

# Development and Standardization of Attitude Towards Science Scale for Student Teachers

S. Prakash

Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India  
Peniel Rural College of Education, Vemparali, Natham, Dindiguldt - 624 405, Tamil Nadu, India

Corresponding author: prakash.prce@yahoo.com

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## Abstract

The present study is designed to construct an Attitude towards Science Scale for student teachers. An Attitude Scale was developed and standardized by administering it on 100 randomly selected student teachers of Madurai Revenue District of Tamil Nadu State and conducting item analysis to eliminate the inconsistent items in a tool. The final form of Attitude Scale consists of 25 items classified into four sections namely – Personal confidence about the subject matter, Involvement with the subject, Usefulness of the subject content and Perception of teacher's attitude. All the items of Attitude Scale are Likert type with the five-point rating.

**Keywords:** Construct, attitude, science

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Science is one of those human activities that man has created to gratify certain human needs and desires. Curiosity has been the greatest motive power of scientific research. The search for truth has become the dominant in persuasion of science. As it is under persuasion since so many centuries it has attracted the attention of a much persisted group of people. Science is no longer confined to a few seriously devoted persons since the life in the present world invariably warrants to variable degrees of scientific facts and laws, science has now become a part of general education. Science takes its place side by side with other subjects as an essential element of one's education. It affords knowledge of certain facts and laws and an insight into methods and data peculiar to the domain of science.

However, the inclusion of any subject in the curriculum should satisfy the intellectual, utilitarian, vocational, cultural, moral and aesthetic values. Besides these, the teaching of science imparts training in the scientific method and develops positive attitude towards science subject, scientific aptitude, which are very valuable and at the same time are transferable to other situations in the life of the learners. The qualities imbibed by the learner

through learning science are of great value to the citizens living in the society.

In the field of education, teachers have a pivotal role at all levels with the shift from knowledge to competencies as backdrop, a corresponding change is evident in the roles of teachers to enable the teachers respond effectively to changing demands and the institutions of teacher education have major responsibilities to perform. One is to equip their products-student teachers with the skills, competences and necessary training needed to effective teachers in the changing context.

An attitude is an emotional reaction towards a person or thing. It is a personal response to an object, developed through experience which can be characterized as favourable or unfavourable. The use of science as the object or stimulus of these feelings delineates that set of attitudes known as 'Attitude towards Science'.

Developing positive attitudes towards science has been an exposed goal of most of the curriculum development efforts since the last 1950s (Welch 1979). It was hoped that

increasing interest in science would result in increased science enrolment which in turn would yield a larger science work force pool and a science literate public. The increased attention to the effective outcomes of science has also resulted in a proliferation of attitude research studies, more measuring techniques and several attempts to measure attitude towards science on an international scale.

### **Objectives**

- To construct an Attitude towards science Scale for student teachers.
- To standardize an Attitude towards science Scale for student teachers.

### **Attitude Towards Science Scale for Student Teachers**

An Attitude Scale was constructed to measure the Attitude of student teachers towards science. The steps followed for its construction and standardization are as follows:

- Planning
- Preparation of Preliminary Form
- Pre-tryout
- Editing
- Pilot study
- Item Analysis
- Preparation of Final form

### **Planning**

During planning it was decided to prepare the statements with reference to -Personal confidence about the subject matter, Involvement with the subject, Usefulness of the subject content and Perception of teacher's attitude.

### **Preparation of Preliminary Form**

The investigator developed the preliminary form of Attitude towards Science Scale for student teachers with 62 simple, clear and concise statements for better understanding. Care was taken to avoid ambiguity and repetition in the statements. At the end of each statement, five graded options were given namely-"Strongly Agree", "Agree", "Undecided", "Disagree" and "Strongly Disagree" having scores 5,4,3,2 and 1 for positive statements and 1,2,3,4 and 5 for negative statements. The investigator classified the statements of preliminary form of

Attitude Scale under different sections namely-Personal confidence about the subject matter, Involvement with the subject, Usefulness of the subject content and Perception of teacher's attitude.

### **Pre-tryout**

The preliminary form of Attitude towards Science Scale for student teachers was given to 10 teacher educators for their observation and criticism regarding the clarity of statements, appropriateness of the language and the pattern against each statement. Based on their suggestions, the developed research tools were further edited.

### **Editing**

Soliciting the responses of the teacher educators approached at the pre-tryout stage, the editing of the developed research tool was completed. On the basis of criticisms and suggestions of the experts involved, 14 statements were rejected and 48 statements were retained.

### **Pilot study**

For the standardization of the constructed tool, the investigator conducted a pilot study. The constructed tool was administered on 100 randomly selected student teachers studying in College of Education, Madurai revenue District of Tamilnadu State. The student teachers were instructed to mark their responses for all the statements of Attitude towards Science Scale. Further, they were given assurances that their responses would be used only for research purpose. They were also convinced that their responses would be kept confidential. There was no time limit, but the student teachers took 40 to 50 minutes for giving responses to all the statements of the tool. The responses of student teachers were scored according to the positive or negative nature of statements.

### **Item analysis**

The investigator used item whole correlation to find out 'r' values. The item having 'r' values between 0.4 to 0.7 were retained and the other items were rejected. In the final Attitude towards science Scale, **25** items were retained with almost equal number of positive (**13**) and negative (**12**) items.

### **Preparation of the Final Form**

After item analysis the Final Form of Attitude towards science scale for student teachers was prepared with 25 retained items.

**Table 1.1:** Item whole correlation for attitude towards science scale

Item number	'r' value	Remarks	Item number in Attitude Scale
1.	0.392	Rejected	-
2.	0.000	Rejected	-
3.	0.446	Retained	1
4.	0.562	Retained	2
5.	0.466	Retained	3
6.	0.705	Rejected	-
7.	0.330	Rejected	-
8.	0.552	Retained	4
9.	0.547	Retained	5
10.	0.690	Retained	6
11.	0.631	Retained	7
12.	0.626	Retained	8
13.	0.235	Rejected	-
14.	0.488	Retained	9
15.	0.455	Retained	10
16.	0.414	Retained	11
17.	0.392	Rejected	-
18.	0.396	Rejected	-
19.	0.348	Rejected	-
20.	0.492	Retained	12
21.	0.559	Retained	13
22.	0.536	Retained	14
23.	0.451	Retained	15
24.	0.664	Retained	16
25.	0.715	Rejected	-
26.	0.533	Retained	17
27.	0.660	Retained	18
28.	0.278	Rejected	-
29.	0.306	Rejected	-
30.	0.558	Retained	19
31.	0.496	Retained	20
32.	0.075	Rejected	-
33.	0.485	Retained	21
34.	0.435	Retained	22
35.	0.134	Rejected	-
36.	0.345	Rejected	-
37.	0.309	Rejected	-
38.	0.262	Rejected	-
39.	0.407	Retained	23
40.	0.028	Rejected	-
41.	0.481	Retained	24
42.	0.340	Rejected	-
43.	0.323	Rejected	-
44.	0.082	Rejected	-
45.	0.274	Rejected	-
46.	0.109	Rejected	-
47.	0.516	Retained	25
48.	0.187	Rejected	-

### Reliability and Validity of the Tool

Split-half reliability coefficient of Attitude Scale was determined on the basis of scores of 50 randomly selected student teachers. In the Split-half method, the tool was divided into two equivalent halves and for these two halves Half-test reliability coefficient was found using Karl Pearson's coefficient correlation formula. From the Half-test reliability coefficient, Whole-test reliability coefficient was estimated by using Spearman Brown prophecy formula.

The Half -test and Whole-test reliability coefficients of Attitude towards Science Scale for student teachers were 0.83 and 0.89 respectively. Hence the developed tool was highly reliable.

On the basis of opinions of experts the items of Attitude Scale were structured. Hence the developed tool has face validity and content validity.

### Conclusion

The education of the student largely depends on their teachers. It is important that student teachers who are the future teachers of the country have a favourable and positive attitude towards science. This will inculcate scientific among the future students.

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