CONSTRUCTION AND STANDARDIZATION OF SELF-EFFICACY SCALE FOR SECONDARY SCHOOL TEACHERS

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Abstract

For measuring self-efficacy of secondary school teachers, the present task was undertaken to construct and standardized teachers' self-efficacy scale. For this, data were collected from secondary school teachers by adopting convenient sampling technique in combination with purposive sampling technique. An item pool was developed initially by consulting various sources and theoretical and empirical literature available in the concerned area. This item pool was put to evaluation and criticism by technical as well as language experts. The preliminary draft of teachers' self-efficacy scale was further subjected to item analysis to select only highly discriminating items. The reliability of scale was ascertained with the help of test-retest and split-half method which were found to be appreciably high. The validity of teachers' self-efficacy scale was also ascertained and norms were established for interpretation of obtained scores on the scale. In the last, conclusions have been presented and implications in the shape of the applicability and usefulness of teachers' self-efficacy scale have been discussed.

Keywords: *Construction, Standardization, Self-Efficacy.*

Introduction

The efficacy beliefs of teachers are themselves related to their instructional practices and to the students' achievement and psychological well-being. Efficacious teachers create classroom climates in which academic rigour and intellectual challenge are accompanied by the emotional support and encouragement necessary to meet that challenge and achieve academic excellence. So, all teachers should seriously share their responsibility in nurturing the self-beliefs of their students. Teachers' sense of self-efficacy is an important factor that had strong, positive relationships to students' performance, achievement of programme goals, and other positive (educational) outcomes. Teacher efficacy includes two dimensions i.e. personal teaching efficacy and general teaching efficacy. Personal teaching efficacy (PTE)

represents a teacher's belief that he/she possesses the skills and abilities to facilitate student learning, that is, it is the teacher's overall sense of his/her own teaching effectiveness. General teaching efficacy (GTE) represents the belief that teaching (as an organizational form of education) can affect pupils positively, even in light of external factors or conditions such as; low motivation or poor home environment. Teacher effectiveness is governed by levels of self-efficacy, that is, the belief teachers have about their teaching capabilities (Gibbs, 2002; Tschannen- Moran, Woolfolk-Hoy and Hoy, 1998). Teachers who have "a high sense of efficacy about their teaching capabilities can motivate their students and enhance their students' cognitive development" (Bandura, 1994). Chan (2004) found that "self-efficacy beliefs were significantly predicted by the components of emotional intelligence" and suggested that differences between teachers might affect this relationship. Previous research, although limited, has focused on "emotions as a consequence rather than an antecedent" of efficacy beliefs (Sutton and Wheatley, 2003). Emmer and Hickman (1991) recommended research to explore the relationship between teacher emotions and efficacy beliefs. Little research in the field of teacher self-efficacy for classroom management is evident. However, among the research that exists, some researchers support theories that imply that personal teaching efficacy has an effect on the behaviour of teachers, as well as on beliefs and outcomes (Morris-Rothschild & Brassard, 2006). Criticizing students for failing and showing-impatience when confronted with challenges in problematic circumstances were found to be related to a low personal teacher efficacy (Gibson & Dembo, 1984). Ashton and Webb (1986) had the same findings that teachers with low personal teaching efficacy are unable to manage behavioural problems. They suggested that teachers' beliefs were linked with strict punishment procedures, such as using authority and verbal abuse and sending students out of class during learning times. Woolfolk-Hoy, Rosoff, and Hoy (1990) contend that, "a sense of personal efficacy becomes related to beliefs about control only after some years of actual experience in classrooms". Guskey and Passaro (1994) have reported "instructional effectiveness" and, Morris-Rothschild and Brassard (2006) have reported fewer referrals to special education from teacher with high personal efficacy. Ashton and Webb (1986) suggested that secondary school teachers with low efficacy were recognized by how they scored on the Rand Corporation assessment items. Their assessment described classroom conditions as "punishment, coercion, and public embarrassment characterized by management strategies" (Woolfolk et al. 1990). Teachers with higher efficacy seemed to cope well, remain friendly, and build trust with their students and consequently undesirable behaviour was not common and was dealt with in satisfying ways (Woolfolk et al.

1990).Richardson (2002) reported that teachers with more years of experience in using the computer were found to have more positive attitudes toward technologies and higher levels of self-efficacy practices. Younger teachers were found to have more positive attitudes toward technologies. Gender was not found to be a significant predictor of the teachers' attitudes toward technologies, self-efficacy, and innovativeness. Arulsamy (2008) revealed that the secondary school teachers of Vellakoil union had a good measure of self-efficacy in teaching but their self-efficacy differed in terms of gender. Tuchman and Elie (2010) revealed that formal teacher training was most strongly associated with efficacy for the instructional practice, while the informal experiences were most strongly associated with efficacy for student engagement. Kumar and Papaiah (2012) reported that there is significant variation between the self-efficacy   in respect of high school teachers working in zila parishad high schools and those working in private un-aided high schools. Douglas (2012) indicated that levels of teaching efficacy in classroom management and student engagement were not significantly based upon whether or not the faculty member held a teaching degree. However, a statistically significant difference was found among those faculties who held a teaching degree for their level of instructional practices efficacy. Jimison and Kanisha (2012) revealed a statistically significant relationship between teachers' self-efficacy and student achievement. The subscale in this study which was most highly correlated with teachers' self-efficacy was efficacy in student engagement. Kilimo (2014) showed that teachers with low self-efficacy faced more problems with the implementation of inclusive education. Hascher and Hagenauer (2016) indicated that self-efficacy was significantly related to the valence of emotional experiences. Enjoyment in teaching practicum was positively predicted by self-efficacy, whereas anxiety was negatively predicted.

On the basis of above discussion, it appears that most of the research studies on self-efficacy beliefs of the teachers have been carried out in foreign countries and there is a lack of studies in India. Moreover, the only tools which are available for measuring self-efficacy of teachers have been developed by Bandura and Schwarzar. There is no research tool available with us which can be safely used for measuring self-efficacy of secondary school teachers of Indian subcontinent. Hence, it was thought worthwhile to construct and standardize self-efficacy scale for secondary teachers working in Indian schools. Therefore, the present research was undertaken with the following objectives:

Objectives:

1. To prepare the preliminary draft of self-efficacy scale for secondary school teachers.

2. To carry out item analysis of preliminary draft of teachers' self-efficacy scale.

3. To estimate reliability of teachers' self-efficacy scale through test-retest and split-half method.

4. To ascertain the validity of teachers' self-efficacy scale.

5. To establish norms for interpretation of scores obtained on teachers' self-efficacy scale.

Methodology

For construction and standardization of teachers' self-efficacy scale, survey technique under descriptive method of research was employed.

Sampling

Multistage sampling along with purposive sampling technique was employed. The samples of teachers were taken from Hamirpur and Shimla districts of Himachal Pradesh. Firstly, a sample of 130 secondary school teachers was selected for carrying out item analysis of preliminary draft of self-efficacy scale. At the second stage, a sample of 55 teachers was selected to compute test-retest reliability of the teachers' self-efficacy scale. At the third stage, 60 teachers were selected purposively to estimate split-half reliability index of self-efficacy scale. At the last stage, a sample of 1048 teachers was chosen for establishing norms for interpretation of scores obtained on teachers' self-efficacy scale.

Planning and Preparation of Initial Draft of Teachers' Self-Efficacy Scale

At the very beginning, it was considered worthwhile to plan for the content of self-efficacy scale for secondary school teachers. For this, the investigator thoroughly screened the related literature, existing inventories / questionnaires / scales / tests on self-efficacy and carried out discussions with the experts in the concerned area. On the basis of this, a list of 90 items / statements (in Hindi language) was prepared which were pooled from various sources and getting the statements of opinions from the experts, researchers, psychologists, experienced teachers and teacher educators. The items in the scale were formulated by using Likert Method of Summated Ratings on a Five point continuum ranging from always, frequently, sometimes, rarely to never. All positive statements were to be scored in such a way that teachers preferring 'Always' option were awarded a score of 5 and teachers preferring 'Never' option were awarded a score of 1. The middle options i.e. frequently, sometimes and rarely were awarded equivalent scores of. 4, 3 and 2 respectively. However, in case of negative statements, the scoring procedure was reversed completely in such a manner that teachers preferring 'Never' option were awarded a score of 5 and teachers preferring 'Always' option were given a score of 1. The middle responses on the scale i.e. rarely, sometimes and frequently were given a score of 4, 3 and 2 respectively in case of negative

statements. The total self-efficacy score of a teacher on this scale was computed by adding the score on all individual items.

Editing and Revision of Initial Draft of Teachers' Self-Efficacy Scale

After writing the statements for teachers' self-efficacy scale, they were edited and revised. For this, the initial draft of scale containing 90 items was given to language teachers, experienced school teachers, research scholars and teacher educators to judge the content and linguistic accuracy of each item and its relevance. Each item/statement was personally discussed with the experts and their suggestions were taken into consideration in order to remove any sort of logical, technical and linguistic ambiguity in the statements. On the basis of expert opinion, it was decided to have 60 items in preliminary draft of teachers' self-efficacy scale. Out of these 60 statements, 56 statements were positive in nature, whereas the remaining 4 were negative in nature.

Data Analysis and Results

Item Analysis of Preliminary Draft (Try-Out Form) of Teachers' Self-Efficacy Scale

Data were analyzed by employing appropriate statistical techniques. The details are given as under:

The technique of item analysis was employed for selection/rejection of statements for preparing final draft of teachers' self-efficacy scale. For carrying out item analysis, the preliminary draft of teachers' self-efficacy scale was tried out on a sample of 130 secondary school teachers of Hamirpur and Shimla districts of Himachal Pradesh. Afterwards, the scoring of teachers' self-efficacy scale in respect of each individual teacher was done by following the procedure mentioned earlier. The total score on preliminary draft of teachers' self-efficacy scale could range from 60 to 300. Afterwards, 27% of the teachers (35 teachers) with highest total scores and 27% of the teachers with lowest total scores on self-efficacy scale were taken into consideration. These two groups were named as 'top group having high scores' and 'bottom group having low scores' respectively. These two groups were considered for this purpose as these two groups provided criterion groups in terms of which to evaluate the individual statements (Edward 1957). The middle 46% cases were weeded out and not considered for further analysis. After this, mean and standard deviation for each statement were calculated separately for high scoring group as well as for low scoring group of secondary school teachers. Then onwards, t-values were computed for each item to find out the significance of mean difference among two groups in respect of each statement of teachers' self-efficacy scale. The value of 't' is a measure of the extent to which a given statement differentiates between the high and low scoring groups. Thus, t-values for all 60

statements were computed and the statements having t-values equal to or greater than 1.75 were selected for final draft of the teachers' self-efficacy scale and the rest of the statements having t-values less than 1.75 were rejected. The t-values in respect of each item of try-out form of teachers' self-efficacy scale are given in Table 1.

Table 1 T-Values in Respect 60 Items of Preliminary Draft of Teachers' Self-Efficacy Scale

Item No.	t-value	Item No.	t-value	Item No.	t-value	Item No.	t-value
1.	5.46	31.	8.67	**16.**	**1.18**	46.	6.26
2.	6.15	32.	10.9	17.	7.94	47.	10.9
3.	2.97	33.	9.16	18.	6.62	48.	6.25
4.	5.99	34.	6.44	19.	3.33	49.	6.24
5.	9.86	35.	8.97	20.	7.00	50.	10.4
6.	6.54	36.	8.09	21.	8.23	51.	6.43
7.	5.82	37.	6.49	22.	9.74	52.	6.96
8.	6.88	38.	6.90	**23.**	**0.99**	53.	3.26
9.	6.59	39.	9.99	24.	4.10	54.	5.15
10.	10.5	40.	12.0	25.	5.86	55.	7.55
11.	5.29	41.	11.9	26.	8.93	56.	10.2
12.	**1.69**	42.	4.91	27.	11.6	57.	8.62
13.	5.13	43.	7.38	28.	9.40	58.	8.29
14.	6.72	44.	4.17	29.	5.62	59.	7.76
15.	3.08	45.	5.97	30.	5.76	**60.**	**3.01**

Note: 't-values' shown in Bold Letters indicate rejected items ($t<1.75$)

On the basis of this, 56 items with serial no.

'1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31, 32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58 and 59 in the preliminary draft were selected and remaining 4 items with serial no. 12, 16, 23 and 60 were rejected from the final draft of the teachers' self-efficacy scale.

Reliability of Teachers' Self-Efficacy Scale

The reliability of teachers' self-efficacy scale was determined by employing two methods i.e. test-retest method and split-half method.

1.   Test-Retest Reliability

The test-retest reliability of teachers' self-efficacy scale was estimated by administering by the final draft of the scale twice on 55 teachers after a time gap of three weeks. Then, the correlation coefficient was calculated between the two sets of scores by applying "Pearson's Product Moment Correlation Method". On applying this method, the correlation coefficient 'r' i.e. reliability index came out to be 0.76 which was greater than the table value (r = 0.339) at 0.01 level of significance, for d_f54 and hence, was high significant. This indicated that there is high stability over time in self-efficacy scores obtained by secondary school teachers.

2.   Split-Half Reliability

For estimating the reliability of teachers' self-efficacy scale by split-half method, the statements of final draft of the scale were divided into two halves by following odd-even procedure. The two halves of the scale were administered on 60 secondary school teachers selected from schools situated in Shimla district. Afterwards, scoring was done separately for two halves of the scale and the value of correlation coefficient was computed between the scores of two halves by using Karl Pearson's 'Product Moment Correlation Method'. The correlation coefficient for one half of the teachers' self-efficacy scale was found to be 0.547. The reliability of the whole teachers' self-efficacy scale was obtained by applying Spearman-Brown Prophecy Formula. Thus, the split-half reliability of whole teachers' self-efficacy scale came out to be 0.709 which was higher than the table value (r=0.325) at 0.01 level of significance, for d_f 59 which was highly significant. This was indicative of the fact that the self-efficacy scale was internally consistent to measure the self-efficacy level of the secondary school teachers.

Validity of Teachers' Self-Efficacy Scale

The validity of teachers' self-efficacy scale was ascertained in terms of item validity, content validity and cross validity. Teachers' self-efficacy scale was considered valid enough in terms of item validity because only those items were retained in the final draft of the scale which was having t-values equal to or greater than 1.75 (highly discriminating items). The content validity of teachers' self-efficacy scale was established by carrying out critical discussions with field experts at the time of development of preliminary draft of the scale. The experts were of the opinion that the statements in the teachers' self-efficacy scale were fully adequate and relevant to measure the self-efficacy of secondary school teachers. In addition to this, only those items were retained in the preliminary draft of teachers' self-efficacy scale for which there has been at least 90% agreement amongst experts. Thus, the teachers' self-efficacy scale was found to possess adequate content validity. Furthermore, the self-efficacy scale can be considered to have adequate intrinsic validity because split-half reliability of the scale was found to be 0.709 which is a fairly high correlation index. The cross validity of teachers' self-efficacy scale was ensured by taking entirely different samples of secondary school teachers in order to carry out item analysis, establishing reliability and developing norms.

Norms for Interpreting Teachers' Self-Efficacy Scores

Before establishing the norms for interpretation of self-efficacy scores obtained by secondary school teachers, the obtained data were verified for possessing normality. This was done by

computing the values of skewness and kurtosis for overall scores of sampled teachers (N=1048) on the scale. The value of skewness came out to be -0.480 showing the distribution of total self-efficacy scores as somewhat negatively skewed. In addition to this, the value of kurtosis was calculated to be .011 indicating that the distribution of self-efficacy scores is somewhat leptokurtic in nature. Further, on the basis of collected data, the mean and standard deviation in respect of self-efficacy scores of all sampled teachers were calculated which came out to be 238.06 and 27.489 respectively. Then, the raw self-efficacy scores were converted into z-scores by taking into consideration the values of mean and standard deviation for the purpose of establishing norms for interpretation of obtained self-efficacy scores. The following range of z-scores on a continuum can be used as suggestive norms for interpreting scores obtained on scale for measuring teachers' self-efficacy.

Table 2 Norms for Interpretation of Scores on Self-Efficacy Scale for Secondary School Teachers

Z-scores Range	Self-Efficacy Scores	Interpretation
+2.01 and above	294 and above	Very high self-efficacy
+1.26 to +2.00	273 to 293	High self-efficacy
+0.51 to +1.25	252 to 272	Above average self-efficacy
-0.50 to + 0.50	225 to 251	Moderate self-efficacy
-0.51 to -1.25	204 to 224	Below average self-efficacy
-1.26 to –2.00	182 to 203	Low self-efficacy
-2.01 and below	181 and below	Very low self-efficacy

Conclusions

Following conclusions were drawn with respect to construction and standardization of scale for measuring self-efficacy of secondary school teachers:

1. The present self-efficacy scale has been specifically developed for secondary school teachers. However, it can be employed for measuring self-efficacy of teachers at other levels of education by taking precaution and care.

2. The initial draft of teachers' self-efficacy scale was comprised of 90 statements which were put to strict and rigorous examination in terms of expert opinions. After such critical examination and taking into consideration the suggestions of field experts, thirty statements were rejected and certain items were modified/revised. The preliminary draft of scale was thus comprised of 60 items. After carrying out item analysis, four statements with t-values less than 1.75 (least discriminating items) were rejected and final form of

the scale has 56 items. Out of these, 56 items were positive in nature and 4 items were of negative type.

3. The reliability coefficients computed through test-retest and split half method were found to be 0.76 and 0.709 which were highly significant and thus teachers' self-efficacy scale possessed appreciably high stability and internal consistency respectively.

4. The validity of teachers' self-efficacy scale has also been ascertained in terms of item validity, content validity and cross validity which have been found to be satisfactory.

5. The suggestive norms for interpretation of obtained scores on the teachers' self-efficacy scale have been developed on the basis of which, the level of teachers' self-efficacy can be ascertained.

Applicability and Implications

The present research work was carried out to construct and standardize a scale for measuring self-efficacy of secondary school teachers. This scale can be used for any diverse group of teachers differentiated on the basis of level of education, gender, teaching experience etc. The scale is fairly reliable and valid to measure secondary school teachers' self-efficacy level. This scale can be easily administrated in individual situations and can be scored and interpreted conveniently. On the basis of scores obtained on this scale, necessary steps can be taken to bring suitable changes in self-efficacy beliefs of secondary school teachers. The findings revealed on the basis of this scale may prove to be helpful in designing various capacity building programmes for teachers to improve their efficiency and effectiveness.

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