

CONSTRUCTION OF ATTITUDE TOWARDS SCIENCE SCALE (ATSS)

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Attitude plays a vital role in the development of pupil's achievement. Positive correlations between attitude towards science and academic achievement have been reported by Keeves (1972). Bloom (1976) in his theory of school learning argues for the principle that cognitive and affective characteristics have much to do with the learning in schools. Shringley (1983) claimed that attitude is central to human action. Attitude guides and directs an individual's behaviour (Mehrens and Lehman, 1969).

To measure the pupil's attitude towards science, a valid and reliable scale was needed. In India, very few instruments particularly in Hindi are available for measuring secondary stage student's attitude towards science. Therefore, it was decided to prepare a Likert type attitude scale in Hindi for Secondary school students.

Construction of the Scale 'Attitude Towards Science':

The main steps given by Edward (1957) were followed for constructing the scale 'Attitude Towards Science'.

*** Defining the Variable in Operational Terms:**

'Attitude towards Science' is the feeling of an individual towards scientific objects, scientific issues, scientific policy or any identifiable aspects related to science.

*** Selection of Relevant and Appropriate Areas of Attitude Towards Science:**

The present scale has been constructed to cover the following six dimensions –

1. Scientific outlook
2. Science for future career
3. Utility for society
4. Science and Religious faith.
5. Science and culture
6. Science and activity.

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• **Item Selection:**

Items related to respective dimensions were prepared. Statements were based on different dimensions on which respondents were expected to express their opinion and attitude.

The list of items thus prepared was revised several times in the light of the guidelines given by Edward 1957. In the first draft of 77 items, 46 statements were positive and 31 statements were negative. Instructions for the subjects were given on the first page of the scale.

• **Try-Out:**

The scale was administered on a sample of 300 science students of IX class in batches of 25 to 30 each. No time limit was given but they were requested to finish the task conveniently. Time taken by the first and last respondent was noted down.

• **Scoring:**

Scoring was done by assigning 5 score to response category "Strongly agree"; 4 to 'agree'; 3 to 'uncertain'; 2 to 'disagree'; and 1 to 'strongly disagree'; for a favourable (positive) statement. For unfavorable (negative) statements 1 score to 'strongly agree'; 2 to 'agree'; 3 to 'uncertain'; 4 to 'disagree'; and 5 to 'strongly disagree' was given. By summing up the scores on each statement, the total score of each subject was obtained.

• **Item Analysis:**

The items were analysed by the following method of Likert (Edward 1957). All the answer sheets were arranged in rank order. Twenty seven percent of the sample from the top constituted the 'high scorer' and twenty seven percent from the bottom comprised the 'low scorer'. These two groups were used for calculating the 't' value for each item.

The obtained 't' value for all the 77 items have been given in Table-1
 Table-1 Showing Item Number of Try-Out Form and their 't' value

Item No.	't'	Item No.	't'
1	6.79*	39	3.94*
2	2.92*	40	0.97
3	.52	41	3.24*
4	5.55*	42	5.23*
5	2.78*	43	4.11*
6	2.70*	44	5.45*
7	1.10	45	2.68*
8	1.20	46	4.78*
9	2.85*	47	2.75*
10	4.47*	48	0.15
11	4.28*	49	3.84*
12	3.02*	50	2.43*
13	2.99*	51	1.85
14	2.26*	52	0.43
15	3.27*	53	0.28
16	1.20	54	0.82
17	7.00*	55	2.70*
18	2.87*	56	3.40*
19	0.95	57	4.02*
20	1.58	58	0.13
21	1.38	59	1.48
22	4.16*	60	3.03*
23	4.40*	61	2.77*
24	5.15*	62	2.79*
25	2.79*	63	3.44*
26	1.30	64	2.72*
27	1.38	65	2.83*
28	5.64*	66	2.85*
29	5.24*	67	2.99*
30	3.24*	68	0.75
31	3.54*	69	1.78
32	1.54	70	4.19*
33	3.54*	71	1.18
34	5.44*	72	1.66
35	3.41*	73	1.47
36	1.14	74	0.70
37	5.78*	75	3.36*
38	2.74*	76	3.39*
		77	4.99*

*Significant at 0.05 level

Table-1 shows that 25 items had insignificant 't' values, therefore, they were rejected.

***Final Form:** On the basis of item analysis only 52 items were selected for the final form of the 'Attitude towards Science Scale'. Out of which 28 were positive statements and the rest 24 were negative one.

Table-2 showing the serial number of positive and negative statements

S.No.	Item number in the final form	Types of Statement
1.	1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 15, 16, 18, 19, 20, 22, 23, 25, 26, 28, 30, 34, 36, 38, 40, 43, 45, 48.	Positive Statements
2.	3, 6, 9, 12, 17, 21, 24, 27, 29, 31, 32, 33, 35, 37, 39, 41, 42, 44, 46, 47, 49, 50, 51, 52	Negative Statements

***Administration of the Final Form:**

The final printed form was administered on 1200 students studying in selected institutions of Varanasi city.

***Scoring:**

The answer sheets were scored with the help of hand made punched keys and rechecked for the mistakes if any.

***Reliability:**

The Pearson's product-moment correlation formula was used for calculating the correlation between odd and even items. The value of correlation is found to be 0.84. The coefficient of split- half reliability using spearman- Brown prophecy formula was carried out. The corrected reliability was found to be 0.91.

***Validity:** Garrett (1967) stated that sometimes Index of reliability can also be taken as measure of validity. Intrinsic validity of the scale was 0.95.

***Norms:** Norms of the test were developed on a sample of 1200 IX grade science students studying in different institutions.

Table-3 Giving the interpretation of raw scores of the Attitude towards Science scale

S.No.	Raw scores	Interpretation
1.	203 and above	High
2.	180 - 202	Average.
3.	Below - 179	Low

Table-3 Gives the interpretation of the raw scores of the attitude towards science scale. In this scale raw scores above 203 denote i.e., Q_3 'high' attitude, raw scores between 180 - 202 denote 'average' or 'moderate' attitude and raw scores below 179 i.e. Q_1 point indicate 'low' attitude.

Percentile norms were calculated and are given in table 4.

Table-4 showing Percentiles value of the Distribution of the attitude towards Science Scale Scores

Percentile	Scores
P ₁₀	169.55
P ₂₀	175.70
P ₃₀	181.40
P ₄₀	186.39
P ₅₀	191.12
P ₆₀	195.46
P ₇₀	199.95
P ₈₀	206.65
P ₉₀	215.50
P ₁₀₀	249.50

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