Chapter V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

In the recent past, there had been a more systematic research on skills, fitness, motor abilities, psychological and physiological parameters, and its combination of factors responsible for the enhancement of performance for the game "Soccer". Soccer scientists, top coaches and physical educators concern on skill abilities, motor abilities, psychological and physiological parameters that might be performance limiting factors to produce the top players. Due to the poor performance of India at the international competitions, a great concern has been shown to draw out long-term plans for selecting and training talented young soccer players. Therefore, experts and coaches have to draw out some scientifically authentic criteria to catch the young talents and train them earlier for the potential champion of tomorrow. Hence, the research scholar felt the need for understanding such a study to develop or construct a criterion for objective measurement of talent abilities of soccer-playing students on the basis of specific soccer skills, motor abilities, psychological and physiological parameters.
The objective of the study was to construct reliable talent search test battery to trace out and spot the soccer talent among schoolboys on the basis of selected soccer skills, motor abilities, psychological and physiological parameters.

On the basis of fundamental skills, motor abilities, psychological and physiological parameters for the selection of test items, 44 specific soccer skill test items, 20 motor ability test items, 10 psychological and 10 physiological standard tests were discussed with each three different experts who have deep knowledge of research in soccer. For the development and setting of all the test items into appropriate manner, a preliminary investigation of all the test items of each area of specific skills, motor abilities, psychological and physiological parameters was conducted on 10 schoolboys from different schools of Gwalior, who were interested and regularly playing the game ‘soccer’ at LNIPE Ground, Gwalior.

After the preliminary investigation, through experts comments and suggestions, 18 test items for specific soccer skills as Ground Pass Stationary Ball for Accuracy, Ground Pass Rolling Ball for Accuracy, Kicking Stationary Ball for Distance, Kicking Rolling Ball for Distance, Shooting Stationary Ball in the Goal, Shooting Rolling Ball in the Goal,
Diagonal Shuttle Dribbling, Figure ‘8’ Dribbling, Receiving Ground Pass with Foot, Receiving Aerial Pass with Foot, Zig-Zag Feinting Dribbling, Angular Feinting with Ball, Standing Heading for Distance, Jumping Heading for Distance, Tackling ‘One vs One’ in Limited Area, Tackling ‘One vs One’ on the Spot (Basic Tackle), Juggling the Ball, and Forward Dribbling and Dragging Back were finally selected. For Motor Abilities, 10 specific test items as Leg-Lift Dynamometer, Standing Broad Jump, Bent Knee Sit-up, 20m Shuttle Run, Sit and Reach, Fleishment Extent Flexibility (Twist and Touch), Sprint with Flying Start, Sprint with Forward Roll Break, Agility Run on Unknown Course and Illinois Agility Run were finally selected. For psychological parameters, 4 specific standard tests as Porter and Cattell’s Children’s Personality Questionnaire (CPQ), Pramila Ahuja’s Group Test of Intelligence (PGTI), Self-Modified Sport Achievement Motivation Test (SAMT), and Self-Modified Group Environment Questionnaire (GEQ) were finally selected. Further, for physiological parameters, 4 specific test items as Resting Heart Rate, Vital Capacity, Aerobic Capacity and Anaerobic Capacity were also finally selected.

The data pertaining to this study were collected on a total of 120 schoolboys between the age of 12 and 14 years, who were interested and
regularly playing the game ‘Soccer’ at least at Inter-School or District level and other local tournaments. The schoolboys (subjects) were selected from High Schools and Senior Secondary Schools of different places of India as – Delhi, Gwalior (M.P.), Goa, Thiruvananthapuram (Kerala) and Imphal (Manipur).

The data collected from 120 schoolboys were subjected to various statistical analyses, such as Descriptive Analysis, Pearson’s Product Moment Correlation and Factor Analysis. Finally, for the development of Norms, the Hull Scale technique was employed and overall performance (talent ability) scores were interpreted by developing a grading scale based on the 6-Sigma scale.

The analysis of data for the relationship between the performance of playing ability and specific soccer skill test items showed that there were significant relationship between the performance of playing ability and ground pass stationary ball for accuracy (0.63), ground pass rolling ball for accuracy (0.57), kicking stationary ball for distance (0.49), kicking rolling ball for distance (0.45), shooting stationary ball in the goal (0.48), shooting rolling ball in goal (0.50), diagonal shuttle dribbling (-0.63), figure ‘8’ dribbling (-0.49), receiving ground pass with foot (0.68), receiving aerial pass with foot (0.65), zig-zag feinting dribbling
(-0.40), angular feinting with ball (-0.57), standing heading for distance 
(0.50), jumping heading for distance (0.49), tackling ‘one vs one’ in
limited area (0.68), tackling ‘one vs one’ on the spot (basic tackle) (0.58),
juggling the ball (0.46), and forward dribbling and dragging back (-0.64)
as their calculated values were greater than the tabulated value of 0.195 at
0.05 level of significance.

The analysis of data for the relationship between the performance
of playing ability and specific motor ability test items showed that there
were significant relationship between the performance of playing ability
and leg-lift dynamometer (0.30), standing broad jump (0.49), bent-knee
sit-up (0.48), 20m shuttle run (-0.41), sit and reach (0.20), Fleishment
extent flexibility (twist and touch) (0.20), sprint with flying start (-0.48),
sprint with forward roll break (-0.47), agility run on unknown course
(-0.53), and Illinois agility run (-0.67), as their calculated values were
greater than the tabulated value of 0.195 at 0.05 level of significance.

The analysis of data for the relationship between the performance
of playing ability and psychological test items also showed that there
were significant relationship between the performance of playing and
Personality Factor A (0.26), Personality Factor B (0.21), Personality
Factor C (0.28), Personality Factor E (0.24), Personality Factor F (0.32),
Personality Factor I (0.22), Personality Factor J (-0.27), Personality Factor N (-0.28), Personality Factor O (-0.22), Personality Factor Q3 (-0.24), Personality Factor Q4 (0.21), Group Test of Intelligence (0.41), Self-modified Sports Achievement Motivation Test (0.38), and Self-modified Group Environment Questionnaire (0.21) as their calculated values were greater than the tabulated value of 0.195 at 0.05 level of significance. But, the analysis further showed that there were no significant relationship between the performance of playing ability and Personality Factor D (0.17), G (-0.19) and H (-0.16) as the calculated values were less than the tabulated value of 0.195 at 0.05 level of significance.

The analysis of data for the relationship between the performance of playing ability and physiological test items further showed that there were also significant relationship between the performance of playing ability and resting heart rate (-0.32), vital capacity (0.20), aerobic capacity (0.59), and anaerobic capacity (0.43) as their calculated values were greater than the tabulated value of 0.195 at 0.05 level of significance.

Factor analysis was employed on each area of specific soccer skills, motor abilities, psychological and physiological parameters. In
Factor Analysis, significant factors responsible for variance and dominant were extracted from each group. All the dominant variables were grouped under different factors, and the factors were retained from Rotated Factor Loading (Varimax Solution). Thus, the results of factor analysis identified four factors for specific skills, three factors for motor abilities, five factors for psychological parameters and one factor for physiological parameters. The four factors for specific skills together have accounted 44.78% (13.16%, 11.55%, 11.39% and 8.69% respectively) of the total common variance. The three factors for motor abilities together have accounted 33.60% (14.38%, 10.36% and 8.85% respectively) of the total common variance. For psychological parameters, the five factors together have accounted 27.22% (7.86%, 7.07%, 5.16%, 3.64% and 3.49% respectively) of the total common variance. Further, the only one factor for physiological parameters has accounted 20.22% of the total common variance. The significance for factor loading was set at ±0.51 on an alpha level of 0.01 (two-tailed). Each factor was given a suitable name based on the highest loading item of each factor.

The four test items of specific soccer skills, one from each factor having the highest loading, were selected as “Zig-Zag Feinting Dribbling” (-0.60) from Factor 1, “Diagonal Shuttle Dribbling” (-0.65)
from Factor 2, “Kicking Rolling Ball for Distance” (0.73) from Factor 3, and “Shooting Rolling Ball in the Goal” (0.66) from the Factor 4. The three test items of specific motor abilities, one from each factor having the highest loading, were selected as “20m Shuttle Run” (0.57) from Factor 1, “Agility Run on Unknown Course” (0.72) from Factor 2, and “Sit and Reach” (0.57) from the Factor 3. Further, the five test items of psychological parameters, one from each factor having the highest loading, were selected as “Self-Modified Group Environment Questionnaire” (0.56) from Factor 1, “Group Test of Intelligence” (0.80) from Factor 2, “Personality Factor C” (0.56) from Factor 3, “Personality Factor A” (0.52) from Factor 4 and “Personality Factor Q4” (0.56) from the Factor 5. Only one test item of physiological parameters were selected for single factor as “Cooper’s 12min Run-Walk Test” (0.69).

From the Factor Analysis, the selected dominant test items of each factor of four areas of specific soccer skills, motor abilities, psychological and physiological parameters were combined in series and developed the Soccer Talent Search Test Battery. By the nature and structure of the study, for the future advantage, and to equate the weightage of all test items as well as according to objective of the study, the Soccer Talent Search Test Battery was developed constituting each factor of four areas.
Therefore, the Soccer Talent Search Test Battery consisted of 13 test items. The name of the selected test items and the name of their respective factors are presented below:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Item No.</th>
<th>Name of the Test Items</th>
<th>Name of the Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>S₄</td>
<td>Kicking Rolling Ball for Distance</td>
<td>Kicking Ability</td>
</tr>
<tr>
<td>2.</td>
<td>S₆</td>
<td>Shooting Rolling Ball in the Goal</td>
<td>Shooting Accuracy</td>
</tr>
<tr>
<td>3.</td>
<td>S₇</td>
<td>Diagonal Shuttle Dribbling</td>
<td>Dribbling Ability</td>
</tr>
<tr>
<td>4.</td>
<td>S₁₁</td>
<td>Zig-Zag Feinting Dribbling</td>
<td>Feinting with Ball</td>
</tr>
<tr>
<td>5.</td>
<td>M₄</td>
<td>20m Shuttle Run</td>
<td>Physical Endurance</td>
</tr>
<tr>
<td>6.</td>
<td>M₅</td>
<td>Sit and Reach</td>
<td>Body Flexibility</td>
</tr>
<tr>
<td>7.</td>
<td>M₉</td>
<td>Agility Run on Unknown Course</td>
<td>Coordinative Movement</td>
</tr>
<tr>
<td>8.</td>
<td>P₁</td>
<td>Personality Factor A</td>
<td>Extroversion</td>
</tr>
<tr>
<td>9.</td>
<td>P₃</td>
<td>Personality Factor C</td>
<td>Emotional Balance</td>
</tr>
<tr>
<td>10.</td>
<td>P₁₄</td>
<td>Personality Factor Q₄</td>
<td>Mental Tension</td>
</tr>
<tr>
<td>11.</td>
<td>P₁₅</td>
<td>Group Test of Intelligence</td>
<td>Cognitive Ability</td>
</tr>
<tr>
<td>12.</td>
<td>P₁₇</td>
<td>Self-Modified Group Environment Questionnaire</td>
<td>Team Cohesion</td>
</tr>
<tr>
<td>13.</td>
<td>PH₃</td>
<td>Cooper’s 12min Run-Walk Test</td>
<td>Cardiorespiratory Endurance</td>
</tr>
</tbody>
</table>
Thirteen test items constituted the developed Soccer Talent Search Test Battery, which were selected as the highest loaded item from each dominant factor of four areas of specific skills, motor abilities, psychological and physiological parameters. By employing the Hull Scale technique for all the selected test items of each factor, the norms were developed. On the basis of norms of these (13) test items included in the Soccer Talent Search Test Battery, all the raw scores of 120 soccer-playing schoolboys were converted into norm scores and added together separately for each student. For the scoring purpose, a single norm was developed based on the Hull Scale technique for overall performance of “Soccer Talent Ability”. The Soccer Talent Ability was interpreted by developing a grading scale based on the 6-Sigma scale as given below:

<table>
<thead>
<tr>
<th>Score</th>
<th>Alphabetical Grades</th>
<th>Interpretive Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 811</td>
<td>A⁺</td>
<td>Excellent</td>
</tr>
<tr>
<td>730 to 811</td>
<td>A</td>
<td>Very Good</td>
</tr>
<tr>
<td>650 to 729</td>
<td>B</td>
<td>Good</td>
</tr>
<tr>
<td>570 to 649</td>
<td>C</td>
<td>Average</td>
</tr>
<tr>
<td>489 to 569</td>
<td>D</td>
<td>Poor</td>
</tr>
<tr>
<td>Below 489</td>
<td>E</td>
<td>Very Poor</td>
</tr>
</tbody>
</table>
The scientific authenticity of the test items of Soccer Talent Search Test Battery was established by computing the reliability, objectivity and the logical validity (face validity) on the recommendation of experts and coaches. The reliability coefficients of all the 13 test items established by using the test-retest method were 0.81, 0.67, 0.79, 0.86, 0.71, 0.83, 0.95, 0.83, 0.71, 0.71, 0.94, 0.92 and 0.80 respectively. The objectivity coefficients of all the 13 test items established by using the two sets of test scores conducted by two testers were 0.80, 0.89, 0.88, 0.91, 0.76, 0.92, 0.96, 0.90, 0.73, 0.90, 0.97, 0.94 and 0.88 respectively. Further, the validity of the Soccer Talent Search Test Battery was established by logical validity (face validity) with the recommendations and suggestions of experts on the basis of logical values.

**Conclusions**

Within the constraints and limitations of the present study, the following conclusions were enumerated:

All the test items included in this study were highly correlated with playing ability performance except Personality Factor D, G and H from Psychological Parameters.
2. The Factor Analysis yielded 4 factors for specific skills, 3 factors for motor abilities, 5 factors for psychological parameters and only 1 factor for physiological parameters.

3. Only one test item from each identified factor with the highest loading was selected to constitute the “Soccer Talent Search Test Battery” for the age between 12 and 14 years schoolboys. The selected test items were Kicking Rolling Ball for Distance, Shooting Rolling Ball in the Goal, Diagonal Shuttle Dribbling, Zig-Zag Feinting Dribbling, 20m Shuttle Run, Sit and Reach, Agility Run on Unknown Course, Personality Factor A, Personality Factor C, Personality Factor Q4, Group Test of Intelligence, Self-Modified Group Environment Questionnaire and Cooper’s 12min Run-Walk Test.

4. The Constructed or developed “Soccer Talent Search Test Battery” have established the criterion of specific Scientific Authenticity, i.e. the test items were highly reliable, objective and valid.

5. The Soccer Talent Ability performance (overall performance) score of the soccer-playing schoolboys were interpreted by using a grading scale on the basis of 6-Sigma scale as $A^+$, A, B, C, D and E
or Excellent, Very Good, Good, Average, Poor and Very Poor according to their overall performance score based on the Hull Scale Norm, which was developed for all the 13 test items of the Soccer Talent Search Test Battery.

**Recommendations**

On the basis of the findings of the present study the following recommendations are made:

**Recommendation for Application**

1. The soccer coaches, trainers and physical educators must know the distinct aims and objectives of long term soccer training programme with the early selection of talented young children.

2. The coaches, trainers and physical educators for evaluating the talent of soccer-playing students may use the constructed talent search test battery.

3. Specific skills, motor abilities, psychological and physiological parameters are all indispensable dominant performance limiting factors. It is therefore, coaches, trainers and physical educators should have the sound knowledge of different dimensions of dominant performance limiting factors that related to talent identification.
4. It is recommended that the coaches, trainers and physical educators must give due importance to the skills, motor abilities, psychological and physiological areas.

5. There must be set-up talent search test battery and its procedure, norms and grading scale.

6. Talent search should be targeted on early young age.

**Recommendation for Further Research**

1. It has been found in the present study that there are considerable variations in different areas for developing talent search test items. Therefore, it is recommended that other test items could be developed for talent identification.

2. It is also recommended that talent search test battery could be developed separately on different performance related areas.

3. Talent search test battery can be developed for different age groups.

4. Similar study may be conducted on female players also.

5. Similar studies may be undertaken in other sports, so that the differences can be ascertained, besides constructing the criteria for identification of talents in sports and games.