



Reasoning ability as a determinant of teaching aptitude: a study on teachers trainee student of Durg-Bhilai region, India

Bindu Kumari Tomar and Jubraj Khamari

Department of Education, MATS University, Raipur, CG, India
tomar.mba@gmail.com

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Abstract

This research paper aims to highlight the importance of reasoning ability in selecting the students of teacher training colleges so that they are more likely to develop higher teaching aptitude during their training. On examining the reasoning ability score and teaching aptitude score of selected sample of student from teacher training colleges of Durg-Bhilai region it was concluded that there was a high significant correlation between teaching aptitude and reasoning ability score of students. It was also concluded that Reasoning Ability was able to explain about 45 % of variation in the teaching aptitude of teacher trainee students. This can act as a benchmark to set entrance exam in such a way that at least 45 % of the weight age is to be given to the the questions on reasoning ability.

Keywords: Reasoning, ability, determinant, teaching, aptitude.

Introduction

A plenty of government activities to give access to essential primary schooling might be in progress, however issues of value, quality and access to all remain area of concern- especially in small states like Chhattisgarh. Children in provincial area are being denied of value training, attributable to variables like absence of able and committed teachers, lack of teaching aptitude and absence of course books among others.

This study tries to examine one of these variables, teaching aptitude, that how we can select teachers who have a right aptitude for teaching. The importance of this study lies in the fact that Teaching is a highly skilled job and requires proper training and preparation on the part of teacher. Successful teachers offer convincing conversation starters, clarify alternatives, show us to reason, recommend conceivable headings, and urge us on. Fruitful educators are fundamental and loaded with energy. They want to instruct, as a painter loves to paint, as an author loves to compose, as an artist loves to sing. They have a genuine reason but then appreciate colossally what they do.

They can get excited for their subject regardless of how often they have gone through it before. They vivify their subject and transcend the mechanical, dry, or routine educating. They propel themselves similarly as they push their understudies, and their courses wind up plainly critical learning encounters. The place and significance of the educator in a general public can never be over evaluated. These qualities are to be cultivated or could be inborn in an individual. It is then become a duty of governing bodies to select teachers having right aptitude of teaching. How this right aptitude can be found out is the main focus of this study.

In India the Bachelor of Education degree is a prerequisite in most of the state and central run schools. The candidate selected to become teacher trainee have to appear in a Pre B.Ed. examination administered by different agencies and Department in Center and States. Most of the pre B.Ed. exam covers General Knowledge, Languages and Subject Knowledge. It gives very less weight age to taste the critical and reasoning ability of the students who aspire to become teacher trainee. The lack of importance given to reasoning ability in the entrance exam might be a factor due to which a aspiring teacher is not able to deliver a high quality education to children.

In the next section of this study various aspects of reasoning ability and teaching aptitude are discussed. The literature covering the aspect of reason and teaching aptitude are analyzed critically to determine the factor that might vary reasoning skill of the individual and the teaching aptitude of teacher trainee.

Next section discuss the blue print to conduct this study .It signifies the use of descriptive research design to come to the conclusion. The objective of thee research are designated in this section followed by Hypotheses and Sub Hypotheses. Later part of this section deals with the data collection methodology and the description of sampling design employed. It also describe the data collection tools which was mainly the questioners clearly indication the ration of choosing such tool and thee reliability and validity of the tool. It is followed by the finding of the statistical methods that were used in arriving at a conclusion. The last section of the study comments on the result that were obtained after applying various statistical method .It is ended by the concluding remarks on the results obtained with the implication and scope for future work in the field.

Literature Review: The previously published research on the present topic can be segregated as the one describing different aspects of reasoning ability and other describing the facets of Teaching Aptitude.

Reasoning Ability: Reasoning Ability is the ability to think about something in a logical way in order to form a conclusion or judgment. In a comprehensive dictionary of Psychological and Psychoanalytical terms Reasoning is defined as “The form of thinking which find its complete expression in logical forms (whether the conclusion reached are valid or not). The reasoner is usually aware that the judgment (conclusion) is dependent upon other judgment (the premises). It is also defined as Problem solving ability (by English and English).

Nisbett et al.¹ studies showed that if a training is given to improve the reasoning ability of an individual the reasoning ability can be enhanced substantially. Kyllonen, Christal², investigated the relationship between reasoning ability and working capacity. They also concluded that there is a significant positive correlation between reasoning ability of an Individual and working capacity.

After these studies it was thought by Schmitt and Fischer³ to determine that whether reasoning skill can be taught for this they conducted an experiment to enquire inferential reasoning in Baboons. They experimented it with a bottle of food that Baboons like, it was done to infer that whether reasoning skill can improve through teaching. The results of the experiment were identical to the same experiment conducted on Apes and other monkeys. From this understanding it was learned the reasoning skill can be improved through training in humans also.

Ben-Chaim et al.⁴ researched the importance of reasoning skills for development of innate capabilities of students. Their recommendation were that a thinking skill of superior level is essential to explore student’s intelligence and abilities, that will be a critical factor in every aspect of work in the society.

Barak et al.⁵ investigated the importance of cultivating thinking and decision making ability among students of schools. They suggested that the school should give increased importance to the development of critical thinking skill, high order thinking and problem solving abilities among students.

Camilla Persson and Julian C. Stanley⁶ identified the relationship between gender and mathematical reasoning ability. They identified that a large sex difference in Mathematical Reasoning Ability exists.

In a more recent study Mukhopadhyay⁷ investigated the need to analyze scientific aptitude. He concluded that scientific aptitude can act as the measure of professional success and it can be measured by designing the aptitude test for various construct.

Teaching Aptitude: Aptitude is our capacity to acquire proficiency, with specifying its composition. The term aptitude is used in several ways. First, it is used to denote a combination of traits and abilities, which result in a person being qualified for some type of occupation or activities. Second, it is intended to convey the idea of discrete unitary characteristics, which is important in various degrees in a variety of occupation and activities. Aptitude for teaching is a condition or set of characteristics including knowledge, understanding, an attitude regarded as symptomatic or indicative of individual’s ability to acquire with training abilities for teaching work.

Sharma⁸ estimated predictor of teachers effectiveness and their mutual relationship at elementary school level before and after one year of training. He found that teaching aptitude is a significant predictor of teacher effectiveness, and the teacher trainee having high teaching aptitude tends to become more effective teacher than the one having low teaching aptitude.

Adval⁹ investigated into qualities of teachers undergoing teachers training. His main aim was to investigate the role of gender in measuring teaching aptitude. He concluded that Controlling for extraneous variable different genders have different measure of teaching aptitude. Another astounding finding was that female teacher trainees have greater Teaching Aptitude than Male Trainees.

Ekstorm, Ruth B.¹⁰ identified the factors affecting student achievement and the relationship between Teacher Aptitudes, Teaching Behaviors and pupil outcomes. They identified the major components which affect student achievement as, teacher knowledge and teacher aptitude.

Banerji¹¹ investigated that is there any relationship between teaching practice and theoretical studies. The results of the study showed that there was a positive correlation between practice teaching and theoretical studies with general intelligence and teaching aptitude.

Methodology

The broad methodology adopted for the study is descriptive in nature. The study is conducted during the period of three months during which the data was collected from teacher trainee student on their teaching aptitude and reasoning skills.

Objective of the study: The teaching aptitude can be thought of as the ability of teacher trainee student to conduct effective teaching. To identify the level of teaching aptitude it was necessary to measure the teaching aptitude of the Teaching Trainee college students of Chhattisgarh region. So first objective was - i. To measure the teaching aptitude of the teaching college students of Chhattisgarh region. Since it was required to find the relation between reasoning ability of the student and its teaching aptitude the second objective was - ii.

To measure the reasoning ability of the teaching college students of Chhattisgarh region. Since a large proportion of teacher trainee students were female it as required to identify that is there any difference between the teaching aptitude and reasoning ability of male and female trainee students, this proportion gave rise to the next two objectives as – iii. To identify the difference in Teaching aptitude of male and female Teaching college student of Chhattisgarh region. iv. To identify the difference in reasoning ability of male and female Teaching college students of Chhattisgarh region. The primary objective of the study was to identify the relationship between teaching aptitude and reasoning ability of teacher trainee student for this it was also necessary to investigate that if there is a relationship, than, does it hold good for male and female separately. So the next three objective focus on this investigation as – v. To discover the relationship between reasoning ability and Teaching aptitude of Teaching College student of Chhattisgarh region. vi. To discover the relationship between reasoning ability and Teaching aptitude of Male Teaching College student of Chhattisgarh region. vii. To discover the relationship between reasoning ability and Teaching aptitude of Female Teaching College student of Chhattisgarh region.

Hypotheses: Hypotheses are assumption about the population of interest based on the objective of the study.

Since it as required to investigate that do the teaching aptitude as well as the reasoning ability of Male and Female teacher trainee student differ in magnitude the first two hypotheses were required to be checked to fulfill these objectives:

H₁: The Teaching Aptitude of Male and Female teacher trainee students of teacher training colleges of Durg Bhilai region do not differ.

H₂: The Reasoning Ability of Male and Female teacher trainee students of teacher training colleges of Durg Bhilai region do not differ.

The relationship between reasoning ability and teaching aptitude were assumed to be non existing and to investigate it following Hypothesis were formed Firstly to check for whole population and then to check for sub population of Male and Female teacher Trainee Students.

H₃: There is no relationship between Teaching Aptitude and Reasoning Ability of teacher trainee students of teacher training colleges of Durg-Bhilai region.

H₄: There is no relationship between Teaching Aptitude and Reasoning Ability of Female teacher trainee students of teacher training colleges of Durg-Bhilai region.

H₅: There is no relationship between Teaching Aptitude and Reasoning Ability of Male Teacher Trainee students of teacher training colleges of Durg-Bhilai region.

Sampling Design: In this study probability sampling design was used. The sampling design was mixed sampling, consisting of stratified sampling at first stage and then using simple probability random sampling to select sample element from each strata.

The sampling frame was the roll list of enrolled student studying in first year of teacher’s training and engineering course. The, sampling frame was the list of student studying in first year of teaching courses in Durg district. First stage strata comprises of male and female student in the total sample. At the last stage random sampling was used to identify the sample elements from each sub strata. The break of the sample items according to gender, will be as follows –

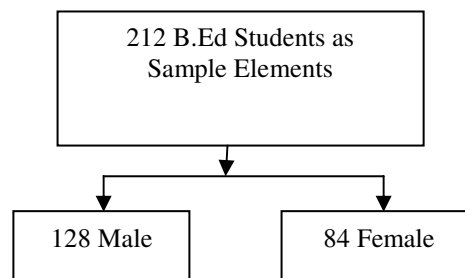


Figure-1: The break of the sample items according to gender

The size of various sample units were decided on the basis of their respective share in population. On analyzing the population it is seen that in Bachelor of Education course the Female are having much greater enrolment as compared to Male. The population of teacher trainee student studying in first year of Bachelor of Education course is 14,950, in Chhattisgarh state, as per National Council of Teacher Education (NCTE), Western Regional Committee (WRC) figures. From the same report it has been observed that enrollment of teacher trainee students in First year of Teacher Trainee course, awarding a degree of Bachelor of Education, comes out to be 4900 in Durg-Bhilai region. As the scope of study covered Durg-Bhilai region the appropriate sample size was determined accordingly, as 250 covering approximately 5% of the population.

Data Collection: After zeroing out the ideal sample size, the roll list of the student in first year of B.Ed. courses as obtained to act as a sampling frame. Initially the first stage stratified sampling was done to segregate the sampling frame into two parts first consisting of Male Teacher Trainee Students and Second strata consisting of Female teacher trainee students. Then in second stage the simple probability random sampling techniques was applied to identify 150 Male and 100 sample elements. Most of the sample elements concentrated in five colleges of Durg city area, few element were from remote area which were dropped and same no of elements were added from city area again following random sampling. It was not possible to collect data from 22 Male and 16 female sample elements as they might have dropped out from the course. This has reduced the sample size to 212 with 128 Male and 84 female elements.

Results and Discussion

Checking the Normality assumption: In order to perform statistical inferential analysis using parametric tests, the critical assumption is that the population follows the normal distribution. While collecting data from sample the variable reasoning ability and teaching aptitude of teacher trainee students were measured. The Sampling Technique adopted was Stratified Probability Sampling, where the strata were Male and Female Teacher Trainee Student. The Normality Assumption was checked in the two strata, by plotting the Histogram and conducting Shapiro-Wilk test for the two variables Reasoning Ability and Teaching Aptitude, so as to confirm the applicability of Inferential Statistical Technique. Shaipro-Wilk test result confirms the approximate Normal data for Reasoning Ability and Teaching Aptitude of both of the groups of Male and Female Teacher Trainees.

Table-1: Tests of Normality.

Variable	Gender of Teacher Trainee	Shapiro-Wilk		
		Statistic	Df	sig
Reasoning Ability	Female	.967	84	.030
	Male	.986	128	.234
Teaching Aptitude	Female	.960	84	.010
	Male	.973	128	.013

The Normality assumption is further strengthened by referring the approximate bell shaped curve drawn on Histograms of both of the variable for both of the groups of Male and Female teacher trainees.

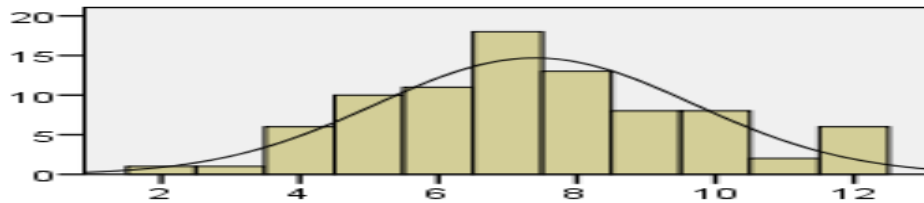


Figure-2: Frequency Histogram Female Frequency/ Reasoning Ability.

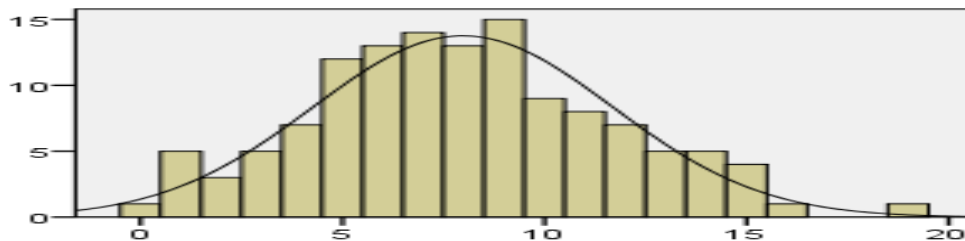


Figure-3: Frequency Histogram Male Frequency/ Reasoning Ability.

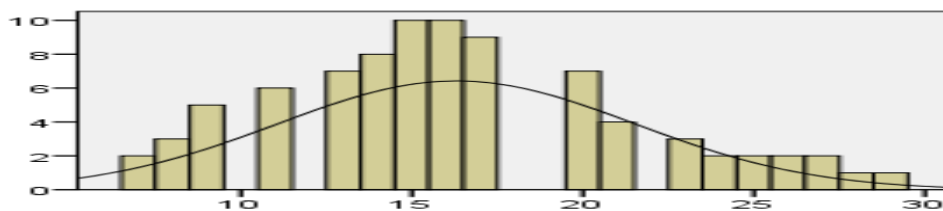


Figure-4: Frequency Histogram Female Frequency/ Teaching Aptitude.

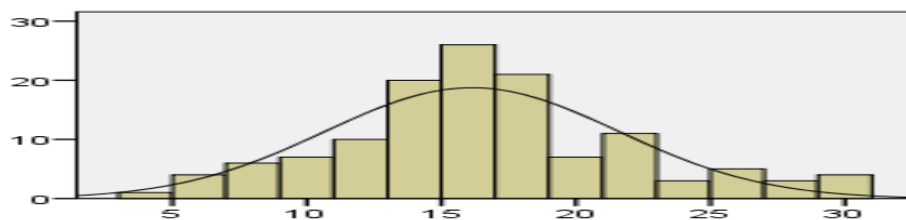


Figure-5: Frequency Histogram Male Frequency/ Engineering Aptitude.

Descriptive Statistics: The descriptive statistics shows that the Reasoning Ability score of Teacher Trainee student range from minimum value of 0 to 19 with the mean score of 7.75 with the standard deviation of 3.22. Whereas the Teaching Aptitude have a minimum score of 4 to the maximum of 30 and it is with the mean score of 16.2 with the standard deviation of 5.34.

While observing the descriptive statistics gender wise it has been found the female teacher trainee have a mean score of 7.39 with a standard deviation of 2.2 for the Reasoning Ability and female have mean score of 16.3 with the standard deviation of 5.2 for the Teaching Aptitude score. The descriptive statistics of male student shows that for the Reasoning Ability score they have a mean value of approximately 8 with a bit higher standard deviation of 3.7 as compared to female group for the same variable. In the case of teaching aptitude male students have mean score of 16.13 with a standard deviation of 5.45.

The Research Question: The first two research question were answered by referring the descriptive statistics of male and female group, and students as a whole. While analyzing the descriptive statistics it was confirmed that there was not much

of the difference in the mean score of Male and Female teacher trainee student score of either in the Reasoning ability score or in the teaching aptitude score. This conclusion also directed us to investigate our 3rd and 4 research question of finding whether significant difference exist between male and female teacher trainee student regarding their reasoning and teaching aptitude score. On conducting independent sample ‘t’ test between male and female students on their score of reasoning ability and teaching aptitude, it was found that there was no significant difference that exist between reasoning ability of male and female student and neither there was any significant difference between teaching aptitude score of male and female teacher trainee students. Hence both of the Hypothesis H₁ and H₂ were accepted.

Correlation Analysis: In order to investigate the research question 5,6 and 7 the correlation analysis is been conducted between Reasoning Ability score and Teaching Aptitude score firstly for all the teacher trainee students and then by grouping students Gender wise. The result of the analysis are given in the Table-5.

Table-2: Statistics (Descriptive).

Variable	N	Minimum Score	Maximum Score	Mean Score	Std. Deviation
Reasoning Ability	212	0	19	7.75	3.228
Teaching Aptitude	212	4	30	16.20	5.347

Table-3: Descriptive Statistics (Gender Wise).

Gender of Teacher Trainee	Variable	N	Minimum	Maximum	Mean	Std. Deviation
Female	Reasoning ability	84	2	12	7.39	2.282
	Teaching aptitude	84	7	29	16.30	5.218
Male	Reasoning ability	128	0	19	7.98	3.711
	Teaching aptitude	128	4	30	16.13	5.450

Table-4: Independent Samples Test.

Equal variance not assumed	t-test for Equality of Means				
	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Reasoning Ability	1.418	209.22	.158	.584	.412
Teaching Aptitude	-.221	183.07	.825	-.165	.746

Table-5: Correlations Analysis for Whole Group.

Variable	Correlations	Reasoning Ability	Teaching Aptitude
Reasoning ability	Pearson Correlation sig.	1	.671**
Teaching aptitude	Pearson Correlation sig.	.671**	1

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

There are indications that there is a strong positive correlation $r=0.671$ between reasoning ability score and teaching aptitude score of the teacher trainee students this correlation was found significant at 0.01 level. On splitting the dataset between groups the correlation analysis was done again and the result are given in the following table.

Table-6: Correlations Analysis for Female Group.

Variable	Correlations	Reasoning Ability	Teaching Aptitude
Reasoning Ability	Pearson Correlation sig.	1	0.6**
Teaching Aptitude	Pearson Correlation sig.	0.6**	1

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

Table-7: Correlations Analysis for Male Group.

Variable	Correlations	Reasoning Ability	Teaching Aptitude
Reasoning Ability	Pearson Correlation sig.	1	0.722**
Teaching Aptitude	Pearson Correlation sig.	.722**	1

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

The result shows that there is a strong significant correlation between Reasoning Ability score and Teaching Aptitude score of both of the groups of male and female students. The correlation is strong and positive and it is even stronger for Male teacher trainee students with $r=0.722$. For female students $r=0.60$.

Table-9: Anova.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2718.782	1	2718.782	172.236	.000 ^b
	Residual	3314.898	210	15.785		
	Total	6033.679	211			

b. Dependent Variable: Teaching Aptitude

Table-10: Coefficients^a.

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	Constant	7.584	.711	10.67	.000
	Reasoning Ability	1.112	.085	1.124	.000

a. Dependent Variable: Teaching Aptitude.

Predicting Teaching Aptitude on the basis of reasoning

Ability Score: During correlation analysis it was observed that there was high degree of significant correlation between Reasoning Ability Score and Teaching Aptitude Score of Teacher Trainee Students. It was then desired to investigate that to what extent we can predict the teaching aptitude of student on the basis of reasoning ability score of students. For this a regression analysis was conducted where reasoning ability score was taken as predictor variable and teaching aptitude score was taken as a dependent variable. The result are given in the following table.

Table-8: Model Summary.

Model	R	R Square	Adjusted R Square	Std. error of the estimate
1	.671 ^a	.451	.448	3.973

a. Predictor: (Constant), Reasoning Ability.

It was observed from the analysis that Reasoning Ability Score was able to explain 45.1% of Variance in the teaching aptitude of teacher trainee students. The result of Anova analysis indicates that the regression coefficient has explain significantly the variation in the response variable. The table of coefficient was able to determine the Model to predict teaching aptitude of students based on the reasoning ability score.

$$\text{Teaching Aptitude} = 7.584 + 1.112 * \text{Reasoning Ability.}$$

The coefficient of model the constant term and three coefficient of reasoning ability was found to be significant.

Conclusion

There has been a through debate in improving the quality of teaching in Primary and Secondary Schools. One way to select those teacher as a participant in Teacher Training colleges who have a higher aptitude to teaching. To achieve this purpose the regular exam conduct to select student teacher trainee should undergo a major reformation.

The importance of reasoning ability has been widely accepted as a parameter to improve professional efficiency. The research conducted on teacher trainee students shows that the male and female teacher trainees do not differ in their teaching aptitude level and also they do not differ in their reasoning ability level. It has also been concluded there seem to be high and significant correlation between teaching aptitude and reasoning ability of thee students. Owing to this conclusion since direct questions of teaching aptitude could not be asked in the entrance examination of teacher trainee it seems if the emphasis is given to the reasoning ability question in the entrance then there are higher chances that we will be able to select teacher trainee student who might develop higher aptitude for teaching during their training.

It can also be concluded that since the reasoning ability score was able to explain approximately 45% of variation in the teaching aptitude score the weight age of reasoning ability in the entrance test should be somewhere close to 45% of the total weight age.

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