Teaching Aptitude of Pre-service Teachers towards Inclusive Education

Construction and Standardisation of IETAT

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Abstract

Teaching aptitudes of pre-service teachers towards inclusive education of students with disabilities were examined. A 50-item test was constructed based on the literature review, experts' judgement and pilot testing, and administered on the 552 pre-service teachers enroled in the first year of two-year Bachelor of Education program at thirteen teacher education institutions of Gujarat. The result of the study showed that the test found to have good reliability and validity. The participants had an average level of teaching aptitude towards inclusive education of students with disabilities. The paper concludes with the possible implications for teacher education institutions, stakeholders and policy makers.

Introduction

Inclusive education has been started since the last decade in India, to break isolation from special and general education, to bridge the gap between them and to mainstream Children with Disabilities (CWD) into general education to learn with other children without disabilities. For the education of CWD, the Government of India enacted many policies and legislative acts. Most recently, in the line of United Nations Convention on Rights to Persons with Disabilities (UNCPRD), the Right to Persons With Disabilities (RPWD) Act 2016

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was implemented for the inclusive education of CWD (Ministry of Law and Justice, 2016). Recognising RPWD Act 2016 and its provisions for inclusive education, the *National Educational Policy* (NEP, 2020) asserts that CWD will have opportunities for equal participation across the educational systems (Ministry of Human Resource Development, 2020). Besides incorporating the recommendations of RPWD Act 2016, the NEP (2020) addresses teachers' training as an important aspect for inclusive education because teachers' role is crucial for the successful implementation of the inclusive education programme. However, many teachers do not have necessary knowledge, skills and attitudes to carry out the work in inclusive setting (Evans and Lunt, 2002; Forlin, 2001). The reason may be due to insignificant progress in teachers' training. A majority of training institutes in India provide limited, if any, information about how to teach Students with Disabilities (SwD), thus, without adequate training, teachers may be resistant to the idea of including SwD in their classrooms (Sharma, Moore and Sonawane, 2009). Forlin, Douglas and Hattie (1996) and Forlin and Colleagues (2009) argued that the success of mainstreaming is largely dependent on the regular classroom teachers' ability and willingness to make adaptations to accommodate individual differences. In support of this argument, Smith (2000) noted, although positive perceptions and feelings may encourage appropriate policies and supportive integration practices, negative attitudes tend to sustain low achievement expectations and unacceptable behaviour in SwD. So, negative attitude among pre-service teachers, if not addressed during initial teacher education, may continue to hamper the progress of inclusive education efforts in schools (Forlin et al., 2009).

Based on the review of research on pre-service teacher preparation, Caroll, Forlin and Jobling (2003) reported that initial teacher programs tend to overemphasise knowledge acquisition and pay limited attention to practical skills for teaching a diverse range of students, including those with disabilities, and therefore the pre-service teachers lack confidence and have negative attitudes to inclusion. Looking at the limitations of general teacher education programmes in preparing teachers for inclusive education, selecting persons with aptitude towards teaching in inclusive education can benefit in making the IE successful.

Recently, Rehabilitation Council of India (RCI) implemented All India Online Aptitude Test (AIOAT) for admitting candidates in certificate and diploma level special education course. This AIOAT is meant only for the candidates who opt to be special education teachers. But, the general Teacher Education Institutes (TEIs) are neither conducting a pre-entry level test, nor they measure aptitude of the candidates before admitting them

into initial teacher training courses. The aptitude tests constructed so far were developed for the general teaching aptitude, and the researches have not come across studies that focused on teaching aptitude for inclusive education conducted in India. So, an attempt has been made in this study to construct such a test and standardise by implementing on pre-service teachers. The results obtained are presented in this paper with its possible implications.

Looking to the limitation of general teacher training courses in preparing teachers for inclusive education, there is a great need to prepare teachers for inclusive education and selection of persons with right aptitude for teaching in inclusive education. The right persons should be spotted out through proper testing and advised to join teaching profession and later on to the inclusive schools.

Most generally, Arts, Science, and Commerce graduates and post-graduates join the teaching field in India. But now, following the National Council for Teacher Education (NCTE) Guidelines 2014, Engineering, Pharmacy, and Master of Business Administration (MBA) pass outs are also permitted to join B.Ed. course. The general teacher education programmes are focused on preparing teachers for general schools and they are merely giving a subject on inclusive education where the pre-service teachers are equipped with a theoretical knowledge, but they have often limited exposure to and practice with SwD (Kumari et al., 2019). So, the pre-service teachers feel themselves untrained for inclusive education and after their training will hesitate to join inclusive schools. This might be the main reason for the shortage of the teachers for inclusive education. Thus, selecting right personnel for the inclusive education right before the teacher training course through the application of suitable scientific techniques is need of the hour.

Many academics in the field of inclusive education consider teacher education as essential for the implementation of inclusive education in the classroom (Ainscow, 2005; Sandhill and Singh, 2005; Booth et al., 2003). Before 2014, the general teacher education diplomas and degree courses available nationwide were offering an optional 'special education' paper to train and prepare teachers having interest in teaching SwD. However, it was not an integral part of the training and it did not train teachers to deal with the challenge, diversity and negative attitudes (Singhal, 2005). This results in distrust in both the special and mainstream education systems which leads some parents to keep their CwD at home for the fear of their abuse or neglect in the classroom (Zulka, 2005). Many surveys have found that teachers' attitude towards inclusion is not particularly positive (Ellins and Porter, 2005), and they expressed concern about their lack of preparation for inclusion and for teaching all learners (Forlin, 2001). Thus, selection of teachers with aptitude for teaching in inclusive

education could benefit in preparing teachers for inclusive education programme. The persons with high inclusive education teaching aptitude should be spotted out through proper testing and advised to join inclusive school after their initial training. Thus, admitting candidates with aptitude for inclusion can benefit in making the inclusive education successful to some extent.

Bingham (1937) defines aptitude as a condition that is indicative to a person's relative fitness for his readiness to acquire proficiency, potential ability and to develop an interest in exercising his potential capacity. Thus, when we say a person possesses an aptitude for teaching in inclusive education, it is assumed that he has a good proportion of the traits required for becoming successful as an inclusive education teacher. The magnitude of these traits may differ from person to person or even the number of traits possessed by each person may also differ as some may possess more traits while some may be less. A number of traits required for being successful teacher in inclusive education, compose as a whole the aptitude for teaching in inclusive education. Thus, the high or low aptitude for teaching in inclusive education is in proportion to the number of traits possessed by an individual. It also depends on the nature of traits possessed.

Estimating the aptitude for teaching in inclusive education, the factors that contribute to the success in teaching in inclusive education, should be measured through proper tests. The inclusive education teaching aptitude is in proportion to the number of such factors, and also in proportion to their magnitude and importance in conditioning success in teaching in inclusive education. By constructing a test on teaching aptitude for inclusive education, an attempt was made to satisfy a felt need of such test. Unlike other tests constructed so far meant for general teaching aptitude, this test is specifically prepared to measure aptitude for teaching in inclusive education.

Method

Construction of IETAT

The Inclusive Education Teaching Aptitude Test (IETAT) was constructed to measure the teaching aptitude of pre-service teachers towards inclusive education. The following steps were undertaken in the construction of IETAT.

Step 1: Identifying components

As a first step in construction of the IETAT, five components related to teaching in inclusive classroom were identified based on the sixteen experts' rating on importance of the components. A pool of 97 items under the five identified components was framed on the basis of literature review and informal discussion with the experts in the field of inclusive education.

Step 2: Development of scale (Draft form)

A 97 item IETAT was constructed in English. For each item, respondents could indicate their aptitudes by selecting an option from the four options given with each item.

Step 3: Review of the scale by an expert panel

A panel of sixteen experts working in the field of inclusive education was again referred with a working definition of teaching aptitude towards inclusive education and was asked to review 97 items and their ratings on importance of the items. The purpose of the ratings was to measure and establish the content validity of the scale. The panel was asked to review and provide their comments and suggestions on clarity, conciseness and wordings of items. Besides review, the experts were also asked to rate each item from essential, useful to not necessary for measuring teaching aptitude of pre-service teachers towards inclusive education. The panel rated 69 items as "essential" and 28 items as "useful" or "not necessary". Some experts suggested adding an item on Universal Design of Learning (UDL), few terminological changes and the rephrasing of some of the items. A second draft of the IETAT consisting 70 items which were rated as essential by the experts was constructed. The test was translated into Gujarati by the two language experts who were well familiar with both English and Gujarati language. The two translated scripts then given to an academician for finalising the Gujarati version.

Step 4: Pilot study

In order to determine the reliability (internal consistency) of the scale, it was administered to a sample of 50 pre-service teachers of a TEI. Time restriction was not implemented during the pilot testing of IETAT and the pre-service teachers were given chance to attempt every item of the test, but the time taken by the average number of students in attempting the whole test was noted down. The average time noted was 28 minutes. Considering the 2 minutes for reading instructions, time limit of 30 minutes was decided. The reliability of the scale was determined by computing bi-serial 'r' coefficient of correlation for each item. Twenty items with low coefficient of correlation 'r' value .20 were omitted and 50 items with coefficient values more than .20 were retained in the final IETAT.

Step 5: Final version of the IETAT

Finally, a 50 item IETAT was produced. This test was used to collect the data from the 552 pre-service teachers in the eleven TEIs of Gujarat state.

Participants

The population included all pre-service teachers of the Gujarat state pursuing their B.Ed. I [First Year] for the academic year 2016–17. Thirteen TEIs of eight universities of the Gujarat state were selected

randomly drawn through lottery method. All the first year B.Ed. students of the thirteen TEIs were invited to participate in the study. There were 50 seats per B.Ed. unit in each TEI. So, there were 650 students enroled in first year of two-year B.Ed. course. During the data collection, 98 students were either absent or opted out from the survey. Thus, a total of 552 pre-service teachers participated in the study.

Data Collection Procedure

Before distributing the test booklets, the purpose of the test was made clear to the pre-service teachers and they were instructed to read the instructions given in the test booklet carefully. Additional instructions were given orally like their performance in the test will not affect their career and the purpose is only to measure their teaching aptitudes for inclusive education. An assurance was also given about the confidentiality of information provided by them and they were instructed to return test booklets with answer sheets to the tester after attempting whole test. Their doubts and queries with regard to answering test items were also clarified.

30 minutes time limit was followed during the entire phase of data collection from all the thirteen TEIs, and almost all the pre-service teachers answered the test items within the prescribed time limit without any difficulty.

Data Analysis

One mark was assigned to every correct answer of the item and no mark assigned to the wrong answer. Investigator himself assessed all 552 answer sheets so there was no chance for scoring errors. After valuing all the 552 answer sheets, the scores obtained by the pre-service teachers in the test were entered in a Statistical Package for Social Sciences (IBM SPSS 23.0) for the purpose of statistical analysis of the collected data. The data were analysed by measuring central tendency (mean, median, SD, range), divergence, and chi-square. The reliability of the test was ensured by using split-half, Hoyt's method and K-R formula. The validity was estimated by using standard test scores and standard criterion scores. Later grade norm was established to classify the respondents based on their status of teaching aptitude.

Results and Discussion

Measure of Central Tendency

Table 1 shows the value of mean; median and mode are found to be 20.57, 20.55 and 20.51 respectively. These values indicate that there is no much difference between the mean, median and mode. Hence the distribution is normal and the selected sample is representative of the population. The highest score obtained in the test was '35' while the lowest score was '7'. The range between the highest and the lowest score was, therefore, (35 – 7) + 1 = '29'.

Table 1
Frequency Distribution, Mean, Median, Mode and SD of the Scores in IETAT

Score Intervals	Midpoint (X)	Frequencies (f)	Cum. Frequencies (Cf)	D	fd	fd2
31–35	33	17	552	+3	51	153
26–30	28	80	535	+2	160	320
21–25	23	181	455	+1	181	181
16–20	18	182	274	0	0	0
11–15	13	76	92	–1	–76	76
06–10	8	16	16	–2	–32	64
		N=552				

Mean = 20.57
Median = 20.55
Mode = 20.51
SD = 5.45

Nature of Frequency Distribution

The nature of the frequency distribution was studied in three ways, viz., through the measures of divergence, through the chi-square test and through the best fitting normal curve.

Measures of Divergence

From the Table 2, it can be seen that the value of Sk obtained in terms of percentile indicates a positive value (+0.03), but slightly higher than the Sk value obtained through in terms of frequency distribution (+0.01). The result obtained in terms of the frequency distribution and percentile differs slightly. According to Garrett, the two measures of Sk are computed from different reference values in the distribution, and hence, are not directly comparable.

The Kurtosis of the frequency distribution as shown in Table 3 is thus equal to 0.2527. The value is slightly less than 0.263. The negative direction of the deviation indicates that the distribution tends slightly towards leptokurtic. These results indicate that both the divergences are not at all significant of a 'real' discrepancy between the data and that of the normal distribution.

Table 2
Skewness of the Distribution

	Sk in terms of Frequency Distribution	Sk in terms of Percentiles	Significance	Critical Ratio [CR]
Skewness	+0.01	+0.03	0.3319	0.09

Table 3
Kurtosis of the Distribution

	Ku	Significance	Critical Ratio [CR]
Kutosis	0.2527	0.0119	-0.8655

Chi-square test

The calculated value of chi-square is found to be 2.548, which is less than the table values at 0.01 and 0.05 levels of significance. This also testifies to the normality of distribution. The data given in Table 4 were used to super-impose the ideal (best-fitting) normal curve on the obtained histogram given in Figure 1 on the whole, fits in with the obtained distribution well enough to warrant our treatment of data as normal. The distribution of the test score is, thus, taken as normal.

Best Fitting Normal Distribution Curve

The best fitting curve is to be superimposed on the obtained histogram. To plot a normal curve over this histogram, the height of the maximum ordinate (Y_0) was calculated, which was found to be 201.76 when the 'x' at the mean of the normal curve is '0'. The values of Y, the heights of the ordinates at different σ – distances from the mean, are found out from the statistical table B for the ordinates of the normal probability curve

Table 4
Chi-square Test of Normal Distribution for Whole Test

Score Intervals	Exact Score Interval	fo	X	X–M		Area P(x)	ΔP(x)	fe= N×Δ P(x)	fo-fe	(fo-fe)2	
31–35	30.5-35.5	17	30.5	9.93	1.83	0.96637	0.03366	19	2	4	0.2105
26–30	25.5-30.5	80	25.5	4.93	0.90	0.81593	0.15044	83	3	9	0.1084
21–25	20.5-25.5	181	20.5	–0.07	–0.01	0.47210	0.34383	190	9	81	0.4263
16–20	15.5-20.5	182	15.5	–5.07	–0.94	0.17361	0.29849	165	17	289	1.7515
11–15	10.5-15.5	76	10.5	–10.07	–1.86	0.03145	0.14216	78	2	4	0.0513
6–10	5.5-10.5	16	5.5	–15.07	–2.78	0.00272	0.02873	16	0	0	0
		N=552									2.548
Mean = 20.57 SD = 5.45		Degrees of Freedom (df) = 3					From the table at .01 level = 11.345 at .05 level = 7.815 Thus, the value obtained is less than the table values at both the levels and therefore the value obtained is not significant at both .01 and .05 levels.				

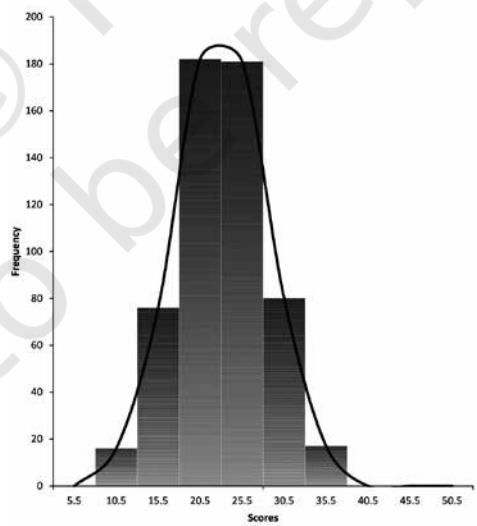
expressed as fractional parts of the mean ordinate, y_0 (Garrett, 1966, 4th Indian Reprint-2014, p. 459) and the corresponding values of Y when Y_0 = 201.76 are computed. The final values of the ordinates at different σ distances are given in the following Table 5.

The data given in Table 5 were used to super-impose the ideal (best-fitting) normal curve on the obtained histogram given in Graph 1. The normal curve on the whole, fits in with the obtained distribution well enough to warrant our treatment of data as normal.

Table 5
Normal Curve Ordinates at Mean

N	Mean	SD* (σ)	Y0 ()	σ distance from the Mean	Value of Y when Y0 = 1 (Read from Table)	Value of Y when Y0 = 201.76 (obtained from data)	Height of the ordinate
552	20.57	1.09	201.76	± 0.5σ	0.88250	0.88250 × 201.76	178.05
				± 1σ	0.60653	0.60653 × 201.76	122.37
				± 1.5σ	0.32465	0.32465 × 201.76	65.50
				± 2σ	0.13534	0.13534 × 201.76	27.30
				± 3σ	0.01111	0.01111 × 201.76	2.24

(**in class interval unit*)



Graph 1 Superimposition of the Best Fitting Curve on the Obtained Histogram for the Whole IETAT.

Reliability

Table 6 presents the reliability coefficient obtained through the application of 'split-half' method gives higher value (0.97). This might be due to the tendency of 'split-half' method to give the high value of reliability coefficient. The K-R formula 20 (0.65) and Hoyt's method (0.62) gives little identical results. Thus, the reliability of the present IETAT can be fixed at 0.75, and the value showed that the constructed IETAT is reliable at the satisfactory level.

been rejected. All the items in all the sections were included after a careful scrutiny. Only the valid items were selected while the items that were not found to be valid were summarily rejected.

Predictive Validity

The criterion against which the present IETAT is validated, is the examination marks of the pre-service teachers in the subject of Creating Inclusive School. The criterion was selected after a careful scrutiny, and

Table 6
Reliability Coefficient of IETAT obtained through Different Methods

Sr.No.	Method Used	Reliability Coefficient obtained	P.E.r
1.	Split-half method	0.97	0.0003
2.	Kuder-Richardson method	0.65	–
3.	Hoyt's Method	0.62	–

Validity

Content Validity

Content validity has been decided on experts' rating on the items constructed and the validity index of each item. The Content Validity Ratio (CVR) was calculated for each item based on the formula given by Lawshe (1975) for determining content validity of the test. The average of the CVR across all items on the test was found to be 0.64.

Construct Validity

For validity index, items showing .20 and more have been selected while items below .20 validity index have

all the consulted experts had agreed that the criterion is satisfactorily reliable and valid. However, it should be noted here that no criterion is a perfect one and it is extremely difficult to fix up criteria to judge success in teaching. So, the present criterion also cannot be a perfect one, but the investigator is confident that it is reliable and valid to the extent it is possible to reach in the present circumstances and limited researches in the field.

For estimating predictive validity, 20 per cent (110 pre-service teachers) sample is selected for determining the validity of the test. The raw scores on total test obtained by 110 pre-service

teachers were converted into the standard scores. The raw test scores, and raw criterion scores are converted into standard scores.

The examination scores on the subject of Creating Inclusive School taken as the criterion scores, and converted into standard scores. The raw scores are expressed in standard scores in a distribution where M= 39.36, M' = 50 and = 10.

The two sets of scores were arranged in the form of a scatter diagram and the product-moment coefficient of correlation was calculated. The scatter diagram pertaining to the standard test scores and criterion inclusive education examination scores are given in Table 7.

The product-moment coefficient of correlation 'r' was calculated according to the usual procedure from the scatter diagram shown in Table 7. The value product-moment coefficient of correlation 'r' was found to be 0.5195. The probable error of this 'r' also was calculated. It was found to be 0.01871. The predictive validity of the present test is much satisfactory and it can be said that the test is a good predictor of inclusive education teaching aptitude. Even then, obviously, other things being equal, the higher the correlation, the better it is.

Norms

The classification of respondents according to letter grades is given in Table 8.

Table 7
Standard Test Score and Standard Criterion Scores
(External Examination Marks in Inclusive Education Subject)

Scores 11–15		Standard Criterion Scores								fy
		16–20	*21–25*	*26–30*	*31–35*	*36–40*	*41–45*	*46–50*		
Standard Test Scores	46–50	–	–	–	–	–	23	–	–	23
	41–45	–	–	–	–	–	12	–	–	12
	36–40	–	–	–	–	1	–	–	–	1
	31–35	–	–	–	–	6	–	–	–	6
	26–30	–	–	–	–	2	–	–	–	2
	21–25	–	–	–	2	–	–	8	38	48
	16–50	–	–	–	–	3	10	–	–	13
	11–15	–	–	–	5	–	–	–	–	5
Fx		0	0	0	7	12	45	8	38	110

Product Moment r = 0.5195 P.E.r. = 0.1871

Table 8
Classification of Pre-service Teachers according to Letter Grades

Letter Grade	Limits of Raw Scores	Frequency	Teaching Aptitude Status
A	35 and above	1	Very high
B	Between 30 and 34	23	High
C	Between 25 and 29	106	Above average
D	Between 20 and 24	191	Average
E	Between 15 and 19	162	Below average
F	Between 10 and 14	59	Poor
G	9 and below	10	Very poor

Grade A and B suggest that pre-service teachers who are assigned this grade possess high aptitude for teaching in inclusive education, and that they would make excellent teachers in inclusive schools. One can enrol such candidates in TEIs or recruit in inclusive schools. Grades C, D, and E indicate decreasing magnitude of aptitude for inclusive education teaching aptitude possessed by the respondent pre-service teachers. The grade F and G suggests that pre-service teachers who are assigned this grade possess an extremely low aptitude for teaching in inclusive education, and that they would make very poor teachers. Such teachers should be eliminated for training in inclusive education or recruiting in inclusive schools. It would be advisable, therefore, to reject a pre-service teacher who scores, on this IETAT, 9 and below as they should be considered unacceptable to teach in an inclusive education. Thus, in selecting pre-service teachers for inclusive education, care should be taken to eliminate poor teachers from the beginning.

Implications

The norms established through the present study may be applied in comparing the performance of region-wise samples from the population of pre-service teachers. The pre-service teachers can easily be placed in particular grades, and the extent of their future success as the inclusive school teachers can be judged. Thus, the norms established by this study will be helpful to a reasonable extent in screening out the teachers who really possess the aptitude for teaching in an inclusive school.

The test norms will be mainly useful in selecting prospective teachers for pre-service level training, and they are most likely to be successful as teachers in inclusive education after the training. As there is a great dearth of trained teachers in inclusive education, the inclusive schools are required to employ untrained teachers, and such school

authorities may use the present IETAT in appointing the teachers who have teaching aptitude for inclusive education.

The test can also be helpful for vocational guidance purpose. If the test is applied to fresh graduate or post-graduate candidate, and if it is found, that they possess a good deal of teaching aptitude towards inclusive education, they may be advised to take up the teaching profession by joining teacher education courses.

Conclusion

The test items included in the IETAT numbering 50, based on the five components comprising teaching aptitude for inclusive education measures the inclusive education teaching aptitude to a considerable degree. The information obtained about the pre-service teachers' teaching aptitude for inclusive education through the IETAT is to be supplemented further with the information about their performance in the subject, interest, ability, and attitude before a final decision is arrived at with regard to his possessing a real teaching aptitude in an inclusive education. The distribution of the scores obtained by the pre-service teachers is normal and it suggests that a majority of the pre-service teachers coming under the average group do possess some kind of aptitude for teaching in an inclusive setting. The reliability and validity of the test are found to be quite satisfactory, and the test serves as a useful purpose in measuring inclusive education teaching aptitude of pre-service teachers.

Although the efforts have been made to make the present IETAT as much scientific and comprehensive as possible, it cannot be claimed that it is the perfect one as the items included in the test are only 50. Adding more items may further improve the test and make it a perfect one.

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