balls were used in some practices, though more balls were available. The practice activities often resulted in children waiting for long periods of time to be involved in activity. The coach rarely used scrimmage or game play activities, concentrating mostly on specific skill practices. Despite this concentration on the development of skills, the coach did not seem to have a bank of appropriate strategies to ensure a high degree of skill involvement for players of all skill levels.

Analysis and Interpretation of Results From Under 12 Basketball Observations

Results of the study of under 12 basketball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in tables 5.17, 5.18, 5.19 and 5.20.

Game Results

Results from the Revised ALT-PE/SPORT instrument (Table 5.17) reveal that there was not a great difference in the level of skill engagement between the high and low skilled players in under 12 games.

Table 5.17

Revised ALT-PE/SPORT - Behavioural Category Percentages Under 12 Basketball Game Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
injury	0.00	0.00	0.00	0.00
management	0.28	0.96	0.20	0.24
transition	18.22	13.30	16.35	4.06
knowledge	6.80	6.38	8.28	3.06
wait	9.25	7.72	6.31	2.56
wait(reserve)	16.90	2.75	26.90	10.75
Off Task	0.00	0.00	0.00	0.00
Non Activity Total	51.46	15.20	58.03	8.34
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00
movement	24.74	12.07	23.55	4.97
Activity - Non Skill Total	24.74	12.07	23.55	4.97
Activity - Skill				
ball skill + (positive)	12.84	12.96	8.67	2.21
ball skill - (negative)	3.78	2.45	3.25	0.43
non ball skill (i.e. defending)	7.18	2.16	6.50	2.36
Activity - Skill Total	23.80	13.64	18.42	3.50
OVERALL ACTIVITY TOTAL	48.54	13.18	41.97	8.34

Interestingly one of the two high skilled players made less responses in the two observations of his play than the low skilled player. However, the other high skilled player made far more frequent responses accounting for the difference between the high and low skilled players overall, and the high standard deviation scores in the activity categories for the high skilled players. (Refer to Appendices 32, 33, 34 & 35 for specific game session details). The high skilled players spent 12.84% of the game time positively involved in ball skill content, compared to 8.67% for low skilled players. Both high and low skilled players spent similar amounts of time in non-ball skills, with high skilled players spending 7.18% and low skilled players 6.50% in such behaviours. Involvement in non-skill movements was also quite equitable with high skilled players spending 24.74% in this category of activity, compared to 23.55% for low skilled players. High skilled players spent nearly half of the allocated game time in activity (48.54%) with the low skilled players spending 41.97% of time in activity.

The results also highlight some other differences. One of these was the amount of time spent as a reserve. Low skilled players spent 26.90% on the bench, compared to 16.90% for high skilled players. Transition episodes accounted for a major part of non-activity time with high skilled players spending 18.22% in transition episodes and low skilled players 16.35%. There was a small difference in the amount of time spent in knowledge receival by high and low skilled players with low skilled

players spending 6.80% of time in knowledge episodes and high skilled players 8.28%.

The results from the Revised S.O.S.O.R instrument (Table 5.18) reinforce the ball skill results from the Revised ALT-PE/SPORT instrument (Table 5.17) which indicate that high skilled players were positively involved in ball skills more often than low skilled players during game play.

Table 5.18
Revised SOSOR Data - Rates of Responses (1/_ Minutes)
Under 12 Basketball Game Data

SESSION RESPONSES	High Skill				Low Skill			
	Tot OTR	X OTR	St Dev	Rate(1/_Min)	Tot OTR	X OTR	St Dev	Rate(1/_Min)
Passing								
chest/shoulder	96	24.00	4.76	1.31	66	16.50	11.73	1.46
Bounce	14	3.50	4.12	10.24	7	1.75	2.22	16.49
hook	6	1.50	1.73	24.16	0	0.00	0.00	0.00
overhead	22	5.50	1.29	6.37	5	1.25	1.50	23.32
underarm	3	0.75	1.5	48.32	4	1	1.41	29.25
Passing Total	141	35.25	8.96	1.02	82	20.5	12.48	1.26
Shooting								
set shot	6	1.50	1.91	24.16	4	1.00	1.41	29.25
lay-up	6	1.50	3.00	24.16	8	2.00	1.41	14.42
field	29	7.25	3.77	5.01	21	5.25	2.99	5.36
Shooting Total	41	10.25	4.35	3.33	33	8.25	1.5	3.34
				Success (29.26%)				Success (35.5%)
Catching								
from pass	110	27.50	12.61	1.19	64	16.00	7.12	1.50
rebound	35	8.75	1.50	4.10	31	7.75	2.63	3.40
intercept	16	4.00	2.16	9.05	8	2.00	0.82	14.42
groundball	24	6	1.63	6.04	18	4.5	1.73	6.32
Catching Total	185	46.25	16.21	0.47	121	30.25	10.5	0.50
dribbling	84	21.00	19.13	1.44	58	14.50	4.20	2.02
jump/toss	6	1.50	1.29	24.16	3	0.75	0.96	39.14
intercept	11	2.75	1.71	13.14	11	2.75	1.50	10.42
TOTAL RESPONSES	468	117	49.66	0.19	309	77.25	27.04	0.23
No Response	2	0.00	0.58	72.49	0	0.00	0.00	0.00
Uncodable Response	0	0.00	0.00	0.00	2	0.50	0.58	58.50
Acceptable Response	430	107.50	49.22	0.20 (91.9%)	279	69.75	25.01	0.25 (91.3%)
Unacceptable Response	38	9.50	1.73	3.50 (8.1%)	30	7.50	3.00	3.55 (9.7%)
Successful Response	388	97.00	48.60	0.23 (82.9%)	255	63.75	23.92	0.28 (82.5%)
Unsuccessful Response	80	20.00	3.16	1.49 (17.1%)	54	13.50	4.20	2.11 (17.5%)

Revised SOSOR results report that high skilled players made a successful skill response every 23 seconds, compared to every 28 seconds for low skilled players. Overall, high skilled players made a skill response every 19 seconds and low skilled players every 23 seconds.

Despite the near equivalence of the response rates, some interesting contrasts can be drawn from the Revised SOSOR data. The high skilled players made more frequent passes in every passing category, with the greatest difference being in the frequency of over head passes. (High skilled - 1/6:37 mins, Low skilled - 1/23:32 mins). Interestingly, the high skilled and low skilled shooting frequencies were almost identical (1/3:33 minutes - high skilled, 1/3:34 minutes - low skilled). Low skilled players shot successfully in 35.5% of attempts and high skilled players in 29.3% of attempts. Though it must be considered that variables such as fatigue and the level of difficulty of shots taken may have affected this result.

High skilled players made more frequent catches with a catch every 47 seconds, compared to every 58 seconds for low skilled players. High skilled players achieved better rates in each of the catching categories, except rebounds. Most of the difference between the skill groups in the catching category can be attributed to the catches received from direct passes from team mates. High skilled players received a pass every 79 seconds, whereas low skilled players only received one every 110 seconds.

Dribbling rates were quite equitable, as were jump balls and interceptions. Both high and low skilled players made topographically acceptable responses frequently (1/20 seconds at 91.9% for high skilled players and 1/25 seconds at 90.3% for low skilled players). Though there is only a difference of 5 seconds in these rates, this difference in the amount of skill responses actually accounts for 151 responses. (Though low skilled players spent 10% more time as a reserve).

Training

Data from the training sessions reveal that the rate of skill involvement for both high and low skilled players was high. The Revised ALT-PE/SPORT results showed that the high skilled participants spent 21.86% of time positively engaged in ball skill practice with low skilled players spending 18.22% (see Table 5.19, p. 154).

Table 5.19

Revised ALT-PE/SPORT - Behavioural Category Percentages
Under 12 Basketball Training Data

ALT/PE CATEGORIES	High Skill (%)	SD	Low Skill (%)	SD
Non Activity				
Injury	0.00	0.00	0.00	0.00
management	3.23	1.72	5.04	1.65
transition	16.05	6.61	15.38	2.92
knowledge	11.07	6.03	10.62	6.73
wait	25.74	9.76	27.29	3.19
wait(reserve)	0.00	0.00	0.00	0.00
Off Task	1.48	0.95	0.46	0.95
Non Activity Total	57.56	6.76	58.79	5.89
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	3.14	3.12	3.48	0.63
movement	4.80	1.28	7.23	3.12
Activity - Non Skill Total	7.93	3.28	10.71	2.92
Activity - Skill				
ball skill + (positive)	21.86	8.01	18.22	1.67
ball skill - (negative)	6.27	1.84	5.49	1.99
non ball skill (i.e. defending)	6.36	2.07	6.78	2.01
Activity - Skill Total	34.50	8.00	30.49	3.37
OVERALL ACTIVITY TOTAL	42.44	6.76	41.21	5.89

In all skill activities, high skilled players spent marginally more time involved (34.50%) than low skilled players (30.49%), with most of the difference being attributed to the ball skill categories where the high skilled participants spent more time. However the overall activity percentages were very close with the high skilled player spending 42.44% of time in activity and the low skilled player 41.21%. Results indicated that the low skilled players spent 7.23% of activity time in movement (non skill behaviour) whilst high skilled players spent only 4.80% of time.

Results from the non activity categories reveal that the participants spent only a small amount of time in management (3.23% - high skilled and 5.04% - low skilled) as well as only spending a moderate amount of time in knowledge content (11.07% - high skilled and 10.62% - low skilled).

Most non-activity time was spent in transition and waiting. Both high and low skilled players spent over 15% of time in transition tasks. High skilled players spent 25.74% of time waiting with low skilled players spending slightly more with 27.29%.

The Revised SOSOR results further emphasises the large amount of ball skill practice made available to all participants with the high skilled players making more ball skill responses than the low skilled players. (see Table 5.20, p.156).

Table 5.20

Revised SOSOR Data - Rates of Responses (1/ Minutes)
Under 12 Basketball Training Data

SESSION	High Skl				Low Skl			
RESPONSES	Tot OTR	X OTR	St Dev	Rate(1/ Min)	Tot OTR	X OTR	St Dev	Rate(1/ Min)
Passing								
chest/shoulder	268	67.00	38.52	0.41	265	66.25	51.98	0.42
Bounce	66	16.50	17.06	2.48	20	5.00	5.29	9.12
hook	9	2.25	1.71	20.32	0	0.00	0.00	0.00
overhead	4	1.00	1.15	47.11	6	1.50	1.29	30.40
underarm	9	2.25	2.22	20.32	8	2.00	1.83	23.00
Passing Total	356	89	39.82	0.31	299	74.75	50.76	0.37
Shooting								
set shot	37	9.25	6.24	5.00	26	6.50	6.61	7.05
lay-up	67	16.75	5.32	2.45	32	8.00	2.83	5.45
field	110	27.5	10.66	1.41	80	20.00	13.19	2.18
Shooting Total	214	53.5	2.38	0.52	138	34.5	12.07	1.20
				Success (43.9%)				Success (41.3%)
Catching								
from pass	349	87.25	38.60	0.32	302	75.50	43.75	0.37
rebound	94	23.50	5.20	1.50	96	24.00	14.31	1.55
intrcept	4	1.00	2.00	47.11	3	0.75	0.96	61.20
groundball	104	26	10.90	1.47	69	17.25	4.99	2.40
Catching Total	551	137.75	34.94	0.2	470	117.50	59.87	0.23
dribbling	192	48.00	26.05	0.58	147	36.75	13.45	1.15
bmv/trn	0	0.00	0.00	0.00	0	0.00	0.00	0.00
intcrcpt	4	1.00	1.15	47.11	3	0.75	0.96	61.20
TOTAL RESPONSES	1316	329	74.1	0.03	1056	264.00	110.94	0.10
No Response	8	2.00	1.63	23.05	9	2.25	0.96	20.27
Uncodable Response	32	8.00	8.72	5.46	50	12.50	9.75	3.41
Acceptable Response	1144	286.00	51.19	0.10 (86.9%)	902	225.50	109.86	0.12 (85.4%)
Unacceptable Response	170	42.50	14.49	1.05 (13.1%)	153	38.25	6.75	1.12 (14.6%)
Successful Response	1123	280.75	56.38	0.10 (85.3%)	909	227.25	108.55	0.12 (86.1%)
Unsuccessful Response	191	47.75	7.57	0.58 (14.7%)	146	36.50	9.88	1.15 (13.9%)

High skilled players made a response every eight seconds, with the low skilled players making one every ten seconds. Results indicated that high skilled participants made more frequent responses in every skill area.

In the skill area of passing, the rates were high for both groups, with low skilled participants making a pass every 37 seconds compared to every 31 seconds for the high skilled

participants. The major difference in passing types occurred in the frequency of bounce passes. High skilled players made a bounce pass every 2:48 minutes, whilst low skilled participants made one every 9:12 minutes.

Shooting results showed that participants were able to make a great many shots during practice sessions, however the results exhibited the largest contrast between the two skill groups, with the high skilled players making far more frequent shots than the low skilled participants in each type of shooting. This resulted in an overall shooting rate of one shot every 52 seconds for high skilled participants and one every 80 seconds for low skilled players.

Results for the catching category showed that high skilled players received a pass every 32 seconds, compared to every 37 seconds for low skilled players. High skilled players also gained possession more frequently from the ground than low skilled players (1/1:47 mins - high skilled, 1/2:40 mins - low skilled). High skilled players dribbled the ball more frequently (1/58 seconds) than low skilled players (1/75 seconds).

Despite the low skilled participants experiencing lower rates of involvement than the high skilled participants, they did make frequent responses (1056 responses) during the four training sessions, compared to high skilled participants who made 1316 responses.

Discussion of Under 12 Basketball Results

Game Results

Results from Tables 5.17 and 5.18 show that high skilled players had more opportunities to be involved in ball skill content than the lower skilled players. This difference occurred mostly in the passing and catching categories with the high skilled players making more frequent passes in all types of passing except underarm and receiving a pass more frequently from a teammate than did the low skilled players.

When noting the levels of involvement for the under 12 players, it is important to consider that the team won all of their games convincingly, and obviously exhibited more skill responses than the opposition teams. Despite the high skilled players spending 48.54% of time in activity and the low skilled players 41.97% of time, considerable amounts of time were lost to the categories of transition and waiting.

The similar percentage of involvement in non-skill movements between high and low skilled players (despite low skilled players spending 10% more time off the ground as a reserve) is explained by the pattern of play observed, where the high skilled player was more likely to move to a position and receive the ball, whereas the low skilled player would not receive the ball as frequently and would subsequently keep running around trying to move into a position that would enable them to receive a possession. Low skilled players in fact spent

over a quarter of their time on the bench as a reserve (26.90%), compared to 16.90% for high skilled players. Though this result is far more equitable than in the under 10 team, there was still the tendency by the coach to leave the high skilled players on the court during close stages of the game and bring the low skilled player on when the result appeared to be safe. Transition episodes were high (18.22% for high skilled and 16.35% for low skilled). Again this was due to time wasted in substituting players and in moving to and from time outs.

The difference in the time spent in knowledge by high and low skilled players (6.80% and 8.28% respectively) can be attributed to the coach spending more time discussing the game and skills with the low skilled player when he was spending time sitting off as a reserve.

In summary the major differences that existed between high and low skilled players were in the amount of time spent as a reserve and the frequency of catching and throwing skill responses.

Training Results

Both the Revised ALT-PE/SPORT (Table 5.19) and Revised SOSOR (Table 5.20) results show that the high and low skilled players spent much of their time involved in activity during the training sessions. The high level of active involvement can be attributed to a variety of variables. Anecdotal notes reveal that the coach instigated a variety of

activities throughout the training session, many incorporating the full range of skills and resulting in high frequency skill responses. The activities chosen often used pair or three member groupings. The activities often required the performance of a variety of skill type responses in each completion of a routine. However some of these activities accrued greater wait time than they should have because only one or two balls were used for the team and pairs at times had to wait in line to be involved. The set routines were also restricted at times as only one goal was available, as teams were only allocated a half of a court for practice, thus not allowing the group to be split between two goals when completing a shooting exercise. This was at times compensated by dividing into two or three groups when shooting at the same goal.

Many of the activities were obviously familiar to the players who moved quickly into different routines without the coach having to explain the activity, thus reducing transition time. The fact that the players were familiar with set training routines was further emphasised when on two occasions the players started set training exercises when the coach was late to training.

The coach spent less than 11% of time explaining skills or strategies to the players, much less than the time spent by players in activity. He rarely spoke to the group as a whole in delivering knowledge, preferring to work with the participants individually on most occasions, as they completed an activity.

Comparison of Results for Under 10 and Under 12 Basketball

A comparison of the results of the study of under 10 and under 12 basketball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in summary tables 5.21 and 5.22 (game results) and 5.23 and 5.24 (training results).

Game Results

When analysing and comparing the data from the Revised ALT-PE/SPORT (Table 5.21) and Revised SOSOR instruments (Table 5.22) from both age groups some definite contrasts can be made.

Table 5.21

Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Under 10 and under 12 Basketball Game Data

	High Skill			Low Skill		
ALT/PE CATEGORIES	U/10	U/12	MEAN (X̄) OF U/10 & U/12	U/10	U/12	MEAN (X̄) OF U/10 & U/12
Non Activity						
injury	0.00	0.00	0.00	0.00	0.00	0.00
management	0.82	0.28	0.55	0.74	0.20	0.47
transition	18.56	18.22	18.39	12.75	16.35	14.55
knowledge	8.72	6.80	7.76	8.61	8.28	8.44
wait	12.21	9.25	10.73	6.80	6.31	6.56
wait(reserve)	5.44	16.90	11.17	39.74	26.90	33.32
Off Task	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	45.74	51.46	48.60	68.65	58.03	63.34
Activity - Non Skill						
warmup	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00
movement	25.85	24.74	25.30	21.89	23.55	22.72
Activity - Non Skill Total	25.85	24.74	25.30	21.89	23.55	22.72
Activity - Skill						
ball skill + (positive)	14.67	12.84	13.76	3.93	8.67	6.30
ball skill - (negative)	4.82	3.78	4.30	2.55	3.25	2.90
non ball skill (i.e. defending)	8.92	7.18	8.05	2.98	6.50	4.74
Activity - Skill Total	28.41	23.80	26.10	9.46	18.42	13.94
OVERALL ACTIVITY TOTAL	54.26	48.54	51.40	31.35	41.97	36.66

Table 5.22

Revised SOSOR - Rates of Responses (1 / Minutes)
Comparison of Under 10 and 12 Basketball Game Data

	HIGH SKILL		MEAN (X̄) OF	LOW SKILL		MEAN (X̄) OF
RESPONSES	U/10	U/12	U/10 & U/12	U/10	U/12	U/10 & U/12
Passing						
chest/shoulder	1.07	1.31	1.18	2.34	1.46	1.58
Bounce	16.58	10.24	12.58	92.23	16.49	25.08
hook	75.38	24.16	37.18	92.23	0.00	201.03
overhead	152.46	6.37	12.58	92.23	23.32	33.30
underarm	0.00	48.32	99.28	0.00	29.25	50.16
Passing Total	1.02	1.02	1.02	2.22	1.26	1.39
Shooting						
set shot	30.32	24.16	27.07	0.00	29.25	50.16
lay-up	10.11	24.16	14.12	46.12	14.42	20.06
field	2.33	5.01	3.21	11.33	5.36	6.55
Shooting Total	1.55	3.33	2.27	9.14	3.34	4.40
Catching						
from pass	1.19	1.19	1.19	4.24	1.50	2.21
rebound	5.27	4.10	4.44	8.24	3.48	4.47
intercept	4.15	9.06	5.44	13.32	14.42	14.00
groundball	4.15	6.04	4.58	7.06	6.32	6.46
Catching Total	0.42	0.47	0.45	1.47	0.58	1.10
dribbling	1.07	1.44	1.21	5.46	2.02	2.38
jump/toss	76.23	24.16	37.18	30.48	39.14	33.30
intercept	0.00	13.14	27.07	92.23	10.42	16.45
TOTAL RESPONSE	0.16	0.19	0.17	0.46	0.23	0.28
No Response	76.32	72.49	74.36	0.00	0.00	0.00
Uncodable Response	38.16	0.00	74.36	0.00	58.50	100.32
Acceptable Response	0.18	0.20	0.19	0.58	0.25	0.32
Unacceptable Response	2.02	3.50	3.02	3.38	3.55	3.45
Successful Response	0.19	0.23	0.21	1.04	0.28	0.35
Unsuccessful Response	1.32	1.49	1.39	2.38	2.11	2.15

The most obvious contrast is in the amount of ball skill responses available to low skilled players in the two age groups. Results show that in the under 12 age group, the low skilled players spent 8.67% of time positively engaged in ball skill behaviour and made a successful skill response every 28 seconds when involved in game play. Comparatively the low

skilled under 10 player spent only 3.93% of time positively involved in ball skills and only made a successful skill response every 64 seconds when involved in game play.

Under 12 low skilled players made far more frequent responses in all skill categories, than under 10 low skilled players, with the most outstanding difference being in the rate of shooting for goal. Under 12 low skilled players made a shot every 3:34 minutes at a success rate of 35.50%, with under 10 players low skilled players making a shot only every 9:14 minutes, all of which were unsuccessful. Conversely, high skilled players in under 12 basketball made less frequent successful skill responses (1/23 seconds) than the under 10 high skilled players (1/19 seconds). Under 12 high skilled players spent 12.84% of time in successful ball skill behaviour, compared to the higher percentage of 14.67% for under 10 players. Most of the difference in the skill response frequencies between high skilled groups of both teams can be attributed to the categories of catching and shooting as the passing rates were identical.

Under 10 high skilled players made a shot every 1:55 minutes (34.60% success), almost double the rate of the under 12 high skilled players who made a shot every 3:33 minutes (29.30% success).
Under 10 high skilled players made a catch every 42 seconds, compared to every 47 seconds for under 12 high skilled players. There was no difference in the rates of catches obtained from passes, though the difference in the overall

catching can be attributed to more frequent interceptions and ground ball possessions made by the under 10 high skilled players. There was a wider gap in the frequency of skill responses between high and low skilled players in the under 10 basketball team than in the under 12 basketball team.

There was a much greater difference in time spent off the court between under 10 high and low skilled players (34.30% difference), than in the under 12 skill groups (difference of 10.00%). Revised ALT-PE/SPORT results (Table 5.21) also demonstrate that high skilled players in both age groups spent more time in each of the activity behaviours than the low skilled group, with it more the case with the under 10 players.

Interestingly, high skilled players spent more time in wait episodes during the game than low skilled players. In the under 10 team the high skilled players spent 5.41% more time in waiting behaviours than the lower skilled players, and in the under 12 team the high skilled players spent 2.94% more time waiting.

Other important findings include:
(a) Far less rebounds were made in the under 10 age group than in the under 12. Under 12 high and low skilled players made nearly double the rate of rebounds than the under 10 players.

(b) High skilled players in both teams dribbled the ball far more frequently than the low skilled players.

(c) Under 12 players used a far greater variety of passes than the under 10 players, especially the bounce pass and overhead pass.

(d) Over 7.5% of game time was used for timeouts (knowledge) in both age groups, with even more time lost in transition time, as players moved on and off the court during time outs and in other game stoppages.

(e) High skilled basketball players spent an equivalent amount of time in skill and non skill activity, whereas low skilled players spent significantly more in nonskill activity (movement), seeking possession of the ball, than in skilled activity.

(f) Under 12 players shot at an overall success rate of 31.94%, with the lower skilled players performing marginally better. Under 10 players shot with an overall success of 30.77% (High and low skilled players' results combined) indicating that the modification of lowering the ring has helped to achieve equitable success rates to older children who use higher rings. However it is significant that the low skilled under 10 players did not make one successful shot in all of the games (out of only 10 shots made). This statistic is indicative of the imbalance that is evident in the under 10 results for high and low skilled participants.

Training Results

Data from the training sessions of the two basketball teams reveal vast differences in the amount of activity engaged in by players of each age group. Revised ALT-PE/SPORT results (Table 5.23) show that the under 12 high and low skilled participants spent over 41% of time involved in activity, with over 30% devoted to skill practice, of which more than 18% was utilised in successful ball practice.

Table 5.23
Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Under 10 and under 12 Basketball Training Data

ALT/PE CATEGORIES	High Skill			Low Skill		
	U/10	U/12	MEAN ($\bar{X}$) OF U/10 & U/12	U/10	U/12	MEAN ($\bar{X}$) OF U/10 & U/12
Non Activity						
injury	0.00	0.00	0.00	0.00	0.00	0.00
management	2.60	3.23	2.92	2.38	5.04	3.71
transition	19.02	16.05	17.54	16.95	15.38	16.16
knowledge	19.27	11.07	15.17	22.11	20.62	16.22
wait	29.59	25.74	27.66	31.29	27.29	29.29
wait(reserve)	0.57	0.00	0.28	0.00	0.00	0.00
Off Task	3.74	1.48	2.61	1.31	0.46	1.13
Non Activity Total	74.80	57.56	66.18	74.04	58.79	66.42
Activity - Non Skill						
warmup	0.00	0.00	0.00	0.00	0.00	0.00
support	0.89	3.14	2.02	1.15	3.48	2.32
movement	5.61	4.80	5.20	5.61	7.23	6.52
Activity - Non Skill Total	6.50	7.93	7.22	6.88	10.71	8.80
Activity - Skill						
ball skill + (positive)	11.14	21.86	16.50	10.57	18.22	14.40
ball skill - (negative)	3.41	6.27	4.84	5.41	5.49	5.45
non ball skill (i.e. defending)	4.15	6.36	5.26	3.03	6.78	4.90
Activity - Skill Total	18.70	34.50	26.60	19.08	30.49	24.78
OVERALL ACTIVITY TOTAL	25.20	42.44	33.82	25.96	41.21	33.58

In contrast to this, under 10 high and low skilled participants spent less than 26% of practice time in activity, with less than 19% in skill activity and of which only 11% being spent in successful ball skill responses.

Revised SOSOR data (Table 5.24, p. 168) demonstrate that under 12 participants made significantly more frequent skill responses in all ball skill areas (over twice as frequent in each area) than under 10 participants.

Table 5.24

Revised SOSOR - Rates of Responses (1/ Minutes)
Under 10 and 12 Basketball Game Training Data

RESPONSES	HIGH SKILL		MEAN (X) OF	LOW SKILL		MEAN (X) OF
	U/10	U/12	U/10 & U/12	U/10	U/12	U/10 & U/12
Passing						
chest/shoulder	1.24	0.49	0.57	1.22	0.42	0.57
Bounce	9.52	2.48	4.30	42.08	9.12	15.47
hook	27.35	20.32	24.30	35.06	0.00	65.46
overhead	51.46	47.11	49.00	210.38	30.40	56.22
underarm	25.53	20.32	23.03	19.09	23.00	20.46
Passing Total	1.06	0.31	0.43	1.12	0.37	0.50
Shooting						
set shot	8.17	5.00	6.19	8.26	7.05	7.44
lay-up	5.45	2.45	3.48	11.05	5.45	7.44
field	5.35	1.41	2.40	9.34	2.18	3.52
Shooting Total	2.07	0.52	1.15	3.11	1.20	1.56
Catching						
from pass	1.08	0.32	0.44	1.16	0.37	0.51
rebound	4.36	1.58	2.49	7.48	1.55	3.03
intercept	27.35	47.11	35.37	35.06	61.20	44.31
groundball	4.08	1.47	2.32	6.41	2.40	3.28
Catching Total	0.43	0.20	0.28	0.52	0.23	0.33
dribbling	1.35	0.58	1.13	1.58	1.15	1.33
jump/toss	207.05	0.00	391.47	210.38	0.00	394.39
intercept	15.53	47.11	32.39	52.40	61.20	56.22
TOTAL RESPONSE	0.18	0.08	0.12	0.21	0.10	0.14
No Response	207.05	23.06	43.32	42.08	20.27	28.11
Uncodable Response	2.19	5.46	3.14	6.23	3.41	4.45
Acceptable Response	0.22	0.11	0.15	0.30	0.12	0.18
Unacceptable Response	1.33	0.51	1.07	1.12	1.12	1.12
Successful Response	0.22	0.10	0.14	0.29	0.12	0.17
Unsuccessful Response	1.47	0.53	1.17	1.24	1.15	1.20

Results in Table 5.24 show that high skilled players making a successful skill response every 10 seconds and low skilled players every 12 seconds. Conversely under 10 high skilled participants only made a successful ball skill response every 22 seconds and low skilled participants every 29 seconds.

In analysing the skill responses of the two teams, the greatest contrast existed in the rate of shooting responses. In under 10 training sessions low skilled players only shot the ball once every 3:11 minutes (31.80% success) and high skilled players once every 2:07 minutes (45% success). Under 12 players shot far more frequently with high skilled players shooting every 52 seconds (43.90% success) and low skilled players every 80 seconds (41.30%). Interestingly in both age groups, the low skilled player made less frequent shots and was less successful in their shots, though there was only a slight disparity between high and low skilled participants in the under 12 team.

The under 10 coach spent far more time delivering knowledge to the players, with high skilled players spending 19.27% of time in knowledge and low skilled players even more with 22.11% of time in this category. Dissimilarly, the coach in the under 12 team spent only 11.14% of time in knowledge with high skilled players and 10.62% with low skilled players, resulting in more time available for skill practice.

In both age groups wait time was well over 25%, with low skilled players spending marginally more time in this category in both groups. Little activity time was sacrificed in each age group for management or off task behaviour but much more was lost in transition episodes. In the under 12 team, high skilled players spent 16.05% of time in transition and low skilled players 15.38%. In under 10, high skilled players spent 19.02% and low skilled players 16.95% in transition.

Discussion of Under 10 and 12 Basketball Results

Game Results

The results from Tables 5.23 and 5.24 demonstrate that there is a definite inequity in the amount of involvement for high and low skilled players in junior basketball. This was far more evident in the under 10 results than in the under 12 results. The ALT-PE/SPORT results (Table 5.23) were greatly affected by the amount of time players spent as a reserve, especially so in the under 10 team where the high skilled players spent 34.30% more time on the court than the lower skilled players. In under 12 basketball high skilled players spent 10% more time on the court. Coaches chose to leave the high skilled players on the court for greater durations, as there are no binding rules in junior basketball to ensure equity in court time for players. Teams were playing for spots in finals and this appeared to influence the substitutions made by the coaches, depending on the state of play at the time.

Valuable playing time was lost in all games from both age groups due to substitution and time-out rules. Over 7.5% of game time was used for timeouts (knowledge) in both age groups, with even more time lost in transition time, as players moved on and off the court during time outs. More time was lost as players were subbed on and off the court and as the umpire made detailed signals to the score bench.

Interestingly, high skilled players spent more time in wait episodes during the game than low skilled players. This can be mainly attributed to their greater time on court and also to the fact that they often make good position to receive the ball and wait for a pass, while lower skilled players tended to move around inconsistently seeking a pass wherever possible.

High skilled players made more frequent responses in all major response categories, with this being especially evident in the under 10 results, especially in the area of shooting. There was less of a difference in the rates of active involvement for high and low skilled under 12 players. Much of this can be attributed to a more even spread of skill levels in the players in the under 12 team, where the gap in skill levels between high and low skilled players was noticeably less than in the under 10 team. It may well be that in younger age groups children bring a variety of prior experiences to their first season of the game, resulting in some children dominating the game as others are still acquiring many of the basic skills. Whereas this difference in skill levels between players in older age groups may be less obvious as players have practised skills over a period of a few seasons and gained a greater level of mastery. It may also be the case that low skilled players from younger years who are constantly exposed to little active skill involvement, have already left the game after a season or two, resigned to fact that they are not going to receive the opportunities they seek to fully participate in the game, thus leaving a more even spread of skill levels in older teams.

In assessing the effectiveness of the modifications to the under 10 game, some import it factors need to be considered. Changes to equipment and rules such as 'no press in the backcourt' and 'six seconds in the keyway' appear to have been of assistance in increasing success rates in performing skill responses, to a level of near equivalence to the older age group. The percentage of successful responses was quite equitable for under 10 and 12high skilled players (82.8% - under 10, 82.9% - under 12) only marginally different for low skilled players (71.1% - under 10, 82.5% - under 12).

Despite the success of the modifications in assisting successful execution of skills, they do not address the problem of the great disparity in the opportunities to respond between high and low skilled players. It appears that the modifications have had little effect in reducing any inequities that exist between the skill groups in rates of active skill involvement. The 'three dribble rule' may have increased the amount of skill responses made in the game, but it appears that the high skilled players are the group that benefit mostly from this, with the low skilled players still being denied sufficient access to the ball. Anecdotal observations also pointed to the high skilled children passing the ball in more often when it has gone out of court and usually brought the ball up the court after a goal. Obviously further consideration needs to be given to providing more effective game design and rule changes if any effect is to be made on evening the amount of involvement for participants.

The equipment used by under 12 participants appeared to suit the needs of the children resulting in acceptable rates of success when performing skills (both high and low skilled players). However it may be advisable for administrators to investigate minor rule changes to deal with the time lost in time-outs and transition episodes and in providing equity in court playing time for all participants.

In summary the high skilled players in the junior basketball games that were observed in this study were successfully engaged more often than low skilled players, with the gap between high and low skilled players being greater in the under 10 age group than the under 12 age group, despite some modifications to the game design in this age group.

Training Results

Results displayed in Tables 5.23 and 5.24 vividly demonstrate that the under 12 coach was able to provide training exercises that consistently produced high rates of skill responses, whereas the under 10 coach was unable to do this due to the institution of exercises that only provided limited opportunities for active involvement .

The different types of the activities instituted by the respective coaches definitely attributed to much of the contrast between the skill activity results for the two age groups. The coach in the under 12 team often implemented ball skill drills that required many responses in a short space of

time. The under 10 coach predominantly used exercises that required only a few skill responses at a time before the player returned to wait for another turn in the activity. The under 10 coach spent far more time delivering knowledge to the players, with players spending approximately 20% of time in this category. The coach in the under 12 team spent only about 11% of time with his players in supplying knowledge.

Participants from both teams spent over 16% of time in transition episodes and over 25% in waiting episodes. Both coaches need to be made aware of strategies to reduce such non-activity behaviour, thus allowing more time for activity.

The similar shooting success rates of the two age groups indicate that lowering the ring in the under 10 age group assists in achieving rates that are comparable the older game and thus the equipment seems to suit the body size and development o fthe younger players. Under 12 players appeared comfortable with the design of their equipment achieving high rates of success in performing skill.

Finally it must be recognised that the coach of the under 12 team is far more experienced in coaching basketball and has achieved high levels of coaching accreditation, whereas the coach of the under 10 team has had limited experience and has had little training in coaching in junior sport. This could be a determining variable in the amount of successful skill involvement provided for the participants during practice sessions.

Specific Research Question

(4) How do the two sports of basketball and netball, with a similar basis, but differing game design, compare in levels of successful motor skill engagement?

Analysis, Interpretation and comparison of Results From Basketball and Netball

Comparative results of the study of under 10 and 12 basketball and netball participants using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in summary tables that allow inspection and comparison of results from high and low skilled participants of all teams. For each section of game and training results there are four tables. The first two tables present the Revised ALT-PE/SPORT data with the first table allowing direct comparison of the results from each team and the second providing combined results for each sport. The second two tables display Revised S.O.S.O.R findings, which are presented in the same manner as the first two tables.

Graphs are also provided for the purposes of visual comparison amongst the age groups and sports in areas where they are deemed relevant.

Comparison of Netball and Basketball Game Results

In analysing the game data from the Revised ALT-PE/SPORT instrument, some differences become obvious when comparing the sports and age groups (Table 5.25).

Table 5.25
Revised ALT-PE/SPORT - Behavioural Category Percentages
Overview of Under 10 and under 12 Netball and Basketball
Teams Game Data

ALT CATEGORIES	HIGH SKILL (PERCENT %)				LOW SKILL (PERCENT %)			
Non Activity	u10N/ball	u12N/ball	u10B/ball	u12B/ball	u10N/ball	u12N/ball	u10B/ball	u12B/ball
injury	0.00	N/A	0.00	0.00	0.00	0.00	0.00	0.00
management	1.27	0.11	0.82	0.28	0.96	0.11	0.74	0.20
Transition	17.37	13.45	18.56	18.22	17.50	14.64	12.75	16.35
Knowledge	0.00	0.00	8.72	6.80	0.00	0.00	8.61	8.28
wait	23.83	33.90	12.21	9.25	40.88	36.78	6.80	6.31
wait(reserve)	12.60	6.67	5.44	16.90	12.70	6.70	39.74	26.90
off task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	55.08	54.12	45.74	51.46	72.04	58.23	68.65	58.03
Activity Non Skill								
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	22.67	20.45	25.85	24.74	13.13	19.75	21.89	23.55
Non Skill Total	22.67	20.45	25.85	24.74	13.13	19.75	21.89	23.55
Activity - Skill								
ball skill +(positive)	11.86	13.45	14.67	12.84	4.91	6.58	3.93	8.67
ball skill - (negative)	4.03	4.86	4.82	3.78	2.77	3.63	2.55	3.25
non ball skill	6.36	7.12	8.92	7.18	7.15	11.80	2.98	6.50
Activity Skill Total	22.25	25.42	28.41	23.80	14.83	22.02	9.46	18.42
ACTIVITY TOTAL	44.92	45.88	54.26	48.54	27.96	41.77	31.35	41.97

Results show that in general more time was spent in non-activity behaviours than activity behaviours in both game types. Little difference exists in the total amount of non-activity time for high skilled players across the different

groups, though both netball teams spent longer in such behaviours with 55.08% - under 10 and 54.12% - under 12 netball.

The high skilled under 10 basketballers spent less time in non-activity behaviours accruing 45.74% and under 12 basketballers accruing 51.46%.

There was greater variance in the amount of non-activity behaviours for lower skilled players with under 12 basketball and netball averaging 58% of non activity time during games, whilst under 10 low skilled netballers accrued a much higher percentage on 72.04% and under 10 basketballers spent 68.65% of time in non-skilled behaviours. It is interesting to note that the modified age group games, accrued over 10% less activity time than the under 12 game versions for low skilled players. Despite the difference between each team, Results in table 5.26 show that the overall results for the two sports were quite equitable amongst high skilled players.

Table 5.26

Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Netball and Basketball Game Data
(Under 10 and 12 Data Combined)

ALT/PE Categories	HIGH SKILL		LOW SKILL	
	NETBALL	BASKETBALL	NETBALL	BASKETBALL
Non Activity				
injury	0.00	0.00	0.00	0.00
management	1.14	0.55	0.95	0.47
transition	15.41	18.39	16.07	14.55
knowledge	0.00	7.76	0.00	8.44
wait	28.86	10.73	38.83	6.56
wait(reserve)	9.64	11.17	9.65	33.32
off Task	0.00	0.00	0.00	0.00
Non Activity Total	54.60	48.60	65.14	63.34
Activity - Non Skill				
warmup	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00
movement	21.56	25.30	16.44	22.72
Activity Non Skill Total	21.56	25.30	16.44	22.72
Activity - Skill				
ball skill + (positive)	12.66	13.76	5.74	6.30
ball skill - (negative)	4.44	4.30	3.20	2.90
non ball skill (i.e. defending	6.74	8.05	9.48	4.74
Skill Total	23.84	26.10	18.42	13.94
ACTIVITY TOTAL	45.40	51.40	34.86	36.66

with low skilled netballers spending 65.14% of time in non-activity behaviours and low skilled basketballers 63.34% of time.

Within the specific categories of non-activity behaviours there were some definite contrasts between the teams. Management and injury behaviours were negligible for each team, and little difference existed in the amount of transition time for each skill group, in each team, with a range of only 5.81%. The major discrepancies existed in the wait, wait (reserve) and knowledge categories. There was a major difference between the four teams, in both high and low skilled players in the wait

category, with basketball players spending far less time waiting during game play. The high skilled player results from Table 5.25 show that the Under 12 netballers spent the most time in wait behaviours, with a percentage of 33.90, compared to the percentage of 23.83 for under 10 high skilled players. Under 10 high skilled basketballers spent 12.21% in wait episodes and under 12 basketballers spent 9.25% . Results in table 5.26 demonstrate that the combined team percentages for each sport were much different, with the high skilled netballers spending 18.13% more time in wait episodes and low skilled players 32.27% more time than the basketballers.

The amount of time spent as a reserve (off the court) differed between the two sports. Results from Table 5.26 show that the netball results were equitable between high and low skilled players. However there was a large difference between high and low skilled basketball players with the high skilled players spending 11.67% of time as a reserve compared to 33.32% of time for low skilled players. The results in Table 5.25 highlight that the major reason for such a difference occurring was as a result of the high skilled under 10 basketball players spending far more time on the court (34.30%) than the low skilled under 10 players, whilst in the under 12 age group the difference was only 10% in favour of the high skilled players.

The Netball players did not spend any time involved in knowledge content during game time, as they do not have the time-out situation that exists in junior basketball. Combined

team results in table 5.26 show that high skilled basketballers spent 7.76% of time in knowledge receival and low skilled players 8.44% of time. Table 5.25 results reveal little range in the amount of knowledge receival for each team.

Results in Table 5.25 reveal that players in all teams, except for the low skilled under 10 netball players spent between 19.75 and 25.85% of time in non-skill movement behaviours. The low skilled under 10 players however, only spent 13.13% of time in such behaviours, contrasting the results from the other groups.

Figure 5.1 (p. 181) shows that there was not a marked difference between the activity totals for high skilled players from each netball and basketball team, whilst the low skilled results in the under 12 age groups were higher than in the under 10 age groups for both games.

FIGURE 5.1

Revised ALT-PE/SPORT Percentages of Involvement in Activity Behaviours During Game Sessions in Under 10 and 12 Netball and Basketball
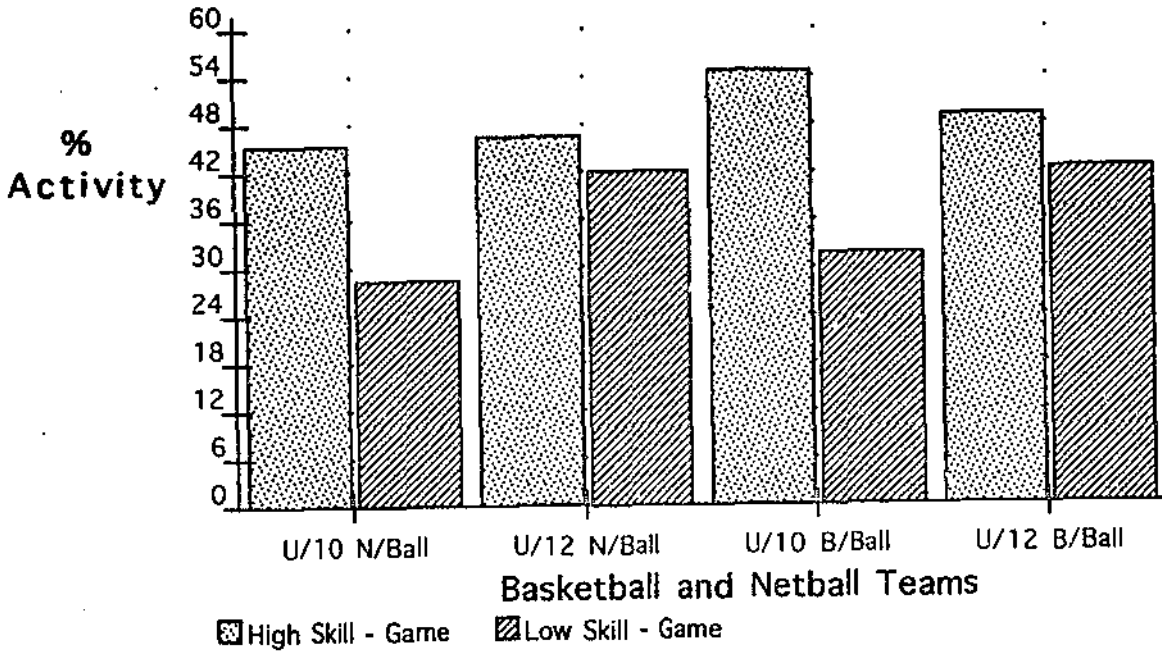
The high skilled under 10 basketballers accrued the most activity time, spending 54.26% of time in activity, with the under 12 high skilled basketballers spending 48.54% of time in activity. Under 10 and 12 high skilled netballers spent 44.92% and 45.88% of time respectively in activity behaviours.

Low skilled netballers spent less time in activity behaviours than basketballers, with the under 10 players spending 27.96% of time in activity and the under 12 players 41.77%. Low skilled basketballers spent marginally more time in activity than their comparable netball age group with under 10

players spending 31.35% and under 12 players 41.97% of time in activity behaviours. Interestingly the low skilled under 10 netballers spent 13.81% less time in activity behaviours than the low skilled under 12 netballers. This was mirrored in the basketball results with the low skilled players in the under 10 age group spending 10.62% less time involved in activity than the under 12 low skilled players.

There was not a significant difference in the amount of time spent in non-ball skill behaviours in the high skilled players of each group, though the results in Table 5.26 show that the combined results for high skilled netballers were 6.74% and high skilled basketballers 8.05% for non-ball skill activity.

The low skilled results were opposite to this with low skilled netballers spending 9.48% of time in non-ball skill behaviours, compared to only 4.74% for low skilled basketballers. Such a discrepancy is a result of the compratively high percentage for low skilled under 12 netballers who spent 11.80% of time in non-ball skill behaviours, and under 10 low skilled basketballers who only spent 2.98% of time in such behaviours.

Figure 5.2 displays comparisons of ball skill behavioural percentages amongst the skill groups and sports.

FIGURE 5.2

Revised ALT-PE/SPORT Percentages of Successful Ball Skill Involvement During Game Sessions in Under 10 and 12 Netball and Basketball
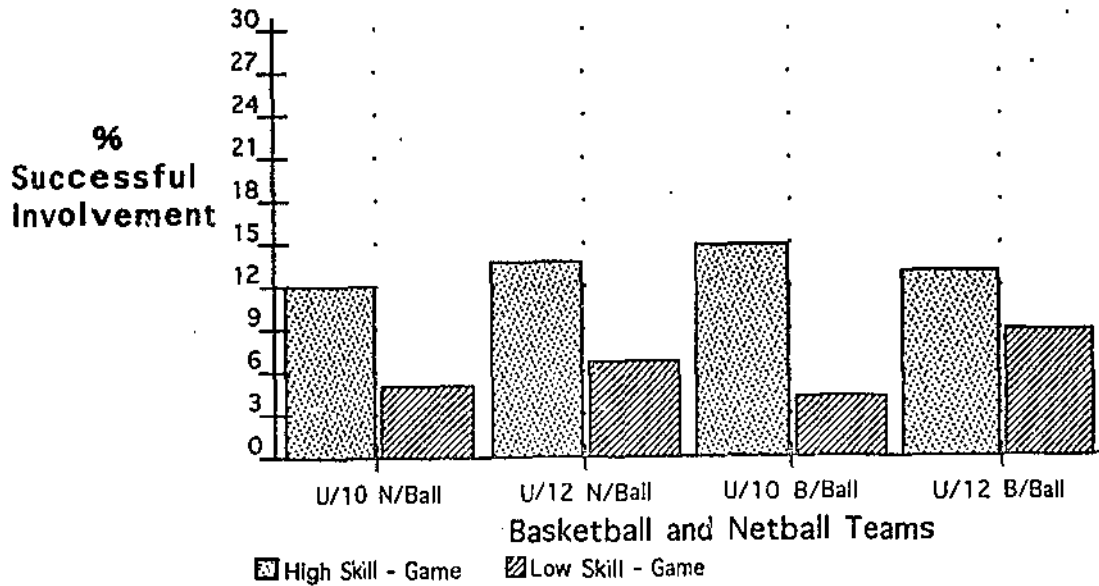
The amount of positive ball skill responses differed little between the high skilled players of each team, with only a range of 2.81% between the four teams, with the high skilled under 10 basketballers accruing the highest percentage with 14.67% and the under 10 netballers the lowest with 11.86%.

There was a negligible difference in the amount of unsuccessful ball-skill behaviour with a range from 3.78% (under 12 basketball) to 4.86% (under 12 Netball).

In the low skilled player ball skill percentages, the totals were considerably less than the high skilled totals. Again the younger age group (modified game) of each sport scored a lower percentage of time positively involved in ball skills, than players in the older age group. The low skilled under 10 basketball players spent only 3.93% of time in this behaviour compared to 8.67% for low skilled under 12 basketball players, whilst low skilled under 10 netball players spent 4.91% of time and under 12 low skilled netballers 6.58% of time.

The difference in the amount of time spent positively engaged in ball skills between high and low skilled players was greatest in the under 10 basketball team, where high skilled players spent 10.74% more time. There was little disparity in the differences for the two netball teams, with high skilled players in under 10 netball spending 6.95% more time positively engaged in ball skills than the lower skilled players and the under 12 netball players spending 6.87% more time. The difference between the high and low skilled players in under 12 basketball showed the least difference with high skilled players spending 4.17% more time in positive engagement in favour of the high skilled players.

Results in Table 5.26 show that the rates of successful ball skill engagement were very similar overall for netball and

basketball. High skilled netballers accrued 12.66% of time in this category, 1.10% of time less than the high skilled basketball players. In the low skilled results, the netball players accrued 5.74% of time positively involved in ball skills, only 0.56% less than the low skilled basketball players. Therefore the overall difference between high and low skilled players in both junior ages in basketball was 7.46%, compared to 6.92% in both junior netball age groups.

Results in table 5.25 indicate that there was not a significant difference in the overall amount of skill activity for high skilled players of each group, with the skill totals ranging from 22.25 (under 10 netball) to 28.42% for under 10 basketball. This however was not the case in the low skill percentages where the under 12 basketball and netball results were higher (18.42% and 22.02% respectively) than the low skilled results, and the low skilled under 10 basketballers spent only 9.46% of game time in skill behaviour, compared to 14.83% for low skilled under 10 netballers.

Revised SOSOR results for each team in Table 5.27 (p. 186) show that the total number of responses was quite inequitable between high and low skilled players in all teams except the under 12 basketball team, where both high and low skilled players responded frequently. This was evident in all major skill categories.

Table 5.27

Revised SOSOR Summary - Rates of Responses (1/_ Minutes)

Overview of Under 10 and 12 Netball and Basketball Teams

Game Data

RESPONSES	HIGH SKILL (Rates 1/_ Minutes)				LOW SKILL (Rates 1/_ Minutes)			
	u10 N/ball	u12 N/ball	u10 B/ball	u12 B/ball	u10 N/ball	u12 N/ball	u10 B/ball	u12 B/ball
Passing								
chest/shoulder	0.56	1.29	1.07	1.31	2.44	1.36	2.34	1.46
Bounce	0.00	0.00	16.58	10.24	0.00	0.00	92.23	16.49
hook	0.00	0.00	75.38	24.16	0.00	0.00	92.23	0.00
overhead	0.00	13.46	152.46	6.37	136.20	13.46	92.23	23.32
underarm	0.00	0.00	0.00	48.32	0.00	0.00	0.00	29.25
Passing Total	0.56	1.10	1.02	1.02	2.40	1.36	2.22	1.26
Shooting								
set shot	4.35	2.42	30.32	24.16	8.01	68.30	0.00	29.25
lay-up	0.00	0.00	10.11	24.16	0.00	0.00	46.12	14.42
field	0.00	0.00	2.33	5.01	0.00	0.00	11.33	5.36
Shooting Total	4.35	2.42	1.55	3.33	8.01	68.30	9.14	3.34
Shooting Success (%)	55.30%	54.90%	34.60%	29.30%	41.20%	0.00%	0.00%	35.50%
Catching								
from pass	1.03	1.01	1.19	1.19	2.47	2.58	4.24	1.50
rebound	10.34	4.18	5.27	4.10	27.16	10.32	8.24	3.48
intercept	6.33	27.32	4.15	9.06	34.05	22.50	13.32	14.42
groundball	4.55	6.15	4.15	6.04	5.27	8.04	7.06	6.32
Catching Total	0.43	0.43	0.42	0.47	1.39	1.40	1.47	0.58
dribbling	0.00	0.00	1.07	1.44	0.00	0.00	5.46	2.02
jump/toss	19.39	39.33	76.23	24.16	68.10	68.30	30.48	39.14
intercept	9.49	13.46	0.00	13.14	34.05	137.00	92.23	10.42
TOTAL RESPONSE	0.22	0.22	0.16	0.19	0.50	0.43	0.46	0.23
No Response	0.00	0.00	76.32	72.49	45.27	45.40	0.00	0.00
Uncodable Response	0.00	39.33	38.16	0.00	0.00	137.00	0.00	58.50
Acceptable Response	0.22(92.3%)	0.25(89.3%)	0.18(87.1%)	0.20(91.9%)	1.10(72.6%)	0.58(75%)	0.58(78.5%)	0.25(90.3%)
Unacceptable Response	4.35(7.7%)	3.42(10.7%)	2.02(12.9%)	3.50(8.1%)	3.06(27.4%)	2.54(25%)	3.38(21.5%)	3.55(9.7%)
Successful Response	0.26(81.3%)	0.28(79.2%)	0.19(82.8%)	0.23(82.9%)	1.10(72.6%)	1.01(71.8%)	1.04(71.1%)	0.28(82.5%)
Unsuccessful Response	1.53(18.7%)	1.47(20.8%)	1.32(17.2%)	1.49(17.1%)	3.06(27.4%)	2.35(28.2%)	2.38(28.9%)	2.11(17.5%)

The low skilled responses reinforced the Revised ALT-PE/SPORT findings that the under 12 low skilled players in each sport made more frequent responses than their under 10 counterparts.

The low skilled under 10 netballers made a response every 50 seconds and the under 10 basketballers made a response every 46 seconds. The under 12 netball results were not too dissimilar to these results with a response every 43 seconds, however, the low skilled under 12 players made far more frequent responses, one every 23 seconds.

Figure 5.3 visually demonstrates the difference in response rates between high and low skilled players in each team and allows comparison between the sports.

FIGURE 5.3

Revised SOSOR Total Rates of Responses (1 per ___ seconds) of Under 10 and 12 Netball and Basketball in Game Sessions
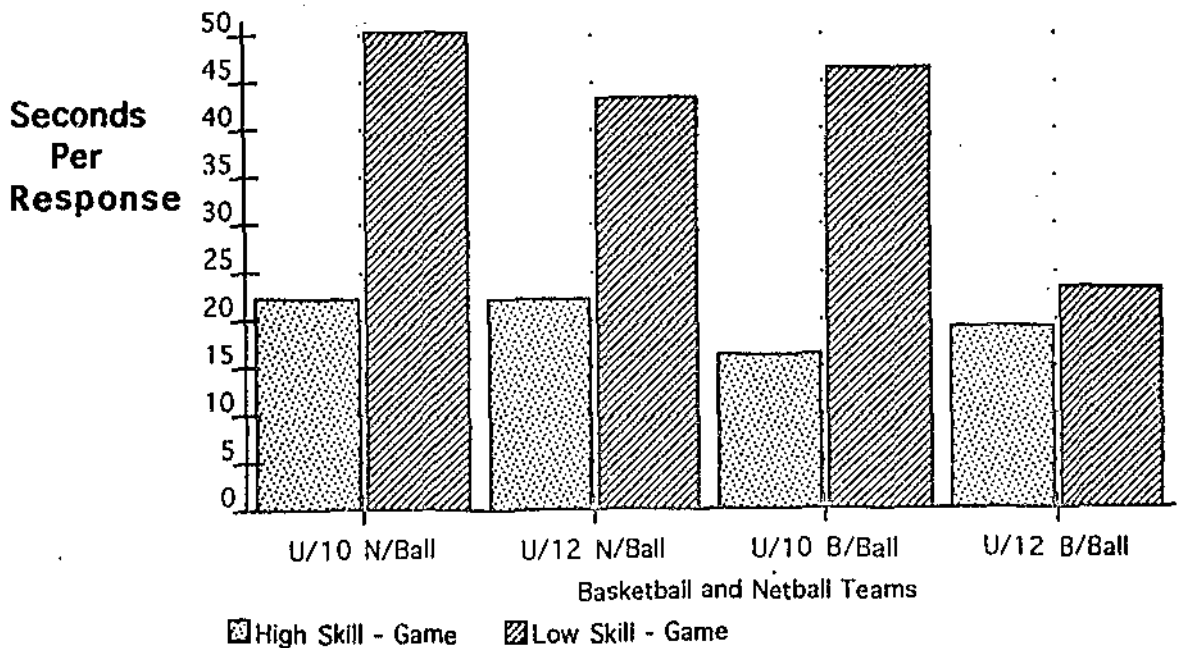
Results from Figure 5.3 demonstrate the more frequent response rates of the high skilled players in each team, with the difference in the response rates of high and low skilled players far less in the under 12 basketball team (4 seconds) than the under 10 basketball team (30 seconds), the under 12 netball team (21 seconds) and the under 10 netball team (28 seconds).

Table 5.28 supplies a comparison of combined revised SOSOR age group results from netball and basketball.

Table 5.28
Revised SOSOR Summary - Rates of Responses (1/_ Minutes)
Comparison of Netball and Basketball Teams Game Data
(Under 10 and 12 Data Combined)

CATEGORIES	HIGH SKILL (Rate 1/__Mins)		LOW SKILL (Rate 1/__Mins)	
	NETBALL	BASKETBALL	NETBALL	BASKETBALL
Passing				
chest/shoulder	1.06	1.18	2.01	1.58
bounce	0.00	12.58	0.00	25.08
hook	0.00	37.18	0.00	201.03
overhead	27.31	12.58	273.20	33.30
underarm	0.00	99.28	0.00	50.16
Passing Total	1.02	1.02	2.00	1.39
Shooting				
set shot	3.23	27.07	14.23	50.16
lay-up	0.00	14.12	0.00	20.06
field	0.00	3.21	0.00	6.55
Shooting Total	3.23	2.27	14.23	4.40
Catching				
from pass	1.02	1.19	2.52	2.21
rebound	6.07	4.44	15.11	4.47
intercept	10.11	5.44	27.20	14.00
groundball	5.30	4.58	6.30	6.46
Catching Total	0.43	0.45	1.33	1.10
dribbling	0.00	1.21	0.00	2.38
jump/toss	30.34	37.18	48.20	33.30
intercept	11.27	27.07	11.53	16.45
TOTAL RESPONSE	0.22	0.17	0.47	0.28
No Response	0.00	74.36	45.33	0.00
Uncodable Response	137.35	74.36	273.20	100.32
Acceptable Response	0.24 (91%)	0.19 (89.2%)	1.04 (73.9%)	0.32 (86.6%)
Unacceptable Response	3.59 (9.0%)	3.02 (26.1%)	3.02 (26.1%)	3.45 (13.4%)
Successful Response	0.27 (80.4%)	0.21 (82.8%)	1.05 (72.2%)	0.35 (78.9%)
Unsuccessful Response	1.50 (19.6%)	1.39 (17.2%)	2.49 (27.8%)	2.15 (20.1%)

The high skilled players in netball made a response every 22 seconds. In basketball there are only five players on the court at a time compared to seven in netball, so it would be expected that they would accrue more frequent response rates. It is also prudent to consider that basketball players can accrue greater rates of responses, through dribbling the ball before passing, whereas the netballers hold onto the ball before passing. This was the case in the high skilled basketball results with the basketball results with the high skilled players making a response every 17 seconds.

Figure 5.4 represents the rates of successful skill responses of high and low skilled players during game play.

FIGURE 5.4

Revised SOSOR Total Rates of Successful Skill Responses (1 per _ seconds) of Under 10 and 12 Netball and Basketball in Game Sessions

Seconds Per Resonse — Basketball and Netball Teams

☒ High Skill - Game   ☒ Low Skill - Game
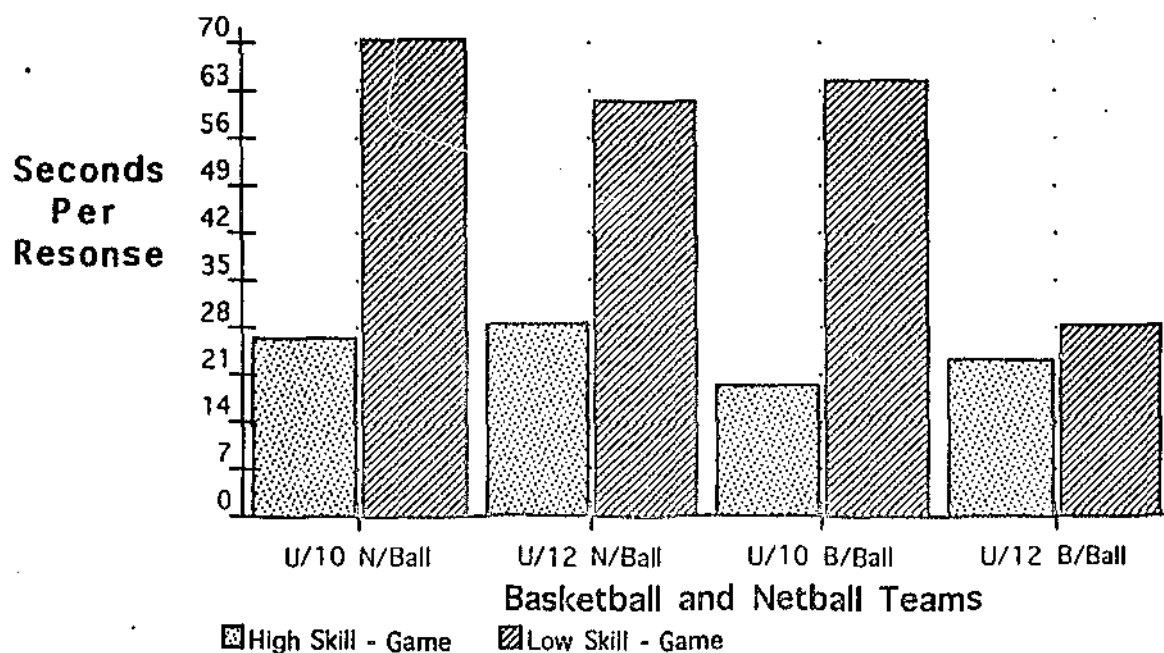
Results show that the high skilled under 10 and 12 basketball players made more frequent successful ball skill responses than the under 10 and 12 netball players, making one successful response every 19 and 23 seconds respectively. The high skilled under 10 netball players made a successful ball skill response every 26 seconds and the under 12 netball players every 28 seconds.

As expected the rates of successful ball skill responses for low skilled players were not as frequent. Under 10 netballers made a successful response every 70 seconds compared to every 61 seconds for under 12 players. Low skilled under 10 basketballers made a successful response every 64 seconds, in contrast to every 28 seconds in under 12 basketball. Interestingly the under 12 low skilled players made a successful response in 82.5% of responses, whilst the other low skilled players made a successful response in 71-72% of responses.

The difference in the amount of successful ball skill responses between high and low skilled players in each team is as follows:-
: Under 10 netball - 44 seconds
: Under 12 netball - 33 seconds
: Under 10 basketball - 40 seconds
: Under 12 basketball - 5 seconds

Again it reinforces the fact that the difference between high

and low skilled players in the younger age groups c. each sport is broader than in the older age group.

Results in Table 5.28 show that there exis' a real difference in the amount of total and successful ball skill responses, between high and low skilled players in each sport, with the difference being broader in netball than basketball. The difference in ball skill responses between high and low skilled players in netball and basketball was found to be more pronounced in the Revised SOSOR data than in the Revised ALT-PE/SPORT data.

When analysing the type and frequency of ball skill responses displayed in Table 5.27, many similarities between the two sports and age groups can be made. The passing results reveal that high skilled players from each team in netball and basketball passed more frequently than the lower skilled players. The under 10 high skilled netballers passed the most frequently - one every 56 seconds. The under 10 netballers passed every 70 seconds and high skilled basketballers of each team passed every 61 seconds.

The under 10 low skilled players in basketball and netball passed far less frequently than their under 12 counterparts. In netball the under 10 low skilled players passed every 160 seconds, compared to every 96 seconds for the under 12 low skilled players. The low skilled under 10 basketball players passed the ball every 144 seconds and the under 12 players every 86 seconds.

The difference in the frequency of disposals between the high skilled under 10 and 12 netball players was equated by the amount of shots made. Though the under 12 netball players may have made less frequent passes, they were more frequent in their shooting at goal making a shot every 2:42 minutes, compared to every 4:35 minutes by the under 10 high skilled players. The under 10 high skilled basketballers shot the most frequently of all groups making a shot every 1:55 minutes, compared to every 3:33 minutes by the under 12 high skilled players.

In all teams, except the under 12 basketball team there was a great disparity in the frequency of shooting between high and low skilled players. The low skilled under 10 netball players only made a shot every 8:01 minutes, the low skilled under 12 netballers every 68:30 minutes and the low skilled under 10 basketball players made a shot every 9:14 minutes.

The results in Table 5.27 show that the percentage of success in the shooting was very even for the high skilled under 10 and 12 netballers, with the under 10 players being successful on 55.30% of time compared to 54.90% of time for under 12 high skilled netballers. The percentages of shooting success were much lower for the high skilled basketball players, with the under 10 players shooting at 34.60% and the under 12 players at 29.30%. The low skilled shooting percentages make for interesting comparisons. Neither the under 10 basketball nor the under 12 netball players made a single successful shot at goal during the periods of observation. The low skilled under

10 players were more successful shooting accurately on 41.20% of the time. The under 12 low skilled basketballers actually had more success in shooting than the under 12 high skilled players shooting at 35.50%.

Catching rates were similar for all high skilled groups with both netball groups making a pass every 43 seconds, under 10 high skilled players every 42 seconds and under 12 high skilled players every 47 seconds. Catching rates for low skilled participants in each team were higher in comparison to low skilled groups, with under 10 and under 12 netball players catching at a rate of one every 99 and 100 seconds respectively. Under 10 low skilled players caught less frequently than this, making a catch every 107 seconds. The under 12 low skilled players made more frequent catches with a rate of one catch every 58 seconds.

From the overall skill response rates displayed in Table 5.28 the following findings are made:

(a) High skilled basketball and netball passing and catching rates were equitable, though low skilled basketballers achieved more frequent responses in these two skill categories.

(b) Basketball players in both under 10 and 12 age groups were far more frequent in their shooting at goal.

(c) Basketball players in both under 10 and 12 age groups made more frequent successful responses with the high skilled netballers achieving a rate of one successful response every 27 seconds compared to every 21 seconds for high skilled basketball players. Low skilled netballers made a successful response every 65 seconds and low skilled basketballers every 35 seconds.

Comparison of Netball and Basketball Training Results

Comparative results of the study of under 10 and 12 basketball and netball training sessions using the Revised ALT-PE/SPORT and Revised S.O.S.O.R. are presented in summary tables that allow inspection and comparison of results from high and low skilled participants of all teams.

Graphs are also provided to provide visual inspection for the purposes of comparison amongst the age groups and sports in areas where they are deemed relevant.

The results provided in Table 5.29 show that both skill groups in each team spent more time in non-activity behaviours than in activity behaviours.

Table 5.29

Revised ALT-PE/SPORT - Behavioural Category Percentages
Summary of Under 10 and Under 12 Netball and Basketball
Training Data

ALT CATEGORIES	HIGH SKILL				LOW SKILL			
Non Activity	u10N/ball	u12N/ball	u10B/ball	u12B/ball	u10N/ball	u12N/ball	u10B/ball	u12B/ball
injury	0.00	0.34	0.00	0.00	0.00	7.40	0.00	0.00
management	7.06	8.87	2.60	3.23	6.84	8.68	2.38	5.04
Transition	20.70	23.53	19.02	16.05	19.03	19.99	16.95	15.38
Knowledge	10.42	15.96	19.27	11.07	8.84	14.27	22.11	10.62
wait	25.38	17.33	29.59	25.74	28.87	20.46	31.29	27.29
wait(reserve)	0.00	0.00	0.57	0.00	4.49	0.00	0.00	0.00
off task	1.33	0.89	3.74	1.48	0.93	0.47	1.31	0.46
Non Activity Total	64.90	66.92	74.80	57.56	69.00	71.27	74.04	58.79
Activity Non Skill								
warmup	4.83	0.95	0.00	0.00	5.27	1.01	0.00	0.00
support	1.68	0.27	0.89	3.14	0.57	0.40	1.15	3.48
movement	8.25	8.12	5.61	4.80	6.56	9.56	5.81	7.23
Non Skill Total	14.76	9.35	6.50	7.93	12.40	10.97	6.88	10.71
Activity - Skill								
ball skill +(positive)	12.73	13.51	11.14	21.86	10.12	9.49	10.57	18.22
ball skill - (negative)	3.22	3.68	3.41	6.27	4.70	2.89	5.41	5.49
non ball skill	4.41	6.55	4.15	6.36	3.78	5.38	3.03	6.78
Activity Skill Total	20.35	23.74	18.70	34.50	18.60	17.77	19.08	30.49
ACTIVITY TOTAL	35.10	33.08	25.20	42.44	31.00	28.73	25.96	41.21

Only the under 12 basketball participants spent less than 60% in non-activity behaviours, and subsequently more than 40% in activity behaviours. In comparison, under 10 basketball participants spent well over 70% of time in non activity behaviours (high skilled - 74.80%, low skilled - 74.04%) and less than 26% in activity behaviours. Under 12 low skilled netball participants spent 71.27% in non activity with the high skilled participants spending slightly less with 66.92%. High skilled under 10 netball participants spent 64.90% in non-activity behaviours, compared to 69% for low skilled players.

Figure 5.5 below supplies a graphical respresentation of the time spent in activity for each group.

FIGURE 5.5
Revised ALT-PE/SPORT Percentages of Involvement in Activity Behaviours During Training Sessions in Under 10 and 12 Netball and Basketball
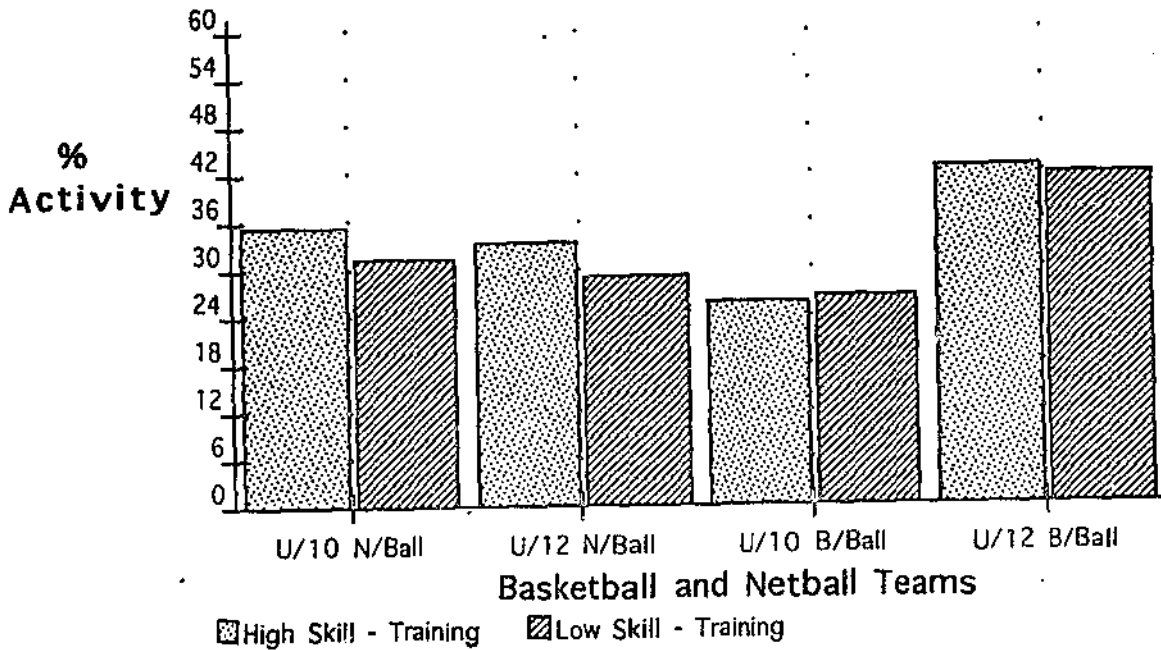
Figure 5.5 clearly demonstrates that the under 12 basketball participants were exposed to greater amounts of activity, whilst the results for the other teams were virtually parallel.

Combined team results from the Revised ALT-PE/SPORT instrument (see Table 5.30) show that the duration of involvement for low and high skilled players was more equitable in basketball, with a difference of only 0.26% between the high and low skilled participants, whereas high skilled netball participants spent 4.23% more time in activity than the low skilled participants.

Table 5.30
Revised ALT-PE/SPORT - Behavioural Category Percentages
Comparison of Netball and Basketball Training Data
(Under 10 and 12 Data Combined)

ALT/PE Categories	HIGH SKILL		LOW SKILL	
	NETBALL	BASKETBALL	NETBALL	BASKETBALL
Non Activity				
injury	0.17	0.00	3.70	0.00
management	7.96	2.92	7.76	3.71
transition	22.12	17.54	19.51	16.16
knowledge	13.19	15.17	11.56	16.22
wait	21.36	27.66	24.66	29.29
wait(reserve)	0.00	0.28	2.24	0.00
off Task	1.11	2.61	0.70	1.13
Non Activity Total	65.91	66.18	70.14	66.42
Activity - Non Skill				
warmup	2.89	0.00	3.14	0.00
support	0.98	2.02	0.48	2.32
movement	8.18	5.20	9.06	6.52
Activity Non Skill Total	12.06	7.22	11.68	8.80
Activity - Skill				
ball skill + (positive)	13.12	16.50	9.80	14.40
ball skill - (negative)	3.45	4.84	3.80	5.45
non ball skill (i.e. defending	5.48	5.26	4.58	4.90
Skill Total	22.04	26.60	18.18	24.78
ACTIVITY TOTAL	34.09	33.82	29.86	33.58

Overall high skilled netballers spent 0.27% more time in activity behaviours than the high skilled basketballers, though

the low skilled basketballers spent 3.72% more time in activity than the low skilled netballers.

In analysing the 'Activity-Non Skill' categories in Table 5.29 some real differences are apparent between netball and basketball results. Both netball teams were involved in some warm-up exercises, whilst the basketball participants were not. The under 10 netballers spent about 5% of time in such behaviours, compared to approximately 1% of time for under 12 netballers.

Negligible amounts of time were spent in support behaviours in all teams except the under 12 basketball team. Both high and low skilled participants spent over 3% of their time assisting other players in skill practice. Participants in both netball teams spent more time in non-skill movement behaviours than the basketball participants. Table 5.30 shows that high skilled participants spent more time in such behaviours than low skilled participants, with high skilled netballers spending 8.18% in movement behaviours, compared to 9.06% for low skilled players, and high skilled basketballers spending 5.20%, compared to 6.52% for low skilled participants. With the netball participants spending more time in warm-up and movement behaviours, they spent more time overall in non-skill activity behaviours. High skilled netballers spent 12.06% of time in such behaviours, compared to 7.22% for high skilled basketballers and low skilled netballers spent 11.68% in non-skill behaviours, compared to 8.80% for low skilled basketballers.

In analysing the ball skill activity, it is obvious that the participants of the under 12 basketball team achieved far greater amounts of ball-skill activity than any other . There was little difference in the amount of positive ball skill responses for high skilled players in the under 10 and 12 netball and under 10 basketball results, with a range of 11.14% for under 10 basketball to 13.51% for under 12 netball. However the high skilled under 12 basketballers accrued 21.86% of time positively involved in ball skills. The case was similar in the low skilled results, with the under 12 basketball participants spending 18.22% of time positively involved in ball skill practice, compared to a range of 9.49% to 10.57% for the low skilled participants from the other teams. Inspection of these results is aided by the graphical representation, exhibited below in Figure 5.6 (p. 200), which shows the amount of successful ball skill involvement for high and low skilled participants at training.

FIGURE 5.6

Revised ALT-PE/SPORT Percentages of Successful Ball Skill Involvement During Training Sessions in Under 10 and 12 Netball and Basketball

%
Successful
Involvement

Basketball and Netball Teams

⊠ High Skill - Training   ▨ Low Skill - Training
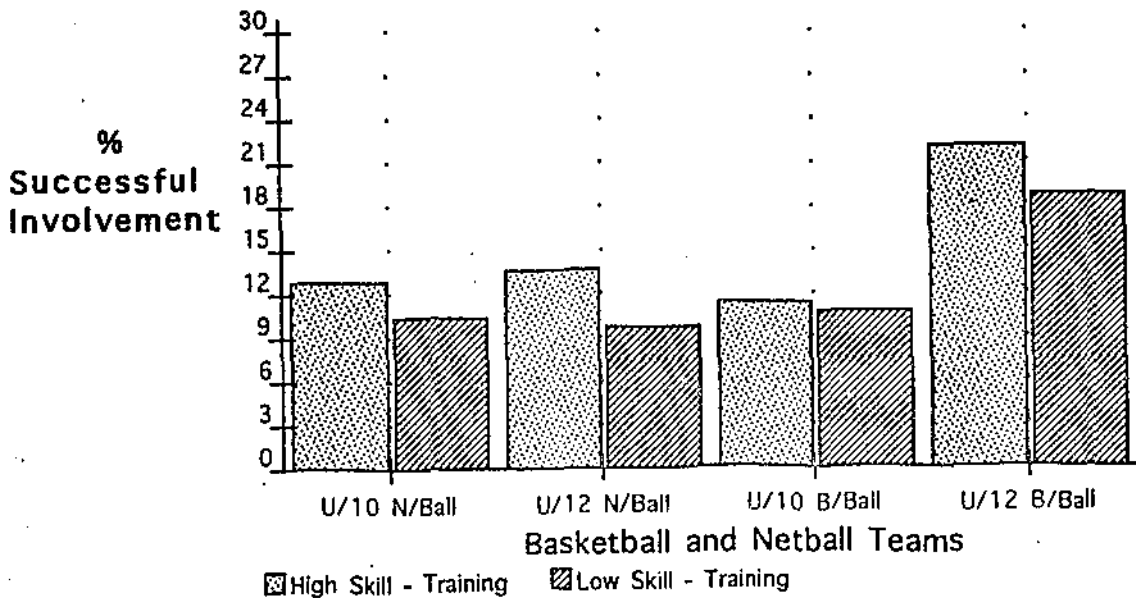
In each of the basketball and netball teams the high skilled participants accrued higher percentages in the ball skill (positive) category than the lower skilled participants. The difference between high and low skilled participants was greatest in the under 12 netball team, with a difference of

4.02%. In under 10 netball the difference was 2.61%, in under 10 basketball the difference was 1.65% and in under 12 basketball it was 3.64%.

Little disparity was found across the skill groups in the amount of unsuccessful ball skill behaviour, though the under 12 high and low skilled basketballers accrued greater percentages than the other teams, as a result of their overall increased involvement. The low skilled under 10 basketball players spent 2% more time in unsuccessful ball skill practice than the high skilled participants, thus having accrued a greater amount of time in ball skill behaviour than the high skilled participants (positive and negative responses added). This was the only team in which the low skilled participants actually spent more time in ball skill behaviours than the high skilled participants.

In the non-ball skill category there was not a significant difference between the skill groups, with the under 12 basketballers and under 12 netballers accruing marginally greater rates in this area than the younger aged participants.

Revised SOSOR ball skill response rates exhibited in Table 5.31 further demonstrate the high rates of involvement for under 12 basketball participants in comparison to other teams.

Table 5.31

Revised SOSOR Summary - Rates of Responses (1/_ Minutes)
Overview of Under 10 and 12 Netball and Basketball Teams
Training Data

RESPONSES	HIGH SKILL (Rates 1/_Minutes)				LOW SKILL (Rates 1/_Minutes)			
	u10 N/ball	u12 N/ball	u10 B/ball	u12 B/ball	u10 N/ball	u12 N/ball	u10 B/ball	u12 B/ball
Passing								
chest/shoulder	0.53	1.12	1.24	0.41	1.04	1.06	1.22	0.42
Bounce	9.56	34.54	9.52	2.48	9.54	229.20	42.08	9.12
hook	0.00	241.00	27.35	20.32	0.00	0.00	35.06	0.00
overhead	119.10	27.09	51.46	47.11	123.50	28.40	210.38	30.40
underarm	0.00	10.11	25.53	20.32	0.00	76.27	19 09	23.00
Passing Total	0.48	1.00	1.06	0.31	0.57	1.02	1.12	0.37
Shooting								
set shot	8.31	3.13	8.17	5.00	9.10	7.10	8.26	7.05
lay-up	0.00	0.00	5.45	2.45	0.00	0.00	11.05	5.45
field	0.00	0.00	5.35	1.41	0.00	0.00	9.34	2.18
Shooting Total	8.31	3.13	2.07	0.52	9.10	7.10	3.11	1.20
Shooting Success (%)	46.40%	38.20%	45.00%	43.90%	27.90%	56.20%	31.80%	41.30%
Catching								
from pass	0.51	1.01	1.08	0.32	0.56	1.15	1.16	0.37
rebound	11.55	5.41	4.36	1.58	82.33	15.17	7.48	1.55
intercept	18.20	30.32	27.35	47.11	49.32	76.27	35.06	61.20
groundball	5.58	4.47	4.08	1.47	8.50	5.06	6.41	2.40
Catching Total	0.40	0.43	0.43	0.20	0.49	0.56	0.52	0.23
dribbling	0.00	0.00	1.35	0.58	0.00	0.00	1.58	1.15
jump/toss	14.01	74.47	207.05	0.00	17.41	0.00	210.38	0.00
intercept	26.29	17.27	15.53	47.11	61.55	22.56	52.40	61.20
TOTAL RESPONSE	0.20	0.22	0.18	0.08	0.25	0.27	0.21	0.10
No Response	119.10	0.00	207.05	23.06	247.40	57.20	42.08	20.27
Uncodable Response	47.40	61.05	2.19	5.46	61.55	229.20	6.23	3.41
Acceptable Response	0.22(89.8%)	0.24(92.2%)	0.22(80.6%)	0.11 (79.9%)	0.30(81.3%)	0.33(82.2%)	0.30(70.7%)	0.12(85.4%)
Unacceptable Response	3.19(10.2%)	4.37(7.8%)	1.33(19.4%)	0.51 (20.1%)	2.12(18.7%)	2.31(17.8%)	1.12(29.3%)	1.12(14.6%)
Successful Response	0.23(86.5%)	0.27(81.8%)	0.22(83.1%)	0.10 (80.7%)	0.30(83.1%)	0.31(84.9%)	0.29(74.9%)	0.12(86.1%)
Unsuccessful Response	1.46(13.5%)	2.30(18.2%)	1.47(16.9%)	0.53 (19.3%)	2.26(16.9%)	2.59(15.1%)	1.24(25.1%)	1.15(13.9%)

Results show that both high and low skilled under 12
basketball participants made far more frequent responses in
all ball skill areas than any other skill group from the other
teams.

The low skilled participants made a skill response every 10 seconds and the high skilled participants, every 8 seconds. The results from the other three teams were quite similar, with high skilled under 10 netballers making a response every 20 seconds, high skilled under 12 netballers every 22 seconds and high skilled under 10 basketballers every 18 seconds. Low skilled participants made less frequent responses with under 10 netballers making a response every 25 seconds, under 12 netballers every 27 seconds and under 10 basketballers every 21 seconds. These results are presented in the form of a graph in figure 5.7 below.

FIGURE 5.7

Revised SOSOR Total Rates of Responses (1 per _ seconds) of Under 10 and 12 Netball and Basketball in Training Sessions
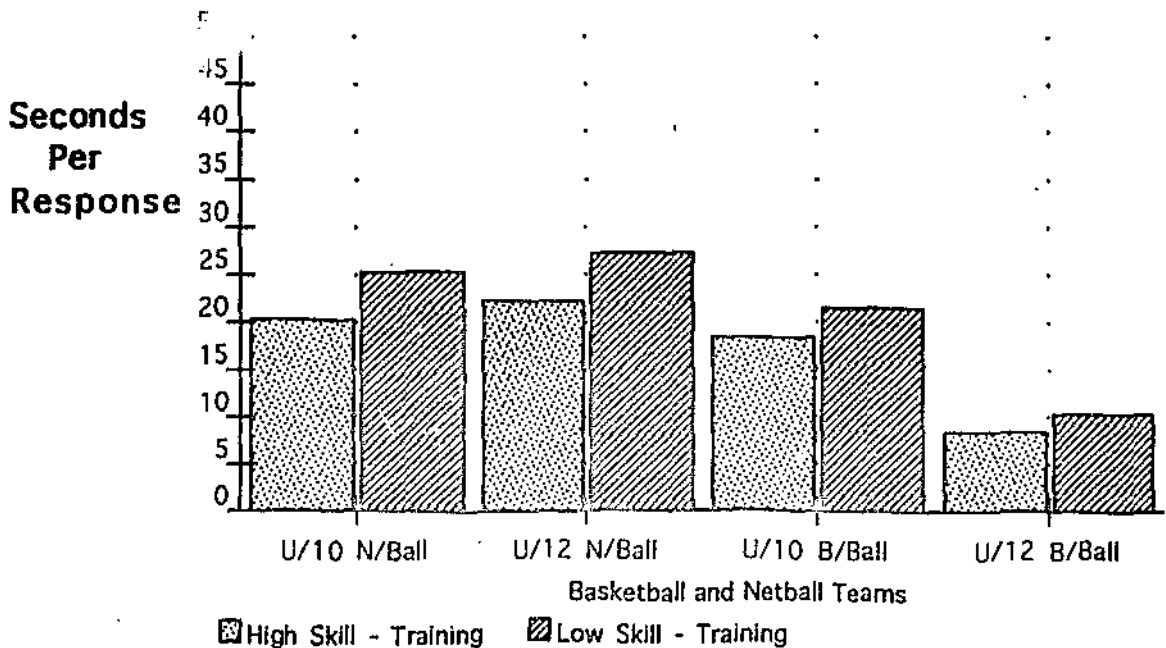
Inspection of the Revised SOSOR (Table 5.31) results reveal that in each team the high skilled players made more passes than the low skilled players, with the under 12 basketballers making the most responses followed by the under 10 netballers. The under 10 basketball participants made the least passing responses.

Shooting response rates show that in both basketball teams the participants made far more frequent shots at goal during practice than the netball participants. However the rate of shots for the basketball teams was increased by the lay-up shots, not permitted in junior netball. In each team the high skilled participants made more frequent shots at goal than the low skilled participants, with the most obvious imbalances occurring in under 10 basketball, where the low skilled children only made a shot every 191 seconds, compared to every 52 seconds for high skilled children. Such an imbalance also occurred in the under 12 netball training with the high skilled participants making a shot every 3:13 minutes compared to every 7:10 minutes for low skilled participants.

Shooting success percentages remained at a similar level for high skilled participants of each team, with a range of 38.20% to 46.40% for the four teams. Low skilled shooting percentages were not so even, with low skilled under 10 netballers only shooting successfully 27.90% of the time, under 12 netballers 56.20% of the time, under 10 basketballers 31.80% of the time and under 12 basketballers 41.30% of the time.

Catching response rates again show that high skilled participants made more frequent responses than low skilled participants and that under 12 basketball participants were over twice as frequent in making catches than any other team. Not unexpectedly players from all groups made the most catches from receiving passes and the basketball participants made more frequent rebounds, as they shot at goal more often.

The dribbling rates obviously increased the total amount of responses made for basketballers as netball participants do not practice such a skill. Results from both the under 10 and 12 teams reveal that high skilled participants made more frequent dribble responses than the low skilled participants.

Results in Table 5.31 show that only the under 10 netball participants really practised the ball-toss, achieving far more frequent rates than any other team. Uncodable responses were far more prevalent in both basketball teams as coaches instituted practices that did not fit the skill criteria in the Revised SOSOR instrument.

When inspecting the rates of acceptable and successful responses it is evident that the high skilled participants in the under 10 and 12 netball and under 10 basketball produced quite parallel results, whilst the under 12 participants had far greater opportunities to respond successfully. This also proved to be the case in the low skilled rates. Figure 5.8, p.206, provides a graph of all successful response rates, graphically

demonstrating that under 12 basketball participants made a successful response far more frequently than any other group.

FIGURE 5.8

Revised SOSOR Total Rates of Successful Skill Responses (1 per ___ seconds) of Under 10 and 12 Netball and Basketball in Training Sessions
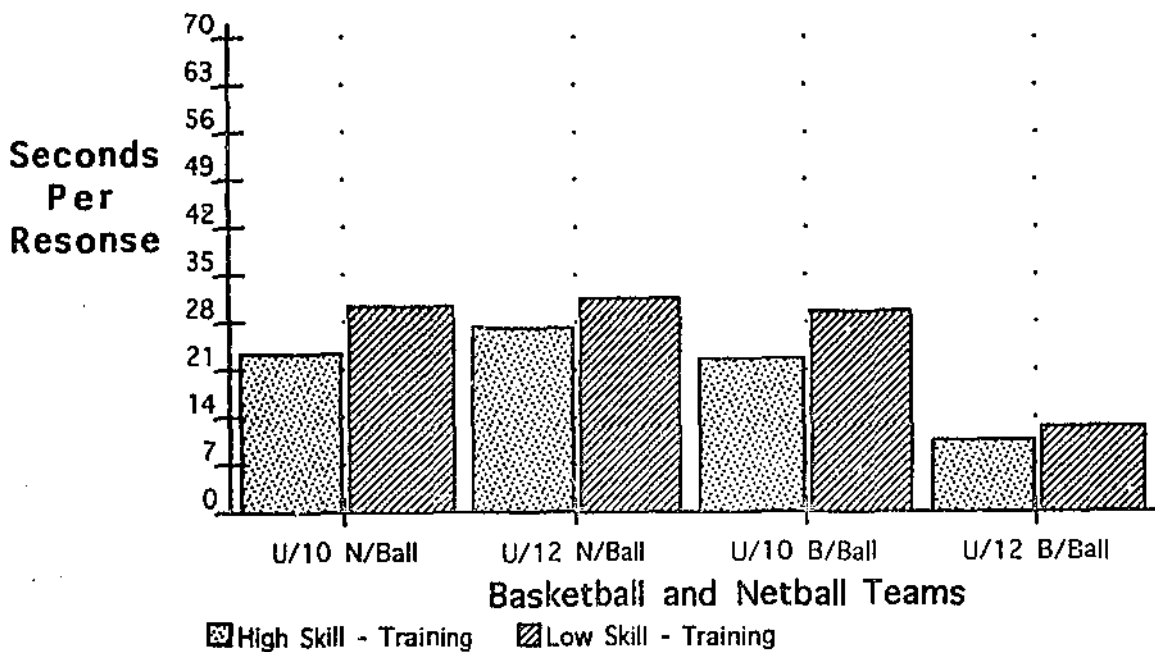
The overall rates for basketball and netball participants in Table 5.32 show that the under 12 basketball results assisted in making the training rates for basketball much superior to the netball rates.

Table 5.32

Revised SOSOR Summary - Rates of Responses (1/_Minutes)

Comparison of Netball and Basketball Training Data

(Under 10 and 12 data combined)

CATEGORIES	HIGH SKILL (Rate 1/__Mins)		LOW SKILL (Rate 1/__Mins)	
	NETBALL	BASKETBALL	NETBALL	BASKETBALL
Passing				
chest/shoulder	1.01	0.57	1.05	0.57
bounce	15.34	4.30	18.21	15.47
hook	482.40	24.30	0.00	65.46
overhead	43.53	49.00	47.17	56.22
underarm	20.07	23.03	159.00	20.46
Passing Total	0.53	0.43	1.00	0.50
Shooting				
set shot	4.38	6.19	8.05	7.44
lay-up	0.00	3.48	0.00	7.44
field	0.00	2.40	0.00	3.52
Shooting Total	4.38	1.15	8.05	1.56
Catching				
from pass	0.56	0.44	1.04	0.51
rebound	7.40	2.49	26.30	3.03
intercept	23.59	35.37	59.37	44.31
groundball	5.18	2.32	6.32	3.28
Catching Total	0.41	0.28	0.52	0.33
dribbling	0.00	1.13	0.00	1.33
jump/toss	24.08	391.47	34.04	394.39
intercept	20.59	32.39	20.94	56.22
TOTAL RESPONSE	0.21	0.12	0.26	0.14
No Response	241.20	43.32	95.24	28.11
Uncodable Response	53.32	3.14	95.24	4.45
Acceptable Response	0.23 (90.9%)	0.15 (80.0%)	0.31 (81.7%)	0.18 (80.0%)
Unacceptable Response	3.52 (9.1%)	1.07 (20.0%)	2.20 (18.3%)	1.12 (20.0%)
Successful Response	0.25 (84.2%)	0.14 (84.4%)	0.31 (83.9%)	0.17 (82.0%)
Unsuccessful Response	2.13 (15.8%)	1.17 (15.6%)	2.40 (16.1%)	1.20 (17.9%)

An interesting comparison that can be made across the groups
however, is in the range of success percentages for each group.
High skilled netballers made a successful response on 84.2% of
occasions, 0.2% less than high skilled basketballers, whilst
low skilled netballers made a successful response on 83.9% of
occasions, 1.9% more than low skilled basketballers.

Discussion and Comparison of All Netball and Basketball Results

Discussion of the findings is difficult, as few studies have been conducted in the settings observed in this study. This is especially the case in the area of basketball and netball game settings, where little research exists. Research in training contexts is more evident, though is still not vast, with basketball studies mainly focussed on high school or college aged participants and no research conducted in netball training contexts.

Some studies in generalised game settings have some application for comparison to findings in this study, however only those studies with pertinent findings, directly relevant to the findings in this study, will be used for the purposes of comparative discussion.

Game Results

Results from the game observations made in netball and basketball show an overall pattern of lower amounts of successful involvement in game skill content for low skilled players than high skilled players. Results from the Revised ALT-PE/SPORT observations indicate that in the the under 10 and 12 netball and under 10 basketball teams the high skilled player was successfully involved in ball skill responses more than twice as frequently than the low skilled players. This was not the case in the under 12 basketball results though, as the

high skilled players in this team spent over a third more time successfully involved in ball skill behaviours. (refer to Table 25)

Results from both the Revised ALT-PE/SPORT and Revised SOSOR instruments show that regardless of the differing game designs, with netball having segregated regions for various positions and basketball having no regions, there is no significant difference between the sports in the equity of ball skill involvement for high and low skilled participants. This finding concurs with those made by Parkin (1980) who manipulated the basketball game environment by providing three separate restrictive regions for players, only to find that the high skilled players still dominated play. The restrictive regions inherent in the netball game design were less effective in providing equity in participation, than in Parkin's study, as the areas that players are allowed to move in during netball game play are not the same for each player, with the positions of Goal Attack, Goal Defence and Centre allowed greater court coverage than the other positions. These positions were also found to be those most often played by the high skilled players, thus allowing them greater access to the ball than the lower skilled players.

In all target groups, except the high skilled under 10 basketballers the players spent more time involved in non-activity behaviours than in activity behaviours. Within the non-activity area, some contrasts can be made in respect to specific categories. The most obvious difference occurred in

the wait (reserve) category. The netball coaches employed a roster system of appointing reserves, ensuring equal participation in the games for all players, adhering to the rule stating that each participant must spend at least one half of the game on the court. In the basketball teams there were major inequities in the amount of time spent as a reserve for high and low skilled players, especially in the under 10 team where the low skilled players spent approximately 16 minutes out of the 40 minutes game time as a reserve, compared to approximately 2 minutes for the high skilled players. This situation is a result of the substitution rules that exist in junior basketball, allowing the coach to substitute a player at any time during the game, a situation that was often characterised by coaches either removing low skilled players when the score was close or finally allowing them to participate when the score was not close. With the skill levels of the players being quite close in under 12 basketball team, the low skilled players were not subjected to the same degree of inequity, however still spent on average nearly 5 minutes less playing time per game than the low skilled players. This occurrence in the junior basketball observations support the findings made by researchers investigating the effect of coaches' expectations on the level of involvement for participants. Cousineau and Luke (1990) found that high expectancy students were involved more in motor content, as did Telama et al., (1987) and Martinek and Karper (1982).

The time players spent waiting to be involved in activity was also of great contrast between the two sports. In netball the

participants spent an average of 33.6% in waiting behaviours compared to 8.8% for basketball. This is a product of the differing game designs, with netballers waiting in their zones for at times, long durations, while the ball is at the other end of the court. This was especially the case for low skilled players in both netball teams, as they spent far more time in the positions of Goal Keeper and Goal Shooter which restricted the players to only one zone of movement, whilst the high skilled players spent more time in the positions of Goal Attack, Goal Defence. and Centre, which allow movement across a greater area of court and subsequently greater access to active involvement. (See Appendix 7)

As a result of the basketball participants being allowed to go anywhere on the court, they accrued more time in 'movement' behaviours, where they were moving around the court without coming into contact with the ball or performing a skill, such as defending a shooter. The difference between the two sports in this area was not significant, nor was the difference between high and low skilled participants in this behaviour in all teams except the under 10 netball team, where the low skilled players were almost exclusively restricted to the Goal Shooter or Goal Keeper positions.

Another area of contrast between the two sports was in the knowledge category. This is a result of time-out situations occurring in junior basketball, where coaches can stop the game and call the players across to the coaches' area and talk to the players about the game. Such a situation must have

limited benefit in junior sport as the game clock is still running (in adult basketball the clock stops). With an average of 8% game time spent in such behaviour, one must question whether 'time-outs' are necessary, even though there may be some benefit in the feedback provided. Surely the coach can provide this information during the quarter time breaks and leave more time in the game to actually be actively engaged.

The time spent in transition behaviours was consistent in netball and basketball, with netball averaging 15.74% transition time and basketball 16.47%. Transition time was increased in netball mostly as a result of the rule of bringing the ball back to the centre after a goal, thus requiring all players to move back to their particular zones before the game could recommence. In basketball time was lost to transition behaviours for a variety of reasons. One such reason was the substitution rule. Every time a player was substituted the game stopped, which took time as the player left the court and the substitute was brought on. Time was also lost in moving to and from time-out episodes and when the game stopped for the referee to make signals to the score bench for fouls and in free throw situations.

The free throw situation also provided for increased transition time as players set themselves up in positions around the key and the referee made signals between each shooting attempt. It is to be expected that with there only being 10 players on a court at one time in basketball, compared to fourteen in netball, that the basketballers would accrue greater amounts

of time involved in balls skill responses. This was the case, though the difference in the overall time percentages was quite minimal. (Refer to table 5.26)

In all teams the high skilled players were involved more than the lower skilled players in both the positive and negative category of ball skill activity, indicating a much greater involvement in ball skill content for the high skilled players. As indicated previously, the difference between the skill groups was least in the under 12 basketball age group, where the gap in skill performance between high and low skilled players was observed to be the least. Interestingly the participants in this team were also exposed to much higher rates of ball skill involvement in their training than participants from other teams.

In both sports the gap between high and low skilled players in ball skill content was greater in the under 10 age group than the under 12 age group. The difference was slight in netball but much more marked in the basketball, indicating that despite modifications to game rules in the younger age groups, they have had little effect in providing equity in participation for players from differing skill groups.

Revised SOSOR findings (refer to Tables 5.27 and 5.28) reinforce the findings made using the Revised ALT-PE/SPORT instrument, indicating that high skilled players made more skill responses than low skilled players. There was a larger disparity in response rates between high and low skilled

players in the under 10 age groups of each sport. The Revised SOSOR rates show a larger gap in response rates between basketball and netball than existed in the ball skill percentages in the Revised ALT-PE/SPORT findings. This can be attributed to the time sampling technique used in the Revised ALT-PE/SPORT instrument not being able to pick up multiple responses in a five second observation period, which Revised SOSOR is able to do. For example a basketballer may make a catch, dribble and shoot in the space of a five second interval, thus making three responses, whilst during the same time a netballer may only make a catch and a shot. Despite the basketballer making one more response, both observations would both be coded as one interval of ball skill activity with the Revised ALT-PE/SPORT instrument. It is also worth noting that the amount of time spent as a reserve is calculated in Revised ALT-PE/SPORT results, thus effecting percentages in other categories, whilst it is not included when calculating rates in Revised SOSOR (Further discussion on these matters are presented in chapter 7).

Again the gap between high and low skilled participants was the lowest in under 12 basketball results, whilst the largest gap existed between the under 10 high and low skilled basketball players. High skilled players in each team made more frequent skill responses in all skill categories with the most striking difference occurring in the shooting responses. The netball results in this category were effected by the positions assigned to the players. Unless given the position of Goal Attack or Goal Shooter in netball the player cannot shoot

at goal. In under 12 netball the high skilled players spent eleven quarters in shooting positions, while the low skilled player spent only two. The high skilled player made a shot every 2:42 minutes (54.9% success) and the low skilled player every 68:30 minutes (0% success). In under 10 netball the high skilled players spent two quarters less in shooting positions than the low skilled players. Despite this the high skilled player made a shot every 4:35 minutes (55.3% success), compared to every 8:01 minutes (41.20% success) for low skilled players. It was observed that when the low skilled player was in a shooting position, they often passed the ball off in preference to shooting and made far less frequent rebounds, greatly affecting their shooting response rates. Parkin (1980) found that the shooting success percentages increased when modified basketball game structures were introduced. This was especially evident in the low skilled results where they improved from 10.3% to 19.4% success rate. A direct comparison is difficult from this study, though it must be noted that the percentage for low skilled basketballers involved in modified games was 0%, though they only made 10 shots, and low skilled netballers involved in modified games was 41.18% from 17 shots. The older lower skilled children participating in modified games shot the following percentages:

(a) 35.35% from 33 shots - under 12 basketball
(b) 0% from 2 shots - under 12 netball

In basketball all players on the court can shoot and the rates for under 12 high and low skilled participants were almost

identical. This however was not the case in under 10 basketball where the low skilled player only made a shot every 9:14 minutes, compared to every 1:55 minutes for the high skilled player. Low skilled players in this team as in the netball teams took on the appearance of what Buck and Harrison (1990) term a 'competent bystander', where they looked like they were involved in all parts of the game, but rarely came into contact with the ball. Avoidance behaviours were observed, especially when in a position to shoot.

Overall the basketball players shot more frequently at goal, which is not unexpected considering all players can shoot in basketball and in netball only two players are permitted to shoot and these players must shoot from within a restricted goal circle. Netball players shot a higher success percentage, despite basketball players having the assistance of a backboard. The higher netball shooting success percentages were possibly higher due to limited opposition when shooting, as opposition players must be more than three feet away when shooting in under 12, and no defence of the shooter is allowed in under 10 netball. In basketball the shooter is quite often under pressure from an opposition player who is allowed to move as close to the shooter as they wish, and shots are quite often made on the run. Only in a free throw situation is a shooter able to take aim without any close opposition.

Basketball players made more frequent rebounds than netball players as a result of the more shots being made in basketball games, and as a result of the backboard being present on

basketball goals, returning a greater majority of the balls to the court than would occur without a backboard.

Revised SOSOR results (Table 5.27 and 5.28) indicate that there is congruency between acceptable responses and successful responses, indicating that if the topography of the skill is acceptable then there is a high chance of a successful skill response being emitted.

The range of successful responses from 71.8% to 82.8% for the target groups in each age and skill group for each sport indicate that the game design is conducive to performing skills successfully, and that the game modifications in the under 10 age groups are suitable for the developmental level of the participants. The problem exists in providing rule structures that ensure equity across various skill groups.

Training Results

Results from this study do not display a definitive pattern for successful engagement respective to particular sports. More so, the involvement levels for participants are predominantly determined by the practice activities instituted by the coach, though it is recognised team sports accrue greater levels of inactivity than individual sports. Beauchamp (et al., 1990).

The results support the findings made by Placek et al., (1982) that low levels of active involvement are a result of poor planning on the part of the coach. This was the case in results

from three of the teams studied with low levels of successful engagement occurring in the under 10 and 12 netball teams and in the under 12 basketball team, mainly as a result of poor organisation and choice of activities. Only the under 12 basketball participants were actively involved in ball skill practices over 20% of the time, making a ball skill response more than once every 10 seconds, due to the implementation of activities that required frequent responses in a short space of time and less time spent in non activity behaviours. A predominance of large group skill practices implemented by the other coaches, often only using one ball for the whole team, resulted in the range of only 9.49% - 13.51% spent positively involved in ball skill practice for the under 10 and 12 netball and under 10 basketball participants. The use of regular practice games also appeared to effect the level of skill involvement for participants in the netball teams. Buck and Harrison (1990) suggest that for participants to properly acquire skills, the learning strategy should include greater amounts of skill practice and that 'game like' drills should be used in preference to full game play as a practice exercise. Much of the non-activity time in each team accrued in wait time. Results show that netball participants spent less time in wait episodes (21.36% - high skilled, 24.66% - low skilled) than the basketball participants (27.66% - high skilled, 29.29% - low skilled). This is an interesting result considering there are less players to be involved in the basketball activities than in the netball. However, it must be considered that the training contexts were different, with the basketballers only having access to half a court for practice, whilst the netballers had

access to a whole court. This may also explain the greater reliance on whole group practice games in netball training, whereas they were rarely used in either basketball team's practice. Wuest et al., (1984) suggest that the way to reduce time participants spend in waiting is to either use smaller drill groups and/or provide activity stations.

The time spent in wait episodes by participants in this study concurs with the results found by Pieron and Conclaves (1987) who found that participants involved in training sessions run by coaches spent 23.3% waiting, compared to 31.5% for children in teachers' classes. In this study the average wait time for participants in all groups was 25.74%, supporting the case made by Beauchamp (et al., 1990, p.94) that participants in team sport activities spend most of their time waiting (30%) when not involved in activity.

Wait time percentages in this study also concur with the results found by Wuest et al., (1985) in their study of college basketball skill groups throughout one season. The results are however at odds to the findings of van der Mars et al., (1984) who made a comparative study of one high and one low skilled high school basketball player finding that the high skilled player spent more time waiting during training sessions than the low skilled player.

There was not a considerable disparity in the amount of activity time for high and low skilled children in each sport, though the differences were slightly more pronounced in

individual team results of under 10 and 12 netball. In the under 12 netball results, some compensation must be made for the 7.40% of time the low skilled participants spent injured, as this reduced the available activity time, not as a direct result of the activities implemented. Only under 12 basketball high and low skilled participants spent over 40% of time involved in activity, with under 10 basketballers spending less than 26 % and under 10 and 12 netball teams, marginally over 30% of time in activity. The overall level of activity for all participants is not dissimilar to the results found by Metzler (1989) who found a median range of 30-40% for sport practice sessions. The results also concur with the findings of Thomas et al., (1984), Wuest et al., (1984), and Wuest et al., (1985) in their studies in sport training settings of basketball, volleyball and lacrosse. However the results from this study did not find the high degree of contrast between high and low skilled participants that were found in these studies.

The amount of time provided for activity during these sessions proved to be higher than levels found in most physical education studies (school setting). Shute et al., (1982) found the high skilled participants in elementary (primary) physical education classes engaged in movement for 28%, compared to 19% for low skilled participants. In this study the average level of active involvement for high skilled netballers was 34.09% and for high skilled basketballers 33.82%. For low skilled netballers the activity level was 29.86% and for low skilled basketballers it was 33.58%. The level of involvement was also greater than that found by Siedentop et al., (1986) in

their summary of ALT-PE studies, where they reported an average involvement level of 21-30%. Time spent in transition and management behaviours showed that the netball participants spent more time in these behaviours than basketball participants. The time spent in transition and management episodes by basketballers of both age groups ranged from 19.33% to 21.62% (transition and management percentages added). Netball participants spent longer in such behaviours with a range of 25.87% to 32.4%. In each team the high skilled participant spent slightly longer in such episodes than the low skilled participant.

It was apparent that the netball coaches spent much more time talking about events not related to the instruction, including giving out awards, discussing recent carnivals and about social aspects, thus explaining their team member's high percentage of management behaviours. The netball teams did not have to stick to a strict timetable as they could train as long as they wished at the facility they were using. The basketball coaches appeared more conscious of the time, as they were only allocated 45 minutes training time in the facility in which they trained. This may also account for the basketball coaches not taking warm-up sessions with the team, choosing instead to start sessions with skill practices.

The amount of time participants spent in receiving knowledge was indicative of the individual coaching styles. The under 12 basketball and under 10 netball coaches were very succinct in their delivery of knowledge content, refering to key points and

often talking to players individually as the activity was progressing, in preference to stopping the whole group. As a result high and low skilled participants only spent approximately 11% of time receiving knowledge in under 12 basketball training and approximately 10% in under 10 netball. In contrast to this the under 10 basketball coach and under 12 netball coach spent more time in delivering knowledge. This was especially evident in under 10 basketball training sessions where periods of time often longer than five minutes were used to describe a skill or strategy. The coach would also spend longer with the lower skilled children who had not mastered the skills to the same degree as the high skilled children. As a result high skilled participants spent 19.27% of time in knowledge content and low skilled participants 22.11%. Under 12 netball participants spent less time with a percentage of approximately 15%. The under 10 basketball team was the only group in which the low skilled participants accrued more knowledge content time than the high skilled participants, however the difference between the two skill groups was quite minimal. These results contradict those made by van der Mars et al., (1984) in their study of college basketball players whose findings indicated that low skilled participants spent much more time in knowledge content. The results of this study concur with the findings of Wuest et al., (1984) and Wuest et al., (1985) who found little disparity in the amount of knowledge involvement for high and low skilled participants.

The level of management and transition time found in this study is greater than that found by Siedentop et al., (1986) in their summary of studies completed between 1978 and 1983. They found a range of 6%-22% for time spent in these behaviours, though it must be considered that many of these studies were in a school setting.

'Movement behaviours' (Non-activity category, Table 5.29) were higher for the netball participants than the basketball participants. This may be a result of the greater amount of time netball participants spent in gamepractice in comparison to the basketball players. Quite high levels of movement behaviours accrue when in a game situation, as demonstrated in the game results from this study (See Table 5.29).
Time spent in off task behaviour was very low in all settings with the high skilled participants spending marginally more time than the lower skilled participants in off task behaviours in each team's practice. This finding contradicts that made by Telama et al., (1987) who found that high skilled participants in ball game sessions were on task more than the low skilled participants.

Revised SOSOR rates further reflect the high degree of active ball skill involvement provided for under 12 basketball participants in comparison to participants from the other teams. (See Tables 5.31 and 5.32). The results from the Revised SOSOR instrument are not totally congruent with the results from the ball skill response section of the Revised ALT-PE/SPORT findings, as all ball skill responses, including those

performed when acting as a support are recorded when using the Revised S.O.S.O.R instrument. It must also be noted that slight discrepencies may also be evident as result of the time sampling technique used in the Revised ALT-PE/SPORT instrument not being able to pick up multiple responses in a five second observation period, which Revised SOSOR can do (as noted in the 'Game Discussion').

Despite minor incongruencies, the triangulation of results from both instruments show that only the coach of the under 12 basketball team provided his participants with frequent ball skill responses in the training sessions, as a result of the implementation of suitable exercises.

In all skill areas the high skilled participants made more ball skill responses than the lower skilled participants, with the greatest disparity being evident in the netball teams. Again this could very well be as a result of the predominance of the use of practice games in each training session, where the high skilled player often was placed into the positions usually played in weekend games that allow greater access to possession of the ball. This is best highlighted in the difference in the shooting response rates for the under 12 netball team, where the high skilled participants shot at goal twice as frequently as the low skilled participants, as a result of the high skilled participant playing in shooting positions more often during practice games than the low skilled participants.

Shooting drills were used far more often in basketball drills than in netball, as reflected in the shooting response rates (Table 5.31). This was partly due to the nature of the shooting in the two games. In basketball it is possible to dribble the ball to the goal and shoot or lay up, whereas in netball, unless standing near the ring and continually shooting by onesself or in small groups, you are reliant on a pass to you near the goal before being able to shoot. The nature of the skill in basketball makes for a greater variety of shooting activities, that can easily encompass other skills. Plus in some ways the training results reflect the results from the game where basketballers were found to shoot more frequently than netballers.

The high percentage of successful skill resonses made (see Table 5.31) in both the under 10 and 12 results for each sport, indicate that the design of the equipment is well suited to the development level of the children and that the activities implemented by the coaches may not have always promoted high rates of active involvement, but were appropriate for the skill level of the participants.

CHAPTER 6

CONCLUSIONS

This research project has studied how participants use their time in junior netball and basketball programmes and the comparative involvement levels of high and low skilled participants involved in these programmes. Separate analysis was conducted in game and training settings with particular focus upon the degree of successful ball skill engagement for the high and low skilled participants within these settings.

Descriptive results from this study have shown that high skilled players in both netball and basketball in the ages of under 10 and under 12 were involved in activity more often and made more frequent successful ball skill responses in all skill areas than low skilled players during game play. The results show that high skilled participants made more frequent responses in all ball skill areas during games, with a large disparity between high and low skilled participants being evident in under 10 and 12 netball and under 10 basketball. The difference between high and low skilled participants was not as large in under 12 basketball.

Despite netball being designed with restricitive regions for different player positions, it had no effect in providing greater equity of involvement for participants when comparing results to those found in basketball. Much of this was due to the different positions designated for high and low skilled players.

Netball participants were found to have spent more time in wait behaviours and made marginally less skill responses than basketball players, as a result of having two more players in their team.

Low skilled netball players were found to spend more time waiting during games than low skilled players and spent more time in positions which had greater restrictions on court movement and a subsequent lack of access to ball possessions. Time spent in other non activity behaviours was consistent for both skill groups in netball. High skilled netball players were successfully engaged in ball skills over twice as often as low skilled netball players with the difference being slightly broader in the under 10 age group than in the under 12 age group.

In basketball, high skilled players spent more time in activity behaviours than low skilled players and spent a great deal more time on the court, with this being most evident in the under 10 age group. The difference between the active involvement levels of high and low skilled participants was much broader in the under 10 age group than the under 12 age group, with the high skilled participants being twice as frequent in their successful ball skill responses than low skilled participants.

Results from training observations show that the level of active involvement is respective to the planning and organisation of the session by the coach, thus reinforcing the

findings of Placek et al., (1982) who found that the organisation of activities, equipment and participants may affect the learning opportunities of participants more than any other variable.

In both netball and basketball age groups, high skilled participants were actively engaged marginally more than the lower skilled participants, though high skilled participants made more frequent skill responses in each skill area. Low levels of involvement were found in activity behaviours and in successful ball skill engagement in the under 10 and 12 netball and under 10 basketball training sessions. Only in the under 12 basketball training sessions, conducted by the most experienced and accredited coach, were there opportunities for frequent ball skill responses.

The high degree of success for high and low skilled players in performing skills during games and practices in under 10 and 12 basketball and netball indicate that the equipment and rule changes used in both sports suits the physical requirements of the participants, and that modifying equipment for the under 10 participants has been warranted. Focus for future studies and planning should be on adapting rules to promote greater equity in participation for players of differing skill levels, as this problem has not been properly addressed.

CHAPTER 7

RECOMMENDATIONS

The following recommendations are based on the results found in this study pertaining to game design and practice procedures. Recommendations on modifying game designs will aim to provide changes that will be effective in providing greater equity in participation, whilst not altering the basic game design and being manageable and functional.

The findings of the study have not provided any evidence that restrictive court zones are effective in providing equity of participation in game play for high and low skilled players, as the imbalance between high and low skilled netball players and high and low skilled basketball players was very similar. As mentioned in previous discussion this finding supports the results found by Parkin (1980) when he introduced regions in a modified basketball game. He introduced 6 players per team, rotated through three court regions. He concluded that the " The same skilled children in the skilled group continued to dominate the game, but not quite to the same degree." (Parkin, 1980, p.30).

Some of the disparity between high and low skilled players in netball can be attributed to the positions assigned to the player by the coach, as high skilled players were generally placed in the least restrictive positions of Goal Defence, Centre and Goal Attack. Opportunities to respond were also

restricted for some of the players by assigning players to specific positions in attack or defence only for most of the season. A player who plays in a team that wins consistently but is restricted to a defensive position, will obviously have less opportunities to respond than a player playing in an attacking position. Alternatively an attacking player in a less successful team would experience the same problem. Specialising in positions at such an early age in neither necessary or prudent, if equitable participation is to be ensured.

Therefore a major recommendation for junior netball is to:

* <u>Provide a compulsory rotation of positions during games</u>

The rotation of players could be instituted by a ruling that demands that any player cannot spend longer than two quarters in defence or two quarters in attack during a game. For example a player playing at Goal Keeper in the first half must transfer to a defensive position in the second half or to the centre position.

An alternative ruling could be that any player may not be resticted to a 'one region position' (Goal Keeper and Goal Shooter) for more than two quarters per game, thus ensuring lower skilled players have greater access to positions more often occupied by high skilled players.

Results indicate that in basketball a major disparity between high and low skilled players exists in the amount of time spent

as a substitute on the interchange bench, whereas in netball the results were equitable between high and low skilled players. High skilled players spent considerably more time on court than the low skilled players in both age groups and low skilled players were often only brought on the court when the game result was not in jeopardy. This occurred as a result of two major factors. The first factor was the allowance of coaches to substitute players at any time through out the game, whereas in netball it could only occur at the quarter breaks or for injury. The other factor was that the game results appeared to hold moresignifigance in basketball as teams were playing for positions in the finals, whereas in netball there were no finals matches. The coaches appeared to be more inclined to keep high skilled players on the court to ensure a winning result, whereas in netball the coaches worked the interchange of substitutes on a rotational basis. This situation was graphically demonstrated in a finals game in under 10 basketball where the low skilled child spent less than 21% of time on the court whilst the high skilled player spent the entire game playing. Subsequently the following recommendation is made:

* Substitutions only to be made during quarter breaks, and based on a rotational basis, to ensure equity between players.

This rule would also assist in reducing the time spent in transition episodes during the game. In junior basketball the game is stopped to wait for substitutions to be made, whilst the game clock continues to run down. By not having any

substitutions during game time more time could be devoted to actually playing the game. The following recommendations will also assist in providing equitable involvement for all participants:

*Each player must spend at least one half of the game on the court, unless injured.

* No finals matches to be played in 12 years and basketball.

The recommendations have been made to avoid the situation of players spending more time on the court than others due to their perceived ability to ensure a win for the team, often as a result of finals ambitions of coaches.

Results show that on average, 61% of time in junior basketball is lost to non-activity behaviours. Approximately 16.5% of this time is in transitonal episodes and 8% of time in knowledge content. This amount of lost playing time could be reduced if there were not any 'time outs' allowed. Players spend time moving to and from bench area during these episodes to spend time listening to the coach give instructions about the game, instructions that could be well said during the quarter time breaks. No other junior game has such an occurence, and it seriously hinders the amount of time available to practice skills. Alternatively if it is deemed necessary to continue with time-outs, then the clock should be stopped during them, as

occurs in the adult game version. Therefore the recommendation is as follows:

* The game clock should stop during 'Time-Outs in junior basketball, or they should be not be permitted to occur.

The results show a major imbalance in the amount of opportunities to respond in junior basketball between high and low skilled participants, with this imbalance being especially evident in the under 10 age group. Games in this division were characterised by the high skilled players generally passing the ball among themselves, with the low skilled players rarely being involved. The rule enabling the team to bring the ball up the court to the half court line unopposed, ('No Press Rule') had little effect, as the high skilled children usually brought the ball in and up the court. In addition, the rule of only three dribbles had some effect, but was often characterised by high skilled players passing the ball off once they had three dribbles and receiving it back quickly. To address this, a solution must be found that shares the possession of the ball more equitably. Ther ... the following recommendation is made:

* After a goal is scored, the team bringing the ball up to their attacking zone must pass the ball three times before attempting the first shot

Such a rule has been introduced effectively in junior lacrosse (Sofcrosse), though in a different game context, and should be used in conjunction with the existing rules. It is important that this only occurs in the situation where the ball is being

brought up the court after a goal, if it was to happen after each shot it would severely effect the amount of shots made and such skills as 'rebound shooting' and 'tip ins' could not be performed.

The most significant difference between high and low skilled players occurred in the amount of shooting attempts. Only in the under 12 basketball team was there any real equity. The combined rates of responses from each age group (Table 5.30) showed that in junior netball the high skilled players made a shooting response every 3.23 minutes, compared to every 14.23 minutes for low skilled players. In basketball the high skilled players made a shot every 2.27 minutes, compared to every 4.40 minutes for high skilled players. No modifications to the rules have been instituted in either game to allow for all children to have opportunities to shoot at goal. In netball the greater difference is partly due to the higher skilled players being placed in the shooting positions more often. If the recommendation on rotating positions is heeded then this problem should be reduced. However, as noted previously when a high and low skilled player were positioned in the two shooting positions the high skilled player made far more frequent shots than the lower skilled player, as they received the ball more often from team mates and made far more rebounds. Therefore an additional rule change may be beneficial in both age groups to assist in equalising the amount of shots made by all players.

The recommended rule change would be as follows:

* Players are not permitted to make more than three shots in a row at goal

It is not prudent to limit the amount of continuous shots to anything less than three in a row, as there are only two shooters in netball and the rule would become far too restricitive, and when enforced would basically restrict the team to only one shooter.

In basketball the positions of the players is not a major variable in determining the amount of shots made, as all players are able to shoot at goal. The difference between high and low skilled players is basically a result of the high skilled player dominating the game. This was well demonstrated in the under 10 age group where there was a large difference in skill level between high and low skilled players resulting in the high skilled players making a shot every 1:55 minutes, compared to every 9:14 minutes for low skilled players. In some games it was observed that the high skilled player made consecutive shots at goal, despite the lower skilled player at times being in a better position to shoot. The following rule change is suggested to help in providing greater equity in shooting responses.

*Players are not permitted to make more than two shots in a row at goal (two free throws count as one shot only).

The administrators of the game may need to develop further rule changes to remedy a situation where the majority of all shots are made by the same players. Other changes to help low skilled participants have greater opportunities at shooting could include making each player's first score worth double points or rotating turns on free throw attempts. Obviously such changes would need to be tested, however innovative ideas certainly need to be implemented and trialed to avoid the obvious imbalance that occurs and the subsequent loss from the game of children bewildered by the lack of skill opportunities. Administrators need to consider that the overall skill development of all players is essential, and that changes in rules in junior age groups to assist in equity of participation should not be seen as a deterioration of the game, but a catalyst in which the skill level of all participants will be further developed enabling effective participation when participating in older age groups. The more children that stay in the game due to a feeling of enjoyment and belonging, the better it is for the maintenance and development of the sport. The stronger the competition, the greater the development for elite performers, and a subsequent higher level of performance in elite level teams.

The major problem that really affects the active involvement of players in the games is the skill levels that they individually bring to a game. The greater the range in skill levels across the team, the larger the gap in the amount of opportunities to respond in high and low skilled players. The difference in the skill level across the team should reduce if

the training sessions provided high rates of involvement for a]l
participants, thus raising the skill level across the team,
enabling greater success in performing skills in games.
Interestingly the under 12 basketball players who achieved far
greater rates of successful active involvement in their
training sessions won all of their games convincingly, yet
showed the least difference in the frequency of skill responses
between high and low skilled players in games.

The training results showed that only the under 12 basketball
coach provided activities that kept the participants actively
involved for nearly half of the allocated training time (Table
5.19). The high skilled participants in his training sessions
made a successful skill response every 10 seconds and the
lower skilled participants every 12 seconds, compared to every
22 seconds for high skilled participants and every 30 seconds
for low skilled participants in under 10 basketball. In under 12
netball the high skilled participants made a successful skill
response every 27 seconds, and every 31 seconds for low
skilled participants, whilst in under 10 netball training the
high skilled participants made a successful response every 23
seconds, compared to every 30 seconds for the low skilled
participant.

The under 12 basketball coach has far greater coaching
experience and has achieved much higher levels of coaching
accreditation from the Western Australian Ministry of Sport
and Recreation than the other coaches in this study. It would be
spurious to conclude that he provides far better training

sessions purely on the basis of his training and experience, however, it appears reasonable to suggest that all coaches should be required to participate in accreditation instruction units before coaching a junior team. A major focus of introductory units in such coaching schemes should be on how to maximise the use of training time to ensure maximum participant involvement and subsequent learning of skills. Strategies in reducing non-activity time through the reduction of episodes in transition, management, knowledge transference and wait time should be taught, to enable the coach to be able to adapt these to their own training sessions.

Walker (1990) found that increasing an instructor's awareness of the participant's level of Academic Learning Time was sufficient to supply a future increase in it. Therefore practical assessment of a coach's ability to provide high rates of successful active involvement for participants, using systematic observation instruments such as Revised ALT-PE/SPORT and/or Revised SOSOR in coach training, would assist in creating an awareness of how they utilise practice time and areas they could work on to improve therates of active involvement of their players. Therefore the following recommendation is made:

* **All coaches should be involved in accreditation units that provide strategies on how to provide high levels of successful active involvement for all participants.**

Finally, it is imperitive that administrators of the game constantly reassess the suitablility of the game design to

provide sufficient active involvement and equity of participation for all participants.

Future studies should be conducted in the following areas as a basis for further improvement in junior basketball and netball competitons:

* Levels of successful active involvement of participants with coaches from different levels of coaching accreditation.

* Levels of successful active involvement of different skill level groups involved in games using the recommended game modifications from this study.

* Determining the optimum ball size and weight and goal height for each age group in netball and basketball

* Comparative successful skill involvement of players (of the same age group) using modified equipment and those using standard sized equipment. This could also encompass rule changes or this could be treated as a separate study.

Methodological Considerations

Over the past fifteen years there has been a widespread acceptance of the ALT-PE instrumentation for its ability to accurately describe junior sport and physical education settings. However, as noted by Siedentop (1983) and Parker and O'Sullivan (1983) ALT-PE instrumentation has some limitations. Parker and O'Sullivan state that

> Despite the productiveness of ALT-PE to generate useful information about motor skill acquisition, it would appear we are looking simplistically at a complex situation. We know time-on-task is related to skill acquisition, yet it does not allow for the the discrimination of various types of responses. Such discrimination is needed to help us highlight the most appropriate motor responses in the development of more effective games, play and activities. (1983, p.9).

Siedentop (1983, p.4) stated

> A major step forward will occur when researchers develop content-specific categories for each of the major physical education activities.... One can envision a content-specific category system that reveals not only generic information but also highly detailed skill specific information.

The use of both the Revised ALT-PE/SPORT and Revised SOSOR instruments (with content specific categories) in this study, has satisfied these requests, by providing data that is rich in its descriptiveness of how participants spend their

time in junior sport settings and in its specificity of the frequency and type of skills used by players of differing skill abilities.

Without the triangulation of the two systems a comprehensive behavioural analysis would not have been possible. The Revised SOSOR system is extremely precise in its recordings, evaluating the success and topography of each skill response. The Revised SOSOR instrument compensates for some of the inadequacies of the Revised ALT-PE/SPORT instrument which are a result of the nature of its interval recording procedure.

Some minor disparities in the ball skill response categories of both systems occurred as a result of the Revised ALT-PE/SPORT system incorporating interval recording systems. This is highlighted in practice sessions where a participant could make a varying number of skill responses within the 5 second observation period and five second recording period of the Revised ALT-PE/SPORT instrument. However the instrument could not differentiate between the number of responses and subsequently one skill response or even three or four made by the player during an observation interval is still recorded the same, as ball skill activity in the interval box. This situation was highlighted in the under 10 basketball results. The Revised ALT-PE/SPORT results showed only a marginal disparity favouring high skilled participants in successful ball skill responses, whereas in the Revised SOSOR results the gap was more pronounced. This came about as result of the Revised ALT-PE/SPORT instrument not

being sufficiently sensitive to record the more frequent passes made by the high skilled players during the observation intervals. It may therefore be beneficial in future studies to reduce the recording interval time to 3 seconds, instead of five, to provide greater sensitivity in recording actual events. This however would require quicker notation of results and would need a recorder extremely well trained in using the instrument. Alternatively the Revised SOSOR system could not be used as a sole instrument either. If this occurred only details on the skill responses made by the players would be described, without delineating how the player uses the rest of his/her time. Knowledge of *how* players use their time is essential if changes are to be instituted to engender greater rates of successful skill engagement. The time spent in non activity behaviours must be described so that the areas which take up time, better used for activity, can be isolated and strategies developed to deal with this.

Another minor problem existed between the two instruments. The Revised S.O.S.O.R instrument could not code anything outside of the categories prescribed. However in training sessions coaches would at times enlist a skill practice, such as weaving the ball between the legs, which could not be coded, as no set skill criteria existed for it. This ball skill behaviour would then have to be coded as 'Uncodable', whereas the Revised ALT-PE/SPORT instrument could code this as ball skill activity, as a judgment is made by the observer as to whether the player is performing the drill as shown by the coach.

It must be said that despite minor discrepancies, the results overall between the Revised ALT-PE/SPORT and Revised SOSOR instruments were quite valid and congruent, thus providing solid foundations upon which the findings and conclusions were made.

Both instruments proved to be relatively easy to learn, however the Revised S.O.S.O.R instrument requires video taped performances to properly evaluate the responses, whereas Revised ALT-PE/SPORT can be live coded.

Each response observed using Revised SOSOR requires four recording operations :-

        (a) Recording the time

        (b) Recording the skill category

        (c) Evaluating skill topography

        (d) Evaluating the success of the response.

This process can be quite time consuming, as it is often required that the video be paused or put in slow motion to ensure the skill response is evaluated properly and there is time to record it. In some training session observations, the target participant made over three hundred responses, sometimes resulting in over two hours being spent on one session of coding.

In future studies in basketball and netball using the Revised SOSOR instrument some changes are required to streamline its use:

(a) Reduce the number of passing categories, as many are rarely used. The categories of hook, underarm and overhead passes could be grouped under the description of 'other passes', leaving chest/shoulder passes and bounce passes as the other categories.

(b) Expand the dribbling category into specific groups to indicate the number of dribbles made. With the present system a player could bounce the ball once and be coded the same as when they bounce the ball ten times.

REFERENCES

Allsopp, R. (1982). Kids are not adults. Sports Coach, 6(2), 43-47.

Australian Sports Commission. (1991). Sport for young Australians, widening the gateways to participation: market research report. Canberra.

Barry, K., & King, L. (1988). Beginning teaching - A developmental text for effective teaching. New South Wales: Hobgin Pool.

Beauchamp, L., Darst, P.W., & Thompson, L.P. (1990). Academic learning time as an indication of quality high school physical education. Journal of Physical Education, Recreation and Dance. (1), 92-95.

Benham, T. (1986, April). Modifications of basketball equipment and children's performance. Paper presented at the Annual American Alliance for Health, Physical Education, Recreation & Dance, Cincinnati, OH.

Berliner, D.C. (1979). Tempus educare in P.L. Peterson and H.J. Walberg (Eds.), Research on teaching: concepts, findings and implications (pp. 120 -135). Berkley, CA: llinois: Human Kinetics.

Brown, W. (1989). Systematic observation of student opportunities to respond (SOSOR) in P.W. Darst, V.H. Mancini and D.B. Zakrajsek (Eds.), Analysing Physical Education and Sport Instruction (pp. 189-193). Illinois: Human Kinetics.

Buck, M., & Harrison, J.M. (1990). An analysis of game play in volleyball. Journal of Teaching in Physical Education, 10, 38-48.

Clough, J., & Trail, R. (1989, Dec.). Report of Australian Sports Commission study of modified sports. Canberra.

Cousineau, W.J., & Luke, M.D. (1990). Relationships between teacher expectations and academic learning time in sixth grade physical education basketball classes. Journal of Teaching In Physical Education, 9(4), 262-270.

Darst, P.W., Mancini, V.H., & Zakrajesk, D.B. (Eds.) (1989). Analysing physical education and sport instruction. Illinois: Human Kinetics.

Fisher, C.W., Berliner, D.C., Filby, N.N., Marliave, R., Cahen, L.S., & Dishaw, M.M. (1982). Teaching behaviours, academic learning time, and student achievement: an overview. Journal of Classroom Interaction, 2 (4), 3-15.

Gay, L.R. (1990) Educational Research - Competencies for analysis and application: Third Edition. New York: Macmillan.

Evans, J. (1980). Objectivity and game modifications - the next step. Australian Journal of Health, Physical Education and Recreation, 89, 11-17.

Gibson, B. (1982). Considering the needs and development of children in sport. Sports Coach, 6(2), 3-7.

Gibson, B.J. (1985). Modifications of games and juniors on match day. Paper presented at the Western Australian Government Department For Sport and Recreation, General Coaching Course.

Godbout, P., Brunelle. J., & Tousignant, M. (1983). Academic learning time in elementary and secondary physical education classes. Research Quarterly for Exercise and Sport, 54, (1), 11-19.

Graham, G., Soares, P., & Harrington, W. (1983). Experienced teachers' effectiveness with intact classes: an ETU study. Journal of Teaching Physical Education, Summer, Monograph 1, 3-13.

Grant, B.C., Ballard, K.D., & Glynn, T.D. (1989, April). Student behaviour in physical education lessons: a comparison among student achievement groups. Journal of Educational Research, 2(4), 216-224.

Gray, E., & Cornish, J. (1985). Values and attitudes of junior sports coaches. Sports Coach, 9(2), 39-45.

Harrison, J.M. (1987) A review of the research on teacher effectiveness and its implications for current practice. Quest, 39(1), 36-55.

Haywood, K.M. (1984). Modification of youth sport: A rationale and some examples in youth basketball. In M.R. Weiss & D. Gould (Eds.), Sport For Children and Youths: 1984 Olympic Scientific Congress Procedings. (pp. 179-185). Champaign, IL: Human Kinetics.

Henry, G.M. (1979). Should the basket be lowered for young participants? Journal of Physical Education and Recreation, March, 65-66.

Hobart Division of Recreation, Education Department and Tasmanian State Schools Sports Council. (1983). A child is not a little adult: modified approaches to sport for Australian children. Tasmania.

Isaacs, L.D., & Karpman, M.B. (1981). Factors effecting children's basketball shooting performance: A log-linear analysis. Carnegie Research Papers, 29-32.

Juhasz, M., & Wilson, M. (1982). Effect of basketball size on shooting characteristics of junior basketballers in comparison to adults. The Australian Journal of Sport Sciences, Spring, 16-21.

Kleiber, D.A. (1981). Searching for enjoyment in children's sports. Physical Educator, 38, 77-83.

Lamb, G. (1985). Some thoughts on junior sport. ACHPER National Journal, March, 55-57.

Laurie, D.R., & Corbin, C.C. (1981) Parental attitudes concerning modifications in baseball for young children, Physical Educator, 38, 105-109.

Lee, A.M. & Poto, C. (1988) Instructional time research in physical education, contributions and current issues. Quest, 40, 64-73.

Longhurst, K., & Spink, K.S. (1987). Participation motivation of Australian children involved in modified sport. Footscray, Australia: Footscray Institute of Technology.

Mancini, V.H., & Wuest, D.A. (1987). Coaches' interactions and their high and low skilled athletes' ALT-PE: A systematic perspective. In G.T. Barrette, R. S. Feingold, R.C. Rees & M. Pieron. (Eds.), Myths, Models & Methods in Sport Pedagogy. Human Kinetics. Illinois: U.S.A.

Mandle, B., & Pang, H. (1981). Mandle v Pang: skill development and competition. Australian Journal for Health, Physical Education and Recreation, 93, 2-9.

Martens, R. (1978). Joy and sadness in children's sports. Champaign, Illinois: Human Kinetics.

Martinek, T., & Karper, W. (1983). The influence of teacher expectations on academic learning time in physical education instruction. Journal of Teaching in Physical Education, 1, 26-39.

Masschette, W., & Sands, R. (1989). Manipulating children's sports settings: Action research. Unpublished report, Department of Physical Education, Victoria College, Victoria.

Metzler, M. (1983) ALT-PE for inservice teachers, questions and hindsights. Journal of In Teaching Physical Education, pp.17-21.

Metzler, M. (1989) A review of research on time in sport pedagogy. Journal of Teaching In Physical Education, 8, 83-103.

Morris, D. (1976). Effects ball and background colour have upon the catching performance of elementary school children. The Research Quarterly, 47(3), 409-415.

Morton, A.R., & Docherty, D. (1980). Guidelines for coaches and parents involved in junior sport. Sports Coach, 4(3), 5-7.

Nettleton, B., & Sands, R. (1985). Modifications of children's sport: Problems or solutions ? Sports Coach, 9 (1), 37-41.

Nixon, J.E., & Locke, L.F. (1973). Research. In R.M.W. Travers (Eds), Second Handbook on Research on Teaching. (pp1210-1242). Chicago: Rand & McNally.

Orlick, T., & Botterill, C. (1975). Every kid can win. Chicago: Nelson-Hall.

Otago, L. (1982). A game analysis of the activity patterns of netball players. Sports Coach, 7(1), 24-27.

Paese, P. (1986). Experimental teaching units in physical education teaching research. The Physical Educator, 43, 141-144.

Pang, H. (1980). The signifigance of variability in normal childhood development. Early Childhood Bulletin, 4, 11-17.

Parker, M. (1989). Academic learning time physical education (ALT-PE), 1982 revision. In P.W. Darst, V.H. Mancini and D.B. Zakrajsek (Eds.), Analysing physical education and sport instruction, (2nd Edition), (pp. 195-203). Illinois: Human Kinetics.

Parker, M., & O'Sullivan, M. (1983). Modifying ALT-PE for game play contexts and other reflections. Journal of Teaching In Physical Education, Summer, 8-10.

Parkin, D. (1980). Children's sport : equalising the opportunity to play. Sports Coach, 4(3), 13-15.

Passer, M.W. (1988). Psychological issues in determining children's age readiness for competition. In F.R. Smoll., R.A. Magill., & M.J. Ash. (Eds.), Children In Sport, 3rd Ed.,(pp. 67-78). Champaign,Illinois: Human Kinetics.

Pieron, M., & Concalves, C. (1987). Participant engagement and teacher's feedback in physical education teaching and coaching. In G.T. Barrette, R. S. Feingold., R.C. Rees., & M. Pieron. (Eds.), Myths, models & methods in sport pedagogy. Human Kinetics. Illinois: U.S.A.

Phillips, D.A., & Carlisle, C. (1983). A comparison of P.E. teachers categorised as most least effective. Journal of Teaching In Physical Education, 2 (3), 55-63.

Placek, J.H., & Randall, L. (1986). Comparison of academic learning time in physical education students of specialists and non-specialists. Journal of Teaching in Physical Education, 5, 257-265.

Placek, J., Silverman, S., Shute, S., Dodds, P., & Rife, F. (1982). Academic learning time (ALT-PE) in a traditional elementary physical education setting: a descriptive analysis. Journal of Classroom Interaction, 17(2), 41- 42.

Plaisted, V. (1990, Oct.). A comparison of the effectiveness of the modified and traditional approach to junior netball. Paper presented at the 27th National Annual Scientific Conference of

the Australian Sports Medicine Federation, Alice Aprings, Northern Territory.

Pooley, J.C. (1980). Drop outs. Coaching Review, 3(15), 36-38.

Potter, M. (1984). Game modifications for youth sport: A practioner's view.
In M.R. Weiss & D. Gould (Eds.), Sport For Children and Youths: 1984 Olympic Scientific Congress Procedings. (pp. 205-208). Champaign, IL: Human Kinetics.

Reynolds, T. (1990). A case for modifying modified sports. The Coaching Director, 5 (3), 40-43.

Rife, F., Shute, S., & Dodds, P. (1985). ALT-PE versions i and ii: evolution of a student centred observation system in physical education. Journal of Teaching in Physical Education, 4, 134-142.

Robbins, S. (1979). Different strokes for smaller folks. Coaching Review, 2 (9), 37-43.

Robertson, I. (1981). Children's perceived satisfactions and stresses in sport. Paper presented at the Australian Council for Health, Physical Education and Recreation: 13th National Biennial Conference.

Robertson, I. (1989). The coach and the drop out. Sports Coach, 12(2), 8-14.

Rokosz, F. (1981, April). Modifications of team sport rules. Paper presented at the Annual American Alliance for Health, Physical Education, Recreation & Dance, Boston, MA.

Siedentop, D. (1983). Teaching research: the interventionist view. Journal of Teaching in Physical Education, Spring,1(3), 46-50.

Siedentop, D. (1985, May). The effect of game modifications in volleyball and soccer. Paper presented at the 11th Annual Meeting of the Association for Behaviour Analysis, Columbo, Ohio.

Siedentop, D. (1983). Academic learning time: reflections and prospects. Journal of Teaching in Physical Education, pp.3-5.

Siedentop, D., Birdwell, D., & Metzler, M. (1979). A process approach to measuring teacher effectiveness in physical education. Paper presented at the AAPHERD National Convention, New Orleans, March.

Siedentop, D., Mand, C., & Taggart, A. (1986). Physical education teaching and curriculum strategies for grades 5-12. Paolo Alto, California: Mayfield.

Siedentop, D., Tousignant, M., & Parker, M. (1982). ALT-PE 1982 revision coding manual. Columbus, Ohio: Ohio State University.

Silverman, S (1985). Relationship of engagement and practice trials to student achievement. Journal of Teaching in Physical Education, 5, 13-21.

Silverman,S., Dodds, P., Placek, J., Shutes, S., & Rife, F. (1984). Academic learning time in elementary school physical education (ALT-PE) for student subgroups and instructional activity units. Research Quarterly for Exercise and Sport, 55(1), 66-72.

Smyth, W. (1981). Research on classroom management: studies of pupil engaged learning time as a special but instructive case. Journal of Education for Teaching, May.

Taggart, A. (1991). Physical education and sport observation coding manual mor basic ALT-PE: Revised edition. Western Australia: Edith Cowan University.

Taggart, A. (1986). Kanga cricket: Some preliminary observations. Sports Coach, 9 (11), 5-11.

Telama, R., Varstala, V., Heikinaro-Johansson, P., & Utriainen, J. (1987). Leaning behaviour in P.E. lessons and physchological responses to P.E. in high-skill and low skill pupils. In G.T. Barrette, R. S. Feingold, R.C. Rees & M. Pieron. (Eds.), Myths, Models & Methods in Sport Pedagogy. Human Kinetics. Illinois: U.S.A.

Templin, T. (1983, Sum.). Triangulating ALT-PE: a research consideration. Journal of Teaching physical Education, pp. 38-41.

Thomas, J. T., Mancini, V.H., & Wuest, D. A. (1984, April). A comparison of the academic learning time-physical education of high-and low-skilled male and female collegiate lacrosse players. Paper presented at the American Alliance for Health, Physical Education, Recreation and Dance National Convention, New Orleans.

Tousignant, M., Brunelle, J., Pieron, M., & Dhillon, G. (1983). What's happening to ALT-PE research outside the united states? Journal of Teaching Physical Education, Summer, 27-33.

van der Mars, H., Mancini, V., Wuest, D., & Galli, G. (1984). A comparison of academic learning time of a high skilled basketball player and a low skilled player. Sport History-Sport Pedagogy and Sport Philosophy-Sport Sociology -1984 Olympic Scientific Congress, p. 41. (From 1984 Olympic Scientific Congress Program Abstracts, Abstract No. 1030)

Walker, R. (1991). Pilot Study: Improving academic learning time in physical education. Unpublished honours thesis, Edith Cowan University, Perth, Western Australia.

Western Australian Netball Association. (1990). Official rules. Perth, Western Australia. (Author not stated).

Wilkinson, S. & Taggart, A. (1989). ALT-PE/SPORT OBSERVATION INSTRUMENT self instruction module. Western Australia: Curtin University.

Wright, E.J. (1967). Effects of light and heavy balls on aquisition of sports-type skills by young children. The Research Quarterly, 38(4), 705-713.

Wuest, D.A., Mancini, V.H., Frye., & Murphy, J. (1985). A comparison of the academic learning time physical education (ALT-PE) of high-, average-,and low-skilled bsketball players during various phases of a season. In E.Haymes (Ed.), Abstracts of Research Papers 1985, presented at the Atlanta, Georgia Convention of AAHPERD in Research consortium meetings.

Wuest, D.A., Mancini, V.H., van der Mars, H., & Terrillion. (1984). The academic learning time-physical education of high- ,average-, and low skilled female intercollegiate volleyball players. Sport For Children and Youths: 1984 Olympic Scientific Congress Procedings. (pp. 123-129). Champaign, IL: Human Kinetics

Appendix 1

Andrew Watt
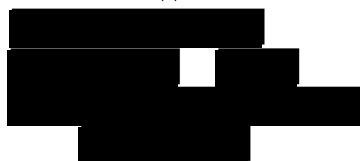
Dear _____

Thankyou very much for considering my request for help in conducting my study on junior netball and basketball.
I have attached a sheet outlining what is to occur in the study, why it is being done and how it is to be conducted. Please read through this. If you have any queries about it please do not hesitate to ask me.
I will contact you in a couple of weeks time to see what you think. If you decide you can help, I will organise a time to meet and discuss it with you further and to organise permission from parents for children to participate.
If you want to discuss the proposed study with the parents of the children feel free to do so and advise me of their reaction.

Once again, thankyou for your help, I greatly appreciate it.

Kind Regards,

Andrew Watt

<u>Appendix 2</u>

<u>STUDY: A DESCRIPTIVE PROCESS ANALYSIS AND COMPARISON OF GAME MODIFICATIONS IN JUNIOR BASKETBALL AND NETBALL</u>
(Summary)

Researcher: Andrew Watt

Institution: Edith Cowan University

Degree: Bachelor of Education (Honours degree) - thesis

Supervisor: Dr Andrew Taggart

<u>Purpose of the Study</u> : To provide a descriptive analysis of how often children of different skill levels are actively and successfully involved in game and practice sessions.

: To observe how children use their time in practice and games.

: To establish the effectiveness of the game structure to cater for children of all skill levels. (i.e - Does the modified game lead to more equity in participation ?).

: To compare the effectiveness of basketball and netball modifications in providing active skill involvement for participants.

Significance of the Study: To provide a better understanding of how children spend their time in junior sport settings, considering so little has been done in this area in relation to basketball and netball.

: Provide descriptive data on the effectiveness of current junior game designs to effectively cater for the needs of all children.

: Use this data to make recommendations on how to best cater for the needs of all participants in junior basketball and netball.

How the Data is to be Collected : With the permission of all coaches and parents of the children involved, four coaching sessions and four game sessions of each team will be recorded on video. The coaches will be asked prior to this to rank in order the players from the most skilful to the least. (This information to remain confidential between researcher and coach). The top third of the players will be regarded as the higher skilled players and the bottom third as the lower skilled players. Prior to each session one higher skilled and one lower skilled player will be randomly selected . These players will be observed participating (video taped), and their involvement coded using the following research instruments:- *(l) Academic Learning Time - Physical Education. (ALT-PE).*

This instument records exactly how a child spends their time during game and practice sessions. (E.G - how much time they spend with particular skills, how much time spent in lead up games, how often is spent listening to instructions or receiving some knowledge from the coach, how much time is spent on management tasks such as paying fees or organising equipment, or how often a child is actively and successfully involved during the session) *This instrument will be used during both game and practice sessions.

:_(II) Systematic Observation of Student Opportunity To Respond (SOSOR)._
This instrument was developed to determine the effectiveness of game modifications in providing opportunities for participants to perform a skill. It basically counts the number of successful and unsuccessful skill attempts by the child during the session and is used as a cross check for the ALT-PE instrument.

*N.B.- The specific children to be observed will not be notified who they are, (nor will the coach) as this may change their normal behaviour during the session and subsequently effect the results adversely.

Confidentiality: Everyone involved in the study will remain completely anonymous, as will the club and the centre at which the sessions will be observed. (No names will be mentioned at all in the study)

: Videos will only be observed by the researcher and research supervisor, but will remain fully accessible to all interested participants to view when required.

: Any participant wishing to pull out of the study at any time is free to do so and is under no obligation to participate.

Results: All findings will be made available to all coaches and any interested parents, and hopefully will be of use for your team.

Appendix 3

Revised ALT-PE/SPORT - Record Sheets (sides 1 and 2)

ALT-PE/SPORT INSTRUMENT (Basketball/Netball)   side 1

COACH_____TEAM_____ SPORT_____ DATE _____TIME_____

GAME/PRACTICE_____START_____STOP_____

OBSERVER_____ LIVE/TAPE_____

KEY BEHAVIOURS

Management (M) - related to class business, unrelated to instructional activity, e.g., taking
     attendance, discussing noncontent related incidents.

Transition (T) - managerial and organisational activities related to instruction.

Waiting (W) - completed a task, period of no activity and no movement between activities.

Wait (Reserve) - time spent off the court as a substitute

Knowledge (K) - listening to instructions, watching a demonstration, questioning, discussing.

Off Task (O) - participant engaging in an activity which he/she should not be participating, or performing
    an activity other than the one he/she should have been participating.

Injury (I) - Unable to participate in activity due to injury

Activity - engaged in motor activity

    (A/w) - warm-up exercises

    (A/su) - Supportive: Active in supportive task. (e.g. feeding balls to shooter)

    (A/m) - Movement: Participant moving/ running during practice or game without
      coming into contact with the ball. (e.g. running to position to receive a pass
      in game)

   Activity - Skill Response Categories

    (A/s) - Skill response, in contact with ball: player performs ball skill (e.g. player passes,
      shoots, dribbles or catches the ball)

    (A/n) - Skill Response - not in contact with ball: player performs a skill not requiring the use of
      a ball (e.g. defending player with the ball, practicing feet shuffling, moving into position
      for a rebound)

   For each skill response add (+) or (-)

(+) - Successful skill performance: criterion skill performed with moderate to high success.

(-) - Unsuccessful skill performance: participant performs skill with little or no success.

e.g - A/s+ - skill performed with a moderate to high degree of success.

RECORD SHEET - REVISED ALT-PE/SPORT   (side 2)

Target participant:_____ Description_____
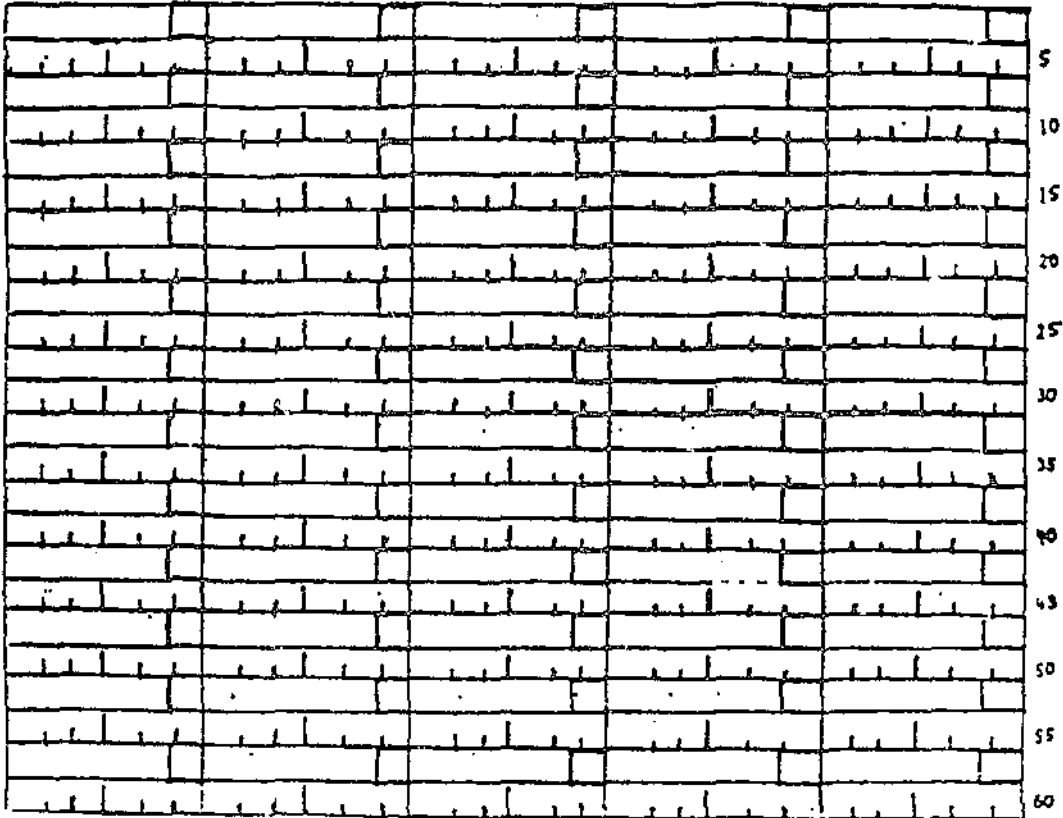
Summary Data

Total observed time:_____

M.	Secs.	%	K.	Secs.	%	O.	Secs.	%
T.	Secs.	%	W.	Secs.	%	I.	Secs	%
			W2	Secs.	%			

- -

A/w	Secs.	%	A/m	Secs.	%	A/su	Secs.	%

- -

A/s+	Secs.	%	* A/s-	Secs.	%	A/n+	Secs.	%
						A/n-	Secs.	

Critical incidents_____

_____

Other comments_____

_____

_____

Appendix 4

Example of Coded Revised ALT-PE/SPORT Observation Sheet

Target participant: _HIGH SKILL_ Description _BLONDE (16)_

¥ UNDER 12 BASKETBALL. (GAME)

Summary Data

Total observed time: _266 (44·20)_

M. (1)	Secs. 0·38 %	K. (19)	Secs. 7·14 %	O. —	Secs. — %
T. (47)	Secs. 17·67%	W. (32)	Secs. 12·03 %	I. —	Secs — %
		W2 (43)	Secs. 16·16 %		

A/w — Secs. — % A/m (73) Secs. 27·44 % A/su — Secs. — %

A/s+ (20) Secs. 7·51 % *A/s- (11) Secs. 4·13 % A/n (20) Secs. 7·51 %

Critical Incidents _Played defensive role in first half, not close to goal_
Played ball to player in th key.

Other comments _Won game by 6 points, close for_
most of the game, opposition fought back late.

Appendix 5

Revised Systematic Observation of Student Opportunities to Respond
Record Sheet (Basketball & Netball)

Systematic Observation of Student Opportunities to Respond - Record Sheet

COACH_____TEAM_____ SPORT_____ DATE _____TIME_____

START_____STOP_____TOTAL TIME_____.

OBSERVER_____ LIVE/TAPE_____

TARGET PARTICIPANT_____DESCRIPTION_____

Codes - Basketball/Netball

Passing	Shooting	Catching	*Dribbling
P1 - Chest	S1- Set shot	C1 - from pass	*D1 - Speed
P2 - Bounce (1 or 2 hand)	S2 - Lay up	C2 - Rebound	*D2 - Control
P3 - Shoulder/baseball	*S3 - Field	C3 - Intercept	Other
P4 - Hook		C4 - Off ground	J -Jumpball/tossup
P5 - Overhead	* = Basketball only		N - No response

X - Uncodable

I - Intercept

Response Seq	Skill Code	Topography		Results	
		A	UA	S	US
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
Totals					

Appendix 6

Example of Coded Revised S.O.S.O.R. Observation Record Sheet

COACH_____—_____ TEAM _Under 12_ SPORT_Netball_ DATE _16/6_ TIME _8.40_____

START _0000_ STOP _36.31_ TOTAL TIME _36.31_

OBSERVER _A. WATT_ LIVE/TAPE - GAME

TARGET PARTICIPANT _Low Skilled (GAME)_ DESCRIPTION _Blonde, long hair_

Codes - Basketball/Netball

Passing	Shooting	Catching	*Dribbling
P1 - Chest **(2)**	S1 - Set shot ~	C1 - from pass **(13)**	*D1 - Speed ~
P2 - Bounce (1 or 2 hand) — S2 - Lay up ~		C2 - Rebound ~	*D2 - Control ~
P3 - Shoulder/baseball **(18)** *S3 - Field ~		C3 - Intercept **(2)**	Other
P4 - Hook ~		C4 - Ground **(2)**	J - Jumpball/tossup **(1)**
P5 - Overhead ~	* = Basketball only		N - No response
+ - Designates pass in court			X - Uncodable
			I - Intercept **(1)**

	Response Seq	Skill Code	Topography A	Topography UA	Results S	Results US
1	2.38	C1	/		/	
2	2.40	P3	/			/
3	3.18	C1		/		/
4	3.19	P3		/	/	
5	4.12	C1	/		/	
6	4.13	P3	/		/	
7	4.44	P3		/	/	
8	5.25	C1		/		/
9	5.36	C4	/		/	
10	5.37	P1	/		/	
11	8.56	C1		/		/
12	8.57	P3		/		/
13	14.04	C1		/	/	
14	14.05	P3	/		/	
15	15.09	C I	/		/	
16	15.10	P3	/		/	
17	15.26	C1	/		/	
18	15.26	P3	/			/
19	15.45	C1	/		/	
20	15.51	P3		/		/
21	16.03	C4	/		/	
22	16.05	J	/		/	
23	16.10	P1		/	/	
24	16.40	C1	/		/	
25	16.42	P3	/		/	
26	19.37	I	/		/	
27	2h.00	C1	/		/	
28	21.08	P3		/	/	
Totals			28	11	28	11

PAGE $\frac{1}{2}$

Appendix 7

Positions Played by High and Low Skilled Players
in Under 10 and 12 Netball Games

Number of Quarters Played in Each Position

POSITIONS	HIGH SKILLED PLAYERS			LOW SKILLED PLAYERS		
	Under 10	Under 12	TOTAL	Under 10	Under 12	TOTAL
Goal Shooter (G.S.)	0	3	3	7	2	9
Goal Keeper (G.K.)	1	0	1	6	6	12
Goal Attack (G.A.)	5	8	13	0	0	0
Goal Defence (G.D.)	4	0	4	1	0	1
Wing Attack (W.A.)	0	2	2	0	2	2
Wing Defence (W.D.)	0	0	0	0	5	5
Centre (C)	4	2	6	0	0	0
Reserve	2	1	3	2	1	3
TOTAL QUARTERS	16	16	32	16	16	32

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL GAME PLAY CONTEXT

U/10 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St. Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	3.00	1.28	0.00	0.00	0.00	0.00	9.00	3.80	12.00	1.27	1.79
Transition	40.00	17.02	29.00	12.18	42.00	17.95	53.00	22.36	164.00	17.37	4.17
Knowledge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
wait	67.00	28.51	46.00	19.33	53.00	22.65	59.00	24.89	225.00	23.83	3.86
wait(reserve)	0.00	0.00	59.00	24.79	60.00	25.64	12.00	5.06	119.00	12.61	13.26
Off Task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	110.00	46.81	134.00	56.30	155.00	66.24	121.00	51.05	520.00	55.08	8.38
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	57.00	24.26	51.00	21.43	43.00	18.38	63.00	26.58	214.00	22.67	3.55
Non Skill Total	57.00	24.26	51.00	21.43	43.00	18.38	63.00	26.58	214.00	22.67	3.55
Activity - Skill											
ball skill +(positive)	38.00	16.17	36.00	15.13	12.00	5.13	26.00	10.97	112.00	11.86	5.01
ball skill - (negative)	10.00	4.26	8.00	3.36	6.00	2.56	14.00	5.91	38.00	4.03	1.43
non ball skill	20.00	8.51	9.00	3.78	18.00	7.69	13.00	5.49	60.00	6.36	2.15
Activity - Skill Total	68.00	28.94	53.00	22.27	36.00	15.38	53.00	22.36	210.00	22.25	5.53
OVERALL ACTIVITY	125.00	53.19	104.00	43.70	79.00	33.76	116.00	48.95	424.00	44.92	8.38

268

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL GAME PLAY CONTEXT

U/10 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St. Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score	Percent	
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	4.00	1.71	0.00	0.00	5.00	2.16	0.00	0.00	9.00	0.96	1.13
Transition	47.00	20.09	29.00	12.24	39.00	16.81	49.00	20.94	164.00	17.50	3.95
Knowledge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
wait	103.00	44.02	111.00	46.84	63.00	27.16	106.00	45.30	383.00	40.88	9.19
wait(reserve)	0.00	0.00	59.00	24.89	60.00	25.86	0.00	0.00	119.00	12.70	14.66
Off Task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	154.00	65.81	199.00	83.97	167.00	71.98	155.00	66.24	675.00	72.04	8.46
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	44.00	18.80	17.00	7.17	24.00	10.34	38.00	16.24	123.00	13.13	5.33
Non Skill Total	44.00	18.80	17.00	7.17	24.00	10.34	38.00	16.24	123.00	13.13	5.33
Activity - Skill											
ball skill +(positive)	16.00	6.84	5.00	2.11	4.00	1.72	21.00	8.97	46.00	4.91	3.57
ball skill - (negative)	13.00	5.56	5.00	2.11	2.00	0.86	6.00	2.56	26.00	2.77	1.99
non ball skill	7.00	2.99	11.00	4.64	35.00	15.09	14.00	5.98	67.00	7.15	5.41
Activity Skill Total	36.00	15.38	21.00	8.86	41.00	17.67	41.00	17.52	139.00	14.83	4.13
OVERALL ACTIVITY	80.00	34.19	38.00	16.03	65.00	28.02	79.00	33.76	262.00	27.96	8.46

APPENDIX 10

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL GAME PLAY CONTEXT

U/10 NETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)
RESPONSES							1: Mins
Passing							
chest/shoulder	44	38	21	44	147	10.87	0.56
Bounce	0	0	0	0	0	0.00	0.00
hook	0	0	0	0	0	0.00	0.00
overhead	0	0	0	0	0	0.00	0.00
underarm	0	0	0	0	0	0.00	0.00
Passing Total	44	38	21	44	147	10.87	0.5612
Shooting							
set shot	16	8	0	6	30	6.61	4.35
lay-up	0	0	0	0	0	0.00	0.00
field	0	0	0	0	0	0.00	0.00
Shooting Total	16	8	0	6	30	6.61	4.35
Catching							
from pass	51	29	11	40	131	17.06	1.03
rebound	3	3	0	7	13	2.87	10.34
intercept	5	11	2	3	21	4.03	6.33
groundball	7	10	4	7	28	2.45	4.55
Catching Total	66	53	17	57	193	21.53	0.4275
dribbling	0	0	0	0	0	0.00	0.00
jump/toss	0	1	3	3	7	1.50	19.39
intercept	4	6	1	3	14	2.08	9.49
TOTAL RESPONSES	130	105	43	113	391	37.96	0.2109
No Response	0	0	0	0	0	0.00	0.00
Uncodable Response	0	0	0	0	0	0.00	0.00
Acceptable Response	121	94	42	104	361	34.04	0.23 (92.3%)
Unacceptable Response	9	11	1	9	30	4.43	4.35 (7.7%)
Successful Response	108	86	34	90	318	31.81	0.26 (81.3%)
Unsuccessful Response	22	19	9	23	73	6.40	1.53 (18.7%)

270

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL GAME PLAY CONTEXT

U/10 NETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)	
RESPONSES							1: Mins	
Passing								
chest/shoulder	23	11	5	11	50	7.55	2.44	
Bounce	0	0	0	0	0	0.00	0.00	
hook	0	0	0	0	0	0.00	0.00	
overhead	1	0	0	0	1	0.50	136.20	
underarm	0	0	0	0	0	0.00	0.00	
Passing Total	24	11	5	11	51	8.02	2.40	
Shooting								
set shot	9	0	0	8	17	4.92	8.01	
lay-up	0	0	0	0	0	0.00	0.00	
field	0	0	0	0	0	0.00	0.00	
Shooting Total	9	0	0	8	17	4.92	8.01	
Catching								
from pass	32	5	0	12	49	14.06	2.47	
rebound	0	0	1	4	5	1.89	27.16	
intercept	1	3	0	0	4	1.41	34.05	
groundball	7	6	2	10	25	3.30	5.27	
Catching Total	40	14	3	26	83	15.90	1.39	
dribbling	0	0	0	0	0	0.00	0.00	
jump/toss	0	1	1	1	2	0.50	68.10	
intercept	1	3	0	0	4	1.41	34.05	
TOTAL RESPONSES	73	30	12	46	161	25.88	0.5081	
No Response	0	0	1	2	3	0.96	45.27	
Uncodable Response	0	0	0	0	0	0.00	0.00	
Acceptable Response	51	26	10	30	117	16.88	1.10	(72.6%)
Unacceptable Response	22	4	2	16	44	9.59	3.06	(27.4%)
Successful Response	57	24	5	31	117	21.52	1.10	(72.6%)
Unsuccessful Response	16	6	6	15	44	5.50	3.06	(27.4%)

271

Appendix 12

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL TRAINING CONTEXT

U/10 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	7.22	7.22	21.00	5.85	45.00	12.82	19.00	5.23	101.00	7.06	3.46
Transition	20.23	20.23	86.00	23.96	63.00	17.95	70.00	19.28	296.00	20.70	2.58
Knowledge	17.63	17.63	33.00	9.19	41.00	11.68	29.00	7.99	149.00	10.42	4.29
wait	23.12	23.12	115.00	32.03	73.00	20.80	79.00	21.76	363.00	25.38	5.16
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	2.02	2.02	1.00	0.28	12.00	3.42	6.00	1.65	19.00	1.33	1.29
Non Activity Total	70.22	70.22	256.00	71.31	234.00	66.67	203.00	55.92	928.00	64.90	7.02
Activity Non Skill											
warmup	0.29	0.29	4.00	1.11	17.00	4.84	18.00	4.96	69.00	4.83	2.45
support	0.00	0.00	0.00	0.00	13.00	3.70	4.00	1.10	24.00	1.68	1.75
movement	9.54	9.54	24.00	6.69	33.00	9.40	40.00	11.02	118.00	8.25	1.81
Activity Non Skill	9.83	9.83	28.00	7.80	63.00	17.95	62.00	17.08	211.00	14.76	5.10
Activity - Skill											
ball skill +(positive)	12.14	12.14	42.00	11.70	34.00	9.69	66.00	18.18	182.00	12.73	3.66
ball skill - (negative)	2.89	2.89	7.00	1.95	15.00	4.27	13.00	3.58	46.00	3.22	0.99
non ball skill	4.92	4.92	26.00	7.24	5.00	1.42	19.00	5.23	63.00	4.41	2.42
Activity - Skill Total	19.95	19.95	75.00	20.89	54.00	15.38	98.00	27.00	291.00	20.35	4.78
OVERALL ACTIVITY	29.78	29.78	103.00	28.69	117.00	33.33	160.00	44.08	502.00	35.10	7.02

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL TRAINING CONTEXT

U/10 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%)	St. Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	15.00	4.27	25.00	7.02	20.00	5.78	36.00	10.29	96.00	6.84	2.56
Transition	69.00	19.66	79.00	22.19	49.00	14.16	70.00	20.00	267.00	19.03	3.42
Knowledge	35.00	9.97	32.00	8.99	19.00	5.49	38.00	10.86	124.00	8.84	2.35
wait	120.00	34.19	119.00	33.43	74.00	21.39	92.00	26.29	405.00	28.87	6.10
wait(reserve)	0.00	0.00	0.00	0.00	63.00	18.21	0.00	0.00	63.00	4.49	9.10
off task	1.00	0.28	0.00	0.00	6.00	1.73	6.00	1.71	13.00	0.93	0.92
Non Activity Total	240.00	68.38	255.00	71.63	231.00	66.76	242.00	69.14	968.00	69.00	2.03
Activity Non Skill											
warmup	31.00	8.83	5.00	1.40	15.00	4.34	23.00	6.57	74.00	5.27	3.17
support	4.00	1.14	0.00	0.00	4.00	1.16	0.00	0.00	8.00	0.57	0.66
movement	14.00	3.99	35.00	9.83	27.00	7.80	16.00	4.57	92.00	6.56	2.76
Non Skill Total	49.00	13.96	40.00	11.24	46.00	13.29	39.00	11.14	174.00	12.40	1.43
Activity - Skill											
ball skill +(positive)	21.00	5.98	35.00	9.83	43.00	12.43	43.00	12.29	142.00	10.12	3.01
ball skill - (negative)	20.00	5.70	16.00	4.49	17.00	4.91	13.00	3.71	66.00	4.70	0.83
non ball skill	21.00	5.98	10.00	2.81	9.00	2.60	13.00	3.71	53.00	3.78	1.55
Activity - Skill Total	62.00	17.66	61.00	17.13	69.00	19.94	69.00	19.71	261.00	8.60	1.42
OVERALL ACTIVITY	111.00	31.62	101.00	28.37	115.00	33.24	124.00	35.43	435.00	31.00	2.97

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL TRAINING CONTEXT

U/10 NETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)
RESPONSES							1: Mins
Passing							
chest/shoulder	32	75	61	104	272	29.94	0.53
Bounce	2	0	4	18	24	8.16	9.56
hook	0	0	0	0	0	0.00	0.00
overhead	1	0	1	0	2	0.58	119.10
underarm	0	0	0	0	0	0.00	0.00
Passing Total	35	75	66	122	298	36.00	0.4798
Shooting							
set shot	8	9	11	0	28	4.83	8.31
lay-up	0	0	0	0	0	0.00	0.00
field	0	0	0	0	0	0.00	0.00
Shooting Total	8	9	11	0	28	4.83	8.31
Catching							
from pass	126	69	53	32	290	40.29	0.5107
rebound	5	9	5	1	20	3.27	11.55
intercept	6	5	0	2	13	2.75	18.20
groundball	5	13	14	8	40	4.24	5.58
Catching Total	48	80	88	137	353	36.81	0.4051
dribbling	0	0	0	0	0	0.00	0.00
jump/toss	14	1	2	0	17	6.55	14.01
intercept	1	2	4	2	9	1.26	26.29
TOTAL RESPONSES	106	167	171	261	705	63.85	0.2028
No Response	0	1	1	0	2	0.58	119.10
Uncodable Response	0	0	1	4	5	1.89	47.40
Acceptable Response	99	153	143	238	633	58.11	0.23 (89.8%)
Unacceptable Response	7	14	28	23	72	9.35	3.19 (10.2%)
Successful Response	79	150	148	233	610	63.01	0.23 (86.5%)
Unsuccessful Response	27	17	23	28	95	4.99	1.46 (13.5%)

274

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL TRAINING CONTEXT

U/10 NETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)	
RESPONSES							1: Mins	
Passing								
chest/shoulder	90	63	32	48	233	24.66	1.04	
Bounce	19	0	4	2	25	8.66	9.54	
hook	0	0	0	0	0	0.00	0.00	
overhead	1	1	0	0	2	0.58	123.50	
underarm	0	0	0	0	0	0.00	0.00	
Passing Total	110	64	36	50	260	32.10	0.5715	
Shooting								
set shot	2	11	9	5	27	4.03	9.10	
lay-up	0	0	0	0	0	0.00	0.00	
field	0	0	0	0	0	0.00	0.00	
Shooting Total	2	11	9	5	27	4.03	9.10	
Catching								
from pass	121	59	34	52	266	37.83	0.5586	
rebound	1	0	1	1	3	0.50	82.33	
intercept	0	0	0	5	5	2.50	49.32	
groundball	3	9	8	8	28	2.71	8.50	
Catching Total	125	68	43	66	302	34.90	0.4902	
dribbling	0	0	0	0	0	0.00	0.00	
jump/toss	1	0	5	8	14	3.70	17.41	
intercept	2	0	2	0	4	1.15	61.55	
TOTAL RESPONSES	240	144	91	129	604	63.39	0.2460	
No Response	0	1	0	0	1	0.50	247.40	
Uncodable Response	4	0	0	0	4	2.00	61.55	
Acceptable Response	200	113	73	105	491	54.32	0.30	(81.3%)
Unacceptable Response	40	31	18	24	113	9.46	2.12	(18.7%)
Successful Response	222	113	64	103	502	67.72	0.30	(83.1%)
Unsuccessful Response	18	31	27	26	102	5.45	2.26	(16.9%)

275

Appendix 16

REVISED ALT/PE – SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL GAME PLAY CONTEXT

U/12 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Percent	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	0.00	0.00	0.00	0.00	1.00	0.50	0.00	0.00	1.00	0.11	0.25
Transition	36.00	16.36	31.00	13.72	33.00	16.42	19.00	7.98	119.00	13.45	3.96
Knowledge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
wait	51.00	23.18	64.00	28.32	84.00	41.79	101.00	42.44	300.00	33.90	9.68
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	59.00	24.79	59.00	6.67	12.39
Off Task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	87.00	39.55	95.00	42.04	118.00	58.71	179.00	75.21	479.00	54.12	16.57
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
movement	55.00	25.00	71.00	31.42	39.00	19.40	16.00	6.72	181.00	20.45	10.49
Activity Non Skill	55.00	25.00	71.00	31.42	39.00	19.40	16.00	6.72	181.00	20.45	10.49
Activity – Skill											
ball skill +(positive)	43.00	19.55	34.00	15.04	14.00	6.97	28.00	11.76	119.00	13.45	5.31
ball skill - (negative)	7.00	3.18	14.00	6.19	16.00	7.96	6.00	2.52	43.00	4.86	2.56
non ball skill	28.00	12.73	12.00	5.31	14.00	6.97	9.00	3.78	63.00	7.12	3.91
Activity - Skill Total	78.00	35.45	60.00	26.55	44.00	21.89	43.00	18.07	225.00	25.42	7.49
OVERALL ACTIVITY	133.00	60.45	131.00	57.96	83.00	41.29	59.00	24.79	406.00	45.88	16.57

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL GAME PLAY CONTEXT

U/12 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St. Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score	Percent	
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	0.00	0.00	0.00	0.00	1.00	0.51	0.00	0.00	1.00	0.11	0.25
Transition	31.00	13.66	39.00	17.81	34.00	17.17	25.00	10.55	129.00	14.64	3.37
Knowledge	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
wait	117.00	51.54	69.00	31.51	75.00	37.88	63.00	26.58	324.00	36.78	10.81
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	59.00	24.89	59.00	6.70	12.45
Off Task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	**148.00**	**65.20**	**108.00**	**49.32**	**110.00**	**55.56**	**147.00**	**62.03**	**513.00**	**58.23**	**7.06**
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	28.00	12.33	65.00	29.68	24.00	12.12	57.00	24.05	174.00	19.75	8.76
Activity Non Skill	**28.00**	**12.33**	**65.00**	**29.68**	**24.00**	**12.12**	**57.00**	**24.05**	**174.00**	**19.75**	**8.76**
Activity - Skill											
ball skill +(positive)	17.00	7.49	14.00	6.39	18.00	9.09	9.00	3.80	58.00	6.58	2.23
ball skill - (negative)	8.00	3.52	8.00	3.65	12.00	6.06	4.00	1.69	32.00	3.63	1.79
non ball skill	26.00	11.45	24.00	10.96	34.00	17.17	20.00	8.44	104.00	11.80	3.69
Activity SkillTotal	**51.00**	**22.47**	**46.00**	**21.00**	**64.00**	**32.32**	**33.00**	**13.92**	**194.00**	**22.02**	**7.58**
OVERALL ACTIVITY	**79.00**	**34.80**	**111.00**	**50.68**	**88.00**	**44.44**	**90.00**	**37.97**	**368.00**	**41.77**	**7.06**

REVISED S.O.S.O.R. DATA SUMMARY (1/_ Minutes)

HIGH SKILL GAME PLAY CONTEXT

U/12 NETBALL

SESSION	1	2	3	4	Total	St Dev	Rate(/min)
RESPONSES							1: _Mins
Passing							
chest/shoulder	50	13	16	26	105	16.78	1.29
Bounce	0	0	0	0	0	0.00	0.00
hook	0	0	0	0	0	0.00	0.00
overhead	0	10	0	0	10	5.00	13.46
underarm	0	0	0	0	0	0	0
Passing Total	50	23	18	27	118	14.15	1.10
Shooting							
set shot	6	28	2	15	51	11.53	2.42
lay-up	0	0	0	0	.0	0.00	0.00
field	0	0	0	0	0	0	0
Shooting Total	6	28	2	15	51	11.53	2.42
Catching							
from pass	48	26	23	28	135	11.35	1.01
rebound	2	14	2	14	32	6.93	4.18
intercept	4	0	0	1	5	1.89	27.32
groundball	4	9	5	4	22	2.38047614285	6.15
Catching Total	58	59	30	47	194	13.48	0.4257
dribbling	0	0	0	0	0	0.00	0.00
jump/toss	0	0	1	1	2	0.58	39.33
intercept	3	1	2	4	10	1.29	13.46
TOTAL RESPONSES	117	111	53	94	375	28.86	0.2191
No Response	0	0	0	0	0	0.00	0.00
Uncodable Response	0	0	0	2	2	1.00	39.33
Acceptable Response	109	97	49	80	335	26.04	0.2466(89.3%)
Unacceptable Response	18	20	15	22	75	2.99	3.42 (10.7%)
Successful Response	100	82	40	75	297	25.14	0.2781(79.2%)
Unsuccessful Response	17	29	13	18	77	6.85	1.47 (20.8%)

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL GAME PLAY CONTEXT

U/12 NETBALL

SESSION	1	2	3	4	Total	StDev	Rate(/min)
RESPONSES							1: _ Mins
Passing							
chest/shoulder	20	28	26	12	86	7.19	1.36
Bounce	0	0	0	0	0	0.00	0
hook	0	0	0	0	0	0.00	0
overhead	0	0	0	0	0	0.00	0
underarm	0	0	0	0	0	0	0
Passing Total	20	28	26	12	86	7.19	1.36
Shooting							
set shot	0	0	2	0	2	1.00	68.3
lay-up	0	0	0	0	0	0.00	0
field	0	0	0	0	0	0	0
Shooting Total	0	0	2	0	2	1.00	68.3
Catching							
from pass	13	7	10	16	46	3.87	2.58
rebound	0	4	9	0	13	4.27	10.32
intercept	2	4	0	0	6	1.91	22.5
groundball	2	7	5	3	17	2.22	8.04
Catching Total	17	22	24	19	82	3.11	1.4
dribbling	0	0	0	0	0	0.00	0
jump/toss	1	1	0	0	2	0.58	68.3
intercept	0	0	1	0	1	0.50	137
TOTAL RESPONSES	39	55	57	36	188	10.78	0.4303
No Response	0	0	0	3	3	1.50	45.4
Uncodable Response	0	0	0	1	1	0.50	137
Acceptable Response	28	45	41	27	141	9.11	0.5829 (75%)
Unacceptable Response	11	10	16	10	47	2.87	2.54 (25%)
Successful Response	28	41	42	24	135	9.11	1.01 (71.8%)
Unsuccessful Response	11	14	15	13	53	1.71	2.35 (28.2%)

279

Appendix 20

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL TRAINING CONTEXT

U/12 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
injury	0.00	0.00	0.00	0.00	5.00	1.26	0.00	0.00	5.00	0.34	0.63
management	25.00	7.23	20.00	5.87	29.00	7.32	56.00	14.62	130.00	8.87	3.96
Transition	70.00	20.23	76.00	22.29	118.00	29.80	81.00	21.15	345.00	23.53	4.37
Knowledge	61.00	17.63	34.00	9.97	74.00	18.69	65.00	16.97	234.00	15.96	3.96
wait	80.00	23.12	67.00	19.65	41.00	10.35	66.00	17.23	254.00	17.33	5.40
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	7.00	2.02	1.00	0.29	4.00	1.01	1.00	0.26	13.00	0.89	0.83
Non Activity Total	243.00	70.23	198.00	58.06	271.00	68.43	269.00	70.23	981.00	66.92	5.85
Activity Non Skill											
warmup	1.00	0.29	3.00	0.88	8.00	2.02	2.00	0.52	14.00	0.95	0.77
support	0.00	0.00	3.00	0.88	0.00	0.00	1.00	0.26	4.00	0.27	0.42
movement	33.00	9.54	34.00	9.97	28.00	7.07	24.00	6.27	119.00	8.12	1.82
Activity Non Skill	34.00	9.83	40.00	11.73	36.00	9.09	27.00	7.05	137.00	9.35	1.93
Activity - Skill											
ball skill +(positive)	42.00	12.14	61.00	17.89	38.00	9.60	57.00	14.88	198.00	13.51	3.57
ball skill - (negative)	10.00	2.89	11.00	3.23	17.00	4.29	16.00	4.18	54.00	3.68	0.69
non ball skill	17.00	4.91	31.00	9.09	34.00	8.59	14.00	3.66	96.00	6.55	2.69
Activity SkillTotal	69.00	19.94	103.00	30.21	89.00	22.47	87.00	22.72	348.00	23.74	4.43
OVERALL ACTIVITY	103.00	29.77	143.00	41.94	125.00	31.57	114.00	29.77	485.00	33.08	5.85

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL TRAINING CONTEXT

U/12 NETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%)	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
injury	110.00	27.50	0.00	0.00	0.00	0.00	0.00	0.00	110.00	7.40	13.75
management	24.00	6.00	18.00	5.28	27.00	7.52	60.00	15.54	129.00	8.68	4.73
Transition	85.00	21.25	68.00	19.94	66.00	18.38	78.00	20.21	297.00	19.99	1.18
Knowledge	51.00	12.75	35.00	10.26	62.00	17.27	64.00	16.58	212.00	14.27	3.30
wait	37.00	9.25	82.00	24.05	104.00	28.97	81.00	20.98	304.00	20.46	8.38
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	0.00	0.00	2.00	0.59	2.00	0.56	3.00	0.78	7.00	0.47	0.33
Non Activity Total	307.00	76.75	205.00	60.12	261.00	72.70	286.00	74.09	1059	71.27	7.39
Activity Non Skill											
warmup	8.00	2.00	4.00	1.17	1.00	0.28	2.00	0.52	15.00	1.01	0.77
support	0.00	0.00	5.00	1.47	0.00	0.00	1.00	0.26	6.00	0.40	0.70
movement	34.00	8.50	49.00	14.37	26.00	7.24	33.00	8.55	142.00	9.56	3.19
Activity Non Skill	42.00	10.50	58.00	17.01	27.00	7.52	36.00	9.33	163.00	10.97	4.13
Activity - Skill											
ball skill +(positive)	25.00	6.25	39.00	11.44	39.00	10.86	38.00	9.84	141.00	9.49	2.33
ball skill - (negative)	8.00	2.00	13.00	3.81	12.00	3.34	10.00	2.59	43.00	2.89	0.80
non ball skill	18.00	4.50	26.00	7.62	20.00	5.57	16.00	4.15	80.00	5.38	1.57
Activity Skill Total	51.00	12.75	78.00	22.87	71.00	19.78	64.00	16.58	264.00	17.77	4.34
OVERALL ACTIVITY	93.00	23.25	136.00	39.88	98.00	27.30	100.00	25.91	427.00	28.73	7.39

APPENDIX 22

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL TRAINING CONTEXT

U/12 NETBALL

SESSION	1	2	3	4	Total	StDev	Rate(/min)
RESPONSES							1/ Mins
Passing							
chest/shoulder	51	63	32	57	202	13.43	1.12
Bounce	6	0	0	1	7	2.87	34.54
hook	1	0	0	0	1	0.50	241.00
overhead	4	2	0	3	9	1.71	27.09
underarm	1	1	20	2	24	9.35	10.11
Passing Total	62	66	52	63	243	6.08	1.00
Shooting							
set shot	12	24	14	26	76	7.02	3.13
lay-up	0	0	0	0	0	0.00	0.00
field	0	0	0	0	0	0.00	0.00
Shooting Total	12	24	14	26	32	7.02	3.13
Catching							
from pass	72	60	47	60	239	10.21	1.01
rebound	13	16	7	7	43	4.50	5.41
intercept	0	3	3	2	8	1.41	30.32
groundball	15	9	13	14	51	2.63	4.47
Catching Total	100	88	70	83	341	12.42	0.4299
dribbling	0	0	0	0	0	0.00	0.00
jump/toss	0	2	1	0	3	0.96	74.47
intercept	5	4	4	1	14	1.73	17.27
TOTAL RESPONSES	179	184	140	173	676	19.85	0.2169
No Response	0	0	0	0	0	0.00	0.00
Uncodable Response	3	1	0	0	4	1.41	61.05
Acceptable Response	160	169	130	164	623	17.56	0.2353(92.2%)
Unacceptable Response	19	15	10	9	53	4.65	4.37 (7.8%)
Successful Response	149	153	112	139	553	18.46	0.2651(81.8%)
Unsuccessful Response	30	31	28	34	123	2.50	2.3 (18.2%)

282

APPENDIX 23

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL TRAINING CONTEXT

U/12 NETBALL

SESSION	1	2	3	4	Total	StDev	Rate(/min)
RESPONSES							1/ Mins
Passing							
chest/shoulder	52	48	53	56	209	3.30	1.06
Bounce	0	0	0	0	1	0.00	229.20
hook	0	0	0	0	0	0.00	0.00
overhead	7	0	1	0	8	3.37	28.40
underarm	1	0	0	2	3	0.96	76.27
Passing Total	61	48	54	58	221	5.62	1.02
Shooting							
set shot	5	2	5	20	32	8.12	7.10
lay-up	0	0	0	0	0	0.00	0.00
field	0	0	0	0	0	0	0
Shooting Total	5	2	5	20	32	8.12	7.10
Catching							
from pass	49	44	44	47	184	2.45	1.15
rebound	5	3	3	4	15	0.96	15.17
intercept	0	0	1	2	3	0.96	76.27
groundball	12	7	11	15	45	3.30	5.06
Catching Total	66	54	59	68	247	6.45	0.5571
dribbling	0	0	0	0	0	0.00	0.00
jump/toss	0	0	0	0	2	0.00	0.00
intercept	2	1	5	2	10	1.73	22.56
TOTAL RESPONSES	134	105	123	148	510	18.16	0.2698
No Response	0	2	1	1	4	0.82	57.2
Uncodable Response	0	0	0	1	1	0.50	229.2
Acceptable Response	107	86	89	137	419	23.41	0.3284 (82.2%)
Unacceptable Response	27	19	34	11	91	9.95	2.31 (17.8%)
Successful Response	116	88	104	125	433	16.01	1.01 (71.8%)
Unsuccessful Response	18	17	19	23	77	2.63	2.59 (15.1%)

283

Appendix 24

REVISED ALT-PE /SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL GAME PLAY CONTEXT

U/10 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%)	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	1.00	0.42	0.00	0.00	4.00	1.70	3.00	1.09	8.00	0.82	0.75
Transition	50.00	21.10	39.00	17.03	34.00	14.47	58.00	21.17	181.00	18.56	3.28
Knowledge	16.00	6.75	30.00	13.10	22.00	9.36	17.00	6.20	85.00	8.72	3.15
wait	28.00	11.81	22.00	9.61	30.00	12.77	39.00	14.23	119.00	12.21	1.94
wait(reserve)	22.00	9.28	0.00	0.00	31.00	13.19	0.00	0.00	53.00	5.44	6.68
OffTask	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	117.00	49.37	91.00	39.74	121.00	51.49	117.00	42.70	446.00	45.74	5.52
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	52.00	21.94	80.00	34.93	44.00	18.72	76.00	27.74	252.00	25.85	7.12
Non Skill Total	52.00	21.94	80.00	34.93	44.00	18.72	76.00	27.74	252.00	25.85	7.12
Activity - Skill											
ball skill +(positive)	34.00	14.35	29.00	12.66	38.00	16.17	42.00	15.33	143.00	14.67	1.51
ball skill - (negative)	11.00	4.64	13.00	5.68	10.00	4.26	13.00	4.74	47.00	4.82	0.60
non ball skill	23.00	9.70	16.00	6.99	22.00	9.36	26.00	9.49	87.00	8.92	1.27
Activity Skill Total	68.00	28.69	58.00	25.33	70.00	29.79	81.00	29.56	277.00	28.41	2.06
OVERALL ACTIVITY	120.00	50.63	138.00	60.26	114.00	48.51	157.00	57.30	529.00	54.26	5.52

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL GAME PLAY CONTEXT

U/10 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%)	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
management	3	1.09	0	0.00	2	1.02	2	0.85	7	0.74	0.50
Transition	14	5.11	25	10.59	40	20.41	41	17.45	120	12.75	6.88
Knowledge	15	5.47	23	9.75	27	13.78	16	6.81	81	8.61	3.68
wait	4	1.46	13	5.51	24	12.24	23	9.79	64	6.80	4.76
wait(reserve)	218	79.56	87	36.86	0	0.00	69	29.36	374	39.74	32.85
Off Task	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Non Activity Total	254.00	92.70	148.00	62.71	93.00	47.45	151.00	64.26	646.00	68.65	18.87
Activity - Non Skill											
warmup	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
support	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
movement	12.00	4.38	66.00	27.97	66.00	33.67	62.00	26.38	206.00	21.89	12.87
Non Skill Total	12.00	4.38	66.00	27.97	66.00	33.67	62.00	26.38	206.00	21.89	12.87
Activity - Skill											
ball skill +(positive)	3	1.09	4	1.69	20	10.20	10	4.26	37	3.93	4.16
ball skill - (negative)	0	0.00	8	3.39	9	4.59	7	2.98	24	2.55	1.95
non ball skill	5	1.82	10	4.24	8	4.08	5	2.13	28	2.98	1.27
Activity Skill Total	8.00	2.92	22.00	9.32	37.00	18.88	22.00	9.36	89.00	9.46	6.58
OVERALL ACTIVITY	20.00	7.30	88.00	37.29	103.00	52.55	84.00	35.74	295.00	31.35	18.87

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL GAME PLAY CONTEXT

U/10 BASKETBALL

SESSION	1	2	3	4	TOTAL	St. Dev	1: _ Mins
RESPONSES							
Passing							
chest/shoulder	37	33	43	22	135	8.85	1.07
Bounce	2	0	7	0	9	3.30	16.58
hook	0	0	2	0	2	1.00	75.38
overhead	0	1	0	0	1	0.50	152.46
underarm	0	0	0	0	0	0	0
Passing Total	39	34	52	22	147	12.42	1.02
Shooting							
set shot	0	2	2	1	5	0.96	30.32
lay-up	2	3	6	4	15	1.71	10.11
field	18	13	10	19	60	4.24	2.33
Shooting Total	20	18	18	24	80	2.83	1.55
Catching							
from pass	26	31	35	24	116	4.97	1.19
rebound	8	6	4	10	28	2.58	5.27
intercept	11	4	12	9	36	3.56	4.15
groundball	17	7	5	7	36	5.42	4.15
Catching Total	26	53	64	42	185	16.21	0.42
dribbling	34	31	39	32	136	3.56	1.07
jump/toss	1	0	1	0	2	0.58	76.23
intercept	0	0	0	0	0	0.00	0.00
TOTAL RESPONSES	156	131	174	166	581	18.68	0.16
No Response	1	1	0	0	2	0.58	76.32
Uncodable Response	3	1	0	0	4	1.41	38.16
Acceptable Response	138	111	151	106	506	21.55	0.1811 (87.1%)
Unacceptable Response	18	20	15	22	75	2.99	2.02 (12.9%)
Successful Response	126	109	139	107	481	15.13	0.19 (82.8%)
Unsuccessful Response	30	22	27	21	100	4.24	1.32 (17.2%)

APPENDIX 27

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL GAME PLAY CONTEXT

U/10 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)
RESPONSES							1: Mins
Passing							
chest/shoulder	3	19	4	10	36	7.35	2.34
Bounce	0	1	0	0	1	0.50	92.23
hook	0	0	0	1	1	0.50	92.23
overhead	0	0	0	1	0	0.50	92.23
underarm	0	0	0	0	0	0.00	0.00
Passing Total	4	20	4	11	39	7.59	2.22
Shooting							
set shot	0	0	0	0	0	0.00	0.00
lay-up	0	2	0	0	2	1.00	46.12
field	0	6	1	1	8	2.71	11.33
Shooting Total	0	8	1	1	8	3.70	9.14
Catching							
from pass	2	8	2	9	21	3.77	4.24
rebound	1	4	3	3	11	1.26	8.24
intercept	0	6	1	0	7	2.87	13.32
groundball	0	7	3	3	13	2.87	7.06
Catching Total	3	25	9	15	52	9.38	1.47
dribbling	0	9	1	6	16	4.24	5.46
jump/toss	1	0	0	2	1	0.96	30.48
intercept	0	0	1	0	1	0.50	92.23
TOTAL RESPONSES	7	62	18	34	121	23.89	0.4581
No Response	0	0	0	0	0	0.00	0.00
Uncodable Response	0	0	0	0	0	0.00	0.00
Acceptable Response	. 6	51	9	29	95	20.84	0.58 (78.5%)
Unacceptable Response	1	11	9	5	26	4.43	3.38 (21.5%)
Successful Response	7	44	9	26	86	17.25	1.04 (71.1%)
Unsuccessful Response	0	18	9	8	35	7.37	2.38 (28.9%)

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL TRAINING CONTEXT

U/10 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean %	St. Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	4.00	1.27	8.00	2.55	3.00	1.01	17.00	5.72	32.00	2.60	2.16
Transition	78.00	24.76	44.00	14.01	67.00	22.56	45.00	15.15	234.00	19.02	5.34
Knowledge	56.00	17.78	98.00	31.21	50.00	16.84	33.00	11.11	237.00	19.27	8.51
wait	84.00	26.67	102.00	32.48	97.00	32.66	81.00	27.27	364.00	29.59	3.24
wait(reserve)	7.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.57	1.11
off task	16.00	5.08	6.00	1.91	0.00	0.00	24.00	8.08	46.00	3.74	3.56
Non Activity Total	245.00	77.78	258.00	82.17	217.00	73.06	200.00	67.34	920.00	74.80	6.36
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	3.00	0.95	5.00	1.59	3.00	1.01	0.00	0.00	11.00	0.89	0.66
movement	9.00	2.86	9.00	2.87	20.00	6.73	31.00	10.44	69.00	5.61	3.63
Non Skill Total	12.00	3.81	14.00	4.46	23.00	7.74	31.00	10.44	80.00	6.50	3.08
Activity - Skill											
ball skill +(positive)	29.00	9.21	29.00	9.24	37.00	12.46	42.00	14.14	137.00	11.14	2.45
ball skill - (negative)	9.00	2.86	9.00	2.87	12.00	4.04	12.00	4.04	42.00	3.41	0.68
non ball skill	19.00	6.03	4.00	1.27	16.00	5.39	12.00	4.04	51.00	4.15	2.11
Skill Total	57.00	18.10	42.00	13.38	65.00	21.89	66.00	22.22	230.00	18.70	4.13
OVERALL ACTIVITY	69.00	21.90	56.00	17.83	88.00	29.63	97.00	32.66	310.00	25.20	6.83

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL TRAINING CONTEXT

U/10 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	4.00	1.27	14.00	4.76	7.00	2.35	4.00	1.27	29.00	2.38	1.65
Transition	44.00	14.01	45.00	15.31	53.00	17.79	65.00	20.63	207.00	16.95	2.92
Knowledge	96.00	30.57	43.00	14.63	58.00	19.46	73.00	23.17	270.00	22.11	6.73
wait	111.00	35.35	90.00	30.61	94.00	31.54	87.00	27.62	382.00	31.29	3.19
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	0.00	0.00	5.00	1.70	4.00	1.34	7.00	2.22	16.00	1.31	0.95
Non Activity Total	255.00	81.21	197.00	67.01	216.00	72.48	236.00	74.92	904.00	74.04	5.89
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	u.u.	0.00
support	5.00	1.59	3.00	1.02	5.00	1.68	1.00	0.32	14.00	1.15	0.63
movement	9.00	2.87	30.00	10.20	14.00	4.70	18.00	5.71	71.00	5.81	3.12
Non Skill Total	14.00	4.46	33.00	11.22	19.00	6.38	19.00	6.03	84.00	6.88	2.92
Activity - Skill											
ball skill +(positive)	27.00	8.60	37.00	12.59	33.00	11.07	32.00	10.16	129.00	10.57	1.67
ball skill - (negative)	14.00	4.46	22.00	7.48	20.00	6.71	10.00	3.17	66.00	5.41	1.99
non ball skill	4.00	1.27	5.00	1.70	10.00	3.36	18.00	5.71	37.00	3.03	2.01
Skill Total	45.00	14.33	64.00	21.77	63.00	21.14	60.00	19.05	233.00	19.08	3.37
OVERALL ACTIVITY	59.00	18.79	97.00	32.99	82.00	27.52	79.00	25.08	317.00	25.96	5.89

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL TRAINING CONTEXT

U/10 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)
RESPONSES							1: Mins
Passing							
chest/shoulder	38	33	36	40	147	2.99	1.24
Bounce	3	12	2	4	21	4.57	9.52
hook	1	0	4	2	7	1.71	27.35
overhead	0	1	1	2	4	0.82	51.46
underarm	0	3	4	1	8	1.83	25.53
Passing Total	42	49	47	49	187	3.30	1.06
Shooting							
set shot	8	0	0	17	25	8.10	8.17
lay-up	8	2	8	18	36	6.63	5.45
field	10	6	11	10	37	2.22	5.35
Shooting Total	26	8	19	45	98	15.55	2.07
Catching							
from pass	41	46	40	55	182	6.86	1.08
rebound	22	4	33	16	45	12.09	4.36
intercept	0	4	1	2	7	1.71	27.35
groundball	14	12	11	13	50	1.29	4.08
Catching Total	77	66	55	86	284	13.44	0.4347
dribbling	29	26	27	49	131	10.90	1.35
jump/toss	0	0	0	1	1	0.50	207.05
intercept	1	4	3	0	8	1.83	15.53
TOTAL RESPONSES	175	153	149	210	687	27.94	0.1808
No Response	0	0	0	1	1	0.50	207.05
Uncodable Response	36	14	13	26	89	10.90	2.19
Acceptable Response	136	130	126	162	554	16.20	0.22 (80.6%)
Unacceptable Response	71	71	33	43	218	19.49	1.33 (19.4%)
Successful Response	138	134	127	172	571	20.02	0.21 (83.1%)
Unsuccessful Response	37	19	22	38	116	9.90	1.47 (16.9%)

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL TRAINING CONTEXT

U/10 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)
RESPONSES							1: Mins
Passing							
chest/shoulder	40	51	30	32	153	9.54	1.22
Bounce	2	2	1	0	5	0.96	42.08
hook	0	5	1	0	6	2.38	35.06
overhead	0	1	0	0	1	0.50	210.38
underarm	1	3	4	3	11	1.26	19.09
Passing Total	43	62	36	35	176	12.52	1.12
Shooting							
set shot	16	0	1	8	25	7.41	8.26
lay-up	10	5	4	19	11.05	6.86	11.05
field	3	4	8	7	22	2.38	9.34
Shooting Total	29	4	14	19	66	10.41	3.11
Catching							
from pass	52	50	30	33	165	11.35	1.16
rebound	8	1	9	9	27	3.86	7.48
intercept	2	1	2	1	6	0.58	35.06
groundball	14	8	11	12	45	2.50	6.41
Catching Total	76	60	52	55	243	10.69	0.52
dribbling	39	27	26	15	107	9.81	1.58
jump/toss	1	0	0	0	1	0.50	210.38
intercept	0	3	1	0	4	1.41	52.40
TOTAL RESPONSES	191	161	129	126	597	30.59	0.2116
No Response	3	0	0	2	5	1.50	42.08
Uncodable Response	14	5	14	0	33	6.95	6.23
Acceptable Response	134	93	104	91	422	19.84	0.30 (70.7%)
Unacceptable Response	54	63	25	33	175	17.73	1.12 (29.3%)
Successful Response	146	110	97	94	447	23.87	0.29 (74.9%)
Unsuccessful Response	42	46	32	30	150	7.72	1.24 (25.1%)

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL GAME PLAY CONTEXT

U/12 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent	Score		
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	0.00	0.00	1.00	0.38	2.00	0.76	0.00	0.00	3.00	0.28	0.96
Transition	36.00	13.69	47.00	17.67	43.00	16.41	67.00	25.00	193.00	18.22	13.30
Knowledge	20.00	7.60	19.00	7.14	24.00	9.16	9.00	3.36	72.00	6.80	6.38
wait	14.00	5.32	32.00	12.03	24.00	9.16	28.00	10.45	98.00	9.25	7.72
wait(reserve)	46.00	17.49	43.00	16.17	42.00	16.03	48.00	17.91	179.00	16.90	2.75
Off Task	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	116.00	44.11	142.00	53.38	135.00	51.53	152.00	56.72	545.00	51.46	15.20
Activity - Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	67.00	25.48	73.00	27.44	74.00	28.24	48.00	17.91	262.00	24.74	12.07
Non Skill Total	67.00	25.48	73.00	27.44	74.00	28.24	48.00	17.91	262.00	24.74	12.07
Activity - Skill											
ball skill +(positive)	46.00	17.49	20.00	7.52	26.00	9.92	44.00	16.42	136.00	12.84	12.96
ball skill - (negative)	13.00	4.94	11.00	4.14	8.00	3.05	8.00	2.99	40.00	3.78	2.45
non ball skill	21.00	7.98	20.00	7.52	19.00	7.25	16.00	5.97	76.00	7.18	2.16
Skill Total	80.00	30.42	51.00	19.17	53.00	20.23	68.00	25.37	252.00	23.80	13.64
OVERALL ACTIVITY	147.00	55.89	124.00	46.62	127.00	48.47	116.00	43.28	514	48.54	13.18

Appendix 33

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL GAME PLAY CONTEXT

U/12 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean/%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent			
Injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	0.00	0.00	0.00	0.00	1.00	0.38	1.00	0.45	2.00	0.20	0.24
Transition	49.00	18.49	33.00	12.41	37.00	14.07	47.00	21.27	166.00	16.35	4.05
Knowledge	21.00	7.92	24.00	9.02	30.00	11.41	9.00	4.07	84.00	8.28	3.06
wait	26.00	9.81	10.00	3.76	16.00	6.08	12.00	5.43	64.00	6.31	2.56
wait(reserve)	68.00	25.66	109.00	40.98	39.00	14.83	57.00	25.79	273.00	26.90	10.75
OffTask	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Activity Total	164.00	61.89	176.00	66.17	123.00	46.77	126.00	57.01	589.00	58.03	8.34
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
movement	59.00	22.26	48.00	18.05	79.00	30.04	53.00	23.98	239.00	23.55	4.97
Non Skill Total	59.00	22.26	48.00	18.05	79.00	30.04	53.00	23.98	239.00	23.55	4.97
Activity - Skill											
ball skill +(positive)	15.00	5.66	23.00	8.65	28.00	10.65	22.00	9.95	88.00	8.67	2.21
ball skill - (negative)	7.00	2.64	9.00	3.38	9.00	3.42	8.00	3.62	33.00	3.25	0.43
non ball skill	20.00	7.55	10.00	3.76	24.00	9.13	12.00	5.43	66.00	6.50	2.36
Skill Total	42.00	15.85	42.00	15.79	61.00	23.19	42.00	19.00	187.00	18.42	3.50
OVERALL ACTIVITY	101.00	38.11	90.00	33.83	140.00	53.23	95.00	42.99	426.00	41.97	8.34

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL GAME PLAY CONTEXT

U/12 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate((min))	
RESPONSES							1: Mins	
Passing								
chest/shoulder	21	21	31	23	53	4.76	1.31	
Bounce	0	6	8	0	14	4.12	10.24	
hook	0	4	1	1	6	1.73	24.16	
overhead	4	6	5	7	22	1.29	6.37	
underarm	0	3	0	0	3	1.50	48.32	
Passing Total	25	40	45	31	141	8.96	1.02	
Shooting								
set shot	0	2	4	0	6	1.91	24.16	
lay-up	0	0	6	0	6	3.00	24.16	
field	4	10	4	11	29	3.77	5.01	
Shooting Total	4	12	14	11	41	4.35	3.33	
Catching								
from pass	11	32	41	26	110	12.61	1.19	
rebound	8	8	11	8	35	1.50	4.10	
intercept	3	7	4	2	16	2.16	9.06	
groundball	4	6	8	6	24	1.63	6.04	
Catching Total	26	53	64	42	185	16.21	0.4723	
dribbling	4	31	43	6	84	19.13	1.44	
jump/toss	0	2	3	1	6	1.29	24.16	
intercept	1	2	5	3	11	1.71	13.14	
TOTAL RESPONSES	61	140	174	95	468	49.66	0.1867	
No Response	1	0	0	1	2	0.58	72.49	
Uncodable Response	0	0	0	0	0	0.00	0.00	
Acceptable Response	51	132	162	85	430	49.22	0.20	(91.9%)
Unacceptable Response	9	8	12	9	38	1.73	3.50	(8.1%)
Successful Response	42	123	150	73	388	48.60	0.23	(82.9%)
Unsuccessful Response	18	17	24	21	80	3.16	1.49	(17.1%)

294

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL GAME PLAY CONTEXT

U/12 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)	
RESPONSES							1: Mins	
Passing								
chest/shoulder	11	6	16	33	66	11.73		1.46
Bounce	1	0	5	1	7	2.22		16.49
hook	0	0	0	0	0	0.00		0.00
overhead	0	0	2	3	5	1.50		23.32
underarm	1	3	0	0	4	1.41		29.25
Passing Total	13	9	23	37	82	12.48		1.26
Shooting								
set shot	3	1	0	0	4	1.41		29.25
lay-up	2	3	0	3	8	1.41		14.42
field	4	2	9	6	21	2.99		5.36
Shooting Total	9	6	9	9	33	1.50		3.34
Catching								
from pass	10	12	16	26	64	7.12		1.50
rebound	8	4	9	10	31	2.63		3.48
intercept	3	2	1	2	8	0.82		14.42
groundball	4	3	4	7	18	1.73		6.32
Catching Total	25	21	30	45	121	10.50		0.5835
dribbling	10	13	15	20	58	4.20		2.02
jump/toss	2	0	1	0	3	0.96		39.14
intercept	4	2	1	4	11	1.50		10.42
TOTAL RESPONSES	63	51	80	115	309	27.84		0.2284
No Response	0	0	0	0	0	0.00		0.00
Uncodable Response	0	0	1	1	2	0.58		58.50
Acceptable Response	58	46	71	104	279	25.01	0.26	(90.3%)
Unacceptable Response	5	5	9	11	30	3.00	3.55	(9.7%)
Successful Response	52	42	64	97	255	23.92	0.28	(82.5%)
Unsuccessful Response	11	9	16	18	54	4.20	2.11	(17.5%)

Appendix 36

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

HIGH SKILL TRAINING CONTEXT .

U/12 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent			
injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	4.00	1.42	7.00	2.43	9.00	3.80	15.00	5.40	35.00	3.23	1.72
Transition	32.00	11.39	74.00	25.69	33.00	13.92	35.00	12.59	174.00	16.05	6.61
Knowledge	11.00	3.91	47.00	16.32	38.00	16.03	24.00	8.63	120.00	11.07	6.03
wait	84.00	29.89	33.00	11.46	73.00	30.80	89.00	32.01	279.00	25.74	9.76
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	8.00	2.85	3.00	1.04	3.00	1.27	2.00	0.72	16.00	1.48	0.95
Non Activity Total	139.00	49.47	164.00	56.94	156.00	65.82	165.00	59.35	624.00	57.56	6.76
Activity - Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	1.00	0.36	19.00	6.60	12.00	5.06	2.00	0.72	34.00	3.14	3.12
movement	15.00	5.34	17.00	5.90	7.00	2.95	13.00	4.68	52.00	4.80	1.28
Activity Non Skill	16.00	5.69	36.00	12.50	19.00	8.02	15.00	5.40	86.00	7.93	3.28
Activity - Skill											
ball skill +(positive)	90.00	32.03	53.00	18.40	31.00	13.08	63.00	22.66	237.00	21.86	8.01
ball skill - (negative)	18.00	6.41	18.00	6.25	9.00	3.80	23.00	8.27	68.00	6.27	1.84
non ball skill	18.00	6.41	17.00	5.90	22.00	9.28	12.00	4.32	69.00	6.36	2.07
Activity Skill Tota	126.00	44.84	88.00	30.56	62.00	26.16	98.00	35.25	374.00	34.50	8.00
OVERALL ACTIVITY	142.00	50.53	124.00	43.06	81.00	34.18	113.00	40.65	460.00	42.44	6.76

Appendix 37

REVISED ALT/PE - SPORT CATEGORY RAW SCORES & PERCENTAGES

LOW SKILL TRAINING CONTEXT

U/12 BASKETBALL

ALT CATEGORIES	Session1		Session2		Session 3		Session 4		Total	Mean(%	St Dev
Non Activity	Score	Percent	Score	Percent	Score	Percent	Score	Percent			
injury	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
management	17.00	6.12	21.00	7.17	3.00	1.07	14.00	5.86	55.00	5.04	2.72
Transition	31.00	11.15	70.00	23.89	33.00	11.74	34.00	14.23	168.00	15.38	5.91
Knowledge	24.00	8.63	47.00	16.04	8.00	2.85	37.00	15.48	116.00	10.62	6.25
wait	86.00	30.94	52.00	17.75	90.00	32.03	70.00	29.29	298.00	27.29	6.60
wait(reserve)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
off task	0.00	0.00	1.00	0.34	0.00	0.00	4.00	1.67	5.00	0.46	0.80
Non Activity Total	158.00	56.83	191.00	65.19	134.00	47.69	159.00	66.53	642.00	58.79	8.71
Activity Non Skill											
warmup	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
support	2.00	0.72	15.00	5.12	2.00	0.71	19.00	7.95	38.00	3.48	3.55
movement	22.00	7.91	28.00	9.56	18.00	6.41	11.00	4.60	79.00	7.23	2.11
Non Skill Total	24.00	8.63	43.00	14.68	20.00	7.12	30.00	12.55	117.00	10.71	3.48
Activity - Skill											
ball skill +(positive)	59.00	21.22	31.00	10.58	86.00	30.60	23.00	9.62	199.00	18.22	9.91
ball skill - (negative)	24.00	8.63	8.00	2.73	20.00	7.12	8.00	3.35	60.00	5.49	2.87
non ball skill	13.00	4.68	20.00	6.83	21.00	7.47	20.00	8.37	74.00	6.78	1.57
Skill Total	96.00	34.53	59.00	20.14	127.00	45.20	51.00	21.34	333.00	30.49	11.88
OVERALL ACTIVITY	120.00	43.17	102.00	34.81	147.00	52.31	81.00	33.89	450.00	41.21	8.59

APPENDIX 38

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

HIGH SKILL TRAINING CONTEXT

U/12 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min) 1: Mins	
RESPONSES								
Passing								
chest/shoulder	112	32	38	86	268	38.52	0.41	
Bounce	27	35	2	2	66	17.06	2.48	
hook	0	4	3	2	9	1.71	20.32	
overhead	0	2	0	2	4	1.15	47.11	
underarm	0	3	1	5	9	2.22	20.32	
Passing Total	139	76	44	97	356	39.82	0.3114	
Shooting								
set shot	13	5	16	3	37	6.24	5.00	
lay-up	19	21	18	9	67	5.32	2.45	
field	20	31	18	41	110	10.66	1.41	
Shooting Total	52	57	52	53	214	2.38	0.5181	
Catching								
from pass	136	72	45	96	349	38.60	0.32	
rebound	16	24	27	27	94	5.20	1.58	
intercept	0	4	0	0	4	2.00	47.11	
groundball	15	29	20	40	104	10.98	1.47	
Catching Total	167	129	92	163	551	34.94	0.2012	
dribbling	35	87	33	37	192	26.05	0.58	
jump/toss	0	0	0	0	0	0.00	0.00	
intercept	0	0	2	2	4	1.15	47.11	
TOTAL RESPONSES	393	349	222	352	1316	74.10	0.8424	
No Response	4	2	0	2	8	1.63	23.06	
Uncodable Response	5	21	3	3	32	8.72	5.46	
Acceptable Response	278	278	189	307	1052	51.19	0.10	(86.9%)
Unacceptable Response	71	·7?	33	43	218	19.49	1.05	(13.1%)
Successful Response	292	292	181	297	1062	56.38	0.10	(85.3%)
Unsuccessful Response	57	57	41	53	208	7.57	0.58	(14.7%)

REVISED S.O.S.O.R. DATA SUMMARY (RATES PER MINUTE)

LOW SKILL TRAINING CONTEXT

U/12 BASKETBALL

SESSION	1	2	3	4	Total	St. Dev	Rate(/min)	
RESPONSES							1: Mins	
Passing								
chest/shoulder	125	· 95	22	23	265	51.98		0.42
Bounce	6	0	2	12	20	5.29		9.12
hook	0	0	0	0	0	0.00		0.00
overhead	1	3	2	0	6	1.29		30.40
underarm	3	0	1	4	8	1.83		23.00
Passing Total	135	98	27	39	299	50.76		0.3692
Shooting								
set shot	16	2	2	6	26	6.61		7.05
lay-up	12	6	8	6	32	2.83		5.45
field	14	35	26	5	80	13.19		2.18
Shooting Total	42	43	36	17	138	12.07		1.20
Catching								
from pass	128	95	37	42	302	43.75		0.37
rebound	28	42	17	9	96	14.31		1.55
intercept	0	2	1	0	3	0.96		61.20
groundball	21	22	14	12	69	4.99		2.40
Catching Total	177	161	69	63	470	59.87		0.2349
dribbling	46	18	47	36	147	13.45		1.15
jump/toss	0	0	0	0	0	0.00		0.00
intercept	0	1	2	0	3	0.96		61.20
TOTAL RESPONSES	400	321	207	154	1056	110.94		0.1046
No Response	3	3	2	1	9	0.96		20.27
Uncodable Response	17	6	24	3	50	9.75		3.41
Acceptable Response	353	280	149	120	902	109.86	0.12	(85.4%)
Unacceptable Response	47	40	32	34	153	6.75	1.12	(14.6%)
Successful Response	359	273	147	130	909	108.55	0.12	(86.1%)
Unsuccessful Response	41	47	34	24	146	9.88	1.15	(13.9%)