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Construction and Standardization of an Achievement Test in *Rachana Sharir* (Anatomy)

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ABSTRACT

The main purpose of the study was to construct and standardization of an Achievement Test in Anatomy to assess achievement of BAMS 1st year students under NCISM, New Delhi. The steps for construction as well as standardization are followed to frame and create the achievement test, viz., planning, preparation, first tryout, final tryout, item analysis (difficulty value, discrimination power), and final form of the tInitially objective type of achievement test including 85 items were administered for tryout. Final selection of the items was made based on difficulty value and discrimination index of each item. Ebel's (1979) criteria & guidelines were used for categorizing discriminatory indices. Test-retest method was used for estimation of reliability which was 0.89 as the calculated value of reliability co-efficient. Apropos to this, the test was also validated through content validity method. It was found that most of the items were falling in acceptable range of difficulty & discrimination level, however some items were rejected due to their poor discrimination indices and difficulty levels recorded. The final form of the Achievement Test consisted of 60 items, following the selection criteria were considered for final test.

Keywords: Achievement test, Anatomy, Construction, Standardization.

INTRODUCTION

Achievement test is a test used for evaluation of student performance after a period of instructions. Achievement test in Anatomy can help the students because the main purpose of an achievement test is to determine one's knowledge in a subject. Achievement test is an important tool in college evaluation and has great significance in measuring instructional progress and progress of the students in the subject area. It is a test of knowledge based on something taught. Achievement tests assess what the students have achieved from their courses within a period and provide some information about their current level of progress or whether they are ready for subsequent stages of learning. An achievement test is a test of developed skill or knowledge. The most common type of achievement test is a standardized test developed to measure skills and knowledge learned in a given grade level, usually through planned instruction, such as training or classroom instruction. Anatomy is a fundamental subject which is taught at the primary level of medical institutes including BAMS course. *Rachana Sharir* (Anatomy) is fundamental and basic subject in learning out human body with details of structures & relations. Students face difficulty in grasping typical terms & morphological relations. So, there is need of some teaching methods which can resolve this issue and can create interest. Consequently, overall standardization of an achievement test would be a critical stage.Here ,the researcher has tried this method in BAMS 1st year as per the syllabus prescribed by NCSIM, New Delhi for the subject mentioned.

Objectives:
The objective of this exercise is to construct and standardize an achievement test in Anatomy for BAMS 1st year students.

DELIMITATION

The study was being conducted in P.G. Department of Rachana Sharir (Anatomy), Sriganganagar College of Ayurvedic Science & Hospital, Tantia University, (Sri Ganganagar) for BAMS 1st year students. The study was conducted on BAMS 1st year students for academic session 2020-2021.

Only three units from the syllabus of BAMS 1st year in *Rachana Sharir* were considered for constructing the achievement test.

METHOD OF CONSTRUCTING AND STANDARDIZATION OF ACHIEVEMENT TEST:**Construction of Achievement Test:**

Achievement test was constructed based on educational objectives; Knowledge, understanding, application and skill in *Rachana Sharir* (Anatomy)at BAMS 1st year students. Items were selected with the help and advice of subject experts. Onthis basis preliminary draft was prepared.

Planning of the test:

Planning of the test is a first and very important step in the construction of an achievement test. In this test investigator opted *Rachana Sharir* (Anatomy) subject of BAMS 1st year students. In the achievement test investigator had decided to prepare objective type and short answer type & long type items. After this a blue print was prepared keeping in view the content area and objectives of learning as per Revised Bloom's taxonomy of educational objectives.

Objectives of the test:

Objectives of the achievement test were defined in behavioral terms focusing on knowledge, understanding, application and skill from three units of *Rachana Sharir* (Anatomy) text book of BAMS 1st year prescribed by NCISM, New Delhi.

Table 1: Distribution of Weightage to objectives from revised Bloom's taxonomy

Objectives	Weightage	Percentage
Knowledge	28	32.94 %
Understanding	25	29.41%
Application	18	21.17%
Skill	14	16.47%
Total	85	100%

Content of the test:

Content analysis is another very important step in construction of achievement test. It covered the three units of Anatomy text book of BAMS 1st year.

Table 2: Distribution of Weightage of content:

Unit	Content	Weightage	Percentage
1	Upper Limb	33	39%
2	Lower Limb	32	38%
3	*Marma Sharir*	20	23%
Total		85	100

Size and type of test:

The size of the test refers to number of items in the test. It is difficult to prepare good items at first attempts; therefore, more items are prepared in the initial drafts than the desired items in the final draft. The initial draft of an achievement test contains 85 items of objective questions.

Preparation of blue print:

Blue print is very important phase of planning of test which provides a path for writing items for preliminary draft. Here investigator put various types of questions in blue print and distribute the questions according to their cognitive level.

Table 3: Blueprint for the first draft of achievement test:

Objective → / Content ↓	Knowledge	Understanding	Application	Skill	Total

Upper Limb	11	10	7	5	33
Lower Limb	10	10	7	5	32
Marma Sharir	7	5	4	4	20
Total	28	25	18	14	85

Preparation of the test:
The task of preparation of an achievement test includes Item-writing, checking by subject experts and item- editing. All the test items were reviewed by subject experts. As a prerogative, the items were sent to few subject experts for their suggestions and feedback. The tests items were finalized considering their inputs on the content, types of questions andformat.

Administration of the test:
First try out:
The test items were administered on the 20 BAMS pass out students for first try out. This step was made to check any point of difficulty as well as any language problems occurring in the construction of the test. Out of 90 items 05 items were found to be confusing by the students due to language difficulties. Therefore, out of 90 items 05 items removed from the draft. Thus, the first draft of the achievement test is consisting 85 items.

Table 4: Objective wise distribution of items of the preliminary draft:

Objective → / Content ↓	**Knowledge**	**Understanding**	**Application**	**Skill**	**Total**
Upper Limb	11	10	7	5	33
Lower Limb	10	10	7	5	32
Marma Sharir	7	5	4	4	20
Total	28	25	18	14	**85**

Final try- out:
The test was administered on 60 students of BAMS 1st year academic session 2020-2021 for final try out. The answer sheetswere collected from all students.

Item Analysis:
Item analysis is a statistical technique which is used for selecting and rejecting the items of the test based on their difficulty value and discriminating power. For item analysis all the answer sheets were arranged in descendingorder The difficulty value and discriminating power of the test items were determined by adopting Kelley's method.

Difficulty Value:
Difficulty level of item provides information whether test is too easy or too difficult. It provides the proportion of students who correctly answer an item. Too difficult or too easy items will reject i.e. Items with indices of difficulty lower than 20 and higher than 75 will be rejected. Calculating formula –

$$DV = \frac{R_U + R_L}{T} \times 100$$

DV = difficulty level/ index

R_U= the number of students of upper group who answered the item correctlyR_L = the number of students of lower group who answered the item correctlyT= total no of students in both the groups

Table 5: Difficulty value [Kelley's 1939]

If p lower than 0.20	Item too difficult
If p between 0.20 – 0.75	Item is good
If p greater than 0.75	Item too easy

Discrimination Power:
Discrimination power of an item defined as how well an item can distinguish between examinees who are knowledgeable and those who are not. A good item should discriminate between those who score high (top 27% cases) on the test and who score low on the test (bottom 27% cases). Discrimination index of each item was found by applying following formula:

$$D_P = \frac{R_U - R_L}{N/2}$$

DP = Discriminating Power
RU = the number of students of upper group who answered the item correctly RL = the number of students of lower group who answered the item correctlyN= total no of students in both the groups

Table 7: Discrimination Index [Ebel's 1979

Discrimination power	Description
0.40 -0.90	Very good item
0.30-0.39	Reasonably good item
0.20-0.29	Marginal item subjected to modification
0.19 and below	Poor item.

Final Draft of Achievement Test:
Final draft is prepared based on item analysis. The final draft of achievement test is given below.

Table 8: Distribution of discrimination indices and difficulty values of items of final draft of achievement:

Level of Difficulty / Discrimination Index	Medium (0.20-0.75)	Total	Remarks
0.40 and above		55	Very gooditems
0.30-0.39		05	Reasonablygood items
Total		**60**	

Table 9: Objective wise distribution of items of the Final Achievement test

Content	Knowledge	Understanding	Application	Skill	Total Item
Upper Limb	10 1 0	8	7	2	**27**
Lower Limb	8	5	4	2	**19**
Marma Sharir	6	4	2	2	**14**
Total	24	17	13	6	**60**
%	40	28.33	21.66	10	**100**

Table 10: Final Items of Achievement Test

Content	Weightage				Total No. Items	Total Marks
	Knowledge	Understanding	Application	Skill		
Upper Limb	10(10)	8(8)	7(7)	2(2)	27	27
Lower Limb	8 (8)	5(5)	4 (4)	2(2)	19	19
Marma Sharir	6 (6)	4(4)	2 (2)	2(2)	14	14
Total	**24(24)**	**17(17)**	**13(13)**	**6(6)**	**60**	**60**
%	40	28	22	10	100%	

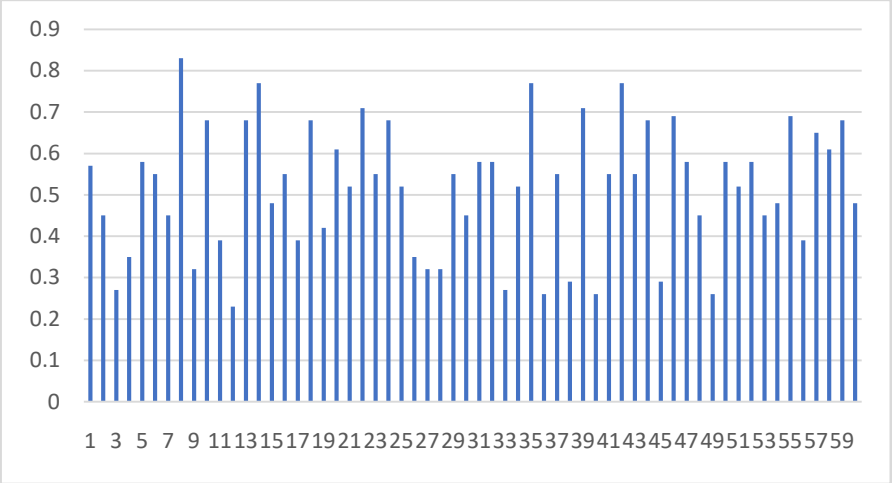

Fig.1 Graphic Presentation Of Difficulty Value Of Items

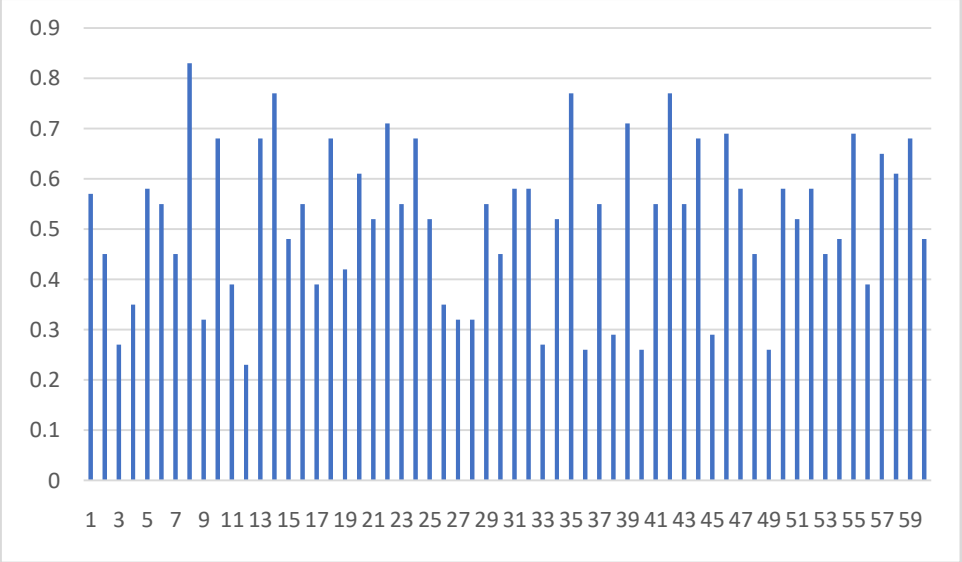

Fig.2 Graphic Presentation Of Discrimination Power Of Items

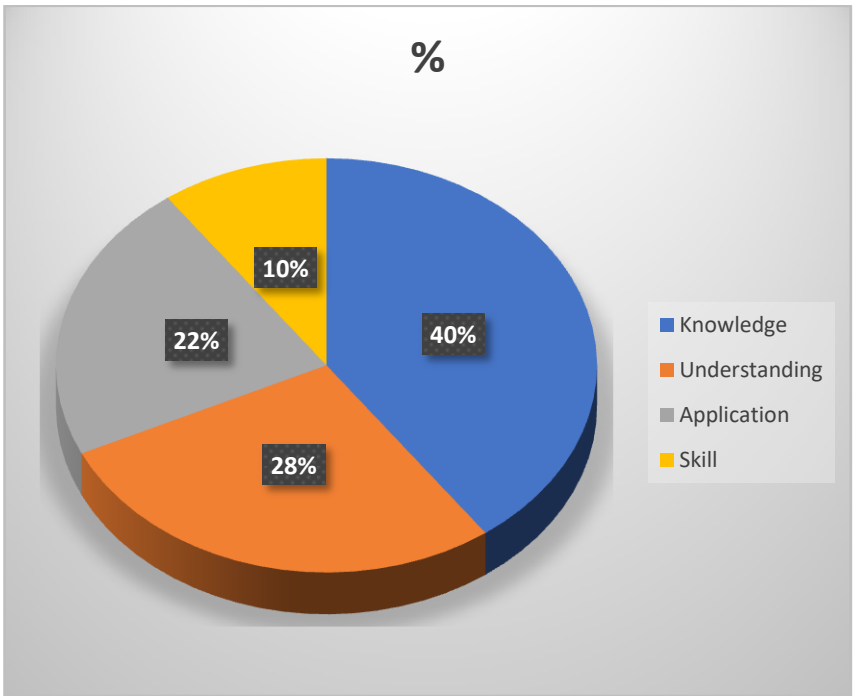

Fig.3: Objective Wise Weightage In Final Form Of Achievement Test

Standardization of Achievement Test:
60 items constituted the final form of achievement test. Achievement test was further standardized by reliability and validity.

Reliability of the test:
The reliability of a measuring instrument is the degree of consistency with which it measures whatever it was measuring. A test must be reliable that it must have the ability to consistency yield the same result when repeated measurements are taken of the same individuals under the same conditions. There are several methods such as test-retest, split- half, alternate form and parallel form etc. In the present research the reliability of the test was measured by**test-retest method**. The test was administered to a group of students and was re-administered to the same group of students after fifteen days and two sets of scores were correlated. The reliability co-efficient of the present test was 0.89.This shows that achievement test has high reliability.

Validity of the test:
Validity is the most important aspect of a test which can define as the degree to which a test can measure the achievements for which it is designed. There are different methods of estimating validity such as face validity, content validity, construct validity, predictive validity and concurrent validity. For the present study, content validity was opted through subject expert**.**

CONCLUSION

The study was carried out to construct and produce a reliable and valid achievement test in Anatomy. The test was standardized on the sample of 60 students studying in BAMS 1st year of Sri Ganganagar college of Ayurvedic Science & Hospital, Tantia University, Sri Ganganagar (Raj). The reliability of the test was determined through Test-Retest method of reliability which was 0.89 and content validity of the test was estimated. Hence, the constructed achievement test in *Rachana Sharir* (Anatomy)has a high reliability and validity. The test can be used by the teachers to assess student's achievement in *Rachana Sharir* (Anatomy) when they have covered the content areas according to the syllabus.

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