# Impact of Cognitive Tasks on Scholastic Achievement among 14 Year Old Students

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**Abstract: Educational process is complete when the objectives are met, and with this purpose, teachers select instructional methods, media and evaluation. The study was conducted on a sample of 493 students who were 14 years of age. The sample was selected from private schools of Punjab and Chandigarh. They were divided into experimental and control groups. During the programme, five assessments were conducted on all the respondents but the worksheets were given only to the subjects in experimental group. The entire programme was taken up in around 12 months. Eventually, it was found that owing to the personalized instructions system to teach students in experimental group, there was witnessed significant soar in their cognitive abilities and academic achievement. In contrast, insignificant changes were witnessed among their control group counterparts after the intervention programme.**

**Keywords: Intelligence Quotient, Focus Factor, Decision Making Ability, Creative Quotient, Academic Achievement, Intervention Programme, Chandigarh, Punjab**

## 1. Introduction

Learner-centered approach is a foundation to create positive learning contexts to increase the likelihood of more students experiencing success and all students of learning. Teachers provide a variety of instructional methods and techniques for helping learners construct their learning. Differentiated instruction meets the needs of diverse student populations by coupling student needs with a focus on content, process, and learner characteristics. Learner needs and characteristics take precedence over knowledge of facts and skills; the emphasis is on engaging learners in learning for understanding and thinking, to help them build their own conclusions. Multiple intelligence approach brings better academic achievement, appropriate student behaviour and efficient classroom management. Haley (2004) conducted a research study to find out the impact of multiple intelligence in classroom setting. It was found that students of experimental group who were receiving multiple intelligences based instruction witnessed the best performance than that of the control group who had received teacher centered instructions. Kornhaber (2004) established an investigation in the Project SUMIT Schools, wherein multiple intelligence theory was implemented for three years. In this concern, the findings revealed that 78% schools recorded improvements in test scores and 49% of schools associated this improvement with multiple intelligence techniques. But, in this regard, Kardkall (2007) conducted a research study to validate the importance of self-estimation and performance. Results verified that their

self-estimation level is a key indicator of creativity, achievement and performance. Diamond, Barnett, Thomas and Munro (2007) found that in a larger classroom context, data on the development and trainability of attention raises important considerations for supporting selective attention skills of students. Some children may need more cues to support their ability to selectively attend. This may, for some children, involve limiting distractors or presenting a longer opportunity to orient so that a child is prepared to deal with distractions. The results further indicate that the students who have higher focus factor i.e. focused attention score significantly high in academics. Owolabi and Okebukola (2009) carried a study to find the impact of use of multiple intelligence methods of teaching on the reading ability of science students. The results of the study revealed that there was significant difference in performance of the groups taught using study groups and multiple Intelligences methods. The achievement among those taught through multiple Intelligences methods was significantly high. Rogers (2009) carried a research study on the effectiveness of multiple intelligence and the academic achievement of students to find out whether there was any significant relationship between the two aspects. The results traced that there existed a significant relationship between verbal and logical mathematical intelligence and academic achievement among students. Morgan (2010) took up a research study on the curriculum of a learning home whose curriculum was based on multiple intelligence theory. The findings suggested that the academic achievement rose following the multiple intelligence based curriculum and that the students were more involved in curricular as well as extracurricular activities. Olatoye, Akintunde and Yakasi (2010) conducted a research to study the interrelationship between multiple intelligences and science interest. The results indicated that the components of multiple intelligences precisely logical intelligence, spatial intelligence, naturalistic Intelligences and intrapersonal intelligences have significant correlation with science interest among students. Abidin, Rezaee, Abdullah and Singh (2011) conducted a research to study the correlation between intelligence, creativity and academic achievement among 11th standard male students. The results indicated that the relation between creativity and intelligence was positive but low while academic achievement influenced the relation between intelligence and creativity; a positive but low relation was notified between academic achievement and creativity and there was a linear relation between academic achievement and intelligence. Al-Salameh (2012) reported that multiple intelligences theory is seriously deficient because the grounds on the basis of which these intelligence are taken, are subjective and arbitrary in nature. Balagué, Hristovski, Aragonés andTenenbaum (2012) explored the demographic factors and their impact on decision making among early and middle adolescents and results indicated that the respondents gained decision-making skills as a result of learning. In addition, all demographic categories, particularly gender was the main determiner of decision making, girls scored higher than boys in decision making. Putwain, Sander and Larkin (2013) examined the relationship between creativity and self-estimation. It was found that creativity and self-estimation were positively related. The results by Das and Pattanaik (2013) revealed that self-esteem, perfect estimation and locus of control play a major role in the academic achievement of students. Pelley (2014) carried a research study to investigate the impact of multiple intelligences based curriculum on the performance of students. The findings of the study depicted that there was no difference between multiple intelligences curriculum and traditional teaching system. Dhall (2014) made an investigation of cognitive abilities, learning nature and study skills as predictors of academic achievement of prospective teachers and found that examination mastery along with cognitive abilities and imaginative style was found to be a good predictor of academic achievement. Nawaz, Atta and Khan (2015) conducted a survey to find

relationship between self-concept and school achievement of pupils. Results indicated that the self estimation level of students and their school achievement were positively related. Tias, Istamar, Atmoko and Corebima (2015) found that academic achievement can be used as an indicator of learning success. Amitha and Vijayalaxmi (2017) carried a review study to examine the multiple intelligence approach in school curriculum and concluded that the multiple intelligence approach is better than the traditional teaching methods. The study also indicated that multiple intelligence approach is more beneficial than traditional approach in meeting the academic needs of children. Results pointed out towards the significance of teaching based on multiple intelligences theory. It was revealed that multiple intelligence teaching approach had improved the academic achievement among subjects. Similar findings have been witnessed by Abdi and Ahmadyan (2013), Akkuzu and Akçay (2011), Ary et al. (2018), Ayalew, Mikre and Tefera (2016), Baş (2010), Bayley (1955), Bechtel, Abrahamsen and Graham (2017), Benedek et al. (2014), Binet and Simon (1916) and Binet and Simon (1961).

## 2. Methodology

The study was conducted on a sample of 493 students who were 14 years of age. Respondents were further categorised on the basis of gender and eventually into experimental and control group. The experimental group refers to the group under study which receives the intervention during the course of study to find out the variation and changes in the dependent variables precisely intelligence quotient, focus factor, decision making ability, creative quotient and academic achievement before, during and after the implementation of intervention program. The control group refers to the group under study which is refrained from the provision of any intervention during the course of study. Intervention included worksheets based on Gardner's multiple intelligences. Each student was given worksheets according to his own natural learning style which was assessed during the programme. The control group refers to the group under study. At the initial stage, rapport was built with the all the respondents following the consent was taken. The respondents were encouraged to participate actively and the entire process was explained to them. On the first day of the programme, all the respondents were assessed prior to the intervention, this pre assessment was termed as TA-1. After the first intervention, the respondents in the experimental group were given customized tasksheets for three months. Students were to attempt two tasksheets daily on regular basis. These tasksheets were different for students with different dominant multiple intelligence which was assessed in TA-1. In this way, the respondents in experimental group received sheets based on their respective intelligences. However, the subjects in the control group were not given any such worksheets and were thus excluded from the intervention programme. After three months, TA-2 was conducted on respondents of both the experimental as well as the control group. After this, subjects in experimental group were given tasksheets for next three months while no intervention was given to control group. After this, TA-3 was conducted following which experimental group received next three months' tasksheets. Later TA-4 was conducted and three months' tasksheets were given to experimental group. After this, TA-5 was conducted at the final level. In this way, five assessments were conducted in all, on all the respondents but the worksheets were given only to the subjects in experimental group. The entire programme was taken up in around 12 months.

Table 1: Sampling Procedure

| Age (years) | Total Sample | Gender | N | Place | n | Experimental Group | Control Group |
|---|---|---|---|---|---|---|---|
| 14 | 493 | Male | 231 | Punjab | 134 | 67 | 67 |
| | | | | Chandigarh | 97 | 49 | 48 |
| | | Female | 262 | Punjab | 137 | 64 | 73 |
| | | | | Chandigarh | 125 | 73 | 52 |

## 3. Results

When IQ in all tests among males was compared, there was insignificant difference between IQ 1 of experiment and control group in Chandigarh whereas in Punjab, the difference was significant. Later in all subsequent tests, the difference came out to be statistically significant. Among females, significant difference was found in their IQ 3, IQ 4 and IQ 5 at both the places along with IQ 2 of females in Chandigarh. The mean value ranged from 96.18 to 127.6 in experiment group while it ranged from 92.31 to 98.97 in control group. Among females, the mean value ranged from 89.53 to 119.2 in experiment group while it ranged from 88.32 to 95.67 in control group. The mean value of experiment group was higher than the control group in all the tests. When the IQ in all tests of respondents in experiment group was compared gender wise, significant difference was found between males and females in case of experiment group, except in case of their IQ 2 in Chandigarh. However, insignificant difference was found in among their control group counterparts in all the tests. Females had lower values as compared to males. The mean values among males ranged from 96.18 to 127.6 and among females ranged from 89.53 to 119.2. In control group, females had lower values as compared to males. The mean values among males ranged from 92.31 to 98.97 and among females ranged from 88.32 to 95.67. When comparison was made between males of Chandigarh and Punjab, insignificant difference was found between their IQ in experiment as well as control group in all the tests. Similarly, no significant difference was found among females except in case of IQ 2 between females of Chandigarh and Punjab in experiment group. The mean of IQ varied from 94.9 to 125.7 in Chandigarh while in Punjab it varied from 92.31 to 127.6. In case of females, the mean of IQ varied from 88.32 to 116.1 in Chandigarh while in Punjab it varied from 91.28 to 119.2.

Table 2: Details of IQ

| 14 | Place | Gp | N | Mean | SD | Place | M/F | N | Mean | SD | Gp | Place | N | Mean | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exp. and Control Group, Male | | | | | | Gender wise, Experiment | | | | | Area wise, Male | | | | |
| IQ1 | Ch | E | 49 | 96.18 | 12.99 | Ch | M | 49 | 96.18* | 12.99 | Ex | C | 49 | 96.18 | 12.99 |
| | | C | 48 | 94.90 | 14.62 | | F | 73 | 89.53 | 15.41 | | Pb | 67 | 97.66 | 14.42 |
| | Pb | E | 67 | 97.66* | 14.42 | Pb | M | 67 | 97.66* | 14.42 | Co | C | 48 | 94.90 | 14.62 |
| | | C | 67 | 92.31 | 13.57 | | F | 64 | 91.28 | 13.54 | | Pb | 67 | 92.31 | 13.57 |
| I | Ch | E | 49 | 104.9* | 14.17 | Ch | M | 49 | 104.9 | 14.17 | Ex | C | 49 | 104.9 | 14.17 |
| | | C | 48 | 95.88 | 14.62 | | F | 73 | 103.5 | 16.81 | | Pb | 67 | 106.5 | 15.73 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pb | E | 67 | 106.5* | 15.73 | Pb | M | 67 | 106.5* | 15.73 | Co | C | 48 | 95.88 | 14.62 |
| | | C | 67 | 94.09 | 13.57 | | F | 64 | 93.29 | 14.78 | | Pb | 67 | 94.09 | 13.57 |
| IQ3 | Ch | E | 49 | 114.5* | 15.47 | Ch | M | 49 | 114.5* | 15.47 | Ex | C | 49 | 114.5 | 15.47 |
| | | C | 48 | 96.92 | 14.71 | | F | 73 | 106.6 | 18.35 | | Pb | 67 | 116.2 | 17.17 |
| | Pb | E | 67 | 116.2* | 17.17 | Pb | M | 67 | 116.2* | 17.17 | Co | C | 48 | 96.92 | 14.71 |
| | | C | 67 | 94.31 | 13.64 | | F | 64 | 108.7 | 16.12 | | Pb | 67 | 94.31 | 13.64 |
| IQ4 | Ch | E | 49 | 120.4* | 17.49 | Ch | M | 49 | 120.4* | 17.49 | Ex | C | 49 | 120.4 | 17.49 |
| | | C | 48 | 98.04 | 14.81 | | F | 73 | 111.3 | 20.05 | | Pb | 67 | 122.2 | 19.08 |
| | Pb | E | 67 | 122.2* | 19.08 | Pb | M | 67 | 122.2* | 19.08 | Co | C | 48 | 98.04 | 14.81 |
| | | C | 67 | 95.67 | 13.79 | | F | 64 | 114.1 | 18.10 | | Pb | 67 | 95.67 | 13.79 |
| IQ5 | Ch | E | 49 | 125.7* | 18.40 | Ch | M | 49 | 125.7* | 18.40 | Ex | C | 49 | 125.7 | 18.40 |
| | | C | 48 | 98.97 | 14.99 | | F | 73 | 116.1 | 21.03 | | Pb | 67 | 127.6 | 20.02 |
| | Pb | E | 67 | 127.6* | 20.02 | Pb | M | 67 | 127.6* | 20.02 | Co | C | 48 | 98.97 | 14.99 |
| | | C | 67 | 96.82 | 13.94 | | F | 64 | 119.2 | 19.00 | | Pb | 67 | 96.82 | 13.94 |
| Exp. and Control Group, Female | | | | | | Gender wise, Control | | | | | Area wise, Female | | | | |
| IQ1 | Ch | E | 73 | 89.53 | 15.41 | Ch | M | 48 | 94.90* | 14.62 | Ex | C | 73 | 89.53 | 15.41 |
| | | C | 52 | 88.32 | 15.83 | | F | 52 | 88.32 | 15.83 | | Pb | 64 | 91.28 | 13.54 |
| | Pb | E | 64 | 91.28 | 13.54 | Pb | M | 67 | 92.31 | 13.57 | Co | C | 52 | 88.32 | 15.83 |
| | | C | 73 | 91.58 | 16.83 | | F | 73 | 91.58 | 16.83 | | Pb | 73 | 91.58 | 16.83 |
| IQ2 | Ch | E | 73 | 103.5* | 16.81 | Ch | M | 48 | 95.88* | 14.62 | Ex | C | 73 | 103.5* | 16.81 |
| | | C | 52 | 89.30 | 15.83 | | F | 52 | 89.30 | 15.83 | | Pb | 64 | 93.29 | 14.78 |
| | Pb | E | 64 | 93.29 | 14.78 | Pb | M | 67 | 94.09 | 13.57 | Co | C | 52 | 89.30 | 15.83 |
| | | C | 73 | 92.56 | 16.83 | | F | 73 | 92.56 | 16.83 | | Pb | 73 | 92.56 | 16.83 |
| IQ3 | Ch | E | 73 | 106.6* | 18.35 | Ch | M | 48 | 96.92* | 14.71 | Ex | C | 73 | 106.6 | 18.35 |
| | | C | 52 | 90.29 | 15.97 | | F | 52 | 90.29 | 15.97 | | Pb | 64 | 108.7 | 16.12 |
| | Pb | E | 64 | 108.7* | 16.12 | Pb | M | 67 | 94.31 | 13.64 | Co | C | 52 | 90.29 | 15.97 |
| | | C | 73 | 93.57 | 16.94 | | F | 73 | 93.57 | 16.94 | | Pb | 73 | 93.57 | 16.94 |
| IQ4 | Ch | E | 73 | 111.3* | 20.05 | Ch | M | 48 | 98.04* | 14.81 | Ex | C | 73 | 111.3 | 20.05 |
| | | C | 52 | 91.51 | 16.16 | | F | 52 | 91.51 | 16.16 | | Pb | 64 | 114.1 | 18.10 |
| | Pb | E | 64 | 114.1* | 18.10 | Pb | M | 67 | 95.67 | 13.79 | Co | C | 52 | 91.51 | 16.16 |
| | | C | 73 | 94.76 | 16.95 | | F | 73 | 94.76 | 16.95 | | Pb | 73 | 94.76 | 16.95 |
| IQ5 | Ch | E | 73 | 116.1* | 21.03 | Ch | M | 48 | 98.97* | 14.99 | Ex | C | 73 | 116.1 | 21.03 |
| | | C | 52 | 92.17 | 16.41 | | F | 52 | 92.17 | 16.41 | | Pb | 64 | 119.2 | 19.00 |
| | Pb | E | 64 | 119.2* | 19.00 | Pb | M | 67 | 96.82 | 13.94 | Co | C | 52 | 92.17 | 16.41 |
| | | C | 73 | 95.67 | 17.27 | | F | 73 | 95.67 | 17.27 | | Pb | 73 | 95.67 | 17.27 |

Table 3: Comparison of IQ

| Male | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Place | Chandigarh | | | | Punjab | | | |
| Group | Ex | | Co | | Ex | | Co | |
| IQ | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| IQ1 | 96.18* | 12.99 | 94.91 | 14.62 | 97.66* | 14.42 | 92.32 | 13.57 |
| IQ2 | 104.9* | 14.17 | 95.89 | 14.62 | 106.5* | 15.73 | 94.10 | 13.57 |
| IQ3 | 114.5* | 15.47 | 96.93 | 14.71 | 116.2* | 17.17 | 94.31 | 13.64 |
| IQ4 | 120.4* | 17.49 | 98.04 | 14.81 | 122.2* | 19.08 | 95.68 | 13.79 |
| IQ5 | 125.7* | 18.40 | 98.98 | 14.99 | 127.6* | 20.02 | 96.82 | 13.94 |
| | Female | | | | | | | |
| IQ1 | 89.53* | 15.41 | 88.33 | 15.83 | 91.28* | 13.54 | 91.58 | 16.83 |
| IQ2 | 103.5* | 16.81 | 89.31 | 15.83 | 93.29* | 14.78 | 92.56 | 16.83 |
| IQ3 | 106.6* | 18.35 | 90.30 | 15.97 | 108.7* | 16.12 | 93.57 | 16.94 |
| IQ4 | 111.3* | 20.05 | 91.52 | 16.16 | 114.1* | 18.10 | 94.76 | 16.95 |
| IQ5 | 116.1* | 21.03 | 92.17 | 16.41 | 119.2* | 19.00 | 95.67 | 17.27 |

* Statistically significant differences

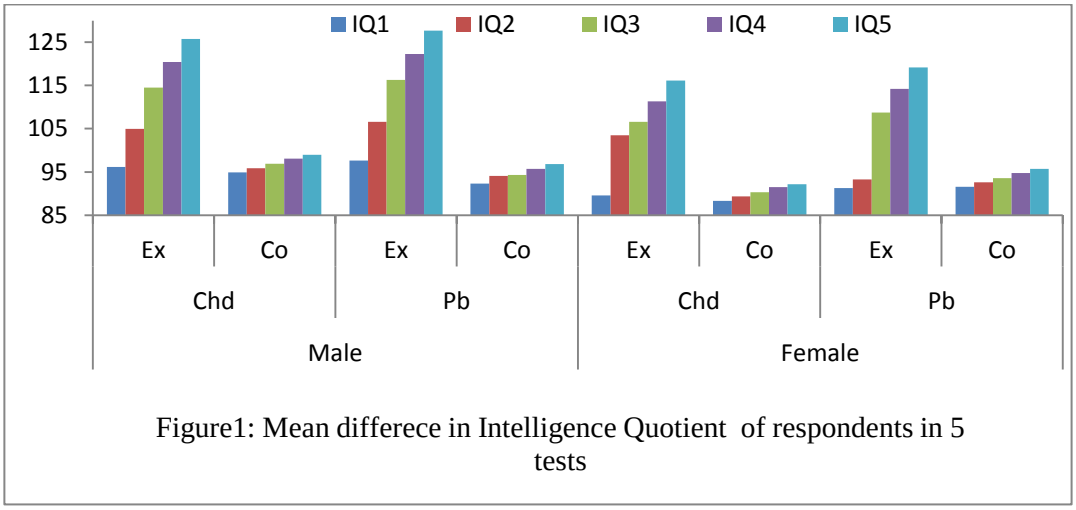


Figure1: Mean differece in Intelligence Quotient of respondents in 5 tests

Table 4: Details of FF

| 14 | Place | Gp | N | Mean | SD | Place | M/F | N | Mean | SD | Gp | Place | N | Mean | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exp. and Control Group, Male | | | | | | Gender wise, Experiment | | | | | Area wise, Male | | | | |
| FF1 | Ch | E | 49 | 51.20 | 14.21 | Ch | M | 49 | 51.20 | 14.21 | Ex | C | 49 | 51.20 | 14.21 |
| | | C | 48 | 49.24 | 15.40 | | F | 73 | 48.65 | 15.43 | | Pb | 67 | 50.96 | 14.72 |
| | Pb | E | 67 | 50.96 | 14.72 | Pb | M | 67 | 50.96 | 14.72 | Co | C | 48 | 49.24 | 15.40 |
| | | C | 67 | 49.73 | 14.42 | | F | 64 | 47.11 | 15.39 | | Pb | 67 | 49.73 | 14.42 |
| FF2 | Ch | E | 49 | 55.87 | 15.51 | Ch | M | 49 | 55.87 | 15.51 | Ex | C | 49 | 55.87 | 15.51 |
| | | C | 48 | 50.22 | 15.40 | | F | 73 | 53.09 | 16.84 | | Pb | 67 | 55.61 | 16.06 |
| | Pb | E | 67 | 55.61 | 16.06 | Pb | M | 67 | 55.61 | 16.06 | Co | C | 48 | 50.22 | 15.40 |
| | | C | 67 | 50.71 | 14.42 | | F | 64 | 51.41 | 16.80 | | Pb | 67 | 50.71 | 14.42 |
| FF3 | Ch | E | 49 | 60.97* | 16.93 | Ch | M | 49 | 60.97 | 16.93 | Ex | C | 49 | 60.97 | 16.93 |
| | | C | 48 | 50.99 | 15.52 | | F | 73 | 57.94 | 18.38 | | Pb | 67 | 60.69 | 17.52 |
| | Pb | E | 67 | 60.69* | 17.52 | Pb | M | 67 | 60.69 | 17.52 | Co | C | 48 | 50.99 | 15.52 |
| | | C | 67 | 51.56 | 14.48 | | F | 64 | 56.10 | 18.33 | | Pb | 67 | 51.56 | 14.48 |
| FF4 | Ch | E | 49 | 64.22* | 17.73 | Ch | M | 49 | 64.22 | 17.73 | Ex | C | 49 | 64.22 | 17.73 |
| | | C | 48 | 51.60 | 15.74 | | F | 73 | 60.70 | 19.25 | | Pb | 67 | 63.99 | 18.68 |
| | Pb | E | 67 | 63.99* | 18.68 | Pb | M | 67 | 63.99 | 18.68 | Co | C | 48 | 51.60 | 15.74 |
| | | C | 67 | 52.33 | 14.73 | | F | 64 | 59.07 | 19.46 | | Pb | 67 | 52.33 | 14.73 |
| FF5 | Ch | E | 49 | 67.04* | 18.51 | Ch | M | 49 | 67.04 | 18.51 | Ex | C | 49 | 67.04 | 18.51 |
| | | C | 48 | 52.09 | 15.90 | | F | 73 | 63.34 | 20.09 | | Pb | 67 | 66.82 | 19.53 |
| | Pb | E | 67 | 66.82* | 19.53 | Pb | M | 67 | 66.82 | 19.53 | Co | C | 48 | 52.09 | 15.90 |
| | | C | 67 | 52.93 | 14.84 | | F | 64 | 61.66 | 20.35 | | Pb | 67 | 52.93 | 14.84 |
| Exp. and Control Group, Female | | | | | | Gender wise, Control | | | | | Area wise, Female | | | | |
| FF1 | Ch | E | 73 | 48.65 | 15.43 | Ch | M | 48 | 49.24 | 15.40 | Ex | C | 73 | 48.65 | 15.43 |
| | | C | 52 | 49.28 | 15.59 | | F | 52 | 49.28 | 15.59 | | Pb | 64 | 47.11 | 15.39 |
| | Pb | E | 64 | 47.11 | 15.39 | Pb | M | 67 | 49.73 | 14.42 | Co | C | 52 | 49.28 | 15.59 |
| | | C | 73 | 50.71 | 12.87 | | F | 73 | 50.71 | 12.87 | | Pb | 73 | 50.71 | 12.87 |
| FF2 | Ch | E | 73 | 53.09 | 16.84 | Ch | M | 48 | 50.22 | 15.40 | Ex | C | 73 | 53.09 | 16.84 |
| | | C | 52 | 50.26 | 15.59 | | F | 52 | 50.26 | 15.59 | | Pb | 64 | 51.41 | 16.80 |
| | Pb | E | 64 | 51.41 | 16.80 | Pb | M | 67 | 50.71 | 14.42 | Co | C | 52 | 50.26 | 15.59 |
| | | C | 73 | 51.69 | 12.86 | | F | 73 | 51.69 | 12.86 | | Pb | 73 | 51.69 | 12.86 |
| FF3 | Ch | E | 73 | 57.94* | 18.38 | Ch | M | 48 | 50.99 | 15.52 | Ex | C | 73 | 57.94 | 18.38 |
| | | C | 52 | 50.97 | 15.78 | | F | 52 | 50.97 | 15.78 | | Pb | 64 | 56.10 | 18.33 |
| | Pb | E | 64 | 56.10 | 18.33 | Pb | M | 67 | 51.56 | 14.48 | Co | C | 52 | 50.97 | 15.78 |
| | | C | 73 | 52.45 | 12.98 | | F | 73 | 52.45 | 12.98 | | Pb | 73 | 52.45 | 12.98 |
| FF4 | Ch | E | 73 | 60.70* | 19.25 | Ch | M | 48 | 51.60 | 15.74 | Ex | C | 73 | 60.70 | 19.25 |
| | | C | 52 | 51.67 | 16.04 | | F | 52 | 51.67 | 16.04 | | Pb | 64 | 59.07 | 19.46 |
| | Pb | E | 64 | 59.07* | 19.46 | Pb | M | 67 | 52.33 | 14.73 | Co | C | 52 | 51.67 | 16.04 |
| | | C | 73 | 53.14 | 13.15 | | F | 73 | 53.14 | 13.15 | | Pb | 73 | 53.14 | 13.15 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FF5 | Ch | E | 73 | 63.34* | 20.09 | Ch | M | 48 | 52.09 | 15.90 | Ex | C | 73 | 63.34 | 20.09 |
| | | C | 52 | 52.05 | 16.19 | | F | 52 | 52.05 | 16.19 | | Pb | 64 | 61.66 | 20.35 |
| | Pb | E | 64 | 61.66* | 20.35 | Pb | M | 67 | 52.93 | 14.84 | Co | C | 52 | 52.05 | 16.19 |
| | | C | 73 | 53.66 | 13.43 | | F | 73 | 53.66 | 13.43 | | Pb | 73 | 53.66 | 13.43 |

As evident from the above table, significant difference was recorded between experiment and control group in case of their FF 3, FF 4 and FF 5 among males. Moreover, among females, the difference was also found to be significant in the FF 3 in Chandigarh. Similarly females of Punjab as well as Chandigarh were found to be significantly different in their FF 4 and FF 5. The mean value ranged from 50.96 to 67.04 in experiment group while it ranged from 49.24 to 52.93 in control group. The mean value of experiment group was higher than the control group in all the tests. Among females, the mean value ranged from 47.11 to 63.34 in experiment group while it ranged from 49.28 to 53.66 in control group. The mean value of experiment group was lower than the control group in all the tests. When the FF of respondents in experiment group was compared gender wise, insignificant difference was found in all the cases. Same trend was followed in case of respondents in control group. Females had lower values as compared to males. The mean values among males ranged from 50.96 to 67.04 and among females ranged from 47.11 to 63.34. In control group, females had higher values as compared to males. The mean values among males ranged from 49.24 to 52.93 and among females ranged from 49.28 to 53.66. When the comparison was made between males of Chandigarh and Punjab in control as well as experiment group, no significant difference was found between their FF of the 5 tests in any of the groups. Same trend was followed in case of females. The mean of FF varied from 49.24 to 67.04 in Chandigarh while in Punjab it varied from 49.73 to 66.82. In case of females, the mean of FF varied from 48.65 to 63.34 in Chandigarh while in Punjab it varied from 47.11 to 61.66.

Table 5: Comparison of FF

| Male | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Place | Chandigarh | | | | Punjab | | | |
| Group | Ex | | Co | | Ex | | Co | |
| FF | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| FF1 | 51.20* | 14.21 | 49.24 | 15.40 | 50.96* | 14.72 | 49.73 | 14.42 |
| FF2 | 55.87* | 15.51 | 50.22 | 15.40 | 55.61* | 16.06 | 50.71 | 14.42 |
| FF3 | 60.97* | 16.93 | 51.00 | 15.52 | 60.69* | 17.52 | 51.57 | 14.48 |
| FF4 | 64.22* | 17.73 | 51.60 | 15.74 | 63.99* | 18.68 | 52.33 | 14.73 |
| FF5 | 67.04* | 18.51 | 52.10 | 15.90 | 66.82* | 19.53 | 52.94 | 14.84 |
| | Female | | | | | | | |
| FF1 | 48.65* | 15.43 | 49.28 | 15.59 | 47.11* | 15.39 | 50.71 | 12.87 |
| FF2 | 53.09* | 16.84 | 50.26 | 15.59 | 51.41* | 16.80 | 51.69 | 12.86 |
| FF3 | 57.94* | 18.38 | 50.97 | 15.78 | 56.10* | 18.33 | 52.46 | 12.98 |
| FF4 | 60.70* | 19.25 | 51.68 | 16.04 | 59.07* | 19.46 | 53.15 | 13.15 |
| FF5 | 63.34* | 20.09 | 52.05 | 16.19 | 61.66* | 20.35 | 53.67 | 13.43 |

* Statistically significant differences

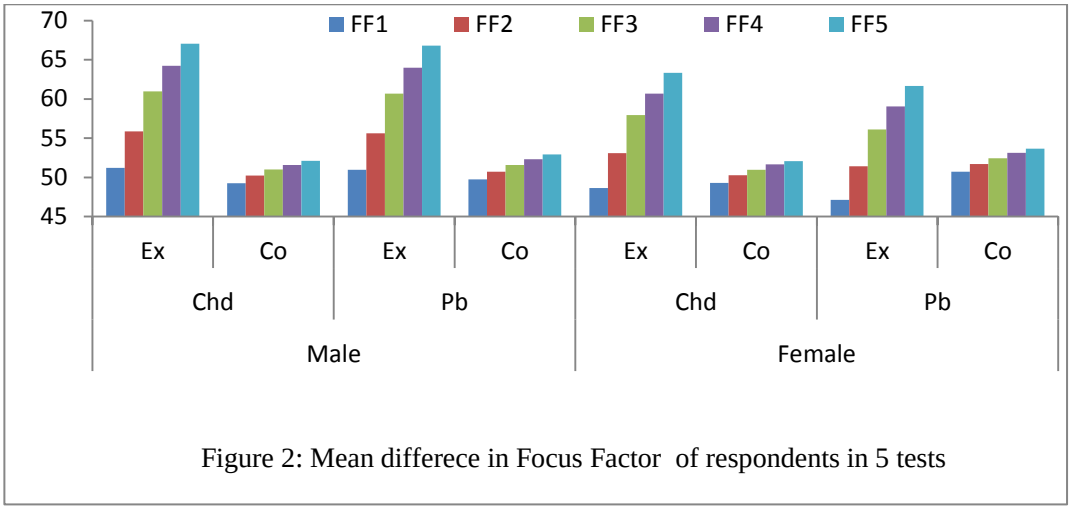


Figure 2: Mean differece in Focus Factor of respondents in 5 tests

Table 6: Details of DMA

| 14 | Place | Gp | N | Mean | | Place | M/F | N | Mean | | Gp | Place | N | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exp. and Control Group, | | | | | | Gender wise, | | | | | Area wise, Male | | | | |
| DMA1 | Ch | E | 49 | 0.24 | 0.08 | Ch | M | 49 | 0.24 | 0.08 | Ex | C | 49 | 0.24 | 0.08 |
| | | C | 48 | 0.23 | 0.08 | | F | 73 | 0.23 | 0.08 | | P | 67 | 0.24 | 0.08 |
| | Pb | E | 67 | 0.24 | 0.08 | Pb | M | 67 | 0.24 | 0.08 | Co | C | 48 | 0.23 | 0.08 |
| | | C | 67 | 0.23 | 0.08 | | F | 64 | 0.22 | 0.08 | | P | 67 | 0.23 | 0.08 |
| DMA2 | Ch | E | 49 | 0.39* | 0.13 | Ch | M | 49 | 0.39 | 0.13 | Ex | C | 49 | 0.39 | 0.13 |
| | | C | 48 | 0.25 | 0.09 | | F | 73 | 0.37 | 0.13 | | P | 67 | 0.38 | 0.14 |
| | Pb | E | 67 | 0.38* | 0.14 | Pb | M | 67 | 0.38 | 0.14 | Co | C | 48 | 0.25 | 0.09 |
| | | C | 67 | 0.25 | 0.08 | | F | 64 | 0.36 | 0.14 | | P | 67 | 0.25 | 0.08 |
| DMA3 | Ch | E | 49 | 0.43* | 0.14 | Ch | M | 49 | 0.43 | 0.14 | Ex | C | 49 | 0.43 | 0.14 |
| | | C | 48 | 0.26 | 0.10 | | F | 73 | 0.41 | 0.15 | | P | 67 | 0.43 | 0.15 |
| | Pb | E | 67 | 0.43* | 0.15 | Pb | M | 67 | 0.43 | 0.15 | Co | C | 48 | 0.26 | 0.10 |
| | | C | 67 | 0.26 | 0.09 | | F | 64 | 0.40 | 0.16 | | P | 67 | 0.26 | 0.09 |
| DMA4 | Ch | E | 49 | 0.45* | 0.15 | Ch | M | 49 | 0.45 | 0.15 | Ex | C | 49 | 0.45 | 0.15 |
| | | C | 48 | 0.26 | 0.10 | | F | 73 | 0.42 | 0.15 | | P | 67 | 0.45 | 0.16 |
| | Pb | E | 67 | 0.45* | 0.16 | Pb | M | 67 | 0.45 | 0.16 | Co | C | 48 | 0.26 | 0.10 |
| | | C | 67 | 0.27 | 0.09 | | F | 64 | 0.42 | 0.17 | | P | 67 | 0.27 | 0.09 |
| DMA5 | Ch | E | 49 | 0.47* | 0.16 | Ch | M | 49 | 0.47 | 0.16 | Ex | C | 49 | 0.47 | 0.16 |
| | | C | 48 | 0.26 | 0.10 | | F | 73 | 0.44 | 0.16 | | P | 67 | 0.47 | 0.17 |
| | Pb | E | 67 | 0.47* | 0.17 | Pb | M | 67 | 0.47 | 0.17 | Co | C | 48 | 0.26 | 0.10 |
| | | C | 67 | 0.27 | 0.09 | | F | 64 | 0.43 | 0.17 | | P | 67 | 0.27 | 0.09 |
| Exp. and Control Group, | | | | | | Gender wise, Control | | | | | Area wise, Female | | | | |
| D | Ch | E | 73 | 0.23 | 0.08 | Ch | M | 48 | 0.23 | 0.08 | Ex | C | 73 | 0.23 | 0.08 |
| | | C | 52 | 0.23 | 0.08 | | F | 52 | 0.23 | 0.08 | | P | 64 | 0.22 | 0.08 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pb | E | 64 | 0.22 | 0.08 | Pb | M | 67 | 0.23 | 0.08 | Co | C | 52 | 0.23 | 0.08 |
| | | C | 73 | 0.24 | 0.07 | | F | 73 | 0.24 | 0.07 | | P | 73 | 0.24 | 0.07 |
| DMA2 | Ch | E | 73 | 0.37* | 0.13 | Ch | M | 48 | 0.25 | 0.09 | Ex | C | 73 | 0.37 | 0.13 |
| | | C | 52 | 0.25 | 0.09 | | F | 52 | 0.25 | 0.09 | | P | 64 | 0.36 | 0.14 |
| | Pb | E | 64 | 0.36* | 0.14 | Pb | M | 67 | 0.25 | 0.08 | Co | C | 52 | 0.25 | 0.09 |
| | | C | 73 | 0.26 | 0.08 | | F | 73 | 0.26 | 0.08 | | P | 73 | 0.26 | 0.08 |
| DMA3 | Ch | E | 73 | 0.41* | 0.15 | Ch | M | 48 | 0.26 | 0.10 | Ex | C | 73 | 0.41 | 0.15 |
| | | C | 52 | 0.25 | 0.10 | | F | 52 | 0.25 | 0.10 | | P | 64 | 0.40 | 0.16 |
| | Pb | E | 64 | 0.40* | 0.16 | Pb | M | 67 | 0.26 | 0.09 | Co | C | 52 | 0.25 | 0.10 |
| | | C | 73 | 0.26 | 0.09 | | F | 73 | 0.26 | 0.09 | | P | 73 | 0.26 | 0.09 |
| DMA4 | Ch | E | 73 | 0.42* | 0.15 | Ch | M | 48 | 0.26 | 0.10 | Ex | C | 73 | 0.42 | 0.15 |
| | | C | 52 | 0.26 | 0.10 | | F | 52 | 0.26 | 0.10 | | P | 64 | 0.42 | 0.17 |
| | Pb | E | 64 | 0.42* | 0.17 | Pb | M | 67 | 0.27 | 0.09 | Co | C | 52 | 0.26 | 0.10 |
| | | C | 73 | 0.27 | 0.09 | | F | 73 | 0.27 | 0.09 | | P | 73 | 0.27 | 0.09 |
| DMA5 | Ch | E | 73 | 0.44* | 0.16 | Ch | M | 48 | 0.26 | 0.10 | Ex | C | 73 | 0.44 | 0.16 |
| | | C | 52 | 0.26 | 0.10 | | F | 52 | 0.26 | 0.10 | | P | 64 | 0.43 | 0.17 |
| | Pb | E | 64 | 0.43* | 0.17 | Pb | M | 67 | 0.27 | 0.09 | Co | C | 52 | 0.26 | 0.10 |
| | | C | 73 | 0.27 | 0.09 | | F | 73 | 0.27 | 0.09 | | P | 73 | 0.27 | 0.09 |

There was insignificant difference between males of experiment and control group in DMA 1 in Chandigarh as well as Punjab. In all other subsequent tests, the difference was statistically significant. Similarly among females, the difference was statistically significant in DMA 2, DMA 3, DMA 4 and DMA 5. The mean value ranged from 0.24 to 0.47 in experiment group while it ranged from 0.23 to 0.27 in control group. The mean value of experiment group was higher than the control group in all the tests. Among females, the mean value ranged from 0.22 to 0.44 in experiment group while it ranged from 0.23 to 0.27 in control group. The mean value of experiment group was lower than the control group in all the tests. When the DMA of respondents in experiment group was compared, insignificant difference was found in all the cases in Chandigarh as well as Punjab. Likewise, when comparison was made between males and females of in control group gender wise, no significant difference was found. Females had lower values as compared to males. The mean values among males ranged from 0.24 to 0.47 and among females ranged from 0.22 to 0.44. In control group, females had lower values as compared to males. The mean values among males ranged from 0.23 to 0.27 and among females ranged from 0.23 to 0.27. When comparison was made between males of Chandigarh and Punjab in control group, no significant difference was found between DMA of males as well as females. The mean of DMA varied from 0.23 to 0.47 in Chandigarh while in Punjab it varied from 0.23 to 0.47. In case of females, the mean of DMA varied from 0.23 to 0.44 in Chandigarh while in Punjab it varied from 0.22 to 0.43.

Table 7: Comparison of DMA among

| Male | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Place | Chandigarh | | | | Punjab | | | |
| Group | Ex | | Co | | Ex | | Co | |
| DMA | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| DMA1 | 0.24* | 0.08 | 0.23 | 0.08 | 0.24* | 0.08 | 0.23 | 0.08 |
| DMA2 | 0.39* | 0.13 | 0.25 | 0.09 | 0.38* | 0.14 | 0.26 | 0.08 |
| DMA3 | 0.43* | 0.14 | 0.26 | 0.10 | 0.43* | 0.15 | 0.27 | 0.09 |
| DMA4 | 0.45* | 0.15 | 0.26 | 0.10 | 0.45* | 0.16 | 0.27 | 0.09 |
| DMA5 | 0.47* | 0.16 | 0.27 | 0.10 | 0.47* | 0.17 | 0.27 | 0.09 |
| | Female | | | | | | | |
| DMA1 | 0.23* | 0.08 | 0.23 | 0.08 | 0.22* | 0.08 | 0.24 | 0.07 |
| DMA2 | 0.37* | 0.13 | 0.25 | 0.09 | 0.36* | 0.14 | 0.26 | 0.08 |
| DMA3 | 0.41* | 0.15 | 0.26 | 0.10 | 0.40* | 0.16 | 0.27 | 0.09 |
| DMA4 | 0.42* | 0.15 | 0.26 | 0.10 | 0.42* | 0.17 | 0.27 | 0.09 |
| DMA5 | 0.44* | 0.16 | 0.26 | 0.10 | 0.43* | 0.17 | 0.28 | 0.09 |

* Statistically significant differences

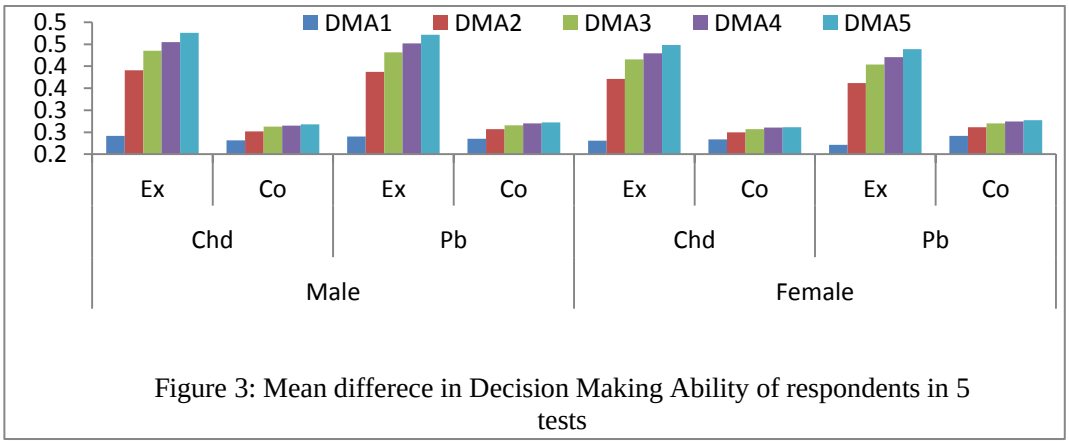


Figure 3: Mean differece in Decision Making Ability of respondents in 5 tests

Table 8: Details of CQ

| 14 | Place | Gp | N | Mean | | Place | M/F | N | Mean | | Gp | Place | N | Mean | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exp. and Control Group, Male | | | | | | Gender wise, Experiment | | | | | Area wise, Male | | | | |
| CQ1 | Ch | E | 49 | 0.54* | 0.07 | Ch | M | 49 | 0.54* | 0.07 | Ex | C | 49 | 0.54 | 0.07 |
| | | C | 48 | 0.36 | 0.06 | | F | 73 | 0.50 | 0.08 | | Pb | 67 | 0.53 | 0.08 |
| | Pb | E | 67 | 0.53* | 0.08 | Pb | M | 67 | 0.53 | 0.08 | Co | C | 48 | 0.36 | 0.06 |
| | | C | 67 | 0.37 | 0.06 | | F | 64 | 0.54 | 0.07 | | Pb | 67 | 0.37 | 0.06 |
| CQ2 | Ch | E | 49 | 0.65* | 0.08 | Ch | M | 49 | 0.65* | 0.08 | Ex | C | 49 | 0.65 | 0.08 |
| | | C | 48 | 0.39 | 0.07 | | F | 73 | 0.61 | 0.10 | | Pb | 67 | 0.64 | 0.10 |
| | Pb | E | 67 | 0.64* | 0.10 | Pb | M | 67 | 0.64 | 0.10 | Co | C | 48 | 0.39 | 0.07 |
| | | C | 67 | 0.41 | 0.06 | | F | 64 | 0.66 | 0.09 | | Pb | 67 | 0.41 | 0.06 |
| CQ3 | Ch | E | 49 | 0.69* | 0.09 | Ch | M | 49 | 0.69* | 0.09 | Ex | C | 49 | 0.69 | 0.09 |
| | | C | 48 | 0.43 | 0.08 | | F | 73 | 0.65 | 0.10 | | Pb | 67 | 0.68 | 0.11 |
| | Pb | E | 67 | 0.68* | 0.11 | Pb | M | 67 | 0.68 | 0.11 | Co | C | 48 | 0.43 | 0.08 |
| | | C | 67 | 0.44 | 0.07 | | F | 64 | 0.70 | 0.09 | | Pb | 67 | 0.44 | 0.07 |
| CQ4 | Ch | E | 49 | 0.74* | 0.09 | Ch | M | 49 | 0.74* | 0.09 | Ex | C | 49 | 0.74 | 0.09 |
| | | C | 48 | 0.46 | 0.08 | | F | 73 | 0.68 | 0.11 | | Pb | 67 | 0.72 | 0.11 |
| | Pb | E | 67 | 0.72* | 0.11 | Pb | M | 67 | 0.72 | 0.11 | Co | C | 48 | 0.46 | 0.08 |
| | | C | 67 | 0.47 | 0.07 | | F | 64 | 0.74 | 0.10 | | Pb | 67 | 0.47 | 0.07 |
| CQ5 | Ch | E | 49 | 0.80* | 0.10 | Ch | M | 49 | 0.80* | 0.10 | Ex | C | 49 | 0.80 | 0.10 |
| | | C | 48 | 0.50 | 0.09 | | F | 73 | 0.75 | 0.12 | | Pb | 67 | 0.79 | 0.12 |
| | Pb | E | 67 | 0.79* | 0.12 | Pb | M | 67 | 0.79 | 0.12 | Co | C | 48 | 0.50 | 0.09 |
| | | C | 67 | 0.52 | 0.08 | | F | 64 | 0.81 | 0.11 | | Pb | 67 | 0.52 | 0.08 |
| Exp. and Control Group, | | | | | | Gender wise, Control | | | | | Area wise, Female | | | | |
| CQ1 | Ch | E | 73 | 0.50* | 0.08 | Ch | M | 48 | 0.36 | 0.06 | Ex | C | 73 | 0.50* | 0.08 |
| | | C | 52 | 0.36 | 0.05 | | F | 52 | 0.36 | 0.05 | | Pb | 64 | 0.54 | 0.07 |
| | Pb | E | 64 | 0.54* | 0.07 | Pb | M | 67 | 0.37 | 0.06 | Co | C | 52 | 0.36 | 0.05 |
| | | C | 73 | 0.37 | 0.06 | | F | 73 | 0.37 | 0.06 | | Pb | 73 | 0.37 | 0.06 |
| CQ2 | Ch | E | 73 | 0.61* | 0.10 | Ch | M | 48 | 0.39 | 0.07 | Ex | C | 73 | 0.61* | 0.10 |
| | | C | 52 | 0.39 | 0.06 | | F | 52 | 0.39 | 0.06 | | Pb | 64 | 0.66 | 0.09 |
| | Pb | E | 64 | 0.66* | 0.09 | Pb | M | 67 | 0.41 | 0.06 | Co | C | 52 | 0.39 | 0.06 |
| | | C | 73 | 0.41 | 0.07 | | F | 73 | 0.41 | 0.07 | | Pb | 73 | 0.41 | 0.07 |
| CQ3 | Ch | E | 73 | 0.65* | 0.10 | Ch | M | 48 | 0.43 | 0.08 | Ex | C | 73 | 0.65* | 0.10 |
| | | C | 52 | 0.43 | 0.06 | | F | 52 | 0.43 | 0.06 | | Pb | 64 | 0.70 | 0.09 |
| | Pb | E | 64 | 0.70* | 0.09 | Pb | M | 67 | 0.44 | 0.07 | Co | C | 52 | 0.43 | 0.06 |
| | | C | 73 | 0.44 | 0.07 | | F | 73 | 0.44 | 0.07 | | Pb | 73 | 0.44 | 0.07 |
| CQ4 | Ch | E | 73 | 0.68* | 0.11 | Ch | M | 48 | 0.46 | 0.08 | Ex | C | 73 | 0.68* | 0.11 |
| | | C | 52 | 0.45 | 0.07 | | F | 52 | 0.45 | 0.07 | | Pb | 64 | 0.74 | 0.10 |
| | Pb | E | 64 | 0.74* | 0.10 | Pb | M | 67 | 0.47 | 0.07 | Co | C | 52 | 0.45 | 0.07 |
| | | C | 73 | 0.47 | 0.07 | | F | 73 | 0.47 | 0.07 | | Pb | 73 | 0.47 | 0.07 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CQ5 | Ch | E | 73 | 0.75* | 0.12 | Ch | M | 48 | 0.50 | 0.09 | Ex | PbC | 73 | 0.75* | 0.12 |
| | | C | 52 | 0.50 | 0.07 | | F | 52 | 0.50 | 0.07 | | | 64 | 0.81 | 0.11 |
| | Pb | E | 64 | 0.81* | 0.11 | Pb | M | 67 | 0.52 | 0.08 | Co | PbC | 52 | 0.50 | 0.07 |
| | | C | 73 | 0.51 | 0.08 | | F | 73 | 0.51 | 0.08 | | | 73 | 0.51 | 0.08 |

Among males, there were significant differences found between the CQ of experiment and control group in Chandigarh as well as Punjab. The same trend was witnessed in case of females. The mean value ranged from 0.53 to 0.8 in experiment group while it ranged from 0.36 to 0.52 in control group. The mean value of experiment group was higher than the control group in all the tests. Among females, the mean value ranged from 0.5 to 0.81 in experiment group while it ranged from 0.36 to 0.51 in control group. The mean value of experiment group was higher than the control group in all the tests. When the CQ of respondents in experiment group was compared gender wise, significant differences were recorded between males and females of Chandigarh while in case of control group, the differences were insignificant. Females had lower values as compared to males. The mean values among males ranged from 0.53 to 0.8 and among females ranged from 0.5 to 0.81. In control group, females had lower values as compared to males. The mean values among males ranged from 0.36 to 0.52 and among females ranged from 0.36 to 0.51. When comparison was made between males of Chandigarh and Punjab, insignificant difference was found between their CQ in experiment as well as control group in all the tests. On the contrary, significant differences were found in CQ of female respondents in experiment group. However, insignificant difference was recorded in case of control group. The mean of CQ varied from 0.36 to 0.8 in Chandigarh while in Punjab it varied from 0.37 to 0.79. In case of females, the mean of CQ varied from 0.36 to 0.75 in Chandigarh while in Punjab it varied from 0.37 to 0.81.

Table 9: Comparison of CQ

| Male | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Place | Chandigarh | | | | Punjab | | | |
| Group | Ex | | Co | | Ex | | Co | |
| CQ | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| CQ1 | 0.54* | 0.07 | 0.36 | 0.06 | 0.53* | 0.08 | 0.38 | 0.06 |
| CQ2 | 0.65* | 0.08 | 0.39 | 0.07 | 0.64* | 0.10 | 0.41 | 0.06 |
| CQ3 | 0.69* | 0.09 | 0.43 | 0.08 | 0.68* | 0.11 | 0.45 | 0.07 |
| CQ4 | 0.74* | 0.09 | 0.46 | 0.08 | 0.72* | 0.11 | 0.48 | 0.07 |
| CQ5 | 0.80* | 0.10 | 0.50 | 0.09 | 0.79* | 0.12 | 0.52 | 0.08 |
| | Female | | | | | | | |
| CQ1 | 0.50* | 0.08 | 0.36 | 0.05 | 0.54* | 0.07 | 0.37 | 0.06 |
| CQ2 | 0.61* | 0.10 | 0.39 | 0.06 | 0.66* | 0.09 | 0.41 | 0.07 |
| CQ3 | 0.65* | 0.10 | 0.43 | 0.06 | 0.70* | 0.09 | 0.44 | 0.07 |
| CQ4 | 0.68* | 0.11 | 0.46 | 0.07 | 0.74* | 0.10 | 0.47 | 0.07 |
| CQ5 | 0.75* | 0.12 | 0.50 | 0.07 | 0.81* | 0.11 | 0.52 | 0.08 |

* Statistically significant differences

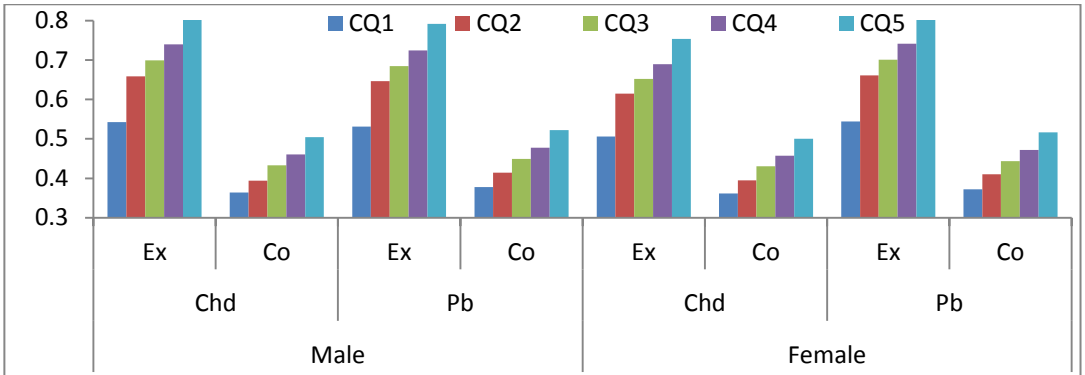


Figure 4: Mean differece in Creative Quotient of respondents in 5 tests

Table 10: Details of marks

| 14 | Place | Gp | N | Mean | SD | Place | M/F | N | Mean | SD | Gp | Place | N | Mean | SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Exp. and Control Group, Male | | | | | | Gender wise, Experiment | | | | | Area wise, Female | | | | |
| M1 | Ch | E | 49 | 57.50 | 7.13 | Ch | M | 49 | 57.50* | 7.13 | Ex | C | 49 | 57.50 | 7.13 |
| | | C | 48 | 56.88 | 7.89 | | F | 73 | 53.80 | 8.21 | | Pb | 67 | 58.39 | 8.08 |
| | Pb | E | 67 | 58.39* | 8.08 | Pb | M | 67 | 58.39 | 8.08 | Co | C | 48 | 56.88 | 7.89 |
| | | C | 67 | 55.31 | 7.30 | | F | 64 | 58.78 | 7.37 | | Pb | 67 | 55.31 | 7.30 |
| M2 | Ch | E | 49 | 62.15* | 8.81 | Ch | M | 49 | 62.15* | 8.81 | Ex | C | 49 | 62.15 | 8.81 |
| | | C | 48 | 56.06 | 8.98 | | F | 73 | 57.37 | 10.00 | | Pb | 67 | 63.60 | 9.72 |
| | Pb | E | 67 | 63.60* | 9.72 | Pb | M | 67 | 63.60* | 9.72 | Co | C | 48 | 56.06 | 8.98 |
| | | C | 67 | 53.39 | 7.90 | | F | 64 | 69.62 | 8.41 | | Pb | 67 | 53.39 | 7.90 |
| Exp. and Control Group, | | | | | | Gender wise, Control | | | | | Area wise, Male | | | | |
| M1 | Ch | E | 73 | 53.80 | 8.21 | Ch | M | 48 | 56.88* | 7.89 | Ex | C | 73 | 53.80* | 8.21 |
| | | C | 52 | 53.01 | 8.35 | | F | 52 | 53.01 | 8.35 | | Pb | 64 | 58.78 | 7.37 |
| | Pb | E | 64 | 58.78* | 7.37 | Pb | M | 67 | 55.31 | 7.30 | Co | C | 52 | 53.01 | 8.35 |
| | | C | 73 | 54.80 | 9.36 | | F | 73 | 54.80 | 9.36 | | Pb | 73 | 54.80 | 9.36 |
| M2 | Ch | E | 73 | 57.37* | 10.00 | Ch | M | 48 | 56.06* | 8.98 | Ex | C | 73 | 57.37* | 10.00 |
| | | C | 52 | 51.28 | 8.49 | | F | 52 | 51.28 | 8.49 | | Pb | 64 | 69.62 | 8.41 |
| | Pb | E | 64 | 69.62* | 8.41 | Pb | M | 67 | 53.39 | 7.90 | Co | C | 52 | 51.28 | 8.49 |
| | | C | 73 | 53.68 | 10.29 | | F | 73 | 53.68 | 10.29 | | Pb | 73 | 53.68 | 10.29 |

Significant difference was recorded in M 1 and M 2 of male as well as female respondents in Punjab along with their M 2 in Chandigarh. The mean value ranged from 57.5 to 63.6 in experiment group while it ranged from 53.39 to 56.88 in control group. The mean value of experiment group was higher than the control group in both the tests. Among females, the mean value ranged from 53.8 to 69.62 in experiment group while it ranged from 51.28 to 54.8 in control group. The mean value of experiment group was

higher than the control group in both tests. When the marks of respondents in experiment group were compared gender wise, significant difference was found in M 1 and M 2of respondents in Chandigarh along with M 2 in Punjab. Likewise, significant difference was found in M 1 and M 2 of respondents in Chandigarh in control group. Females had lower values as compared to males. The mean values among males ranged from 57.5 to 63.6 and among females ranged from 53.8 to 69.62. In control group, females had lower values as compared to males. The mean values among males ranged from 53.39 to 56.88 and among females ranged from 51.28 to 54.8. When comparison was made between females of Chandigarh, highly significant difference was found between marks of experiment group. There was insignificant difference between the marks of males. The mean of marks varied from 56.06 to 62.15 in Chandigarh while in Punjab it varied from 53.39 to 63.6. In case of females, the mean of marks varied from 51.28 to 57.37 in Chandigarh while in Punjab it varied from 53.68 to 69.62.

Table 11: Comparison of marks

| Male | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Place | Chandigarh | | | | Punjab | | | |
| Group | Ex | | Co | | Ex | | Co | |
| Marks | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| M1 | 57.50* | 7.13 | 56.88 | 7.89 | 58.39* | 8.08 | 55.31 | 7.30 |
| M2 | 62.15* | 8.81 | 56.06 | 8.98 | 63.60* | 9.72 | 53.39 | 7.90 |
| Female | | | | | | | | |
| Marks | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| M1 | 53.80* | 8.21 | 53.02 | 8.35 | 58.78* | 7.37 | 54.81 | 9.36 |
| M2 | 57.37* | 10.00 | 51.29 | 8.49 | 69.62* | 8.41 | 53.68 | 10.29 |

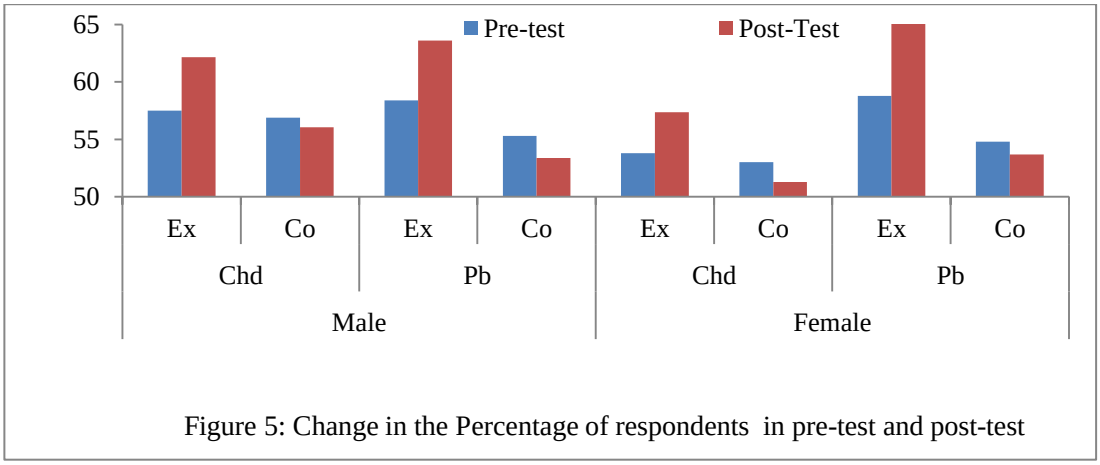


Figure 5: Change in the Percentage of respondents in pre-test and post-test

## 4. Conclusion

The intelligence quotient in Chandigarh increased from 96.19 to 125.7. In Punjab, the mean value rose from 97.67 to 127.6. Similarly, among females, significant increase was recorded. The mean value increased from 89.54 to 116.1 in experiment group of Chandigarh and it rose from 91.29 to 119.2 in

Punjab. In contrast, insignificant changes were witnessed among their control group counterparts. The focus factor in Chandigarh increased from 51.21 to 67.05. In Punjab, the mean value rose from 50.97 to 66.82. Similarly, among females, significant increase was recorded. The mean value increased from 48.66 to 63.34 in experiment group of Chandigarh and it rose from 47.12 to 61.67 in Punjab. In contrast, insignificant changes were witnessed among their control group counterparts. The decision making ability in Chandigarh increased from 0.24 to 0.48. In Punjab, the mean value rose from 0.24 to 0.47. Similarly, among females, significant increase was recorded. The mean value increased from 0.23 to 0.45 in experiment group of Chandigarh and it rose from 0.22 to 0.44 in Punjab. In contrast, insignificant changes were witnessed among their control group counterparts. The creative quotient in Chandigarh increased from 0.54 to 0.81. In Punjab, the mean value rose from 0.53 to 0.79. Similarly, among females, significant increase was recorded. The mean value increased from 0.51 to 0.75 in experiment group of Chandigarh and it rose from 0.54 to 0.81 in Punjab. In contrast, insignificant changes were witnessed among their control group counterparts. The academic marks in Chandigarh increased from 57.50 to 62.15. In Punjab, the mean value rose from 58.39 to 63.60. Similarly, among females, significant increase was recorded. The mean value increased from 53.80 to 57.37 in experiment group of Chandigarh and it rose from 58.78 to 69.62 in Punjab. In contrast, insignificant changes were witnessed among their control group counterparts.

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