CONSTRUCTION AND VALIDATION OF ACHIEVEMENT TEST IN CHEMISTRY (ATC)

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Abstract

In learning situation, the most important centre of attention of teaching is to make easy the learners to learn absolutely the subject qualified to them. To know the importance of achievement of the students, many conventional and contemporary methods of evaluation, techniques and tools are used. The means and methods of evaluation differ from oral tests to online tests. However, Achievement test in Chemistry is considered the majority popular dependable and possible one. Therefore, in the present study, the researcher has planned to construct and validate an Achievement test in Chemistry to determine the achievement level of Higher Secondary students in chemistry.According to the validation procedure the framed 100 questions were finalized to 50 questions constituting the Achievement test in Chemistry.

Keywords: Achievement in Chemistry, Higher secondary school student.

INRODUCTION

The knowledge attained or skills developed in the school subjects, usually resolute by test scores or by marks assigned by teachers. In the present study, Achievement in Chemistry is measured as the total score obtained by a student as measured in the Achievement Test constructed by the researcher, in Chemistry, covering the cognitive domain of the behaviours.

NEED AND IMPORTANCE

Life in universal and for a student in exacting, has become highly ready for action. The two years of higher secondary course has become very critical in view of the fact that these two years shape the entire future of a student. Educationists, teachers and parents are all equally afraid about problems of achievement. The increasing number of low achievers has made them really anxious and research in their direction has made it clear that a student shortage or lack of achievement is not due to single factor but due to contribution of factors. Most of the low achievers have no regularity of habits, they show withdrawing tendencies, they have feeling of insecurity and they show various types of nervous symptoms.

OBJECTIVE

To construct and to validate an Achievement test in Chemistry (ATC).

SAMPLE

100 Higher secondary school students were selected by using Random sampling technique.

METHOD OF THE STUDY

Normative survey method has been used in the present study.

TOOL

The tool namely, Achievement test in Chemistry (ATC) was developed by the researcher in order to measure the Achievement in Chemistry of the students. The Achievement test in Chemistry (ATC) was constructed based on the following three main phases.

a) Pre- pilot phase

b) Pilot phase and

c) Finalization phase

Pre- Pilot Phase

Pre- pilot phase is concerned with item pooling. It consists of

a) Source of items

b) Laying down / criteria for item collection

a) Sources of Items

The preliminary item pool was made by drawing items from the following sources

- Review of thematic and research work

- Discussion with the school Headmasters

- Discussion with the experienced educational psychologists

- Discussion with the learners

- Discussion with educational experts

By careful analysis of the above sources, statements were collected and tabulated. Thus a total of 100 statements were gathered during this stage.

b) Criteria for selection of items

The collected statements were not directly administered, but they were subjected to screening. The following criteria were considered while screening and thereby some statements were added or excluded.

- The language of the statements should be simple, clear and unambiguous

- Each and every statement should be short.

- The statements that are likely to be enclosed by almost every one or no one should be avoided.
- The compound and complex statements should be avoided.

Pilot Study Phase

Once the statements are collected, the next step is pilot study. The pilot study is concerned with refining the items collected during the pre- pilot state. The refinement of the items has been conducted at two levels

a) Judgment analysis,

b) Item analysis

a) **Judgment Analysis**: Judgment analysis implies eliciting the opinion of the experts in the area of study regarding the suitability and objectivity of the items pooled. All the 100 items gathered during the pre-pilot stage were sent to a jury opinion regarding their suitability and clarity, in which the jury council consisting of three school Headmasters belonging to the higher secondary schools in Cuddalore District. On the basis of the jury council's judgment, some of the items were restructured and retained.

b) **Item Analysis**: Having refined and reworded the items, it was decided to put all the 100 items under item analysis procedure. The main objective of the item analysis is to obtain objective information concerning the items pooled. This information is valuable to eliminate subjective judgment in selecting the items. Further, it enables the investigator to know how the respondents react to the items in the Achievement test in Chemistry (ATC).

The researcher has developed Objective type of Question, which consists of 100 questions. This 100 questions intended for the pilot study was administered to the sample of as many as 100 school students studying in the first year higher secondary schools situated in the Cuddalore district of Tamilnadu, India. The next step in the construction and validation of Achievement test in Chemistry (ATC) after pilot study is to find out Index of Discrimination value of each statement which forms the basis for item selection in order to build up the final test

Difficulty index of an item:

The difficulty of an item is represented by the percentage of students who responded to it correctly. It was calculated by using the formula,

$$\text{D. I.} = \frac{U + L}{2N}$$

where, U = Number of correct responses in the upper group

L = Number of correct responses in the lower group

N = Number of students in both groups

Discriminating power of an item:

Discriminating power of an item indicates the measure of the extent to which a test item discriminates or differentiates between the students who do well on the overall test and those who do not do well on the overall test.

In an educational achievement test, the principal function is to distinguish different levels of achievement as much clear as possible. Hence, the discriminating power of the item was calculated by the formula,

$$\text{D. P.} = \frac{U - L}{2N}$$

where, U = Number of correct responses in the upper group

L = Number of correct responses in the lower group

N = Number of students in both groups

Any item, whose discriminating power is above 0.30, should be considered as reasonably good item. In the present study, only such of those items whose difficulty indices ranged from 0.30 to 0.90 and whose discriminating power falls between 0.30 to 0.90 were selected. The item selected for the final study is indicated by the symbol 'S' and the not selected items by the symbol 'NS'. The difficulty index and discrimination power values are given in the table.1.

Table 1: The Index Of Difficulty And Index Of Discrimination Values For The Achievement Test In Chemistry

QUESTIONS NUMPER	INDEX OF DIFFICULTY	INDEX OF DISCRIMINATION	SELECTED STATEMENT
Question 1	76	0.44	S
Question 2	108	0.12	NS
Question 3	52	0.44	S
Question 4	76	0.16	NS
Question 5	116	0.28	NS
Question 6	128	0.32	S
Question 7	48	0.32	S
Question 8	104	0.48	S
Question 9	68	0.52	S
Question 10	56	0.32	S
Question 11	64	0.24	NS
Question 12	84	0.36	S
Question 13	88	0.14	NS
Question 14	116	0.28	NS
Question 15	64	0.32	S

Question 16	84	0.44	S
Question 17	80	0.32	S
Question 18	68	0.2	NS
Question 19	108	0.28	NS
Question 20	120	0.16	NS
Question 21	96	0.32	S
Question 22	68	0.28	NS
Question 23	40	0.00	NS
Question 24	88	0.32	S
Question 25	60	0.04	NS
Question 26	56	0.16	NS
Question 27	12	0.04	NS
Question 28	68	0.36	S
Question 29	36	-0.2	NS
Question 30	40	0.00	NS
Question 31	36	0.36	S
Question 32	84	0.44	S
Question 33	36	-0.00	NS
Question 34	60	0.28	NS
Question 35	48	0.24	NS
Question 36	80	0.32	S
Question 37	52	0.2	NS
Question 38	68	0.2	NS
Question 39	64	0.32	S
Question 40	80	0.16	NS
Question 41	84	0.28	NS
Question 42	44	0.36	S
Question 43	28	0.12	NS
Question 44	76	0.36	S
Question 45	76	0.28	NS
Question 46	64	0.16	NS
Question 47	36	0.12	NS
Question 48	76	0.44	S
Question 49	88	0.08	NS
Question 50	76	0.44	S
Question 51	76	0.36	S
Question 52	68	0.36	S
Question 53	48	0.32	S
Question 54	120	0.16	NS
Question 55	60	0.28	NS
Question 56	96	0.32	S
Question 57	92	0.36	S
Question 58	104	0.24	NS
Question 59	98	0.52	S
Question 60	72	0.24	NS
Question 61	64	0.24	NS
Question 62	84	0.36	S
Question 63	92	0.36	S
Question 64	116	0.28	NS
Question 65	64	0.32	S
Question 66	84	0.44	S

Question 67	80	0.32	S
Question 68	80	0.08	NS
Question 69	92	0.28	NS
Question 70	120	0.16	NS
Question 71	80	0.16	NS
Question 72	68	0.28	NS
Question 73	88	0.48	S
Question 74	88	0.32	S
Question 75	84	0.28	NS
Question 76	76	0.44	S
Question 77	92	0.36	S
Question 78	68	0.36	S
Question 79	80	0.16	NS
Question 80	92	0.28	NS
Question 81	76	0.76	S
Question 82	84	0.44	S
Question 83	76	0.36	S
Question 84	60	0.28	NS
Question 85	88	0.64	S
Question 86	80	0.32	S
Question 87	80	0.16	NS
Question 88	76	0.12	NS
Question 89	64	0.32	S
Question 90	80	0.16	NS
Question 91	84	0.28	NS
Question 92	44	0.36	S
Question 93	68	0.52	S
Question 94	76	0.36	S
Question 95	76	0.28	NS
Question 96	64	0.16	NS
Question 97	76	0.52	S
Question 98	76	0.44	S
Question 99	88	0.08	NS
Question 100	76	0.44	S

S – Significance and **NS** – Not Significance

The investigator classified marks and the Achievement level as below

Low level of achievement   :Upto 12

Average level of achievement   :Above 13 upto 32

High level of achievement   :Above 32

VALIDITY AND RELIABILITY OF ACHIEVEMENT TEST IN CHEMISTRY (ATC)

Achievement test in Chemistry (ATC) for the school students constructed by the investigator has content validity as the test contains items from the content areas prescribed before and the same was ratified by a panel of experts it has construct validity as the items were selected following rigid item analysis procedure described above its intrinsic validity was found to be 0.89.

The coefficient of stability has also been determined by the test retest method and it is found to be 0.80.

Thus the Achievement test in Chemistry (ATC) has validity and reliability.

CONCLUSION

The tool namely Achievement test in Chemistry (ATC) was hence constructed and also validated.

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