Study Habits Scale - Construction and standardization –

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Kaplan and Saccuzzo 2009 (Psychological Testing and Assessment) describe that "A test is a measurement device or technique used to quantify behavior or aid in understanding and prediction of behavior". They also define an item as "An item is a specific stimulus to which a person responds overtly; this response can be scored or evaluated".

In simple word item define that, an items are the specific questions or problems that make up a test. Thus, an Educational Test is a set of items that are designed to measure the characteristics of human beings that pertain to behavior. Behavior has two face. It will be covert or overt. Overt behavior is an individual's observable activity whereas, covert behavior takes place within an individual and cannot be directly observed. So, the tests are devices used to translate the observations of behavior in to numbers. In the term Subject/students is referred to an individual who is used as an examinee for administration of a test. With the help of the test we want to measure or quantify the behavior of a subject/students.

On the basis of different criteria tests may be classified into various categories as basis of administration group tests and individual tests, on the basis of evaluation, subjective tests, and objective tests, etc. On the basis of standardization, tests are classified into two categories, and that are standardized tests and teacher-made tests. Here researcher discussed the construction of a standardized of Study habits scale which is not fix answer type test.

Singh (2006) has enlisted the general steps of test construction as follows:

1. Planning of the test.

2. Writing items of the test.

3. Preliminary administration (or the experimental try-out) of the test.

4. Reliability of the final test.

5. Validity of the final test.

6. Preparation of norms for the final test.

7. Preparation of manual and reproduction of the test.

Price (2017) has also summarized the test development process in to following steps-

1. Articulate a philosophical or theoretical foundation for the test or instrument.

2. Identify the purpose of the test.

3. Select the behavior or attributes reflective of the construct.

4. Identify the testing audience or population.

5. Define or delineate the content that the items will include.

 6. Write the test items.

7. Develop test administration procedures.

8. Conduct pilot test with representative sample.

9. Conduct item analysis.

10. Revise test.

11. Validation studies.

12. Develop norms or other standard scores.

13. Develop the technical manual.

On the basis of reviewing the steps suggested by various experts and for ease of understanding, Researcher shall follow the some steps for construction of standardized test.

Construction of standardized tests-

Researcher follow the following steps for construction of standardized test:

1. Planning of the test

2. Defining the construct

3. Writing the items

4. First administration or pre try out

5. Item analysis (Second administration)

6. Third administration (Dress rehearsal).

7. Developing norms for the final test.

Details description of construction of study habits scale-

1. Planning of the test-

Planning of the test is the very first step in the development of any test. The moment researcher start thinking about need of development of a test, the planning starts. At this stage the test constructor/researcher specifies the broad and specific objectives of the test on clear terms. Researcher decides upon the nature of the content or items to be included, the type of instruction to be included, the method of sampling, a detailed arrangement for the preliminary administration and the final administration, a probable length of the test, probable statistical methods to be adopted etc. It also includes the total number of the reproductions to be made and a preparation of manual. Thus, during the planning phase of the test, Researcher take care about all the basic things in test.

The term study habits indicate a permanent method of studying. Study habits are the substance of a dynamic personality. Thus study habits sum total of all habits determines purposes enforced practices that an individual has, in order to learn. Study habits are a tendency to systematic, efficient studying. In the modern era students frequently used a lot of technologies related to students' learning and thinking. These technologies impact

teaching and learning. The computer, smartphone, internet, social sites, and other communication media directly impact students learning and thinking. The purpose of this test is to find out the study habits of adolescents in the modern era.

In this Study Habits Scale, the target subject (Population) is the adolescents who admissions in classes 09, 10, 11, and 12. The age group of adolescents is 14-18 years. The test is verbal form medium/ language of test is Hindi.

The test based on selection type question which three option in this scale like always, sometimes, never. The test does not fix answer-type questions.

For sampling researcher used Disproportionate stratified random sampling method.

2-Defining the construct-

A construct originates from a set of ideas resulting from various forms of human knowledge acquisition and perception. Synthesis of these ideas forms mental impressions. Delineating or identifying a construct in test development process is enhanced by linking the ideas or mental perceptions to a theory (Price, 2017).

In simpler terms, the abilities or the traits which we are trying to measure with the help of our tests are constructs. Psychological constructs are non-observable traits. Non-observable means they cannot be observed or measured directly. Rather, to measure them we have to develop a framework that links a construct to a set of observable qualities, attributes, or behaviors. It means while defining a construct, researcher need to identify certain directly observable behaviors that reflect the presence of that particular construct.

The construct in consideration is a new construct then defining it is a research work in itself. Most of the time in applied educational researched researcher are focusing on the constructs which are already defined. So, researcher define them operationally as per the need of his work.

The main point is that defining the construct helps in writing the good quality items which sample correctly the behaviors reflecting presence of that construct. Thus, if researcher know the construct well and identify the directly observable behaviors reflecting presence of the construct, researcher can write effective items.

In present test researcher define 9 different Dimensions of study habits.

I-Planning of study- Planning is the important step for study habits. Some students plan his/her study very effective and well but some students not plan his/her study. Some students planed his/her study very well but could not follow their routine. Thus in study habits planning is play an important role.

II-Concentration of study- concentration is important nature of good study habits. Some students can concentrate easily and their concentration does not break with minimal distractions while some students take longer to concentrate. Some students want pin drop silence to concentrate while other students can concentrate on the sound. Through concentration, students can easily learn his lessons in a limited time.

III-Understanding of study- Students have certain characteristics for better understanding. To understand learners' knowledge of a particular topic or situation. Students try to formulate ideas and become familiar with the topic. Some students read the titles and outlines of the chapters first while reading the text. By doing so he/she may want to understand what the text means, some students may not be able to continue until they understand the past because they may try to associate knowledge with new information.

IV-Group study- A group study is a small group of students who regularly discuss and shared learning contents. Group studies have helped students with difficulty in a large group setting. In a group, study students interact with each other. Interaction within-group or teachers is a very helpful and positive outcome towards learning. Group study is very beneficial for students when they do not learn in the school classroom as well as outside of school. Some students do not prefer group study and not interact with their friends as well as teachers. So they

not understood the concept which misunderstands in the classroom. For better learning and good study habits group study is a powerful interactive platform for students.

V-Mental sets of study- The mental set of study is a type of firmness in which a person studies or behaves in a certain way. The mental set of studies may be driven by previous knowledge, especially technology in the domain. This mental state often occurs when people are confronted with a problem situation similar to that of previous problems. Pre-obtained information may help problem solvers to understand, interpret and solve problems more quickly and may even have a negative impact. The mental sets of study are preferred to physical and situational characteristics which students adopt for study. The mental sets of study is developed mental behavior in students which adjust for learning condition with the environment.

VI-Practice of study- Practice is a very important characteristic in study habits. Thorndike gives the law of exercise in which trial behavior is an existence of improvement behavior to make the behavior stronger. Practice makes a man perfect. When students have done a lot of practice they command on subject or theories. Practice gives a positive contribution to study habits. It is also known as revision.

VII-Regularity of study- Regularity of study is a very important dimension of study habits. A successful student studies daily all subjects. Regular study is connecting to the students with subjects. Even on holidays, a good learner is regularly studying his subjects. When students do not study regularly they forget his subject. This portion is also connected to the law of exercise.

VIII-Uses of E-contents- In the modern teaching-learning process, E-contents are playing a very important and essential role in resources. The Internet provides worldwide information for students. YouTube, Online classes, newspapers, journals, e-books, and social media platforms like whatsapp, Telegram, Facebook, etc. are good E-resources aspects for learning. These e-resources are helping to improve the study of students. The use of e-resources is indicating good study habits in students.

IX-Examination challenge- Examination challenge is a part of study habits where students show their confidence, make answering planning, the time management, and show trust in their preparation.

Now, after defining the construct we move to the third step of test construction and that is writing the items.

3. Writing the items-

Under this step researcher writes items as he planned.

For a standardized test, the number of items in primary form is kept higher than the number of items required in final form. Some experts suggest that the number of items written should be doubled as desired in the final form of the test. According to Guilford (1954), one should need not to write more than 50% more items in the preliminary form than are wanted in the final form. Thus in this scale total number of items will be 45, so researcher writes approximately 70 items.

Some important point highlighted by Haladyna (2004), and mentioned by Price (2017) are:

1. Items should measure a single important content as specified in the test specification.

2. Each test item should measure a clearly defined cognitive process.

3. Trivial content should be avoided.

4. Items should be formatted (i.e. style considerations) in a way that is not distracting for examinees.

5. Reading comprehension level should be matched to the examinee population.

6. Correct grammar is essential.

7. The primary idea of a question should be positioned on the stem rather than in the options.

8. Item content must not be offensive or culturally biased.

In addition researcher also keep in mind that he avoid double negatives in the question.

On basis of above points and defined 9 different Dimensions of study habits researcher writes 70 statements. Once written items are reviewed and edited by researcher before going for the next step that is first administration.

After completion of the step of writing of items the researcher move to the next step of test construction and the next step is first administration or pre try out.

4. First administration or Pre try out–

Guilford (1954) suggests that pretesting of the test helps us to discover weakness in the instructions and in the format and to establish a reasonable time limit and desirable length of test. Conrad (1948) recommends three preliminary test administrations. The first one, for which a sample of 100 examinees will suffice, is for the purpose of uncovering the gross defects. The second administration is primarily for item analysis, for which ideally the number of examinees should be about 400. The Third administration would be of the 'final' form as a kind of 'dress rehearsal', to catch any obvious minor defects that may have evaded detection before and to determine reliability.

Thus, the first administration or the pre try out is conducted on a sample of approximately 100 subjects from the target population. The purpose of this administration is to detect gross defects, ambiguities and omissions in items and instructions. The subjects are also asked to pin point linguistic difficulties faced by them in understanding different items. The suggestions and reactions of subjects help the researcher in rewriting and modifying some of the items.

Then researcher reviewed or modified the test on the basis of first administration's feedback. After pre try out researcher done second administration.

5. Item Analysis (Second Administration)–

After revising and/or modifying some items, on the basis of the feedback received from the first administration or pre-try out the next step is second administration or try out. The aim of the try-out is to provide data for item analysis. The approximate number of subjects required for this administration is suggested as 400. Obviously, these 400 subjects will be a different sample from the sample of subjects used for pre-try out but from the same population. The researcher take 370 students makes the calculation of item analysis easy. Sample distribution is given below-

Group		Number of students	Total number
Gender	Male	185	370
	Female	185	
Locality	Rural	185	370
	Urban	185	

According to Singh (2006) item analysis is a set of procedures, that is applied to know the indices for the truthfulness (or validity) of items. In other words, item analysis is a technique through which those items which are valid and suited to the purpose are selected and the rest are either eliminated or modified to suit the purpose. Item analysis demonstrates how effectively a given test item functions within a total test.

Researcher administered this test on 370 students. This administration will be done in proper testing conditions. Proper instructions will be given. After test administration, the answer sheets will be evaluated and scores will be provided. For scoring of items, the researcher awarded the maximum of 03 marks for a most appropriate answer, a minimum of 01 marks awarded for the least answer, and 02 marks awarded for the second answer. The

range of scores obtained by an individual on a particular item would one to three. The researcher scores each item individually and also score for each student's total score. Researcher arranged the scores or marks of the students in an order, highest to lowest on the basis of total score. Then researcher separate upper 27% and the lower 27% out of found ranked group. The upper 27% called the upper group (UG) and the lower 27% called the lower group (LG). Thus, from the total number of students the middle 46% are set aside. Researcher take these two groups, because these two groups are clearly discriminated by the test on the basis of their ability.

Kelley (1939) has demonstrated that when the extreme groups consist of top 27% and bottom 27% in a normal distribution, the ratio of difference between the means of these two groups over the standard error of the difference between these two means i.e. critical ratio is at maximum. Therefore, Kelley has recommended that for this second administration of these which is meant for item analysis, the number of students is 370. So that in the upper group and lower group there are 100 (27% of 370) students in each. Keeping 100 students in each of upper group and lower group makes the calculations of item analysis easy. Researcher calculating the mean and Standard Deviation (SD) of the scores obtained by all the subjects in upper group and lower group on each item. After this the effectiveness of an item would be determined by establishing significance of difference between means of upper group and lower group. Researcher computed t-ratio (also known as critical ratio or CR) for all 70 item.

After finding the value of t-ratio for each item, the researcher will select effective items for the final test. At 95% level of confidence, the researcher compares the value of t-ratio of an item with 1.96. In simpler terms, if the value of the calculated t-ratio of an item is 1.96 or more then the item will be selected for the final form of the test and if t-ratio value is less than 1.96, items were rejected. The researcher selected the 46 items (31 items are positive and 15 items are negative form) for the final form of the test. After the item analysis researcher conducted third administration.

6. Third administration (Dress rehearsal) - After the second administration and with the final 46 items researcher conducted third administration which will be a kind of dress rehearsal and used to establish reliability and validity of the test. In this administration 400 students/subject are taken from same population but different sample from the sample of subjects which used for item analysis. The file form of test with 46 items (31 items are positive and 15 items are negative form) researcher administered in dress rehearsal. The dimension-wise distribution of item has been given in table below.

S.N.	Dimensions	Items Nature	Total No. of Items	Total
1	Planning of study	Positive	3	3
		Negative	0	
2	Concentration of study	Positive	3	8
		Negative	5	
3	Understanding of study	Positive	4	7
		Negative	3	
4	Group study	Positive	4	5
		Negative	1	
5	Mental sets of study	Positive	4	6
		Negative	2	
6	Practice of study	Positive	5	5
		Negative	0	
7	Regularity of study	Positive	2	3
		Negative	1	
8	Uses of E-contents	Positive	4	5
		Negative	1	
9	Examination challenge	Positive	2	4
		Negative	2	
Positive Items-31, Negative items-15			**Total Items-46**	

Reliability- For reliability, the split-half method was used by the researcher on this scale. The researcher divided the scale into two parts i.e. of odd items and even items. The calculated value of the product-moment correlation coefficient between two parts i.e. odd items and even items was found to be 0.887. Which is significant at 0.01 level of significance.

Validity- In this test content validity and construct validity are established. Content validity is based on the very careful supervision of the Expert panel. The content validity of the items was ensured by a careful logical analysis of experts and research supervisor, teachers at the stage of construction, and tryout of the study habits scale and such has content validity.

7. Developing norms for the final test- On the basis of statistical results, Z-score norm have been developed. Z-score norms is given below table

Z-Score norms for Study Habits Scale					
Mean=109.04,		**SD=6.48,**		**N=400**	
RAW SCORE	Z- SCORE	RAW SCORE	Z- SCORE	RAW SCORE	Z- SCORE
95	-2.16	105	-0.62	115	+0.91
96	-2.01	106	-0.46	116	+1.07
97	-1.85	107	-0.31	117	+1.22
98	-1.70	108	-0.16	118	+1.38
99	-1.54	109	-0.006	119	+1.53
100	-1.39	110	+0.14	120	+1.69
101	-1.24	111	+0.30	121	+1.84
102	-1.08	112	+0.45	122	+2.00
103	-0.93	113	+0.61	123	+2.15
104	-0.77	114	+0.76	124	+2.30

Norm for Interpretation of the level of Study Habits

SR. NO.	Range of score	Range of Z- Score	Level of study habits
1	113 and Above	+0.51 and Above	High
2	106 to 112	+0.50 to -0.50	Moderate
3	105 and Below	-0.51 and Below	Low

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