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Construction and Standardization of Scientific Attitude Scale

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Abstract

Scientific attitude scale has been constructed and standardized for higher secondary school students. The items were constructed based on the Likert's five point scale. The pilot study was conducted with one hundred higher secondary school students, randomly selected from five higher secondary schools located in Cuddalore district. The responses collected from the samples were analyzed by statistical techniques. The scores of the items that satisfies 't' value alone were taken for the main study. Out of sixty items, twelve items were not selected and the remaining forty eight items were taken for the main study. The reliability of the score was found to be 0.93 by Chronbach alpha method. Further the validity of the tool was established by using face validity method.

Keywords: Scientific attitude scale, Higher secondary students, Tool construction.

INTRODUCTION

Scientific knowledge in those days exerted little influence on the common man, but since the turn of this century; even the man in the street becomes aware of the impart of science on the society and new age of science (Pitafi & Farooq,2012). The lack of assessing students scientific attitudes may be a factor responsible for the poor scientific orientations among science students which are thus made manifest in various facets and aspects of their daily activities; some of which include declining productivity, haphazardness of development, disorderliness in the society, non-functioning utilities due to inadequate maintenance, distorted values and so on (Oloruntegbe & Omoifo, 2005). Developing scientific attitude is a potential means of eliminating intolerance, superstitions, gullibility and other patterns of thought like obscurantism (Oyakhiromen ,1996). Hukins (2010) argued that the assessment of scientific attitudes has been generally omitted in the evaluation of student progress in science classrooms. The scientific attitude of the students was not measured by science teachers and very less number of studies has been done in this area. Hence the investigator made an attempt to investigate the scientific attitude of higher secondary students.

REVIEW OF RELATED LITERATURE

Mani Naiker et al. (2020) examined the Attitude towards science among senior secondary students in Fiji. One thousand four hundred and one senior secondary Fijian students. Students generally had a positive attitude towards science overall in Years 11–13, with females showing a more positive attitude than males. By Year 13, the attitudes of females towards science had become more negative. The attitude towards science started out lower than other ethnicities in Year 11 and increased during Year

12, before falling to below the starting attitude levels in Year 13. Fijian students of Indian descent generally had a positive attitude towards science that remained consistent throughout Years 11–13, with an increase in leisure and career interest in science in Year 13. A strong correlation was found between the ethnicity of a student and their first language. Continued science outreach programmes, particularly in Year 12, are important to achieve and retain scientific interest and attitudes among Fijian secondary students.

Gurbuz et al. (2021) examined the relationship between secondary school students' problem-solving skills and scientific attitudes in terms of gender, class level and education level of the parents. In the study, correlational research model, which is among the general survey models, was employed. The sample of the study consisted of 560 students selected from the secondary schools in Afyonkarahisar Province, Turkey by using convenience sampling method. In the study, Problem Solving Inventory for Children (PSIC) and Scientific Attitude Scale (SAC) were applied to collect the data. As a result of the analyses, a negative and low-level relationship was found between secondary school students' problem-solving skills and scientific attitudes. While there was a negative and low-level relationship in terms of female students, it was found that this relationship was not significant for male students. When analyzed in terms of class level and maternal education level, it was concluded that this relationship was not significant. It was concluded that problem solving skills and gender did not have a significant and common effect on students' scientific attitudes.

OBJECTIVE OF THE STUDY

To construct and standardize the scientific attitude scale to measure the level of scientific attitude among higher secondary school students.

SAMPLE OF THE STUDY

One hundred higher secondary school students studying in Cuddalore district were randomly selected as sample for the study.

PILOT STUDY

Scientific attitude scale for higher secondary school students has been constructed and validated by the investigator and the Research Supervisor. The investigator reviewed the literatures that are related to scientific attitude. Based on the knowledge obtained on scientific attitude, five point scales was constructed after having discussions with the school teachers, principals and educationist.

The tool has been prepared based on Likert's five point rating scale. Initially, sixty items were prepared both in Tamil and English. For positive items, the scoring procedure for strongly agree, Agree, Neutral, Disagree and Strongly disagree are given as 5,4,3,2,1 respectively. In case of negative items, the scoring procedure for strongly agree, Agree, Neutral, Disagree and Strongly disagree are given as 1,2,3,4, 5 respectively. The minimum score for the tool is sixty and maximum score of the tool is three hundred.

ITEM ANALYSIS

The pilot study tool consists of sixty items. There are thirty nine positive items and twenty one negative items. Each and every item has five responses namely strongly agree, agree, undecided, disagree and strongly disagree.

Table: 1 Scoring procedure for scientific attitude

Response	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Score for Positive Items	5	4	3	2	1
Score for Negative Items	1	2	3	4	5

Table: 2 The responses thus calculated were analyzed by using critical ratio analysis ('t' test). 't'- values of the items

Item number	't' value	Selected/ Rejected
1	2.55	Selected
2	1.69	**Not selected**
3	0.96	**Not selected**
4	1.13	**Not selected**
5	0.66	**Not selected**
6	3.65	Selected
7	1.93	**Not selected**
8	2.04	Selected
9	1.42	**Not selected**
10	3.84	Selected
11	2.72	Selected
12	4.29	Selected
13	3.06	Selected
14	3.41	Selected
15	1.00	**Not selected**
16	3.34	Selected
17	3.85	Selected
18	3.18	Selected
19	3.89	Selected
20	2.04	Selected
21	0.49	**Not selected**
22	4.35	Selected
23	3.61	Selected
24	2.61	Selected
25	5.32	Selected
26	1.76	**Not selected**
27	1.55	**Not selected**
28	3.59	Selected
29	2.92	Selected
30	3.92	Selected
31	3.36	Selected
32	4.12	Selected
33	2.56	Selected
34	3.41	Selected

35	3.10	Selected
36	3.10	Selected
37	3.03	Selected
38	2.00	Selected
39	0.73	**Not selected**
40	5.32	Selected
41	4.17	Selected
42	6.13	Selected
43	6.64	Selected
44	3.43	Selected
45	7.38	Selected
46	5.80	Selected
47	2.70	Selected
48	2.87	Selected
49	2.78	Selected
50	4.67	Selected
51	2.59	Selected
52	5.37	Selected
53	2.34	Selected
54	2.50	Selected
55	3.55	Selected
56	1.76	**Not selected**
57	4.01	Selected
58	3.48	Selected
59	5.73	Selected
60	3.09	Selected

DESCRIPTION OF THE FINAL TOOL

The final draft of the Scientific Attitude Scale consists of forty eight items. It consists of thirty two positive items and sixteen negative items. The scoring procedure of positive items are 5,4,3,2,1 for Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree respectively. The scoring procedure of negative items are 1,2,3,4,5 for Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree. The minimum score of the tool is 48 and the maximum score of the tool is 240.

RELIABILITY OF THE TOOL

The reliability of the tool was established by using Chronbach Alpha test. The reliability of the Scientific attitude scale was founded to be 0.93, which is considered to be highly reliable.

VALIDITY OF THE TOOL

The Scientific attitude scale was validated by using face validity method. To establish validity the tool was distributed to ten experts including Teacher Educators, Psychology Experts and Professors. Experts were asked to check whether the items in the tool are related to the present study and also to check

whether it satisfies the objectives of the study. Based on the suggestions given by the experts, few corrections were done in some items.

CONCLUSION

The investigator is hopeful that this scale would be helpful to measure the level of scientific attitude of higher secondary school students. Hence, the constructed scientific attitude scale will be very useful for the investigator to measure the level of scientific attitude of higher secondary school students in their future teaching profession.

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