

Differential Aptitude Testing of Youth

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Abstract- Aptitude means a natural ability, natural skills or talent. A natural or acquired disposition of capacity for a particular purpose, of tendency to a particular action or effect, as oil an aptitude to burn. The present study on , “ Assessment of Differential Aptitude of college going students”, was under taken during 20011-2012. In this study the population of all the students enrolled in Shri Shivaji College, Akola were considered as a sample. Samples of 120 students from all the faculties were selected randomly. This is an exploratory study and the procedure of simple random sampling method was adopted for drawing the representative sample of 120 students from the population. DAT was administered in two sittings; all the eight tests were administered on various faculty students. Few personal characteristics shown a strong contribution in some aptitude areas where as the other characteristics failed to established correlation with some aptitude areas. Therefore it can be implied that there is a strong correlation of personal characteristics and aptitude of students. Faculty wise correlation seen very significant that is .54, .40, and .46 with verbal reasoning, numerical ability & speed and accuracy respectively. Fathers education & mothers education .25 & .21 established a reasonable correlation with Language Sentence ability of their children. Negative but significant correlation is found predominant in between Gender and certain the areas of Aptitude.

Index Terms- Aptitude, verbal reasoning, numerical ability, abstract reasoning, space relation, Clerical Speed & Accuracy, mechanical reasoning. Faculty, students.

I. INTRODUCTION

In early research, aptitude was defined as the ‘capability of learning a task’. This depends to a large extent on some combination of the characteristics of the learner (Carroll, 1981 cited in Ellis, 2000). The word aptitude is derived from the word Aptos which means ‘fitted for’. According to *Bingham* “Aptitude is a condition or set of characteristics regarded as symptomatic of an individual’s ability to acquire with training some usually specified knowledge, skill or set of responses. Such as the ability to speak a language, to produce music.

Aptitude is a measure of the probable rate of learning which results in interest and satisfaction and is relatively specific & narrow [Van Dusen].

Specific aptitudes are commonly recognized aptitudes that are testable which include:- General Learning Ability, Verbal Aptitude, Numerical Aptitude, Form Perception, Clerical checking also called graphoria ,Inductive reasoning aptitude also called differentiation or inductive learning ability, Finger dexterity aptitude ,Number series aptitude, Indeaphoria also

called creative imagination, Creativity also called creative imagination, Creativity also called remote association, Language learning aptitude, Mechanical Comprehension ,Spatial reasoning, also called special visualization, space visualization or structural visualization ,Symbolic reasoning aptitude, also called analytical reasoning ,Visual memory, Visual pursuit, also called line tracing .

Aptitude testing starts with students, high school or college, making choices about education that will affect the rest of their lives. Choosing a college or career simply based on what friends and family members have done or suggest can be a haphazard way of making such an important decision.

What suits one person or an earlier generation may not work at all for someone else. We know that people are happier and more satisfied in their careers when they choose work that matches their aptitude pattern. Finding a career path that allows them to develop their natural abilities will allow them to express their fullest potential.

Almost anyone can benefit from learning about his or her aptitudes, and how to make use of them high school and college students seeking educational guidance, working adults unhappy or dissatisfied by their current job or career, those returning to the job market, people facing a decision about a promotion or transfer within their current company, or those about to retire.

For the present investigation the Differential Aptitude Test (DAT) is used as a measure and tool for testing the Aptitude of students, Hence the brief description of the DAT is given as-

II. DIFFERENTIAL APTITUDE TEST

The differential aptitude tests (DAT) are the latest genre of the career aptitude tests. It is realized that general aptitude tests are not such powerful to help in screening candidates for all jobs. The differential Aptitude Tests (DAT) battery follows the theory that different individuals have varying levels of interest and intelligence in different fields. Some may be good at math but bad in verbal reasoning. Some may architect language excellently but may be very bad in calculations.

The variety of human society in aptitudes generates a balance. However, total score of general aptitude tests can’t make a true calculation of different kinds of aptitudes. On the other hand the aptitude tests offered by the individual employers are two specific to measure all out potentials. A Differential Aptitude Test measures all kinds of aptitude separately. No doubt the test is scored both individually and collectively but individual scores are given much bigger weight.

It is an integrated battery of guidance tests. It was developed by *George K. Bennett, Harold G. Seashore and Alexander G. Weisman* in 1947 to provide an integrated, scientific and well standardized procedure for measuring the

abilities of boys and girl in grades eight through guidance. While tests were constructed primarily for use in junior and senior high schools they have been used also in the educational and vocational counseling of young adults out of school and in the selection of employees.

The Differential Aptitude Tests were developed and were re-standardized as an integrated battery. The standardization of all eight tests is based on single population. The range of levels is the same for all parts of the battery. Partial matters such as format, instructions, answer-sheets, and time limits were carefully worked out after extensive experimental investigation

The battery includes eight tests: Verbal Reasoning, Numerical Ability, Abstract Reasoning ,Mechanical Reasoning, Space Relations, Language Usage I- Spelling, Language Usage II- Sentences, Clerical Speed & Accuracy.

Although each of the tests is intended to make a unique contribution to the understanding of the individual student, it is advantageous to consider sub-groups of two or more scores together. Thus, the verbal Reasoning, Numerical Ability, and Abstract Reasoning tests measure those functions which are associated with “general Intelligence”. Space Relations and Mechanical Reasoning relate to the student’s abilities to visualize concrete objects and manipulate those visualizations, and to recognize every day physical forces and principles. They are particularly important in dealing with things, rather than with people or words.

The Indian reprint incorporates slight modifications, for a more appropriate application in Indian conditions

Test	What it does	Jobs/fields.
Verbal Reasoning	Verbal Reasoning measures general cognitive ability in positions requiring higher order thinking skills.	-Administrative, -executives, -General Manager etc.
Numerical Ability	Numerical Ability tests the understanding of numerical relationships and facility in handling numerical concepts.	-Project Manager, - Bookkeeper, -Statisticians Shipping Clerk.
Abstract Reasoning	Abstract Reasoning is a nonverbal measure of the ability to perceive relationships in abstract figure patterns.	-Skilled Trades -Computer Programming, -Drafting, -Auto Repair.
Mechanical Reasoning	Mechanical Reasoning Closely parallels the Bennett Mechanical Comprehension Test & measures the ability to understand basic mechanical principles of machinery, tools and motion.	-Carpenter Mechanic -Maintenance, -Worker Assembler.
Space Relations	Space Relations measures the ability to visualize a three-dimensional object from a two-dimensional pattern, and how this object would look if rotated.	-Drafting, -Architecture, -Die-making, -Carpentry clothing Design - Art Decorating Dentistry.
Language Usage	Language Usage measures the ability to detect errors in grammar, punctuation, and capitalization.	

By realizing the importance of aptitude tests in today’s competitive world, the need felt in finding the personal characteristic of students in relation to their potentials & aptitude. The following objectives are set for the purpose of the present investigation.

III. OBJECTIVES OF THE STUDY

1. To study the personal & socioeconomic characteristics of college going students.

2. To study the Differential Aptitude of College going students in eight areas.
3. To ascertain the variation in Differential Aptitude in various eight areas.
4. To ascertain the relationship between personal & Socio-Economic characteristics with Differential Aptitude of college going students.

IV. METHODOLOGY

The population of all the students enrolled in Shri Shivaji College was considered as a sample. A sample of 120 Students from all the faculties was selected randomly. The procedure of simple random sampling method was adopted for drawing the representative sample of 120 students from the population. A Differential Aptitude test was administered to the college going students by giving a brief introduction & purpose of test. Personal interview testing method was used. The test was administered in two attempts as each subtest requires time period to solve.

An exploratory research design and testing method was adopted to collect pertinent facts about Aptitude in various abilities of college going students.

V. ASSESSMENT TOOLS

1. Interview Schedule: - Interview schedule containing various factors like age, education, gender, faculty, father & mothers education, father & mother occupation, family size, family income, & community & other related factors.

2. A Standardized Differential Aptitude Test (DAT) was administered on each student separately. Student attempted all the eight tests of DAT with the interval of half an hour. Initially they were briefed the intention and importance of testing. The following scoring key was used to draw the raw scores.

Test	Maximum Possible Score	Formula	Hand Keys	Notes
Verbal Reasoning	50	R	Rights only	One mark for each item number
Numerical Ability	40	R-1/4 W	Right & Wrongs	One mark for each item number
Abstract Reasoning	50	R-1/4W	Right & Wrongs	One mark for each item number
Space Relations	100	R-W	Rights & wrongs	Multiple marks are permitted for each item number.
Mechanical Reasoning	68	R-1/2 W	Rights & Wrongs	One mark for each item number
Clerical Speed & Accuracy	100	R	Rights only	One mark for each item number Only part II scrod same key for forms A & B
Language Usage Part I Spelling Part II Sentences	100 95	R-W R-W	Rights & wrong Rights & wrongs	One mark for each item number Multiple marks are permitted for each item number.

VI. RESULTS

The second objective of the study is to know the Differential Aptitude of College going students in eight areas. The performance of students of various faculties on DAT is presented in Table 18.

Table 1- Performance of Respondents on various areas of DAT.

Sr.No	Categories	Areas of DAT							
		Verbal Reasoning	Numerical Ability	Abstract Reasoning	Mechanical Reasoning	Space Relations	Language Spelling	Language Sentence	Speed & Accuracy

1	Low	14	54	30	39	74	22	03	13
		(20.00)*	(45.00)	(25.00)	32.5	(61.67)	(18.34)	(2.5)	(10.84)
2	Medium	82	53	65	72	40	84	82	76
		(68.44)	(44.16)	(54.16)	(60.00)	(33.34)	(70.00)	(68.34)	(63.32)
3	High	14	13	25	09	06	14	35	31
		(11.66)	(10.84)	(20.84)	(7.5)	(40.99)	(11.66)	(29.16)	(25.84)
	Total	120	120	120	120	120	120	120	120
		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

* Parenthesis is for percentage values.

Table indicates Aptitude area wise distribution of respondents according to their categories. Numerical ability and space relation are scored less by maximum students ,where as the other areas are more or less similar distribution depicting higher percentage in medium category. Hence it can be concluded that, there is approximately similar distribution of categories of

performance in almost all the areas of aptitude except Abstract Reasoning, Language sentence and Speed & Accuracy. These areas are showing more high scorer students, otherwise rest of the areas are not explained a significant difference in their scores and categories.

Table 2- Coefficient of Correlation between independent & dependent variables.

Sr.No	Independent Variables	Dependent Variables.							
		Verbal Reasoning	Numerical Ability	Abstract Reasoning	Mechanical Reasoning	Space Relation	Language Spelling	Language Sentence	Speed & Accuracy
1	Class	0.027	-0.009	-0.024	-0.094	-0.191*	-0.135	-0.079	-0.159
2	Faculty	0.543**	0.406**	0.164	0.143	-0.083	0.193*	-0.009	0.416**
3	Gender	0.198*	-0.240**	-0.216*	-0.301**	-0.243**	-0.041	0.121	-0.020
4	Age	0.087	0.025	-0.006	-0.112	-0.238**	-0.131	-0.086	-0.108
5	Family Size	-0.044	-0.205*	-0.313**	-0.125	0.011	0.036	-0.147	-0.102
6	Community	-0.056	-0.054	-0.071	0.074	-0.013	-0.078	-0.115	-0.240**
7	Father's Education	0.039	0.131	0.116	0.079	-0.208*	0.042	0.251**	0.171*
8	Father's Occupation	-0.013	0.088	0.075	0.186*	-0.022	0.116	0.013	0.011
9	Mother's Education	0.011	0.097	0.059	0.091	-0.143	0.027	0.231**	0.043
10	Mother's Occupation	0.149	0.163	0.051	0.111	-0.210*	0.054	0.073	0.157
11	Family Economic Condition	0.064	0.134	0.113	0.021	-0.098	0.023	0.233**	0.053

**Significant at 0.01 level of probability (r >0.221) * Significant at 0.05 level of probability (r>0.167)

VII. CORRELATION ANALYSIS BETWEEN INDEPENDENT AND DEPENDENT VARIABLES.

It is revealed from Table 2

1. Relationship with independent variables with Verbal Reasoning ability of students.

The results of correlation analysis between independent and dependent verbal presented in Table 18 indicate that there is positive and significant correlation between the faculties of the students in which they are studying ($r=.543$) and their gender ($r=.198$) with the Verbal reasoning ability of the subjects. No-significant relationship of verbal reasoning was observed with the class (standard), age, family size, community, father's education, father's occupation, Mother's education, Mother's occupation and family economic condition. Thus the verbal reasoning ability of the subjects was positively related with faculty in which they are studying and their gender.

2. Relationship with independent variables with Numerical Ability of subjects :-

The results of co relational analysis between independent and dependent variable given in table 18 revealed that, there is positive and significant correlation between the faculty (0.406) with the Numerical ability of the subjects. Negative and significant correlation between the gender (-0.240) and family size (-0.205) was noted with the numerical ability of subjects. Nonsignificant relationship of Numerical ability was observed with the class, age ;community, father's education, father's occupation, mother's education, mother's occupation and family economic condition. The faculty in which the subjects were studying happens to influence positively the numerical ability and gender and family size in negative direction.

3. Relationship with independent variables with Abstract Reasoning of subject:-

The co relational analysis between independent and dependent variables reported in Table 18 reveals that, the gender (-0.216) and family size (-0.313) of the subject are found to be negatively correlated with the abstract reasoning of the subjects. No-significant relationship of abstract reasoning was observed with the class, age, faculty, community, father's education, father's occupation, mothers' education, mother's occupation, family economic condition.

4. Relationship with independent variables with Mechanical Reasoning of subject:-

The correlational analysis between independent and dependent variables bring out that (Table 18) the father's occupation (0.186) was found to be positively and significantly correlated with the mechanical reasoning of the subjects. Negative and significant correlation between the gender (-0.301) was noted with the mechanical reasoning of the subjects. No-significant relationship of mechanical reasoning was observed with the class, faculty, age, family size, community, father's education, mother's education, mother's occupation and family economic condition, with mechanical reasoning ability of subjects.

5. Relationship with independent variables with Space relation of subject:-

The coefficient of correlation between independent and dependent variables presented in Table 18 point out that, there is a negative and significant correlation between the class (-0.191), gender (-0.243), age (-0.238), father's education (-0.208) and mother's occupation (-0.210) with space relation ability of the subjects. No-significant relationships of space relation were observed with the faculty, family size, community, father's occupation, mother's education and family economic condition.

6. Relationship with independent variables with Language Spelling ability of students:-

The faculty of the subjects (0.193) was found to be positively and significantly correlated with the language spelling ability of the subjects (Table 18). No-significant relationship of language spelling ability was observed with the class, gender, age, family size, community, father's education, father's occupation, mother's occupation, mother's education, and family economic condition with the language spelling ability of the subjects.

7. Relationship with independent variables with Language Sentence ability of subject :-

The results of correlation analysis presented in Table 18 indicated that, there is positive and significant correlation between the father's education (0.251), mother's education (0.231) and family economic condition (0.233) with the language sentence ability of the subjects. No-significant relationship of Language sentence ability was noted with the class, faculty, gender, age, family size, community, father's occupation and mother's occupation with the language sentence ability of subjects.

8. Relationship with independents with Speed & Accuracy ability of students.

The results presented in Table 18 indicate that, the faculty of the subjects (0.416), father's education (0.171) have established positive and significant correlation with the speed and accuracy ability of the subjects. The subject (-0.240) was found to significantly and negatively correlated with the speed accuracy ability of the subjects. The class, gender, age, family size, father's occupation, mother's education, mother's occupation, and family economic condition were found to have non-significant correlation with speed and accuracy of subjects.

VIII. CONCLUSIONS

Hence it is conclude that there is a variation in results, as few personal characteristics shown a strong contribution in some aptitude areas where as the other characteristics failed to established correlation with some aptitude areas. Therefore it can be implied that there is a strong correlation of personal characteristics and aptitude of students. Faculty wise correlation seen very significant that is .54, .40, and .46 with verbal reasoning, numerical ability & speed and accuracy respectively. Fathers education & mothers education .25 & .21 established a reasonable correlation with Language Sentence ability of their

children. Negative but significant correlation is found predominant in between Gender and certain the areas of Aptitude

IX. IMPLICATIONS

The implications of the study are three fold.

1. Choice of faculty, Parents Education, economical conditions of family can play a major role in building Aptitude in children in most of the areas.
2. Counseling for Aptitude Testing and group interaction can be more effective than personal characteristics of students in enhancing aptitude capabilities.
3. In groups, students with special aptitude can involve themselves productively and learn new intellectual and aptitude skills in that particular area.

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