

Construction and Validation of Test of Psychology for Prospective Teachers (TPPT)

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ABSTRACT

In the classroom teaching-learning process, development of knowledge of students at different stages, understanding of individual differences, theoretical perspective of learning and knowledge of adjustment as well as education of deprived children have vital place as these have influenced and shaped instructional methods and practices to some extent. The main purpose of an achievement test is to determine ones' knowledge in a particular subject. It helps in measuring the amount of success of an individual in specific field. The present paper was prepared with the purpose to construct and validate an achievement test in Psychology for B.Ed. students. This test consisted of 210 items covering all aspects from 'Childhood and Growing up(Course-1) from B.Ed. two-year programme (2015-17) scheme & syllabus prescribed by NCTE under NCF-2014. After doing rigorous item analysis of 210 items ,90 items were retained in the final version of the test. Spearman brown and KR21 reliability measured was applied and it found 0.87 & 0.82 respectively. Validity of the test was established by content validity method.

KEYWORDS: Construction, Validation, Educational Psychology, Prospective teachers

INTRODUCTION

Modern society demands from teacher a high-quality teaching and learning in classroom. To fulfill the demands and standards of quality education, teachers need to have possessed a great deal of knowledge and skills with regard to both teaching-learning and assessment practices. Development of students at different stages helps teacher to know the physical, social, mental, emotional and moral changes in children at various stages, which provide means to deal with the children of various stages. Individual difference facilitates teachers in organizing different

educational activities at various stages and understand multiple intelligence that provide assistance to teacher for adopting ways and methods according to need of the children. Learning theories offer resources to programmed teaching & learning in classroom, tools for the teachers for better accomplish in teaching-learning process; and to understand the manifestations of learners. Therefore, teachers should have knowledge of various developmental theories as Piaget's concept of cognitive development; Kholberg's theory of moral development; Erikson's Psycho-social development theory; and understanding of Gardener theory of multiple intelligence. Teacher should be acquainted with various learning perspectives like behavioristics, cognitive, constructive & its theories; applicability of these theories in various situations; principles of learning mentioned in these theories; relevance of learning theories; role of learner and role of teachers in various learning situation. The knowledge of special children for teacher provides aid in teaching of special children.

NEED OF THE TPPT

The teachers' who are teaching prospective teachers in various teachers training colleges, realized that they had faced difficulty in Psychological Foundation of Education and no proper standardized tool available to evaluate their problem areas. There is need for a suitable standardized tool to measure the achievement of prospective teachers in 'Childhood & Growing up'. Achievement test can also be assumed as a sample of indicator of a students' knowledge taken at a particular point of time (Ebel, 1972). It aids both the teacher and the students in assessing learning readiness, monitoring learning process, diagnosing learning difficulties and evaluating learning outcomes (Gronlund, 1977). Keeping into consideration, this test is carefully designed and standardized, so that, it can be used by any educators or researcher to evaluate the performance of prospective teachers. This gives scope for educators to plan the remedial measure to improve prospective teachers' performance. This test is intending to measure the achievement of prospective teachers in the Childhood & Growing up (course-I) of B.Ed. two-year programme.

MAJOR STEPS FOR CONSTRUCTION OF TPPT

(a) PLANNING AND PREPARATION OF BLUE PRINT

At this stage, the content analysis was done before preparing the blue print of the test. Opinions of experts as well as concerned teachers were taken into consideration for content; preparing the blue print of achievement test to decide the weightage given to instructional objectives; to determine weightage given to content areas and to select the test item. After taking the experts' opinions, the test covered the content as mentioned below:

- Development of Children & Adolescence
- Understanding of Individual Differences
- Theoretical Perspective of Learning
- Adjustment & Education of Deprived Children

A blueprint of test showing coverage of content, instructional objectives and types of item was prepared. The blue print is given in table-1 and presented graphically through pie chart in figure-1 & figure-2

Table -1

Blue Print of Test of Psychology for Prospective Teachers (Try out stage)

Sr. No.	Sub-Units	Instructional Objectives				Total	% age
		Knowledge	Understanding	Application	Skills		
1	Development of Children & Adolescence	23	17	14	06	60	28.6%
2	Understanding of Individual Difference	19	13	11	05	48	22.9%
3	Theoretical Perspective of Learning	23	19	10	05	57	27.1%
4	Adjustment & Education of Deprived Children	19	14	09	03	45	21.4%
	Total	84	63	44	19	210	100%
%	Percentage	40%	30%	21%	9%	100%	

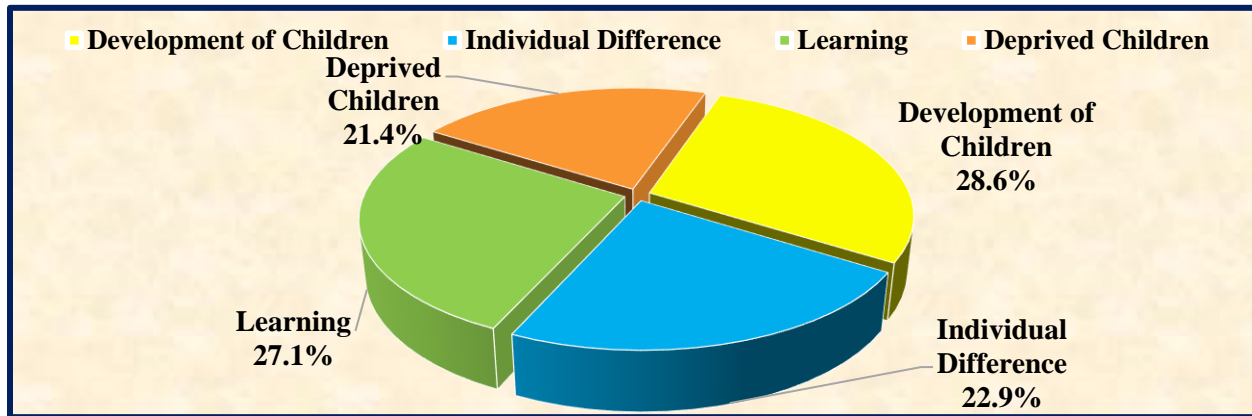


Fig.-1: Distribution of Content in Test of Psychology for Prospective Teachers

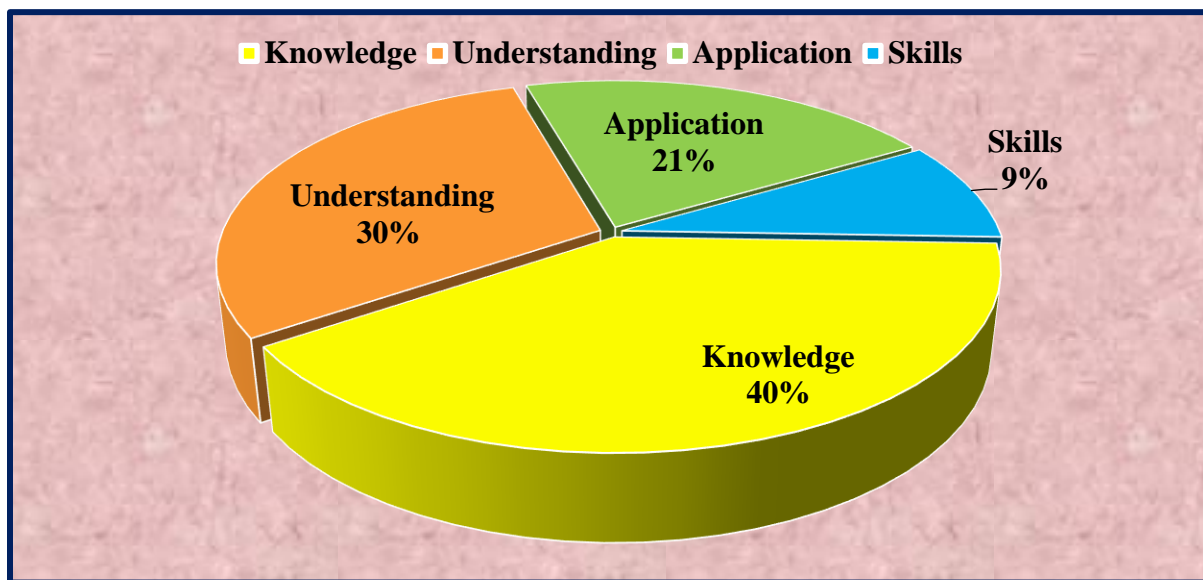


Fig. 2: Allocation of Instructional Objectives in Test of Psychology for Prospective Teachers. (Try-out stage)

(b) TRY OUT STAGE

After preparing the preliminary draft of achievement test, the items were reviewed by seeking the opinion of experts. The initial list of 210 items was given to twenty (20) subject experts. The experts were psychologists, teacher educators and experts. The experts are requested to evaluate each statement in terms of technical accuracy as well as objective consideration. Then, the test was also administered on 70 prospective teachers. It helped to find out the vagueness and competency

of language of the content; to inspect the direction for statements also & to examine the time allotted was enough or not. Keeping in view the opinions of experts and analyzing the response of the prospective teachers, in preliminary try-out 37 items were edited.

Second Try-out

The second draft of the test was administered on 356 prospective teachers studying in five Colleges of Education situated in Rohtak & Bhiwani districts of Haryana state.

(c) ITEM ANALYSIS

The second draft administered on 356 prospective teachers to evaluate individual statement of the test in accordance with Kelley's method (1839). Response sheets evaluated and arranged in descending order from highest score to the lowest score. Then, two groups 27% upper side and 27% lower side of list were considering for item analysis. The scores of middle 46% prospective teachers were wedded out. Then, Discriminative index and Difficulty value were calculated for retaining statements for final draft.

1. Index of Discrimination (DP): For calculating the index of Discrimination of each item of the test, the proportion of bottom scorer of prospective teachers ($L_R / 96$) is subtracted from the proportion of the top scorer ones ($U_R / 96$), who give correct response to particular item. It helps to find out whether an item really discriminates between the high and the low achievers of the sample taken. Index of Discrimination is calculated by the formula

$$DP = (U_R / 96) - (L_R / 96)$$

Table -2
Distribution of Discrimination Index of all the items of Test

DP	Frequen cy	Item No.	Remarks
>0.40	93	1,2,3,5,6,8,12,13,16,17,20,21,22,28,33,38,39,40, 43,44,45,47,48,49,50,51,53,54,55,59,60,72, 74,76,80,83,85,86,87,88,92,93,97,110,115, 116,117,120,121,122,125, 126,127,128,129, 130,131,132,136,137, 149,151,153,157, 160,161,163,164,165,172,173,177,178,179,	Very Good Statements

		181,182,183,184,185,186,187,189,197,198, 199,202,203,204,206,207,208,209, 210	
0.30 - 0.39	23	14,18,19,26,35,69,71,75,77,82,94,96, 100,107,108,112,146,148, 154,159,167,169,200	Reasonable Good
0.20 - 0.29	12	41,46,63,65,66,70,104,118,140,142,175,194	Need to revised
< 0.19	82	4,7,9,10,11,15,23,25,27,29,30,31,32,34,36,37, 42,46,51,56,57,58,61,62,64,67,68,73,78,79,81, 84,89,90,91,95,98,99,101,102,103,105,106,109, 111,113,114,119,123,124,133,134,135, 138,139,141,143,144,145,147,150,152,155,156 158,162,166,168,170,171,174,176,180,188, 190,191,192,193,195,196,201,205	Very Poor Statements
Total	210		

2. **Difficulty Value (DV):** The difficulty value of the test item depends upon the proportion of correct response given by prospective teachers. The larger the proportion, easier the item. A low difficulty value indicates a easy item, while an hard item has high difficult value.

Difficulty Value is calculating by the formula

$$DV = \{(U_R / 96) + (L_R / 96)\} / 2$$

U_R = Correct responses to each statement of high scoring group

L_R = Correct responses to each statement of low scoring group

After calculating the index of discrimination and difficult value for each statement, the statements having very high and very low difficulty value as well as a poor discrimination power were rejected.

Table-3

Distribution of Difficulty Value of each item of the test

DV	Frequency	Statement No	Remarks
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Above 0.75	27	2,18,20,38,44,48,53,62,71,95,76,109,121,123,125,126 ,129,139,149,161,164,173,178,182,199,203,208	Rejected
Between 0.20 & 0.75	163	1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,21,22,23, 24,26,27,28,29,30,31,32,33,34,35,36,37,39,41,42, 43,45,46,47,51,52,54,55,57,58,59,60,61,63,64,66, 67,68,69,70,72,73,74,77,78,79,80,81,82,83,84,87, 88,89,90,91,92,93,94,95,96,100,101,102,103,104, 105,106,107,108,110,111,112,113,114,115,116, 118,119,120,122,127,128,131,132,134,135,136 ,137,138,140,141,142,143,144,145,146,147,148, 150,151,152,153,155,156,157,158,159,160,162, 163,165,166,167,168,169,170,171,172,174,175, 176,177,179,180,181,183,185,187,188,189,191, 192,193,194,195,196,197,198,200,201,202,204, 205,206,207,209,210	Retained
Below 0.20	20	19,25,40,49,50,56,65,85,86, 97,98,99, 117,124,130,133,154, 184,186,190	Rejected
Total	210		

Table-4

Index of Discrimination (DP) & Difficult Value (DV) of each Item & Selection of items for Final Draft

Item No.	DV	DP	Remarks
1	0.50	0.45	Retained
2	0.93	0.52	-----
3	0.64	0.53	Retained
4	0.35	0.07	-----
5	0.45	0.60	Retained
6	0.66	0.43	Retained
7	0.32	0.16	-----
8	0.49	0.50	Retained
9	0.30	0.15	-----
10	0.46	0.07	-----
11	0.39	0.15	-----
12	0.56	0.41	Retained
13	0.47	0.41	Retained
14	0.51	0.39	Retained
15	0.28	0.15	-----
16	0.40	0.42	Retained
17	0.40	0.42	Retained
18	0.93	0.37	-----
19	0.88	0.35	-----
20	0.58	0.54	-----
21	0.41	0.41	Retained
22	0.56	0.68	Retained
23	0.52	0.14	-----
24	0.42	-0.13	-----
25	0.19	-0.02	-----
26	0.56	0.37	Retained
27	0.49	0.15	-----
28	0.37	0.47	Retained
29	0.44	0.13	-----
30	0.41	0.19	-----
31	0.45	0.11	-----



32	0.49	0.07	-----
33	0.61	0.57	Retained
34	0.45	0.12	-----
35	0.59	0.30	Retained
36	0.45	0.03	-----
37	0.55	0.07	-----
38	0.92	0.41	-----
39	0.63	0.40	Retained
40	0.15	0.65	-----
41	0.44	0.27	Retained
42	0.41	0.19	-----
43	0.72	0.52	Retained
44	0.79	0.46	-----
45	0.66	0.54	Retained
46	0.64	0.18	-----
47	0.51	0.50	Retained
48	0.86	0.71	-----
49	0.11	0.56	-----
50	0.16	0.50	-----
51	0.71	0.14	-----
52	0.55	0.61	Retained
53	0.82	0.46	-----
54	0.54	0.63	Retained
55	0.61	0.67	Retained
56	0.09	-0.03	-----
57	0.31	0.17	-----
58	0.50	0.14	-----
59	0.67	0.64	Retained
60	0.69	0.56	Retained
61	0.48	0.17	-----
62	0.95	0.10	-----
63	0.41	0.21	Retained
64	0.43	0.15	-----
65	0.16	0.26	-----
66	0.69	0.25	Retained
67	0.33	0.04	-----
68	0.62	-0.02	-----
69	0.52	0.34	Retained
70	0.50	-0.02	-----
71	0.93	0.39	-----
72	0.69	0.48	Retained
73	0.38	-0.01	-----
74	0.69	0.43	Retained
75	0.92	0.35	-----
76	0.81	0.56	-----
77	0.58	0.35	Retained
78	0.44	0.09	-----
79	0.73	0.15	-----
80	0.25	0.57	Retained
81	0.35	-0.10	-----
82	0.63	0.37	Retained
83	0.47	0.54	Retained
84	0.68	-0.20	-----
85	0.17	0.52	-----
86	0.12	0.54	-----
87	0.65	0.59	Retained
88	0.71	0.50	Retained
89	0.60	-0.08	-----

90	0.68	0.12	-----
91	0.72	0.17	-----
92	0.50	0.60	Retained
93	0.68	0.54	Retained
94	0.66	0.35	Retained
95	0.71	0.13	-----
96	0.73	0.37	Retained
97	0.12	0.72	-----
98	0.95	0.10	-----
99	0.87	0.18	-----
100	0.58	0.35	Retained
101	0.68	0.18	-----
102	0.64	0.13	-----
103	0.59	0.15	-----
104	0.66	0.28	Retained
105	0.46	0.13	-----
106	0.61	0.04	-----
107	0.58	0.35	Retained
108	0.56	0.35	Retained
109	0.77	0.14	-----
110	0.74	0.41	Retained
111	0.45	0.12	-----
112	0.59	0.30	Retained
113	0.45	0.03	-----
114	0.55	0.07	-----
115	0.72	0.41	Retained
116	0.63	0.40	Retained
117	0.12	0.65	-----
118	0.44	0.27	Retained
119	0.41	0.19	-----
120	0.72	0.52	Retained
121	0.79	0.46	-----
122	0.66	0.54	Retained
123	0.94	0.18	-----
124	0.19	0.10	-----
125	0.86	0.71	-----
126	0.91	0.56	-----
127	0.56	0.50	Retained
128	0.71	0.54	Retained
129	0.99	0.61	-----
130	-0.01	0.46	-----
131	0.54	0.63	Retained
132	0.61	0.67	Retained
133	0.09	-0.03	-----
134	0.31	0.17	-----
135	0.50	0.14	-----
136	0.67	0.64	Retained
137	0.69	0.56	Retained
138	0.48	0.17	-----
139	0.95	0.10	-----
140	0.41	0.21	Retained
141	0.43	0.14	-----
142	0.65	0.26	Retained
143	0.69	0.07	-----
144	0.33	0.04	-----
145	0.62	-0.02	-----
146	0.52	0.34	Retained
147	0.50	-0.02	-----



148	0.73	0.39	Retained
149	0.96	0.48	-----
150	0.38	-0.01	-----
151	0.69	0.43	Retained
152	0.45	0.04	-----
153	0.74	0.56	Retained
154	0.14	0.35	-----
155	0.44	0.09	-----
156	0.73	0.15	-----
157	0.25	0.57	Retained
158	0.35	-0.10	-----
159	0.63	0.37	Retained
160	0.47	0.54	Retained
161	0.98	0.61	-----
162	0.67	0.10	-----
163	0.70	0.54	Retained
164	0.79	0.59	-----
165	0.71	0.50	Retained
166	0.45	0.12	-----
167	0.59	0.30	Retained
168	0.45	0.12	-----
169	0.59	0.30	Retained
170	0.45	0.03	-----
171	0.55	0.07	-----
172	0.72	0.41	Retained
173	0.83	0.40	-----
174	0.55	-0.15	-----
175	0.44	0.27	Retained
176	0.41	0.19	-----
177	0.72	0.52	Retained
178	0.79	0.46	-----
179	0.66	0.54	Retained
180	0.64	-0.02	-----
181	0.51	0.50	Retained
182	0.91	0.71	-----
183	0.61	0.56	Retained
184	0.17	0.50	-----
185	0.71	0.54	Retained
186	0.11	0.61	-----
187	0.62	0.46	Retained
188	0.54	-0.10	-----
189	0.61	0.67	Retained
190	0.09	-0.03	-----
191	0.31	0.17	-----
192	0.50	0.14	-----
193	0.45	0.15	-----
194	0.59	0.31	Retained
195	0.45	0.04	-----
196	0.55	0.08	-----
197	0.72	0.44	Retained
198	0.63	0.42	Retained
199	0.95	0.65	-----
200	0.45	0.27	Retained
201	0.41	0.17	-----
202	0.72	0.52	Retained
203	0.79	0.48	-----
204	0.66	0.64	Retained
205	0.64	0.18	-----

206	0.51	0.52	Retained
207	0.56	0.61	Retained
208	0.91	0.56	-----
209	0.56	0.48	Retained
210	0.71	0.64	Retained

The distribution of difficulty value of each item of test has shown in table-3. It revealed that 163 items ranging from 0.20 to 0.75(middle) were retained in the test. While, 20 items having DV of below 0.20 and 27 items having DV of above 0.75 were rejected. Ebel 's (1979) criteria and guidelines for discriminating indices was used in item analysis. The distribution of discrimination index of all the statements of test has been presented in table-2. It can be revealed from table-2 that the 128 items having discriminating index more than 0.19 were selected for final draft & the remaining 82 items having DP below 0.19 were not selected for final draft of achievement test. Keeping both difficulty value and Index of discrimination as given in table-4, only 90 items were selected for final draft of TPPT.

(d) STANDARDIZATION OF TEST

The Test has been standardized on 458 prospective teachers randomly selected from five Colleges of Education of two districts of Haryana state.

(i) Reliability of the test: The reliability of TPPT was established by using Kuder-Richardson (K21) formula, Spearman Brown formula of reliability. It has been calculated for 458 prospective teachers studying in five colleges of education. The value has been given in table5

Table-5
Reliability of the test

Spearman Brown	Kuder-Richardson 21(KR₂₁)
0.87	0.82

(ii) Validity of the test: The test was validated against the criterion of content validity. The content validity is concerned with the adequacy of sampling of a specified universe of the content. To determined content validity of the test, statements and outcomes were given to 20 experts in education, psychology, language and behavioral sciences to judge the relevance of statements with particular subject matter. All the statements were found to have 80 % or more unanimity. The unanimity of experts about the statements was taken as an indicator of face validity of the achievement test.

(e) FINAL DRAFT OF THE TEST

In the Final draft of the Test of Psychology for Prospective Teachers, 90 items out of 210 items were selected. The blue print of final draft having instructional objectives-wise distribution of items and content-wise distribution of items has been shown in table-6.

Table-6
Final draft of Test Psychology for Prospective Teachers

Sr. No	Sub-Units	Instructional Objectives				Total	%age
		Knowledge	Understanding	Application	Skills		
1	Development of Children & Adolescence	11	07	07	02	27	30 %
2	Understanding of Individual Difference	07	06	04	02	19	21 %
3	Theoretical Perspective of Learning	10	08	05	02	25	28 %
4	Adjustment & Education of Deprived Children	07	05	05	02	19	21 %
	Total	35	26	21	8	90	100%
	Percentage	38.9 %	28.9 %	23.3 %	8.9 %	100 %	

(f) Scoring

The scoring of the test is easy and objective. A scoring key has been developed to facilitate the scoring of Test Psychology for Prospective Teachers with the manual and test for investigator. Every item carries equal mark and right response give one mark and wrong one will give zero mark. To find out the total score in TPPT, the examiner should check the answer sheet with the help of scoring key and counting the right responses. The range of minimum and maximum score is 00 to 90.

(g) NORMS

The raw scores of the test were further converted into Z-scores for the purpose of establishing norms for interpretation. The raw scores and corresponding z-scores with mean, S.D. was given in table -7. The interpretation of the norms given in table-8.

Table-7

Mean= 51.7

N = 458

SD =9.1

Z-Score Norms for TPPT

Raw	Z-score	Raw Score	Z-score	Raw Score	Z-score
30	-2.38	45	-0.74	60	+0.91
31	-2.27	46	-0.63	61	+1.02
32	-2.16	47	-0.52	62	+1.13
33	-2.05	48	-0.41	63	+1.24
34	-1.95	49	-0.30	64	+1.35
35	-1.83	50	-0.19	65	+1.46
36	-1.73	51	-0.08	66	+1.57
37	-1.62	52	+0.03	67	+1.68
38	-1.51	53	+0.14	68	+1.79
39	-1.40	54	+0.25	69	+1.90
40	-1.28	55	+0.36	70	+2.01
41	-1.18	56	+0.47	71	+2.21
42	-1.07	57	+0.58	72	+2.23
43	-0.96	58	+0.69	73	+2.34
44	-0.85	59	+0.80		

Table-8

Norms for Interpretation of the level of TPPT

Sr. No.	Z-Score	Raw Score	Interpretation
1	Above +2.01	70 & above	Very High
2	+2.00 to +1.26	69 to 65	High
3	+1.25 to +0.75	64 to 60	Above Average
4	+0.74 to -0.74	59 to 43	Average
5	-1.25 to -0.75	44 to 40	Below average
6	-2.00 to -1.26	39 to 34	Low
7	Below -2.01	Below 33	Very Low

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