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Construction and Standardization of the Scale

5.1 Introduction
It is known by the prominent test frames that the outward appearance and framing of the scale item do not guarantee that the item would behave exactly in the expected manner. For this, each statement must be check out before its inclusion in the final form of the scale. For this reason an experimental tryout is necessary in the process of standardization. This chapter deals with the process of standardization.

5.2 Construction of scale
5.2.1 Determining the test contents
The important point for test constructing a test is to decide the content, that is the factors those are important for self confidence when it was decided to collect the information by testing, it was found that it is necessary to specify the content of the test.
Self confidence is very important feature of a teacher. Gaining self-confidence and developing teaching ability are closely related, and working on either concern leads to improvement on the other. The more you develop your teaching ability, the more confident you will become in your teaching. In the same way, the more confident you become in your teaching skills, the better prepared you are to move on to “the next level”, i.e. deepen your understanding of learning and teaching, find out about the latest learning and teaching theories, and try out new teaching practices, thus developing your teaching ability.

Description of the areas under testing:

Part-1 Physical Confidence
Confidence is the sum total of the individuals positive outlook towards the success or the result of an effort. The physical confidence deals with the individual’s positive outlook towards the success or the result of an effort with respect to his physical ability. In the present research 1 to 4
statements comprise of the physical confidence. These statements deal with the teacher’s positive outlook towards the success or the result of an activity related to the curriculum with respect to his physical ability. The statements that depict the physical confidence are related to the teacher’s idea about his physique, health, ability to control and deal with troubles, fitness.

**Part-2 Techno confidence**

In today’s globalized world, knowledge of technology is must. Now a day a teacher should be able to use technology in teaching because through technology, an educational environment can be created so that student can understand easily, interestingly, thoroughly and in a better way. In this research scale, Statements 4 to 14 are related with it. These statements deal with the technological confidence of the teachers.

**Part-3 Social Confidence**

Social confidence is the application of assertive ways of behaving to situations outside work. One of the most important uses of social confidence is in meeting new people and becoming friends. Schools are the miniature of society and teachers are the members of it. Teacher’s social confidence is necessary for the development of a student. If a teacher is socially adjustable in the society than only he/she can build up confidence in students. Statements 15 to 27 are related with social confidence of teachers.

**Part-4 Psychological**

Self confidence is not necessary a general characteristics which pervades all aspects of a person’s life. Typically, individuals will have some areas of their lives where they feel quite confident, e.g. academics, athletics, while at the same time they do not feel at all confident in other areas, e.g. personal appearance, social relationships. Teachers are enough mature to deal with the psychology of the students. If they are having psychological confidence than only they will be able to prepare confident students. Statements 28 to 46 are related with this.

**Part-5 Judgement confidence**
Teachers are having the quality of judgement because they have to take decision each and every field of education. If the teachers are not having self confidence than they cannot take decision in any academic and co-curricular activities.

Teachers are future builders of students; they have to be decision makers. Statements 47 to 54 are dealt with judgment confidence of teachers.

**Part-6 Readiness**

Readiness is the part of teaching or education field. Teachers should be always ready to do anything related to adopt any changes and to adjust with any situation. In the changed education scenario a teacher should be ready to adopt new teaching learning process.

Statements 55 to 62 are related with this readiness confidence of teachers.

**Part-7 Environment**

Self confident teacher can inspire the others and make their environment full of enthusiasm. Environment is the essential part of school and staffroom. A teacher can motivate others to adjust with environment and make it interesting and lively.

Statements 63 to 75 are related with it.

**Part-8 Stage confidence**

Every time you walk onto the stage to perform – no matter if it’s just in front of a few friends or in front of a huge audience – you have to show confidence in what you are doing. Teachers always face the audience of students and prepare him for motivate them and perform well on the school stage.

Statements 76 to 83 are related with this type of confidence.

**Part-9 Status Confidence**

The status rating is based on whether the partner had led decisions, otherwise influenced them or it is seen as worthy of admiration or respect.

Experiments also showed that people are driven to overconfidence because they’re seeking high social status. Teachers are having the respectable status in the society. So, status confidence is needed in the field of education. Statements 84 to 88 are related with it.
Part-10 Peer Independence

Peer Groups provide opportunities for self-discovery, allow teachers to make sense of new information, and receive support from others experiencing the same things.

Peer Power enhances teacher’s knowledge, skills, and support that prepare teachers for adult life that includes employment, college, and/or independent community living.

Statements 89 to 100 are related with peer confidence of teachers.

5.2.2 Selection of material

For the construction of the items of present scale the researcher kept in view the following points:

- Fundamental level of teachers
- The appropriate behavior of the teachers towards content
- The proper behavior of the teachers towards Environment
- The appropriate behavior of the teachers towards students
- The proper behavior of the teachers towards confidence

5.2.3 Scale length

Making a good kind of scale its length plays very important role. The length of a test is influenced by three factors. They are as mentioned below:

1. Number of Items- The pilot form 120 statements were prepared, covering 12 different areas and in the final form 100 statements were prepared, covering 9 different areas.

2. Time factor- The test is meant for the school teachers. The time consumption is not more than 25 to 30 minutes. No time limit has been prescribed for the original draft of scale.

3. Administration- The third step of a scale is its administration. The whole procedure of administration includes the arrangements, Instructions, explanation and proper motivation to be provided for the teachers. The present scale was to be administered on the teachers of Gujarat State. The teachers were asked to attempt the scale in single sitting.
Peter (1977) suggests three basic principles of scale administration:

- It is essential that a suitable testing situation be arranged to enable the subjects to do justice to them.
- It is also important that the subjects be suitably motivated.
- In the case of standardized scale the scale should be administered accordingly.

5.2.4 Guidelines for the scale items

Helmstadter (1996) suggests basic points for production of good test:

1. The item or direction should be as clear as explicit as possible.
2. Complex and awkward working should be avoided.
3. All qualifications needed to provide a responsible basis for response selection should be included.
4. Responses keyed as correct must be those on which lacks the
5. All incorrect alternatives must be plausible to person who lacks the information or ability in question.
6. Responses that overlap or include each other should be avoided.
7. Stereotypes or textbooks phraseology should be avoided to expect where rote memory is the trait to be measured.
8. At least three and favourable four response alternatives should be provided for each multiple choice question.
9. Correct answer should not appear in one particular position more frequently than any other and patterns in the position of the correct responses should be avoided.

5.2.5 Selection of scale items

Item writing is also an art. It requires an unknown combination of special abilities on the part of the test constructor. The process is essentially a creative one. Each item as it is being written, presents new problems and new opportunities. While compiling the scale items the following points were taken into consideration.

A. Overlapping of items be avoided.
B. One type of items is grouped.
C. The items testing some behaviour grouped together in each test for construction of battery.

Selected items are arranged in order to estimate difficulty level. All the items of the scale were constructed, using the content from reliable references. The items constructed in the pre-pilot form were more than required for the final form. In the light of suggestion made by the guide certain item for the final form were finalized.

5.2.6 Types of scale
A Likert scale is a psychometric scale commonly involved in research that employs questionnaire. It is the most widely used approach to scaling responses in survey research, such that the term is often used interchangeably with rating scale, or more accurately the Likert-type scale, even though the two are not synonymous. The scale is named after its inventor, psychologist Rensis Likert. Likert distinguished between a scale proper, which emerges from collective responses to a set of items (usually eight or more), and the format in which responses are scored along a range. Technically speaking, a Likert scale refers only to the former. The difference between these two concepts has to do with the distinction Likert made between the underlying phenomenon being investigated and the means of capturing variation that points to the underlying phenomenon. When responding to a Likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agrees-disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item. A scale can be created as the simple sum questionnaire responses over the full range of the scale. In so doing, Likert scaling assumes that distances on each item are equal. According to A.van Alphen, R. Halfens, A. Hasman and T. Imbos (1994), “All items are assumed to be replications of each other or in other words items are considered to be parallel instruments.”

The format of a typical five-level Likert item, for example, can be:

- Strongly disagree
- Disagree
- Neither agree nor disagree or Undecided
- Agree
- Strongly agree
So, the investigator has selected this Likert five point rating scale for her research study.

### 5.3 Standardization of the scale

#### 5.3.1 Standardization:
Standardization is a process which makes the scale standard in many respect for measuring different aspects. Standardization is a procedure of refining a measuring instrument through scientific process. In standardized tests, the questions, conditions for administering, scoring procedures, and interpretations are consistent. A well designed standardized test provides an assessment of an individual's mastery of a domain of knowledge or skill. Standardized tests are perceived as being more fair than non-standardized tests. The consistency also permits more reliable comparison of outcomes across all test takers.

Nol (1965) states, standardized test as

“One that has been carefully constructed by experts into the light of acceptable objectives of purpose; procedures for administrating, scoring and interpreting scores are specified in detail so that no matter who gives the test of where it may be given, the results should be comparable; and norms and averages for different age or grade levels have been pre determined.”

#### 5.3.2 The importance of tryout

The tryout of the test is of great importance in the standardization process. When the constructed test is administered on an experimental basis, it is called the experimental tryout of the test. The first tryout is known as ‘The Pre-Pilot Tryout’ of the test. The second tryout is known as ‘Pilot Tryout’ of the test. The final administration is known as the ‘Final Run of the Test’.

H.S. Conard(1951) advocates three preliminary test administration:

1. **The pre pilot try out**

   A very small sample will suffice for the purpose of uncovering the gross defects. For the pre pilot try out, self confidence scale prepared by the researcher to study the self confidence of teachers of Gujarat. The researcher gave this scale to 15 experts for the standardization and their suggestions were incorporated in the self confidence scale:

   The name of the 15 experts and addresses are gives below
The following suggestions were given by the experts of the education field and necessary changes were made:

- The language employed in the construction of few statements was above the level of teachers so accordingly it was modified.
- Some ambiguous and inadequate statements observed in the scale were changed or reconstructed.
- The instructions were quite comprehensive and communicative.
- The scale, in the final form can be administered in a single sitting. It is quite practical in all respects.
- Put the numbering.

Thus pre try out study helped to make necessary changes in the scale and take decision in preparing the pilot form of the test.

(2) The pilot try out of the test
Try out of the test is also known as the pilot test. After having the suggestions of the experts, the researcher made suitable changes in the statements and constructed the pilot form of the scale for second try out of the test. The teachers, teaching in primary and secondary schools of Gujarat state were considered as population randomly. Before approaching the teachers personally for the work, the researcher took the pre permission from the heads of the school. At the particular time and date the investigator went to the school for data collection. She gathered all the teachers in a room and gave them the instructions for filling the self confidence scale.

(3) The final run of the scale
The final form of the scale has its unique importance in establishing the reliability, validity and various norms of the scale. The final form already prepared, is administered on a wide representative sample of the population for which the scale is designed. This final form of the scale was administered on a representative sample to serve the purpose of research.

5.3.3 Time estimation
In the tryout of the scale (the pilot administration) of the present scale, the teachers were allowed as much time as they required. Almost 25-30 minutes were taken by the teachers for rating the scale. So it was decided that the teachers can take their own time.

5.3.4 Administration of the scale
After the construction of the scale, it was administered to the sample on the teachers of Gujarat. The prior permission of principals of schools was taken for administration of the scale. Than at the proper time, she went to school for data collection. In a class she gathered all the respondents and gave proper instructions for giving response of the statements of the scale and time limits and supervises them during the administration process. The time limit taken by the respondent was 25 to 30 minutes.

5.3.5 Scoring of the scale
R. Ebel (1972), said “The task of scoring an objective test is essentially clerical and can often be handled by someone whose time is less expensive than an investigator’s and whose energy and skill are less in demand for their educational tests.”

The following points kept in mind while scoring was done:

- The respondent who has corrected or rewritten the answer according to the instruction should be given credit for the correct answer.
- The items were left incomplete should not be considered.
- If the respondent has marked two or more answers to any item, the answer should not be considered, though it is a correct one, and no credit should be given to such answers.

Each statement carries five responses say Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D), and Undecided (U). Out of which only one response was correct. For registering response, separate sheet was not given. The respondent is supposed to give her response by using ‘√’ mark in appropriate box. This would save their time for giving response. 5 4 3 2 1 marks will be given for positive statement like; SA, A, SD, D and U and 1 2 3 4 5 marks for negative responses like; U, D, SD, A and SA respectively.

5.3.6 Establishing Norms:

After carrying out the final run, the establishment of score is of much importance in establishing the norms. Before interpreting the score to establish the norms, it is essential to know about the term. Different definitions will help to clarify the term norms.

According to Anastasi (1955), “As the name implies a norm is the normal or average performance.”

According to Bruce Tuckman (1972), “Norms are information about the relative performance of a specific group of people that is available.”

According to Garrett (1967), “Norms are measures of achievement which represent the typical performance of some designated group or groups.”

The criteria are generally the average performance of the group and individual who gives the scale finds out has relative position in the average performance of the group. This relative measurement of an individual on the scale is generally called norms. This is an important and most essential point for the standardization of the scale. In the absence of established norms, no
individual would get idea about one’s own performance on the scale. The term norm can be defined as the average performance of the average group of individual.

5.3.7 Types of norms:

These are different types of norms,

According to Tuckman (1975), “Basically there are two types of norms, National and Local norms. National norms are more common and provide for the widest generalization, while local norms represent a narrow generalization or a state or community etc. However, in relating on individuals with similar experiences, local norms may be more useful than national norms. Age norms, grade norms, sex wise norms, percentile norms, standard score norms are most common types of norms, used in the standardization of a scale. The other types of norms are as experience wise norms and qualification wise norms.

Age norms:
The constructor can prepare a set of age norms for any trait that shows a progressive change with age, height, weight, mental ability, reading ability etc. are such traits which are concerned with age.

These age norms are useful and essential in intelligence and achievement testing and comparing the performance of an individual child with the average child of his age. The present scale is a scale for teachers, So, 22 years to 60 years would be the norms for teachers because the investigator has taken the achievement of teachers for the standardization of scale.

Grade norms:
Grade norms are used with standardized achievement tests at the elementary school level only. They are based on the average score earned by pupils in each of the series of grade and are interpreted in terms of grade equivalents.

In the present study, the teachers are not concern with such different grade and hence no such grade norms are required.

Percentile norms:
Percentile ranks and percentiles are known a percentile norms. Percentile norms are also easy to interpret and therefore they are widely used in almost all standardized test.
A percentile rank indicates a subject’s relative position in a group in terms of the percentage of the scores of a subject below one’s percentile scores are much more refined and useful type of rank score. These norms interpret a subject’s score showing one’s position in the group in terms of the percent of subject.

In this present study, the teachers are not concern with the percentile grade hence percentile norms are not required.

5.4 Reliability of the Scale

The term reliability refers to the stability of consistency as well as the precision which enter into measurement procedure. The main objective of standardization is to eliminate the source of ‘error variance’ as far as possible. But no scale can be made perfectly reliable. Absolute consistency and precision are not expected even in physical measurements; too much less should be expected of which deal with human beings for whom it is naturally to vary.

A constructer has to check the accuracy and precision of the measurement procedure as well as the extent to which the scale measurement what it intends to measure, before releasing the newly developed scale for general use.

According to Anastasi………

“Reliability refers to the consistency of scores obtained by the same individuals when re-examined with same test on different occasion, or which different sets of equivalent times, or under other variable examining condition.”

According W.A.Neherens (1969) defined as:

‘Reliability can be defined as the degree of consistency of two majors of the same things.’

According to Ranners and Cage (1967) defines it as:

‘Reliability is the consistency with which a test yield the same result in measuring whatever it does measure.’

The major source of unreliability are the sampling of content, the personal characteristics of the tested, conditions, he environmental conditions, poorly standardized instructions, the inaccuracy in scoring, the difficulty of the items, the test length and innumerable chance factor. However, the researcher did not meet all these during her study. But all the psychometrics has admitted, they can only be avoided and not completely stopped from operating.
There are different methods that can be used to estimate reliability of the test. The following procedures are commonly used to get the reliability of self correlation of a test.

1. The test-re-test method
2. The split half method
3. The alternate of parallel forms methods
4. The rational equivalence method
5. Cronbach's alpha

A scale is said to be reliable, if it gives the same result on different circumstances of the self confidence of teachers. The simplest way to measure the reliability of a scale is to apply it again to the same group after an interval of time. To establish the reliability and to confirm the results obtained the Cronabch’s alpha was used for the present test for inter item correlation and item to total correlation. Cronbach’s \( \alpha \) (alpha) is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. It was first named alpha by Lee Cronbach in 1951, as he had intended to continue with further coefficients. The measure can be viewed as an extension of the Kuder–Richardson Formula 20 (KR-20), which is an equivalent measure for dichotomous items. Cronbach's alpha statistic is widely used in the social sciences, business, nursing, and other disciplines. The term item is used throughout this article, but items could be anything questions, raters, indicators of which one might ask to what extent they "measure the same thing." Items that are manipulated are commonly referred to as variables. The scale was given to 50 teachers of different schools. This Cronbach’s alpha was used for all the ten areas of self confidence scale (Physical, technological, social, psychological, judgment, readiness, environment, status, stage and peer independence). The results of the reliability test are shown in table:
### Table – 5.4.1

#### Reliability of the scale

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Item(Statements)</th>
<th>N of items</th>
<th>Cronbach’s alpha</th>
<th>Cronbach’s alpha based on standardized items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical</td>
<td>4</td>
<td>0.024</td>
<td>0.034</td>
</tr>
<tr>
<td>2</td>
<td>Technological</td>
<td>10</td>
<td>0.745</td>
<td>0.781</td>
</tr>
<tr>
<td>3</td>
<td>Social</td>
<td>13</td>
<td>0.69</td>
<td>0.71</td>
</tr>
<tr>
<td>4</td>
<td>Psychological</td>
<td>19</td>
<td>0.723</td>
<td>0.730</td>
</tr>
<tr>
<td>5</td>
<td>Judgement</td>
<td>8</td>
<td>0.594</td>
<td>0.677</td>
</tr>
<tr>
<td>6</td>
<td>Readiness</td>
<td>8</td>
<td>0.634</td>
<td>0.664</td>
</tr>
<tr>
<td>7</td>
<td>Environment</td>
<td>13</td>
<td>0.643</td>
<td>0.656</td>
</tr>
<tr>
<td>8</td>
<td>Stage</td>
<td>8</td>
<td>0.592</td>
<td>0.589</td>
</tr>
<tr>
<td>9</td>
<td>Status</td>
<td>5</td>
<td>0.374</td>
<td>0.462</td>
</tr>
<tr>
<td>10</td>
<td>Peer Independence</td>
<td>12</td>
<td>0.728</td>
<td>0.734</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
<td><strong>0.91</strong></td>
<td></td>
</tr>
</tbody>
</table>

Further the inter correlation of the items depicted that significant correlation between the inter items as such psychological confidence and stage confidence, readiness confidence and peer independence, environment confidence and peer independence, readiness confidence and environment confidence, judgement confidence and status confidence, stage confidence and status confidence, judgement confidence and stage confidence which was respectively 0.364, 0.468, 0.424, 0.342, 0.287 which indicates that both are positive and highly correlated as well higher the first factor, higher will be the second factor as shown in following tables.
### Table - 5.4.2
Inter correlation between scale items (statements):

Inter correlation between the areas 4 & 8

<table>
<thead>
<tr>
<th></th>
<th>Area-4 (Psychological)</th>
<th>Area-8 (Stage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area-4 Pearson Co-relation Sign.(2-tailed)</td>
<td>1</td>
<td>.364**</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Area-8 Pearson Co-relation Sign.(2-tailed)</td>
<td>.364</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

** Correlation is significant at 0.01 level (2-tailed)

### Table - 5.4.3
Inter correlation between the areas 6 &10 and 7 & 10

<table>
<thead>
<tr>
<th></th>
<th>Area-10 (Peer-Independence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area- 6 (Readiness) Pearson Corelation Sign.(2-tailed)</td>
<td>.468**</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
</tr>
<tr>
<td>Area-7 (Environment) Pearson Corelation Sign.(2-tailed)</td>
<td>.424**</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
</tr>
</tbody>
</table>

** Correlation is significant at 0.01 level (2-tailed)
### Table - 5.4.4

**Inter correlation between the areas 5 & 9 and 8 & 9**

<table>
<thead>
<tr>
<th></th>
<th>Area-9 (status)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area-5 (Judgement)</td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.342**</td>
</tr>
<tr>
<td>Sign.(2-tailed)</td>
<td>.015</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
</tr>
<tr>
<td>Area-8 (Stage)</td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.287**</td>
</tr>
<tr>
<td>Sign.(2-tailed)</td>
<td>.043</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
</tr>
</tbody>
</table>

** Correlation is significant at 0.05 level (2-tailed)

### 5.5 Validity of the scale

The evaluation of a test does not end with the estimation of the stability and precision of its measurement. It only brings there. A highly reliable test may not measure what it intends to measure. Besides, it is necessary to know how or what is intended, is measured. The question is fundamental with ‘Assessment’ test but not with the predictor test. Such tests are more concerned which is termed as ‘concept’ or ‘construct’ validity.

According to **H.E.Guilford**

‘The validity of a test or of any measuring instrument depends upon the fidelity with which it measures what it proposes to measure’.

According to **Lindquist**

‘The validity of a test is an estimate of the correlation between the raw test and ‘true’ (That is perfectly reliable) criterion score.”

There are definite procedures and techniques for determining the validity of a test. But all such procedures are basically related with the performance of the subject on the test. The facts which can be observed are also of much concern. The relationship between such aspects helps in determining the validity of the test and as such there are various to establish such relationship.

The types of validity are numerous. Following are the most commonly types used:
1. Face validity
2. Content validity
3. Construct validity
4. Concurrent validity
5. Criterion validity
6. Factorial validity

To find out the validity of this test the researcher has used criterion validity. From the studies it was observed that the academic achievement was positively and highly correlated with the self-confidence which indicates that higher the academic achievement higher id the self-confidence. Thus the academic achievement was accepted as the criteria to find the validity of the test. The validity coefficient was 0.60 which was significant at the 0.01 level.

5.6 Conclusion

The investigator has discussed the construction of self confidence scale, scale content, scale length, scale statements, types of scale items, pre pilot testing, pilot testing, final run of the scale and finding reliability and validity in detail.

The next chapter deals with analysis and interpretation of data.