Calibration of Comprehensive Assessment Battery for Teachers (CAB – T)

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Background: Teacher builds the nation by moulding the students. Teaching is a unique profession that involves a demand for social engagement and the energy devoted to establishing relationships is rarely found in other professions. The future of students practically relies on the teacher and his teaching. Aim: To calibrate the comprehensive assessment battery for teachers. Method: Sub-scales were first figured out and operational definitions were framed using various theories like Bruner's instructional theory, Clarke's general teaching theory, Mitra's psychological teaching theory and from other studies based on teaching and teacher characteristics. Items were generated through 4 focus group discussions and content validation was done with subject matter experts (N=10). And standardised using purposive sampling of Tamil Nadu school teachers (N=32). Results: Eight sub-tests namely teacher behaviour in classroom, instructional strategies, teacher – student relationship, teacher attitude, decision and initiation, teaching strategy, emotional stability& awareness and social acceptance were extracted: 234 items, 53 incomplete statements and 10 pictures were incepted. The battery was found to have good internal consistency. Conclusion: Teacher assessment battery consists of eight sub-tests along with a sentence completion test and a picture projective test which provides indication of the teacher's personality, attitude, behaviour, strategies and emotional stability. This will be helpful to provide / develop an intervention module for the teachers.

Keywords: Teacher, Battery, Assessment and Calibration..

1 Introduction

Literacy is the key for socioeconomic progress and human development, education has deserved more attention as it is pinned with so many problems like dearth of teacher, teacher student problems and poor quality of teachers [1]. A teacher who is restless, worried, anxious or drought and unhappy cannot possess the serenity required for a good teacher neither the subject knowledge nor the teaching skills makes the teaching effective, it is the personal characteristics of the teacher that makes teaching effective enough to reach the students [2]. At the same time, conflicts between teachers are turning out to be quite common which inversely effects the learning environment and teacher's performance. The potential cause for professional conflict between teachers were found to be difference in information, the way of perceiving, motivation, personal objective and interest, unequal availability of school resources, limited opportunity for career advancement, teacher's subjective performance

appraisal, breaching of schools' rules and regulations and sub – optimal communication [3]. Although workers in many settings must engage socially with colleagues, teaching uniquely emphasises energy spent on the establishment of long-term, meaningful connections with the clients of the work environment (i.e., students) in a way that characterises the job of teaching. Teaching is greatly influenced by the verbal and non-verbal behaviour demonstrated by the teacher in the classroom in order to induce learning [4].

Teaching is contact between a more mature personality and a less mature one which is designed to the further education of the less mature one [5]. Teaching is a form of interpersonal influence aimed at changing behaviour potential of another person [6]. Teaching is an attempt to describe teaching variables involved in the teaching behaviour in terms of their existence and possible interrelation for predicting outcomes of teaching and teaching should answer three question, how do teachers behave, why do the teachers behave as so and with what effect they behave so, it applies for all teachers, students in all situations in which teaching occurs [7]. Teaching is a process that is designed and performed to produce change in behaviour of the students and teaching is a generalised phenomenon or process and not a specific one and the teaching-learning situation in general is common to all types of learning [8]. Researchers propose that teacher-student relationships plays the primary role in fostering student engagement and positive student outcomes [9]. Teachers who devote energy to forming warm and nurturing relationships with their students tend to experience higher levels of well-being, and less emotional stress and burnout [10]. There is a positive relationship between teacher's attitude and teaching efficiency [11]. Young teachers, teachers who are leaders in their profession, teachers with collectivistic pedagogies are most likely to be drawn on internet and these kind of teachers also developed more informal communication with their students [12]. Instructional strategies are used to develop the learners involvement and interest in learning where the learning include cognitive, emotional, social, physical and spiritual aspects [13]. The opportunity to work closely with students is a strong motive for many teachers entering the profession [14]. The quality of teacher – student relationship is a strong predictor of children's successful school adjustment [15]. Usage of humor in teaching and learning in higher education has produced higher scores on the final exam [16].

Assessing a teacher and knowing their quality and efficiency in teaching apart from their academic scores has taken on a new importance in schools and education systems around the world. Since the past 6 decades various tools have been developed assess various characteristics of the teachers. Minnesota Teacher Attitude Inventory (MTAI) was developed with 150 items to predict the type of teacher-pupil relationship maintained in the classroom[17]. Teacher Locus of Control (TLC) was developed with 28 forced choice items to assess teacher's belief about the reasons for student success or failures by asking them to assign responsibility for the successes or failures presented in several example situations[18]. Teacher Efficacy Scale, was developed with 30 items to measure teacher efficacy and examines the relationship between teacher efficacy and observable teacher behaviours [19]. Ohio State Teacher Efficacy Scale (OSTES) also known as Teachers' sense of Self- Efficacy Scale (TSES) was developed under two version short form and long form with 12 and 24 items respectively to assess teacher's self-efficacy [20]. Teacher Self-Regulation Scale (TSRS) was developed based on Zimmerman's self- regulation model with 40 items and conducted semi structured interview with pre-service and in-service teachers [21]. Teacher Aptitude Test (TAT) was developed with 75 statements and targeted towards the selection of candidates for B.Ed. admission [22]. Engaged Teacher Scale (ETS) was developed with 16 items and 4 factors to reflect the particular characteristics of teachers' work in classroom and

schools [23]. In spite there is no exclusive battery for the assessment of teachers and there exists no projective tests to exclusively use with teachers.

Need for the study

In the current era of education system there is a strong necessity to find out the best teacher for implementing a quality education. There are many tools present to assess various characteristics and traits of the teachers but there is no specific battery that would yield a complete set of teacher's characteristics. Only a few tools are present specifically to measure certain characteristics of the teacher such as teacher's engagement, teacher's self-efficacy and teacher's attitude towards children.

Though Minnesota Teacher Attitude Inventory (MTAI) is used to predict the type of teacher-pupil relationship maintained in the classroom predictive validity data in longitudinal nature have been lacking and test has been critical for this nature. Moran & Hoy (2001) developed Ohio State Teacher Efficacy Scale (OSTES) also known as Teachers' sense of Self-Efficacy Scale (TSES) which includes two version short form and long form with 12 and 24 items respectively. The validity data of this scale represents a good predictive and convergent validity with a week discriminant validity. So the scale needs further development in providing task specific teacher efficacy score which is now utilized for a composite score of general teacher efficacy based on three sub-scale score.

Though various scales were developed for measuring particular characteristic of a teacher there still exists fallacy among them and there is no such scale or a battery to yield a composite measure with psychometric soundness. Hence this has led to the development of a comprehensive assessment battery.

Methodology

Aim:

The aim of the present study is to develop and validate the Comprehensive assessment Battery for Teachers (CAB - T)

Objectives:

- Ψ To develop and validate the Comprehensive assessment Battery for Teachers(CAB - T)
- Ψ To ascertain reliability, validity and other psychometric properties of the developed Comprehensive assessment Battery for Teachers (CAB - T).
- Ψ To extend norms and interpretation (manual) for the developed Comprehensive assessment Battery for Teachers (CAB - T)

Sample:

32 samples were selected. It includes those who are teaching from pre-kg and primary class to higher secondary and qualified with D.T.Ed or B.Ed and above, in schools at Coimbatore and Tirupur districts were taken. The sampling was selected using purposive sampling method. Socio-demographic data sheets prepared by the investigators are used for collecting the information regarding the subject handled by the teacher, age, gender, domicile, designation, qualification of the teacher.

Inclusion criteria

1. Teaching from Pre KG-standard to higher secondary.
2. At least minimum experience of two years and above.
3. Qualification of D.T.Ed., B.Ed., and above.
4. All Boards like State, Matriculation, CBSE and ICSE school teachers.

Exclusion criteria

1. If not qualified with D.T.Ed.

2. Experience of below 1 year 11months.
3. Teachers of boards outside Tamilnadu.

Tools:
1. Personal Data Sheet
2. Comprehensive Assessment Battery for Teachers (CAB - T)

Description of the tool:

1. Personal Data Sheet:
It was used to collect name, age, gender, domicile, family type, education and designation.

2. Comprehensive Assessment Battery for Teachers (CAB - T):
Comprehensive Assessment Battery for Teachers was developed by the investigator with the help of experts in the educational field and psychologists. It is a battery that consists of a sentence completion test and picture projection test along with eight sub-scales as, teacher behaviour in classroom, instructional strategy, teacher – student relationship, teacher attitude, decision and initiation, teaching strategy, emotional stability & awareness and social acceptance. The sub-test teacher attitude has the dimensions of attitude towards profession, attitude towards students, attitude towards colleagues, attitude towards challenges and obstacles.

Procedure
Development and validation of Comprehensive assessment Battery for Teachers (CAB - T) involves the following phases.

Pilot study
> Phase – I: Literature Review
> Phase – II: Forming the test through focus group discussion
> Phase – III: Constructions of semi-projective test
> Phase – IV: Content Validation
> Phase – V: Field trial/main study
> Phase – VI: Reliability Analysis
> Phase – VII: Norms and Manual development

PILOT STUDY (Minor Project)
The present study is a pilot study for framing the test through focus group discussion and finding out the internal reliability of the items in each of the sub-tests.

Phase – I: Literature Review
Review of literature was primarily performed for two main functions that are to clearly define the constructs and determined the measure of the construct. It also ensures the construct definition aligns with the related theory and research in the field and helps in identification of the items that would be used for the development of the battery.

Phase – II: Forming the test through Focus Group Discussion:
The items were generated through the available tools and review through 4 focus group discussions based on the focus of forming the test. The items were framed through the basic characteristics that are necessary for the teachers such as their behaviour in classroom, instructional strategy they use, their attitude, teaching strategy they use, their emotional awareness and stability and how far they are managing or manipulating to give socially acceptable response. A total of three focus group discussion was conducted for developing Comprehensive Assessment Battery for Teachers.

Phase – III: Construction of Semi-Projective Test
Sentence completion test was constructed using focus group discussions and through review of literature. It was constructed under two parts one as 'stems' to be filled and other as pictures for which story is to be created as what is happening in a particular situation, what

would have happened and what will happen in future. It was constructed with an aim to elicit the unconscious motive of the test-taker which would provide better clarity about the personality and attribution style of the test-taker.

Phase –IV: Content Validation

Step 1: Expert Rating

The developed Comprehensive assessment Battery for Teachers (CAB - T) was given to 10 professional experts (Educational Psychologists and / or Psychologists). It was solicited for Content appropriateness / effectiveness, ambiguity level and also test's administration instructions were elicited from the professionals.

Step 2: Item / Subtest reduction analysis

After getting the content validation for the generated test, it was administered to 30 subjects those who do fit in the inclusion criteria. The data was obtained from the pilot study, the items were analysed evaluated carefully. The subtest reduction or addition was based on lowest frequency and percentages as well as the importance of the ambiguous stimulus.

Phase – V: Main study

Step 1: Data collection

Subjects who met the inclusion and exclusion criteria were selected for the main study. Subjects who refuse to participate was used to provide with minimal socio-demographic details and reason for non-participation if they co-operate for the same. Personal data sheet and developed Comprehensive assessment Battery for Teachers (CAB - T) was administered to 32 subjects.

Step 2: Data analysis

Data was coded using IBM Statistical Packages for Social Sciences 24. Descriptive statistics such as mean, standard deviation, frequency, percentages were used to examine the Personal information, all subtests and test items. The internal consistency and content validity of the developed battery was established.

Phase – IV: Reliability Analysis

The internal correlation of the items in various sub-tests was found out by collecting the data and processing with the use of Statistical Packages of Social Sciences (SPSS 24). The Cronbach's alpha was established to find out the internal consistency of the items.

Phase – VII: Norms and Manual development

At the end of the main study, a systematic manual for the administration of the tool was developed. The norms and interpretation for each sub-test including the lie scale was developed. The overall range of teacher selection desirability based on the battery's score was also developed.

Ethical considerations:

1**.** Written informed consent was sought from each participant.

2. Participants have the option to leave the study at any point of time, if they wish to.

3. Confidentiality and anonymity of the participants were assured and maintained.

Result and Discussion

Table 1.1 shows the frequency and percentage of Socio – Demographic variables (N=32)

Socio – Demographic variables	Category	Frequency	Percentage (%)
Age	24	2	6.3
	25	2	6.3
	26	2	6.3
	27	3	9.4

	28	2	6.3
	29	2	6.3
	30	3	9.4
	32	3	9.4
	33	1	3.1
	34	1	3.1
	35	3	9.4
	36	2	6.3
	38	1	3.1
	40	2	6.3
	45	1	3.1
	47	1	3.1
	54	1	3.1
Gender	Male	10	31.3
	Female	22	68.8
Domicile	Urban	13	40.6
	Rural	19	59.4
Qualification	UG/PG + D.T Ed	7	21.9
	UG/PG + B. Ed	16	50.0
	UG/PG + M. Ed	9	28.1
Designation	Primary and middle-class teacher	12	37.5
	Secondary class teacher	12	37.5
	Higher secondary teacher	7	21.9
	Principal and academic head	1	3.1
Working Experience	2	5	15.6
	3	4	12.5
	4	2	6.3
	5	4	12.5
	6	2	6.3
	7	2	6.3
	8	2	6.3
	9	1	3.1
	10	3	9.4
	11	2	6.3
	12	1	3.1
	15	2	6.3
	23	1	3.1
	32	1	3.1

Table 1.1 shows the percentage and frequency of age, gender, domicile, qualification, and designation of the respondents. It observed from the table that the respondents range from 24 to 54 in age. There is 1 (3.1%) respondent each in the age group of 33, 34, 38, 45, 47 and 54. There are 2 (6.3%) respondents each in the age groups of 24, 25, 26, 28, 29, 36 and 40. There are 3 (9.4%) respondents each in the age group of 27, 30, 32 and 35. The 32 respondents are widely scattered in the age from 24 to 54. It includes 10 (31.3%) of males and 22 (68.8%) of females, in which 13 (40.6%) of them are working in urban schools and 19 (59.4%) of them

are working in rural schools. Among them 7 (21.9 %) graduates are qualified with Diploma in Teacher Education, 16 (50%) graduates are qualified with Bachelor in Education and 9 (28.1%) graduates are qualified with Master of Education. It covers 12 (37.5%) primary and middle class teachers, 12 (37.5 %) middle class teachers, 7 (29.1 %) higher secondary teachers and 1 (3.1%) in the place of academic head of the institute (principal). The experience of the respondents as a teacher ranges from 2 to 32 years. There are 1 (3.1 %) each with the experience of 9 years, 12 years, 23 years and 32 years. There are 2 (6.3 %) each with the experience of 4 years, 6 years, 7 years, 8 years, 11 years and 15 years. There are 3 (9.4%) with the experience of 10 years. Therefore it covers a wide range of male and female respondents of age 24 to 54 working in urban and rural area with 2 to 32 years of experience.

Table 2.1 shows descriptive statistics of the sub – tests of "Comprehensive Assessment Battery for Teachers (CAB – T)"

	Sub – scales	Range	Minimum	Maximum	Mean	Std. Deviation
	TBC	24	40	64	53.75	5.477
	IS	22	26	48	39.59	5.217
	TSR	20	37	57	49.53	4.677
	ATS	30	51	81	64.72	5.777
	ATP	22	46	68	57.75	4.938
	ATCO	28	36	64	48.16	6.107
TA	**ATCOL**	50	19	69	51.53	9.436
	Total	101	167	268	221.25	18.820
	DI	56	53	109	81.59	10.842
	TS	21	35	56	44.28	4.966
	ESA	49	69	118	85.34	10.927
	SAS	8	2	10	7.09	2.069

TBC = Teacher Behaviour in Classroom, **IS**= Instructional Strategy, **TSR**= Teacher Student Relationship, **ATS**= Attitude Towards Students, **ATP**= Attitude Towards Profession, **ATCO**= Attitude Towards Challenge and Obstacles, **ATCOL**= Attitude Towards Colleagues, **TA**= Teaching Attitude **DI**= Decision and Initiation, **TS**= Teaching Strategy, **ESA**= Emotional Stability and Awareness and **SAS**= Social Acceptance Scale.

Table 2.1 shows the range, minimum, maximum, mean and standard deviation of the sub – scales. From the table it is observed that the sub – scale teacher behaviour in classroom has a range of 24, minimum value of 40, maximum value of 64, mean of 53.7 and a standard deviation of 5.477. The sub – scale instructional strategy has a range of 22, minimum value of 26, maximum value of 48, mean of 39.59 and a standard deviation of 5.217. The sub – scale teacher – student relationship has a range of 20, minimum value of 37, maximum value of 57, mean of 49.3 and a standard deviation of 4.677. The dimension attitude towards student in sub – scale teacher attitude has a range of 30, minimum value of 51, maximum value of 81, mean of 64.72 and a standard deviation of 5.777. The dimension attitude towards profession in sub – scale teacher attitude has a range of 22, minimum value of 46, maximum value of 68, mean of 57.75 and a standard deviation of 4.938. The dimension attitude towards challenges and obstacles in sub – scale teacher attitude has a range of 28, minimum value of 36, maximum value of 64, mean of 48.16 and a standard deviation of 6.107. The dimension attitude towards colleagues in sub – scale teacher attitude has a range of 50, minimum value of 19, maximum value of 69, mean of 51.53 and a standard deviation of 9.436. The sub – scale teacher attitude has a range of 101, minimum value of 167, maximum value of 268, mean of 221.25 and a

standard deviation of 18.820. The sub – scale decision and initiation has a range of 56, minimum value of 53, maximum value of 109, mean of 81.59 and a standard deviation of 10.842.The sub – scale teaching strategy has a range of 21, minimum value of 35, maximum value of 56, mean of 44.28 and a standard deviation of 4.966. The sub – scale emotional stability and awareness has a range of 49, minimum value of 69, maximum value of 118, mean of 85.34 and a standard deviation of 10.927. The sub – scale social acceptance has a range of 8, minimum value of 2, maximum value of 10, mean of 7.09 and a standard deviation of 2.069.

Table 3.1 shows the reliability of the subscales using Cronbach's alpha

S.No	Sub - test		No. of items	Cronbach's alpha
1	Teacher Behaviour in Classroom		16	.703
2	Instructional Strategy		24	.765
3	Teacher Student Relationship		30	.580
4	Teacher Attitude	Attitude Towards Students	24	.571
		Attitude Towards Profession	17	.689
		Attitude Towards Challenges and Obstacles	17	.700
		Attitude Towards Colleagues	18	.911
		Total	76	.882
5	Decision and Initiation		28	.895
6	Teaching Strategy		15	.612
7	Emotional Stability and Awareness		30	.836
8	Social Acceptance Scale		15	.291

Table 3.1 shows the internal reliability of the sub – scale using cronbach's alpha. The sub – test teacher behaviour in classroom has 16 items with an internal reliability value of 0.703. The sub – test instructional strategy has 24 items with an internal reliability value of 0.765. The sub – test teacher – student relationship has 30 items with an internal reliability value of 0.580. The dimension teacher attitude towards students in the sub – test teacher attitude has 24 items with an internal reliability value of 0.571. The dimension attitude towards profession in the sub – test teacher attitude has 17 items with an internal reliability value of 0.689. The dimension attitude towards challenge and obstacles in the sub – test teacher attitude has 17 items with an internal reliability value of 0.700. The dimension attitude towards colleagues in the sub – test teacher attitude has 18 items with an internal reliability value of 0.911. The sub – test teacher attitude as a whole has 76 items with an internal reliability value of 0.882. The

sub – test decision and initiation has 28 items with an internal reliability value of 0.895. The sub – test teaching strategy has 15 items with an internal reliability value of 0.612. The sub – test emotional stability and awareness has 30 items with an internal reliability value of 0.836. The sub – test social acceptance scale has 15 items with an internal reliability value of 0.291.

The sub – test social acceptance scale has a correlation value of 0.291 which is an unacceptable value and the item needs further modifications, if items are deleted its alpha value raises to 0.829 which is a good value of consistency, therefore items need to be deleted from the scale for further reliance.

The sub – test teacher student relationship and the dimension attitude towards students of the sub – test teacher attitude has the alpha value of 0.580 and 0.571 respectively which indicates a poor internal consistency. Therefore the items in this dimension are poorly consistent with each other. The alpha value does not simply measure the unidimensionality of set items, but can be used to confirm whether or not a sample of items is actually unidimensional [24], and so low alpha value of this test may also be attributed to the different handling methods used by the teachers. There needs a further development among the items in the dimension to increase their internal correlation. Thus to increase the alpha more number of related items should be deleted for further process. If items deleted the alpha value raises to 0.815 and 0.812 for teacher – student relationship and attitude towards students respectively, which is a good fit.

The sub – test teaching strategy and the dimension attitude towards profession in the sub – test teacher attitude has the alpha value of 0.612 and 0.689 respectively. Which is a questionable range of correlation and the items need to be worked further on to increase their correlational level. If items are deleted their alpha value raises to 0.826 and 0.817 for teaching strategy and attitude towards profession respectively, which is a good level of consistency.

The sub – test teacher behaviour in classroom, instructional strategy and the dimension attitude towards challenge and obstacles in the sub – scale teacher attitude has a correlation value of 0.703, 0.765 and 0.700 respectively, which clearly says that there exists an acceptable level of internal reliability among the items in this sub – test and dimension. Therefore, though not a good fit, the items could be told to be acceptably fit under the scale. It is argued that a high value of alpha offers limited evidence of the reliability of the research instrument, and that indeed a very high value may actually be undesirable when developing a test of scientific knowledge and understanding [25], and such an acceptable range of alpha which is neither too high is appreciable for the construction of a reliable test instrument. If items are deleted their alpha value raises to a good level of 0.811, 0.812 and 0.798 for teacher behaviour in classroom, instructional strategy and attitude towards challenges & obstacles respectively, so the items are to be deleted to make the scale more consistent and reliable.

The sub – tests teacher attitude, decision & initiation and emotional stability & awareness has internal consistency value of 0.882, 0.895 and 0.836 respectively. Which is a good fit and the items in the scales are consistent and reliable. The dimension attitude towards colleague of the sub – scale teacher attitude has the internal consistency value of 0.911, which is an excellent level of internal consistency. Therefore the items in the scales teacher attitude, decision & initiation and emotional stability & awareness could relied without making any changes.

Summary

The present study is to develop and standardize an assessment battery for teachers. With this idea, a Battery called comprehensive Assessment Battery (CAB – T) was developed on the basis various theories like Bruner's instructional theory, Clarke's general teaching theory, Mitra's psychological teaching theory and from other studies based on teaching and teacher

characteristics. The battery contains eight sub – tests (Teacher Behaviour in Classroom, Instructional Strategy, Teacher – student Relationship, Teacher Attitude, Teaching Strategy, Emotional Stability & Awareness and Social Acceptance Scale) and two projective tests (sentence completion and picture projective test) which accounts for 234 statements along with 53 incomplete statements and 10 pictures for projection. For the pilot study a sample of 32 teachers in Coimbatore district between the age range of 24 to 54 with experience of above two years were chosen. It takes 90 to 120 minutes to complete the battery and items in the battery is easily answerable by all the test taking, thus it is user friendly. Obtained response were scored and the raw data was statistically analysed using SPSS version 25.0 which involved descriptive statistics, frequency, mean, standard deviation and Cronbach's alpha. The Comprehensive Assessment Battery for Teachers (CAB – T) has a good internal reliability. The content validity of the sub – tests of Comprehensive Assessment Battery for Teacher was found which clearly suggests that the tool has adequate level of content validity.

Limitation

The present study has the limitation such as the battery has been validated only with Tamil Nadu population, low sample size with respect to the population and lack homogenous distribution of socio demographic variable of the participants. Data can be collected from the large sample for the further validation and standardisation of the developed battery and addressing the limitation of the current study can be collected from larger population with homogenous distribution of sample across socio demographic variables.

Conclusion

The Comprehensive Assessment Battery for Teachers (CAB – T) is simple and valid for Tamil Nadu school teachers. The battery has satisfactory psychometric properties. This battery can be used for psychological assessments of teachers across various boards and age groups. The obtained scores can be used for providing assistance / training to the teachers.

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