Chapter - III

METHODOLOGY

In this chapter the selection of skills, the design of the investigation, criterion measure, selection of the subjects, methods of collecting the data, pilot study, and the statistical methods adopted for analysis of interpretation of data are presented. The present study is reported in two phases. In the phase one, explanation, selection of skill test items and presentation of newly constructed skill tests and finding out their reliability, validity, objectivity and testers competency are established. In the phase two, norms are constructed for the newly established skill tests. The overall procedure in each phase is presented in this chapter.

CONSTRUCTION OF NEW SKILL TEST

The researcher has taken the experts opinion in selecting the tests. Six reputed national level basketball coaches were requested to identify the appropriate test items. The researcher has explained the purpose of the study to the experts. On the advice of the experts, the researcher has arranged video analysis of basketball matches. Sixteen matches of state level and national level tournaments were analyzed by the experts. Considering all the basic skills like dribbling, defense,
rebounding, passing and shooting, each expert has suggested the test items to be included in the skill test. All together, eight individual test items were identified by six experts. The list of testes suggested by individual experts was consolidated and placed before the experts for finalizing the list of test items. The experts have reviewed all the eight test items and finally approved five items as most appropriate for the basketball skill test. The following are the five items selected for the skill test.

**Test 1: Dribbling control test**

*Purpose:*

To measure the skill in handling the ball while the body is in movement.

*Equipment:*

Standard inflated basketball five cones stopwatch and tape for marking.

*Marking and testing procedure:*

Five obstacle cones are kept in zigzag position in the basketball court as per the measurement furnished in the following diagram.
Administration

The performer stands near the starting line and on the signal of the whistle, the performer starts the dribble in the zig zag path as shown in the diagram with right hand dribble from starting line to cone (A) from (A) to (B) left hand dribble from (B) to (C) right hand dribble from (C) to (D) left hand dribble (D) to (E) Right hand dribble they have to dribble in this method from (E) to (A) straight dribbling with alternate hands until the finishing line is crossed by both feet. Three trials are given for each subject. The 1st is a practice trial and the last 2 are scored for the record with the ball.

Violations:

If ball handling infringements appear (travelling double dribble etc), stop the trial, return to start and begin timing.
*Scoring*

The time taken to complete the circuit is recorded. The time is recorded to the nearest one tenth of second. If the performer fails to begin at the point in course where control was lost, the trail will be stopped and the performer has to return to the start and begin again. Best time recorded among the three is taken into consideration.

**Test-2: Zig Zag Defensive movement**

*Purpose:*

The purpose of the test is to measure the performance of basic defensive movement in different directions and speed.

*Equipment*

A Stop watch, a standard basketball court, measuring tape for marking lines in defensive movement were used.

*Floor marking*

The testing area is marked as per the diagram furnished belo. Eight cones are placed in the points A,B,C,D,E,F,G and H
**Administration**

The subject stood on the starting line near cone 'A' without the ball with his defensive position outside the cone A. On the tester's signal (Whistle) the subjects runs sideward in the path shown in the above diagram and runs from A to the cone B, C, D, E, F, G & H and touches the last cone i.e 'G' and runs fast to the finishing spot. As soon as the subject crossed the finishing line, the tester stopped the watch. The time is recorded to the nearest one tenth of second. Three trials were given. Best time recorded among the three is taken into consideration.

**Violations:**

Foot faults (crossing feet during sliding or shuffling or running) should be avoided. If a fault occurs, the trial is stopped and started again.

**Test - 3: Rebounding**

**Purpose:**
The purpose of the test was to measure the ability of jump and collect the ball from the board over head and shoot the ball into the basket in 30sec.

Equipment:

Standard inflated basketball, a basketball backboard, tape for measuring and marking.

Marking:

A line is marked at a distance of 2.50 mts. away from the end line as shown in the following diagram

Test Procedure

The subject stands with the ball at a distance of 2.50 mts from the end line, facing the board. On signal of the tester i.e. whistle, the subject has to toss the ball against the board in such a way that the ball should touch the board and the player should collect the rebound. After collecting the rebound, he can
land on the floor and make a basket without taking further step or dribble towards the board. If he misses the basket he is not permitted to shoot again. But he can shoot again only after taping the ball on to the board and receive the same. He can take any number of shot in 30sec. Each successful basket is counted as two points and unsuccessful basket only one point. Three trials were given. Best of the three trials is taken.

**Test 4: Wall Passing**

*Purpose:*

To measure the accuracy of Passing and receiving the ball while moving.

*Equipment:*

Standard inflated basketball; stopwatch smooth wall surface and tape for marking target.

*Test/target Dimensions:*

Three lines are drawn vertically on a wall with a gap of 120cms between lines. On the top of each line a square of 60cm is marked as shown in the diagram. The height of the first line from the floor to the base of the fist square (“A”) is 1.55mts, the second square "B" is 2.15mts height and the third square "C" is
1.55 mts. A start line is marked on the floor at a distance of 2.50 mts from the wall.

**Administration:**

- The subject with a ball stands behind the starting line in front of target (A). On the signal (whistle) the performer make a chest pass to the first target and collects the rebound while moving to the second target and make a overhead pass on to the target (B) and collects the rebound while moving to the 3rd target and makes a chest pass to the square(C) and collect the rebound and again moves to target (B) and repeats the same and moves to target (A) and then to (B) and so on. Successful passes within 30 seconds are counted. The subject should make all passes only behind the start line only. Success in chest pass & over head pass at target –two points is awarded for the
pass. There will be a total of 3 trials of 30sec each. The best of the three trials is considered.

Violation:

- Passing from a point in front of the restraining the line (foot fault). no point is awarded for the pass
- Passing at a target B twice in succession no point is awarded for second pass.
- Failing to use chest pass & over head pass at target – one point is awarded for the pass.
**Test 5: Multiple shooting test**

**Purpose**

To measure the rapid shooting ability from specified positions, agility and ball controlling (handling) ability.

**Equipment:**

Basketball court, Standard tape for marking, 7 chairs and 15 balls

**Test/Target Dimensions:**
The chair positions: The marking of seven points are as per the measurements given in the following drawing. Out of the seven chairs, four chairs are arranged inside the 3 points shooting line. i.e. mark distance from center of the end line A, E is 8.15mts and B, F is 8.00mts. One chair is placed at free-throw line. The remaining two chairs are place at zero angles to the shooting ring i.e one on the left side and the other on the right side of the ring. The distance of these two chairs is 4.50mts from the center of the ring on both sides. In each chair two balls are placed except in free throw area.

Administration:

The subjects stand at the three point shooting line. On the testers command he has to collect the ball from the chair and should attempt for a shot. The type of shot allowed from each zone and the points scored is as follows.

<table>
<thead>
<tr>
<th>Name of the zone from where the subject takes a shot</th>
<th>Type of shot allowed</th>
<th>Number of points scored for each successful shot</th>
<th>Number of points scored for each un-successful shot</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3 point shot</td>
<td>3 points</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>Layup shot</td>
<td>2 points</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>Jump shot</td>
<td>2 points</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>Free throw</td>
<td>1 points</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>3 point shot</td>
<td>3 points</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>Layup shot</td>
<td>2 points</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>Jump shot</td>
<td>2 points</td>
<td>1</td>
</tr>
</tbody>
</table>

The subject can attempt as number of basket as he can within 30 seconds. His attempt should be in a sequence starting
from A to G. After completing shot from G he should move to D for free throw again and after that he can continue the shots from A zone and repeat the circuit again and again in the same sequence, within the given time of 30 seconds. There will be 3 trials of 30sec each. The best of the three trials is taken for consideration.

**Violations:**

Ball handling (traveling doubles dribble etc shot following violation scored as zero points.

**Scoring:**

The test administrator must record the points for each of the successful baskets as per the table given above. Number of points secured within 30 seconds is counted.

**Establishment of validity and reliability of the test items**

In order to be sure on the correctness of the test items in terms of the validity, reliability, objectivity and the administrative feasibility, the tester has taken 50 state level basketball players for pilot study and administered the tests.

**Instrument Reliability:**

Standard Indian manufactured steel tape was used after careful testing. A standardized digital stop watches were used. The instruments were new and possessed ISI specification and
calibration were all considered as satisfactory. The reliability of instruments was ensured while taking tester’s reliability.

*Tester’s Competency:*

Even though the investigator is quite familiar with the techniques for conducting these tests, the assistance of four experienced coaches and basketball oriented physical directors were utilized. Each tester was directed to get him acquainted with the procedure of conducting and scoring the selected new skill test. Competency was demonstrated in the form of objectivity and co-efficient based on test – retest correlation with the test given to the same subjects (50 Boys) by two different testers. The Tester’s competency was computed by using the intra-class correlation.

**Table – 1**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the Test</th>
<th>Co-Efficient in Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dribbling Control Test</td>
<td>0.93</td>
</tr>
<tr>
<td>2</td>
<td>Defensive Test</td>
<td>0.94</td>
</tr>
<tr>
<td>3</td>
<td>Rebounding Test</td>
<td>0.91</td>
</tr>
</tbody>
</table>
Reliability of Newly Constructed Tests:

The reliability may be explained as the consistency of the test in measuring a phenomenon. There are many methods in the literature to ascertain the reliability of a test which is best suited for testing, that measures the sports skill is test–retest method. The reliability of the newly constructed tests was established by test-retest method.

Bosco and Gustafson (1983) are of the opinion that, “The coefficient calculated by test-retest method, otherwise called intra class correlation often termed as the coefficient of stability may establish the reliability. Since it is to be derived from the correlation of scores obtained by subjects on two or more administration of the test in identical conditions on successive days”.

Validity of Newly Constructed Tests:

Bosco and Gustafson (1983) define that, “Validity is an estimate to the degree to which a test measures the factor or
factors for which it is designed”. He suggested four ways to
determine the validity depending upon the nature of the test, the
availability of an acceptable criteria and the use to which the test
results will be subjected.

There are four types of validity as follows:

1. Construct Validity
2. Content Validity
3. Concurrent Validity
4. Predictive Validity

**Objectivity of Newly Constructed Test:**

The objectivity of the newly constructed tests was
established by correlating the scores measured by different
raters. This correlation coefficient scores indicate the degree of
agreement between and two raters that gives the objectivity of
the test.

**Reliability of Data:**

The reliability of the data was ensured by establishing the
instrument reliability, tester’s competency, reliability of the tests
and the subject’s reliability.

**CONSTRUCTION OF NORMS**
After establishing the reliability validity and objectivity of the five tests, the tests were administered on 438 players aged between 16 to 19 years from four states i.e. Andhra Pradesh, Tamilnadu, Karnataka and Kerala to obtain the data. The subjects were selected on random basis during the local tournaments conducted in the four states.

**Selection of Subjects:**

To achieve the purpose of the present study, 438 players who played at the national, inter district basketball level tournaments in South India were selected as subjects at random in the age group of 16 to 19 years. The researcher has visited the universities, stadiums and sports hostels in the four states i.e. Andhra Pradesh, Tamilnadu, Karnataka and Kerala.

The test battery consisting of the above five skill tests were used to collect the data. The tests applied on various levels of basketball players in the age group of 16 to 19 years, after briefly explained and demonstration of the five skill testes, a trial was given to the players. The gap between tests is two minutes. First day 5 tests were conducted and the next day again the same tests were taken and the scoring was recorded. In order to determine subject’s reliability for the newly constructed tests, test and re-test procedure was adapted by the investigator for
players. Whether these tests will be relevant for basketball players or not have to be acknowledged. These tests were conducted twice with the same group and consistency results acknowledged. These results were calculated by the statically methods. After constriction of the tests, it was also observed how to measure the different tests. By following various test measurements, it was observed whether they are farmable. Once again opinion of the coaches and experts of this game were taken in to consideration.

**Collection of Data:**

The subjects who are volunteers for the sources of the study are assembled, at a chosen place, where five tests are conducted. The testers have explained and demonstrate all the five test items of the test battery, a couple of times and also clarified the doubts, which are expressed by the subjects. The subjects are allowed to rehearsal the items of test battery. Five stations are arranged for the conduct of the test battery. The subjects have to move from station to station and participate in the tests in rotation order. The trained persons have assured the proper conduct of the test. The record of the data in the score sheet was specially prepared for this purpose.

**Orientation of Subjects:**
To orient and obtain full co-operation from the subjects, the researcher has explained the tests verbally in detail and then demonstrated the test and the test procedure was explained to them, so that there were no doubts raised in their minds regarding the efforts required by them. Some of the subjects were utilized as models for the demonstration. After orientation, each candidate is given three trials and the best performance is considered. The data were collected from 438 subjects. The norms were constructed basing on the data collected from these 438 subjects.

Statistical Techniques:

Pearson’s product movement correlation was used to correlate the test and retest scores to establish the validity of the test and to know the instruments reliability and to examine the objectivity. To construct the norms Hull Scale was used.