



Social

DEVELOPMENT AND VALIDATION OF TOOL ON PROBLEM SOLVING SKILL FOR HIGH SCHOOL STUDENTS



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Abstract

In the present study, Problem solving skill scale has been validated for the High School Students. First 20 items are taken from standardized tool for validation. An item analysis technique was used for this study. The sample consists of 50 High School Students. They are randomly selected from Kancheepuram District. The Difficulty level and Discrimination index values were used to validate the tool and 14 items were retained. Again researcher constructed 12 items for validation. Same techniques and samples were used and this time 6 items were retained. Thus, totally 20 items were retained for the final study.

Keywords: Problem Solving Skill; High School Students.

Cite This Article: T.Indumathi, and Dr. N. Ramakrishnan. (2017). “DEVELOPMENT AND VALIDATION OF TOOL ON PROBLEM SOLVING SKILL FOR HIGH SCHOOL STUDENTS.” *International Journal of Research - Granthaalayah*, 5(7:SE), 42-47. [https://doi.org/10.29121/granthaalayah.v5.i7\(SE\).2017.2044](https://doi.org/10.29121/granthaalayah.v5.i7(SE).2017.2044).

1. Introduction

The productive work involved in the evaluation of the situation and the strategy worked out to reach one's set goals is collectively termed as problem solving. This is an essential exercise for individual advancement as also for the advancement of society.

Definition of Problem Solving Skill

“Problem solving is a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is a procedure of making adjustment in spite of interference”. Skinner (1968).

Need for Problem Solving Skill

Good problem solving skill empowers students in their educational, professional, and personal lives. Nationally and internationally, there is growing recognition that if education is to produce

skilled thinkers and innovators in a fast-changing global economy, then problem solving skill are more important than ever. The ability to solve problems in a range of learning contexts is essential for the development of knowledge, understanding and performance. Requiring students to engage with complex, authentic problem solving encourages them to use content knowledge in innovative and creative ways and promotes deep understanding.

2. Objectives of the Study

The objective of the present investigation to validate a tool to measure the problem solving skill of high school students. The Problem solving skill Inventory (PSSI) is a multiple choice question type.

3. Pilot Study

In this inventory totally 32 items intended for pilot study, 20 standardized items and 12 constructed items were administrated separately to the sample 50 high school students studying in Kancheepuram district. Then their responses have been scored carefully and the marks secured by all the students have been arranged in the descending order from the highest score to lowest score separately for standardized items and constructed items. Then, they were subjected to item analysis.

4. Item Analysis

The next step in the validation of problem solving skill inventory after pilot study is to find out the Difficulty level and Discrimination index value of each item which forms the basis for item selection in order to build up the final inventory.

In the scoring scheme of multiple choice scale, one is given to 'Correct' response and zero is given to 'Wrong' response.

5. Items Selection

To select the items to from the final draft of the Problem solving skill (PSS) Inventory, the highest 27% of marks (14 papers) were selected and it was named upper group and lowest 27% of marks (14 papers) were selected and it was named lower group separately for standardized items and constructed items. The items with the right responses were noted down and then the difficulty value and discrimination index were found separately for standardized items and constructed items.

$$\text{Difficulty level} = \frac{RU+RL}{NU+NL}$$

$$\text{Discrimination Index} = \frac{RU-RL}{NU \text{ or } NL}$$

Where, RU = Number of correct responses from the upper group
RL = Number of correct responses from the lower group

NU = Number of students in the upper group
NL = Number of students in the lower group

Table 1: Items selected for the draft of the PSSI based on their difficulty value and discrimination index (standardized items)

Sl . No.	Difficult Level	Discrimination Index	Remarks
1	0.14	0.14	Rejected
2	0.60	0.35	Selected
3	0.71	0.57	Selected
4	0.35	0.28	Selected
5	0.42	0	Rejected
6	0.14	0.28	Rejected
7	0.67	0.07	Rejected
8	0.28	0.57	Selected
9	0.35	0.71	Selected
10	0.32	0.5	Selected
11	0.28	0.42	Selected
12	0.39	0.21	Selected
13	0.42	0.21	Selected
14	0.35	0.71	Selected
15	0.21	0.28	Selected
16	0.14	0.28	Rejected
17	0.64	0	Rejected
18	0.21	0.28	Selected
19	0.21	0.42	Selected
20	0.53	0.35	Selected

The difficult value and discrimination index for the first 20 items (standardized items) of the PSSI were obtained to select the items for the final draft. Out of 20 items, 14 items were found to be selected and they are given in table 1. The investigator has taken all these selected 14 items for the final study.

The difficult value and discrimination index for the second 12 items (constructed items) of the PSSI were obtained to select the items for the final draft. Out of 12 items, 11 items were found to be selected and they are given in table 2. The investigator has randomly taken 6 items for final study from the selected 11 items.

Table 2: Items selected for the draft of the PSSI based on their difficulty value and discrimination index (Constructed items)

Sl . No.	Difficult Level	Discrimination Index	Remarks
1	0.39	0.36	Selected
2	0.43	0	Rejected
3	0.46	0.36	Selected
4	0.29	0.43	Selected
5	0.5	0.43	Selected

6	0.61	0.79	Selected
7	0.5	0.57	Selected
8	0.5	0.43	Selected
9	0.5	0.86	Selected
10	0.61	0.79	Selected
11	0.57	0.43	Selected
12	0.57	0.29	Selected

6. Here the investigator has mentioned all the 20 questions selected for final study

- There are four married sons of an husband and wife in a family. Each son has 4 children. Then how many members are there in the family?
1) 16 2) 20 3) 24 4) 26
- Write two such numbers which are having their total as 30 and difference as 20?
1) 15:15 2) 28:10 3) 25:5 4) 28:2
- One person is 4 years elder than her wife. His wife is 10 times older than her daughter. Her daughter will be of 6 years old after 2 years, then what is the present age of the person?
1) 40 years 2) 44 years 3) 48 years 4) 42 years
- Smt. Shakuntla said to her daughter Sudha that I were of your age when you were born. If the present age of Smt. Shakuntla is 40 years, what would have been the age of Sudha 4 years before?
1) 14 years 2) 16 years 3) 20 years 4) 24 years
- Adding twice of any number in that number and subtracting half of that number comes 50, then what will be that number ?
1) 50 2) 40 3) 30 4) 20
- A fish is 20 inch long. Its length of head is equal to that of tail. The length of the tail would have been equal to its body if the length of the head had been twice. What will be the length of the body of the fish ?
1) 6 inches 2) 8 inches 3) 30 inches 4) 12 inches
- Age of Madhu is 18 years. She was twice the age of Sharad before 6 years when she was of the age of marriage then what was the age of Sharad at that time ?
1) 6 years 2) 10 years 3) 12 years 4) 14 years
- The cost of white-washing of four walls of the room comes to Rs. 10/-. What will be the cost of white-washing room of exactly twice the length, breadth and height of this room ?
1) Rs. 20/- 2) Rs. 40/- 3) Rs.80/- 4) Rs.120/-
- A number with itself is added. Same number is subtracted from the total, then the remainder is multiplied with the same number. If the product is 100 what will be that number ?
1) 100 2) 50 3) 20 4) 10

10. 'A' gains 10 % more profit than 'B' then what percent of loss occurs to 'B' than 'A' ?
1) 10 % lose 2) No loss No gain 3) $9\frac{1}{11}$ % loss 4) Can n't say
11. A six digit number is formed by repeating three digit number. For example 538538 or 235235. By which number this so formed number can be divided completely?
1) 8 2) 11 3) 14 4) 18
12. A milk seller has one litre water in different bottles. He exchanged half of the quantity among two of the bottles. He did so three times. Then tell what is the ratio of milk and water ?
1) 75 : 25 2) 50 :50 3) $1/3 :2/3$ 4) 25 : 75
13. Kalpana, Sadhana, Rahul and Ashish has to deliver speech in the class. In how many ways teacher can arrange their turn ?
1) 4 2) 8 3) 12 4) 16
14. Every person shook hands with each other after the end of the party. How many persons were there in the party if 28 times in all hands were Shaken ?
1) 14 2) 18 3) 8 4) 10
15. What is the next number in the series 4, 6, 9, 13,.....
1) 15 2) 12 3) 18 4) 17
16. Find the missing letters in the series AZ, GT, MN, ??, YB
1) JH 2) SH 3) Sk 4) TS
17. If "ORIENT" is written as "532146" and "SOUL" is "7598" how will you write "LINE" ?
1) 9241 2) 8341 3) 8241 4) 6241
18. Find out the odd number in the series given 25, 36, 49, 81, 121, 169, 225
1) 36 2) 49 3) 169 4) 225
19. Find the next alphabet in the sequence B, E, I, N, ?
1) U 2) V 3) T 4) S
20. 961 is divisible by
1) 21 2) 31 3) 11 4) 41

7. Reliability

In order to establish the reliability of Problem solving skill inventory, the split-Half method was used. The reliability of Problem solving skill inventory was found to be 0.97. Hence, Problem solving skill inventory was considered as reliable.

8. Validity

The index of validity which is the square root of the reliability was found to be 0.98. Hence, Problem solving skill inventory selected for the study was considered to be highly valid.

9. Conclusion

The investigator is hopeful that this inventory would be helpful to measure the level of Problem solving skill of the high school students. Hence, this tool will be very useful for the investigator to measure to what extent the level of Problem solving skill of the High School Students and it may be utilized and extended in the same for the future researchers.

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