



DEVELOPMENT AND STANDARDIZATION OF ACADEMIC ACHIEVEMENT TEST IN SOCIAL SCIENCE

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Abstract:

This research article explains how the research tool has been developed and standardized by the investigator to measure the academic achievement in Social Science of the 10th standard students. A blueprint for the achievement test question paper was designed as per the model given in textbook of the Government of Tamil Nadu. The prepared 90 items were revised and edited carefully and then given to the subject experts for their valuable suggestions and corrections to ensure its quality. Thus the content validity of the tool was established. Then the tool was administered on the selected sample. Simple Random Sampling Method was adopted for the selection of 150 samples from 1 govt. School, 1 aided school and 2 private schools of Thanjavur District, comprising 75 boys from Govt. and Aided schools, and 75 girls from Private schools. Item Analysis was done by calculating the Difficulty Index level and Discrimination Power for each of the 90 items of the pilot study. Based on the results of the statistical analysis, 18 items were deleted and 72 items were retained and those items were selected for the final study. Test-Retest Method was used to establish the reliability of the tool and it was found to be 0.74 at 0.5 percent level.

Introduction:

Academic achievement has become an educational touchstone (School-Counselor.org., 2016). Student achievement today has become a hot topic in the field of education. It is a factor that matters a lot for the teachers, parents and students. The ultimate goal for any teacher is to improve the ability level and prepare students academically and socially. The quality of education is directed reflected in student achievement. "Our mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access", announced U.S. Department of Education (2016) as a part of Obama's administration efforts to support and improve quality of education in USA, and has a global relevance and significance. Student achievement is the indicator of potential nation's achievement in future. The entire teaching-learning activities in the life of a student centrifuge around the 'Academic Achievement'. Academic performance and Academic excellence are similar terms very much in vogue. The term 'Academic' is used to describe things that relate to the work done in schools, colleges, and universities, especially work which involves studying and reasoning rather than practical or technical skills. Academic achievement in general refers to the level and successful completion in studies. Academic achievement represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university (Steinmayr, Meibner, Weidinger, & Wirthwein, 2015).

Rationale for the Construction of the Tool:

The Secondary School Leaving Certificate (S.S.L.C.) Mark sheet includes Social Science as one of the subjects and any student of X standard ought to score the minimum pass marks, or else the student would be declared fail. It is in this context, academic achievement in Social Science becomes valuable and significant in the further continuation of studies. The investigator, being a teacher trainee who had selected History, a major component of Social Science subject, in his graduation and post-graduation studies, has a special interest and affinity, to pursue research in his subject. In this research, he has attempted to make a comparative study of academic achievement of tenth standard government and private school students in Social Science curriculum in relation to their achievement motivation, learning styles and parental encouragement. The findings of the study would be helpful to excel in his profession personally and of great contribution to the entire student community of X standard, envisages the investigator. To achieve this noble end, no suitable tool was available and so the investigator developed a tool and standardized it to be administered upon a larger sample of study.

Objectives:

- ✓ To construct Academic Achievement Test in Social Science for X standard students.
- ✓ To standardize Academic Achievement Test in Social Science for X standard students.
- ✓ To establish norms for Academic Achievement Test scores in Social Science for X standard students.

Research Design:

'Research Design' both survey and experimental designs can be used to assess the relative influence of many factors on educational achievement (Ross, 2005, p.9). The investigator has adopted survey design to make

a comparative study of academic achievement of tenth standard government and private school students in Social Science curriculum In relation to their achievement motivation, and parental encouragement.

Population and Sample:

“Researchers make the distinction between a population, the universe of people to which the study could be generalized, and a sample, the subset of people from the population who will participate in the current study” (Vanderstoep & Johnston. 2009, p.26). All the X standard students studying Thanjavur, Pattukkottai and Kumbakonam Educational Districts form the population for the study. The randomly selected 425 government and aided Schools students, and 425 private school students, together 850 students, from the population forms the sample for the study.

Academic Achievement Test in Social Science:

Preparation of the Draft Tool:

The investigator at first had a complete reading of the Social Science textbook of X standard and made an analysis of the structure and content. The investigator systematic planned to design the tool in accordance with the ‘Blueprint’ given in the textbook. So before constructing the blueprint, the tables were designed indicating weightage to objectives, weightage to content and weightage to type of questions. Then based on the blueprint, the items were written by the investigator and reviewed and the guide. 90 Multiple Choice Questions prepared from the 18 units at the rate of 5 questions per unit, with four options (a), (b), (c) and (d), out of which only one is correct and it is given the score value of 1; the other options are incorrect. Thus the preliminary tool was drafted.

Content Validity:

The validity of a scale refers to the degree to which it measures what it is supposed to measure (Pallant, 2005, p.6). Efforts were made to establish content validity of Academic Achievement Test in Social Science. “To demonstrate this form of content validity, the instrument must show that it fairly and comprehensively covers the domain or items that it purports to cover” (Cohen, Manion, & Morrison, 2007, p.137). So when the 90 items were written as per the blueprint, after revision, the tool was given to teachers who were teaching Social Science for the X standard students and to the teacher educators in Social Science. After going through the tool, finding out that an equal number of five items each were prepared from all the units, they ensured the adequate coverage of all the units. The given suggestions and modifications by the experts were carried out and thereby content validity was established.

Pilot Study: Administration of the Tool:

The investigator approached the headmasters of the schools concerned and got prior permission to conduct the pilot study. Required number of copies of the draft tool for conducting pilot study was printed, stating the purpose and assuring confidentiality, with proper instructions. The pilot study was conducted on the randomly chose 150 sample of X standard students from 1 govt. School, 1 aided school and 2 private schools of Thanjavur District, comprising 75 boys from Govt. and Aided schools, and 75 girls from Private schools. The investigator met the students in person and briefly explained the purpose of the data collection and made it clear that the data would be used only for research purpose. They were asked to answer all the items and not to omit any of them. No time limit was set to finish the items. The answer scripts were collected, valued and their scores against each item were coded in the item analysis table.

Item Analysis:

One of the important steps in the standardization of any research tool is an items analysis. It is a statistical technique used for selecting and rejecting the items in a scale on the basis of the obtained values. It is done primarily to eliminate inconsistency of the items. It is a test that “comes after the preliminary draft of a test has been constructed, administered on a group of students” (Aggarwal, 2012, p.270). The individual scores for the entire 150 sample were found out.

Difficulty Index (D.I):

“Item Difficulty may be defined as the proportion of the examinees that marked the item correctly. The numerical term which indicates the level of difficulty is called Difficulty Index.” (Aggarwal, 2012, p. 270). The test papers were arranged in order of scores, from high to low. Upper group was formed with the students of high scores by separating the upper 27% percentage. Lower group was formed with the students of low scores by separating the lower 27% percentage. The number of the correct responses in both the groups were counted for each question. The Difficulty Index (D.I.) of an item is represented by the percentage of students who responded to it correctly. For each question the Difficulty Index was calculated using the following formula.

$$\text{Difficulty Index (D.I.)} = \frac{R_U + R_L}{N_U + N_L} \times 100$$

Where,

R_U = Number of students in the Upper Group who answered the item correctly.

R_L = Number of students in the Lower Group who answered the item correctly.

N_U = Number of students in the Upper Group.

N_L = Number of students in the Lower Group.

Discriminative Power (D.P.):

“Item Discrimination or the Discriminating Power of a test item refers to the degree to which success or failure on an item indicates possession of the ability being measured” (Aggarwal, 2012, p.272). The Discriminating Power (D.P.) of an item indicates the measure of the extent to which an item discriminate or differentiates between subjects do well on the overall test and those who do not do well on the overall test. The Discriminating Power of the item was calculated by the formula.

$$\text{Discrimination Power (D.P.)} = \frac{R_U - R_L}{N_U(\text{or})N_L} \times 100$$

Item Selection:

The items are evaluated and selected with the help of Difficulty Index and Discrimination Power of the items. The items were evaluated with the help of Difficulty Value Index and Discrimination Value Index. In the present investigation, only those items whose Difficulty Index (D.I.) ranged from 20% to 80% and whose Discrimination Power falls above 0.2 were selected (Aggarwal, 2012); and the rest of the items were not selected for the final study. Thus the final version of Achievement Test in Social Science has had only 72 items. The Difficulty Index and the Discrimination Power of the preliminary draft tool were given in the Table 1.

Table 1: Preliminary Draft Tool - Academic Achievement in Social Science
 Value of Difficulty Index (D.I.) and Discrimination Power (D.P)

Item No.	D.I Value	D.P Value	Remarks	Item No.	D.I Value	D.P Value	Remarks
1.	74.09	0.32	Selected	46.	39.62	0.40	Selected
2.	31.48	0.31	Selected	47.	34.81	0.45	Selected
*3.	11.11	0.15	Deleted	48.	49.94	0.39	Selected
4.	72.22	0.38	Selected	49.	56.66	0.58	Selected
5.	24.07	0.35	Selected	50.	33.37	0.35	Selected
6.	74.01	0.30	Selected	51.	37.77	0.29	Selected
*7.	13.70	0.11	Deleted	52.	50.60	0.46	Selected
*8.	17.97	0.18	Deleted	53.	44.44	0.37	Selected
9.	77.77	0.39	Selected	*54.	10.13	0.14	Deleted
10.	55.55	0.37	Selected	55.	31.48	0.36	Selected
11.	38.51	0.31	Selected	56.	54.81	0.41	Selected
12.	38.88	0.48	Selected	57.	35.18	0.36	Selected
13.	21.37	0.33	Selected	58.	48.14	0.49	Selected
*14.	10.85	0.04	Deleted	59.	32.96	0.40	Selected
15.	47.77	0.36	Selected	60.	35.33	0.29	Selected
16.	72.22	0.55	Selected	61.	39.33	0.37	Selected
17.	59.25	0.52	Selected	*62.	12.39	0.09	Deleted
18.	37.77	0.48	Selected	63.	32.22	0.60	Selected
*19.	14.59	0.09	Deleted	64.	38.88	0.58	Selected
20.	32.96	0.36	Selected	65.	52.96	0.41	Selected
21.	33.03	0.44	Selected	66.	51.85	0.50	Selected
22.	35.18	0.33	Selected	67.	53.70	0.38	Selected
23.	48.21	0.46	Selected	68.	54.26	0.41	Selected
24.	59.10	0.55	Selected	69.	42.41	0.31	Selected
*25.	10.34	0.11	Deleted	70.	52.47	0.56	Selected
*26.	19.10	0.10	Deleted	*71.	16.33	0.18	Deleted
27.	62.10	0.34	Selected	*72.	18.33	0.09	Deleted
28.	74.19	0.51	Selected	73.	35.18	0.36	Selected
*29.	19.63	0.09	Deleted	74.	48.14	0.49	Selected
30.	40.28	0.36	Selected	75.	32.96	0.40	Selected
31.	55.24	0.39	Selected	76.	35.33	0.39	Selected
32.	62.34	0.41	Selected	77.	45.86	0.45	Selected
*33.	13.93	0.13	Deleted	78.	58.51	0.37	Selected
34.	40.58	0.38	Selected	79.	65.31	0.51	Selected
*35.	14.87	0.06	Deleted	80.	59.67	0.45	Selected
36.	55.57	0.41	Selected	81.	61.28	0.33	Selected
37.	48.22	0.37	Selected	82.	47.89	0.52	Selected

38.	57.79	0.40	Selected	83	59.61	0.30	Selected
39.	32.33	0.31	Selected	84.	67.69	0.46	Selected
*40.	16.52	0.18	Deleted	85.	34.26	0.31	Selected
41.	48.25	0.31	Selected	86.	56.61	0.39	Selected
42.	56.24	0.49	Selected	87.	62.28	0.42	Selected
43.	42.38	0.51	Selected	*88.	12.33	0.05	Deleted
*44.	11.97	0.19	Deleted	89.	72.52	0.64	Selected
*45.	9.39	0.07	Deleted	90.	58.64	0.42	Selected

Note: *marked 18 items were deleted

Reliability:

Reliability refers to the extent to which you get the same answer when the same question is asked repeatedly. “Test–retest reliability measures the extent to which you get the same answer if you test the same person on two different occasions” Rugg & Petre, 2007, P.224). In this study, test-retest method was used. On the 150 randomly selected sample, comprising 75 government and 75 private school X standard student, the preliminary draft tool with 90 items was conducted twice a gap of 15 days. The results of the two test scores were correlated using Pearson’s Product Moment Correlation formula. The reliability obtained was 0.76. Benson and Clark (1982) state, “The reliability coefficient can range from low of zero (negative values are considered zero) to a high of 1.00. The difference between the observed reliability coefficient and 1.00 is attributed to error. Thus, if the observed reliability coefficient was .75, then .25 represents the degree of inconsistency in the measurement. The above coefficients would be interpreted as follows: 75 percent of the variance in the test 'A' as measuring the subject's actual ability, achievement, attitude, or personality, and 25 percent was clue to chance or random error”. As the items have 0.76 reliability co-efficient, the tool is reliable.

Final Version of the Tool:

After item analysis, the final version of the tool has 72 items. Thus the investigator developed a final version of achievement test in Social Science. The D.I. and D.P. of the final tool is given in the Table 2.

Table 2: Final Tool - Academic Achievement in Social Science
 Value of Difficulty Index (D.I) and Discrimination Power (D.P)

Item No.	D.I Value	D.P Value	Remarks	Item No.	D.I Value	D.P Value	Remarks
1.	74.09	0.32	Selected	37.	33.37	0.35	Selected
2.	31.48	0.31	Selected	38.	37.77	0.29	Selected
3.	72.22	0.38	Selected	39.	50.60	0.46	Selected
4.	24.07	0.35	Selected	40.	44.44	0.37	Selected
5.	74.01	0.30	Selected	41.	31.48	0.36	Selected
6.	77.77	0.39	Selected	42.	54.81	0.41	Selected
7..	55.55	0.37	Selected	43.	35.18	0.36	Selected
8..	38.51	0.31	Selected	44.	48.14	0.49	Selected
9.	38.88	0.48	Selected	45.	32.96	0.40	Selected
10.	21.37	0.33	Selected	46.	35.33	0.29	Selected
11.	47.77	0.36	Selected	47.	39.33	0.37	Selected
12.	72.22	0.55	Selected	48.	32.22	0.60	Selected
13.	59.25	0.52	Selected	49.	38.88	0.58	Selected
14.	37.77	0.48	Selected	50.	52.96	0.41	Selected
15.	32.96	0.36	Selected	51.	51.85	0.50	Selected
16.	33.03	0.44	Selected	52.	53.70	0.38	Selected
17.	35.18	0.33	Selected	53.	54.26	0.41	Selected
18.	48.21	0.46	Selected	54.	42.41	0.31	Selected
19.	59.10	0.55	Selected	55.	52.47	0.56	Selected
20.	62.10	0.34	Selected	56.	35.18	0.36	Selected
21.	74.19	0.51	Selected	57.	48.14	0.49	Selected
22.	40.28	0.36	Selected	58.	32.96	0.40	Selected
23.	55.24	0.39	Selected	59.	35.33	0.39	Selected
24.	62.34	0.41	Selected	60.	45.86	0.45	Selected
25.	40.58	0.38	Selected	61.	58.51	0.37	Selected
26.	55.57	0.41	Selected	62.	65.31	0.51	Selected
27.	48.22	0.37	Selected	63.	59.67	0.45	Selected
28.	57.79	0.40	Selected	64.	61.28	0.33	Selected
29.	32.33	0.31	Selected	65.	47.89	0.52	Selected

30.	48.25	0.31	Selected	66	59.61	0.30	Selected
31.	56.24	0.49	Selected	67.	67.69	0.46	Selected
32	42.38	0.51	Selected	68.	34.26	0.31	Selected
33.	39.62	0.40	Selected	69.	56.61	0.39	Selected
34.	34.81	0.45	Selected	70.	62.28	0.42	Selected
35.	49.94	0.39	Selected	71.	72.52	0.64	Selected
36.	56.66	0.58	Selected	72.	58.64	0.42	Selected

Conclusion:

The scale was constructed for measuring the Academic Achievement in Social Science of X standard students. Systematic efforts were made to validate the tool using appropriate statistical techniques and so the tool can be used to measure the academic achievement in Social Science of the X standard students studying the Social Science textbook of 2015-16. The findings of the tool will be helpful to identify the level of academic achievement in Social Science and take appropriate measures to improve their performance.

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