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Development and Validation of Thinking Ability Scale

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ABSTRACT-

Language teaching is called to be a foundation teaching because without learning the language effectively, the learner will not be able to learn and understand any subject. The second language also keeps the same importance because the knowledge is found in many languages and the second language plays a role in being a bridge to reach the knowledge available in other languages. In India and many other countries, the English language is taught as a second language (ESL) or a Foreign Language (EFL). English is accepted as the most spoken language around the world either as a first language as a second language or a foreign language. Teachers who are teaching English in India should competent to use it effectively otherwise the learners may not learn it as effectively as they need to be. We have developed an observation schedule for teachers who were teaching ESL or EFL in their respective classes. In this article, the procedure and steps of developing this observation schedule have been discussed.

KEY WORDS- Thinking Ability, Divergent Thinking, Convergent Thinking

INTRODUCTION-

The success of the methodology is that the schools adopt as a whole school approach to the development of thinking (Scott, 2013). This implies that thinking becomes focal and unequivocal and all teachers and students foster a typical thinking ability (Murawski, 2014). Thinking Abilities are mental cycles that we use to take care of issues, go with various choices, clarifying some things, making arrangements, sorting out and making data (NCERT, 2022). As students move from one lesson to another and teacher to teacher they will involve similar devices and procedures as a component of a reasonable and very much arranged approach (Remesh, 2013). This applies to all types of schools.

Each school distinguishes and chooses explicit thinking tools which can be utilized across the educational program (NCFSE, 2023). These tools may foster explicit sorts of endlessly thinking processes (Chevalier, et al., 2022). The students will foster a comprehension of how they think and have the option to explain their thought process (Tofade, Elsner, & Haines, 2013). A tool to measure the thinking ability of the students was developed by the researchers and this article is based on the plan and procedure of the development of the thinking ability scale.

ANALYSIS OF SOURCE MATERIAL—

Various published reference materials were studied by the researcher under the first step to construct a scale in the context of students' thinking ability. The main reference materials studied by the researcher are as follows-

1. **THE DIVERGENT AND CONVERGENT THINKING BOOK: NOTEBOOK FOR CREATIVE THINKING**- In this book related to thinking ability written by Nielsen, the thinking process and its various dimensions have been highlighted in depth. Two basic dimensions of thinking ability have been described in the book - convergent thinking and divergent thinking. Both the above dimensions have been included in the self-made tool by the researcher (Nielsen, 2017).
2. **TYPES OF DIVERGENT THINKING -** Different dimensions of divergent thinking are described in the above reference material published by Michigan State University (Michigan State University, 2022). The above material proved useful for the measure of thinking ability prepared by the researcher.
3. **CONVERGENT THINKING-** In this chapter published in Encyclopedia of Creativity, in the context of convergent thinking, a detailed discussion has been thrown on convergent thinking and its various dimensions (Encyclopedia of Creativity, 2011). The published material was used by the researcher to construct the thinking ability scale.

The above research papers were deeply studied by the researcher. In these published sources, a detailed description has been given in the context of thinking ability. Based on this study, the possible content of the self-made tool was determined. After a thorough discussion with the research supervisor, experienced experts in the field of psychology, research and education were contacted and requested to provide their valuable suggestions in this context. As per the suggestions given by the experts, the thinking ability scale was developed. The detailed structure of the equipment at this stage was as follows-

DETERMINATION OF DIMENSIONS-

Based on the study of the above source material and the objectives of the presented research, the dimensions of the thinking ability scale were determined in the second step of instrument making. Based on the discussion and cooperation received from the research supervisor and various experts, the following dimensions were decided to measure educational facilities-

i.Divergent Thinking
- Fluency
- Elaboration
- Originality
- Flexibility

ii.Convergent Thinking
- Speed
- Cccuracy
- Logical Intelligence

CONSTRUCTION OF THE FIRST PROTOTYPE OF THE EQUIPMENT-

In this step of equipment construction, efforts were made to construct items. Detailed discussions were held with leading sociologists, educationists along with experienced scholars interested in research and psychology and whatever suggestions were received from them were written down. In this way total 35 posts were collected for different dimensions.
The above 35 items were re-analyzed and similar meaning and difficult items were removed from the instrument. Thus in this stage 31 items remained in different dimensions of the instrument.

At this stage, the instrument was presented to various scholars for re-analysis and it was requested to assess each item according to the following criteria:

- The size of the item should be short, simple and in easy language.
- The statement or phrase should be constructed in such a way that it can be understood by all the respondents and no confusion arises.
- There should not be more than one statement in any item, that is, only one idea should be presented in an item.
- There should be no embarrassment, discomfort, uneasiness in any item. There should be such a system that the respondent can answer without being affected by them.
- All statements should be directly related to a certain dimension.
- All the words should be presented in a systematic order.
- All statements should be kept directly related to the objectives of the research.

As a result of experts' comments, some items were modified and some were removed from the tool. At this stage, 30 items remained in the thinking ability scale.

MARKING PROCESS-

Arrangements were made for the respondent to respond to each item on a 3-point Likert type scale. The response categories are 'Always', 'Sometimes', 'Never'. 2 marks were assigned for ‘Always’, 1 mark for ‘Sometimes’, and 0 marks for ‘Never’. The respondent who scores high marks will also have high thinking ability.

INITIAL ADMINISTRATION-

The initial administration of the thinking ability scale was done on 50 students. These students were different from the students selected for the sample.

ITEM ANALYSIS-

T-formula was used to analyze the items of thinking ability scale. Those terms were removed by means of t-statistics which did not have discriminating power between high and low groups. For this the following process was created-

1. The scores of all the 50 respondents were written in an Excel sheet.
2. The sum of the total scores of the respondents was calculated.
3. The scores were arranged in ascending order.
4. The first 33% students were classified as low group and the last 33% students were classified as high group.
5. In each item the mean and standard deviation of the students were calculated.
6. T-value was calculated with the help of mean and standard deviation of both the groups.
7. The items whose t-value was found to be significant were included in the scale and the remaining items were removed from the scale.

In this step, 2 more items were removed from the scale and finally 28 items were left in the instrument.

RELIABILITY-

Reliability of an instrument can be established on the basis of data only when the data is analyzed by some reliability means, for this systematic procedure is followed, and invalid items are disposed of at each level (Campbell, et al., 1996). Thus, it is the responsibility of the researcher to prove the reliability of the instrument designed for data collection. In the words of Crocker and Algina (1986)- 'The responsibility of proving the reliability of the constructed instrument rests with the researcher himself. The reliability of the present scale was measured by three techniques. The chronbach's Alpha was found to be .79, the Split-Half (odd-Even) Correlation coefficient was found to be .83, and the Split Half with spearman Brown Adjustment coefficient .78. These reliability coefficients prove the high reliability of the scale.

VALIDITY-

Validity index is the degree to which the researcher observes whether the measurement is according to the parameters on the basis of which the test was constructed. The first essential quality of the validity of any valid instrument is that it should be highly reliable. The present instrument obtained low reliability coefficients which ranged from .78 to .83, so the instrument is valid according to the reliability parameters.

FACE-VALIDITY-

Face validity is the extent to which a test is tested to measure what it is designed to measure (Holden R. B., 2010). The face validity refers to the transparency of a scale (Gravetter & Forzano, 2012). In other words, face validity refers to whether the test appears to measure those facts that it is actually intended to measure (Anastasi, 1998). The scale was presented to two intellects to determine the face validity of the test. According to the information received from the scholars, the scale form fulfills the criteria of validity.

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