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Impact of Intervention Program on Intelligence Quotient of 7 Year Old Students in Private Schools of Chandigarh and Punjab

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Abstract

Intelligence is the ability of a person to gain, perceive, comprehend and apply knowledge. The present longitudinal study was conducted to assess and analyze the impact of intervention programme on intelligence quotient of respondents. There are nine different intelligences which are identified. Multiple intelligence level gives us an important insight about our natural strengths. The present research was carried on with an intention to find whether the intervention including educational customization in form of task sheets pertaining to the respondents' natural learning style would develop his interest in studies thereby leading to a soar in their intelligence quotient. The study was conducted on a sample size of 480 male as well as female students selected from Private Schools of Chandigarh and Punjab. The intervention programme was implemented among the respondents in the experimental group, although both the groups were tested from time to time.Results indicated that the intelligence quotient of respondents in experimental group surged significantly over the period of intervention, while in case of their control group counterparts, there had been merely an insignificant change in the intelligence quotient.

Keywords: Intelligence Quotient, Natural Learning Style, Intervention Programme

1. Introduction

In the present scenario when the world is facing so much competition, the standards of education and life have soared owing to the high global pace. Education is an essential element of success in life. It has the capacity to ameliorate the world. Education aids in acquiring knowledge about the world. This knowledge enlightens the innate abilities of the child and creates a better society. Every child has inherent potential powers and education helps in drawing out the powers inherent in them. Intelligence is the ability of a human brain to understand, comprehend and respond to the situations in an effective and efficient way. It is an important cognitive ability. Piaget (1971) has explained cognition as the utmost vital parameter which can lead every child towards success. It refers to any mental activity that leads to the development of meaning. As mentioned by Piaget (1952), cognitive processes use existing knowledge and generate new knowledge. Cognition is the entire thinking process primarily including Intelligence Quotient, Focus Factor, Decision Making Ability, Creative Quotient, Memory, Reasoning, Gifted Intelligences and Natural Abilities. Success requires a focused mind, strong and quick decision making ability, creativity and early grooming on natural abilities. IQ is a measurement of knowledge tested against time and age. It is a ratio of mental age against chronological age and time. IQ cannot be a constant factor and varies in either direction as we grow older. Makes us unique from others. Linguistic intelligence is the ability to use spoken and written language effectively to express oneself. Lawyers, writers, and speakers tend to have high linguistic intelligence. Logical-mathematical intelligence is the ability to analyze problems logically, work effectively with mathematical operations, and investigate issues using the scientific method. Finding patterns and deductive reasoning are other capabilities associated with this intelligence. People working in the scientific and mathematical communities tend to be high in this type of intelligence. Musical intelligence is the ability to perform, compose, and appreciate musical

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patterns, including changes in pitch, tone, and rhythm. Successful musicians, composers, and people involved in music production have high levels of musical intelligence. Bodily-kinesthetic intelligence is the ability to use the body for expression. People high in this intelligence use their physical coordination to master problems. Professional dancers and athletes are good examples of this. Spatial intelligence is the ability to recognize, use, and interpret images and patterns and to reproduce objects in three dimensions. Successful architects, sculptors and designers are likely to have high spatial intelligence. Interpersonal intelligenceis the ability to understand people's intentions, motivations, and desires. This intelligence allows individuals to work well with others. Professions like therapy, teaching, and sales attract individuals with high interpersonal intelligence. Intrapersonal intelligence is the ability to understand one, and to interpret and appreciate one's own feelings and motivations. Therapists, actors, caregivers, and writers are all people who can bring high levels of personal awareness to their work. Naturalist intelligence is the ability to recognize and appreciate our relationship with the natural world. Astronomers, biologists, and zoologists are examples of professions with a high level of naturalist intelligence. Cosmic intelligenceis the ability to use collective values and intuition to understand others and the world around them. People, who excel in this intelligence typically, are able to understand situations of life there are 2 types of classified thinking patterns and behaviors within brain. One is creative bent and the other is logical, or it can be a balance between the two. Creative thinking pattern includes visual, musical, intrapersonal, natural and cosmic intelligence. Logical thinking pattern includes linguistic, logical, kinesthetic and interpersonal intelligence. Primary Natural Learning Style can be any of these nine intelligences irrespective of the dominant thinking pattern. The fundamental goal of education is to equip students with the knowledge and skills necessary to think critically, solve complex problems, and succeed in the present world society. Measurement of such knowledge and skills is essential for tracking students' development and assessing the effectiveness of educational policies and practices. According to Dunning (2003) before performing any task, the ability and capacity of a person to take up that task depends on his self-cognitive estimation level.

In a study conducted by Soares et al. (2015), the association between intelligence and academic achievement was established. In this 3-year longitudinal study, 284 Portuguese middle school students completed three reasoning subtests (abstract, numerical, and verbal) by the end of 7th, 8th and 9thgrade of same subjects, and their academic grades were collected. It was noticed that their IQ Scores were proportional to their academic scores. Tias et al. (2015) found that academic achievement can be used as an indicator of learning success, and the results are further supported by another study conducted by Coyle and Pillow (2008) who found that students having high IQ score are likely to perform better in schools than those whose IQ scores are low. Von and Janc (2004) stated that problems learning to read come from a combination of factors. In general, children who are most at-risk for reading failure are those who enter school with limited exposure to language and who have little prior understanding of concepts related to phonemic sensitivity, letter knowledge,

print awareness, the purposes of reading, and general verbal skills, including vocabulary. Education ought to become student centered so as to ensure the better understanding of the content. Both the studies conducted by Lujan (2006) and Cuthbert (2005) explained that students usually have preferences for the ways by which they learn or understand a subject and it is advisable for students to tailor these styles to suit their own learning needs. The research results of a study carried by Coffield (2004) established that however small the effect on learning outcomes, it is accepted that learning styles can help students enhance their own learning and thus encourage self-directed learning.In a study conducted by Shahzada and Khan (2014) who studied to investigate the interrelation of multiple intelligences and their correlation to students' academic achievement, found that moderate inter-correlation exists between verbal/linguistic and logical/mathematical intelligences and academic Achievement. It was suggested that teachers can use all the multiple intelligences during the teaching-learning process to promote the learning. To concur his findings, yet another study carried by Thomas R. Hoar (1997) in his work with multiple intelligences has affected how the curriculum is designed and how the students are assessed. Teachers create new lessons that incorporate musical intelligence in to mathematics, spatial intelligence in to classroom management, and bodily-kinesthetic intelligence in to social studies. Results revealed that students perform far above average as the learning process was facilitated among students. Muhammad, Syed and Khalid (2015) assessed the self-esteem and academic performance among university students after arising of several behavioral and educational problems. A total number of 80 students, 40 male students and 40 female students were selected through purposive sampling from G.C University Faisalabad. The participants were administered Rosenberg Self-Esteem Scale and Academic Performance Rating Scale to measure their self-esteem and academic performance. The score of male and female students was compared. Pearson's Product Moment and the t-test were used for statistical significance of data. It was found that there was a significant relationship existed between the two taken variables. In another study conducted by Das and Pattanaik (2013) to trace out that the self-esteem and the perception of self-estimation level and they concluded that self-esteem, perfect estimation and locus of control play a major role in the academic achievement of students.

2. Material and Methods
The present in-depth quintessential research is an allying paradigm, aimed to collate Intelligence Quotient, Multiple Intelligence Levels, Learning Style, Dominant Thinking Pattern, and Socio-Demographic aspects of respondents to enhance and amplify learning process.

2.1 Sampling
The study was conducted on a sample size of 480students selected from Private Schools of Chandigarh and Punjab. The students of 7 years in age were purposefully selected. Further, these students were divided into two groups: Experimental Group and The Control group.

2.2 Experimental and Control Groups
The respondents would be divided into two major groups:-
Sample consisted of 480 respondents. Further, there were

236 boys and 244 girls, among each gender further, 274 were taken from Punjab and 206 from Chandigarh. Further, the intervention programme was implemented among the respondents in the experimental group
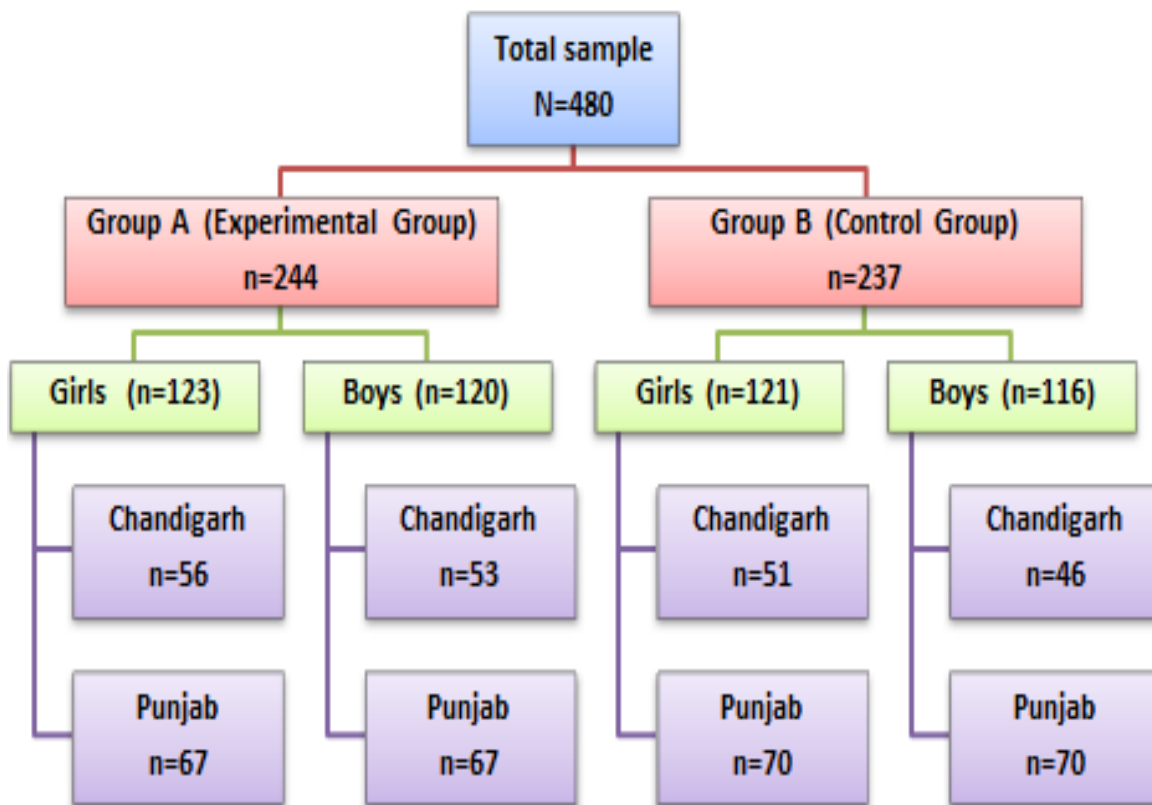

Fig.1: Sampling Procedure

2.3 Tools Used
1. Socio-demographic data sheet
   The Socio-demographic data sheet prepared by the research scholar under the guidance of her supervisors includes the information regarding the socio-economic background of the respondents.
2. Cognitive Ability Scale- to assess the Intelligence Quotient.
3. Multiple Intelligence Scale- to assess the following:
   1. Multiple Intelligence Levels.
   2. Learning Style.
   3. Dominant Thinking Pattern.
   4. Self Estimation Level.

2.4 Procedure and Intervention Programme
At the initial stage, rapport was built and socio demographic data collected from all the respondents. Following this, the Test and Assessment was conducted after giving them instructions. The academic scores of all respondents were collected and the data was analyzed. In the first quarter after the first test and assessment TA-1, one hundred and eighty tasksheets were given to the respondents in experimental group for 3 months. Customized tasksheets pertaining to the dominant intelligence of each student were given. Proper instructions were given about attempting the tasksheets. They had to attempt 2 tasksheets daily. They were to attempt the tasksheets in school under the supervision of their teacher. Although there is no time limit but the average time required for completing each tasksheet is generally 5-10 minutes. They were asked to fill in the start and stop time mentioned at the bottom of each tasksheet. Taksheets were customized according to cognitive abilities and primary learning style of the student as assessed through the cognitive ability assessment. The programme coordinator from school was to make sure that the worksheets are done regularly under the supervision of their teachers. The students were given proper instructions regarding the programme. There was a tracker test after every 3 months to monitor the progress. The next quarter solutions (tasksheets) were prepared keeping individual progress in mind. The intervention program was implemented only on experimental group whereas the Control group received no intervention. After 3 months, TA-2 was conducted on both the groups. In the second quarter, another set of one hundred and eighty tasksheets was given to the respondents in experimental group for next 3 months. After these 3 months, TA-3 was conducted on both the groups. In the third quarter, another set of one hundred and eighty tasksheets was given to the respondents in experimental group for next 3 months. After next 3 months, TA-4 was conducted on both the groups. In the fourth quarter, another set of one hundred and eighty tasksheets was given to the respondents in experimental group for next 3 months so, in total for one year, each student in experimental group had completed 720 tasksheets. At the final stage, TA-5 was conducted on both the groups. Finally, the academic scores were collected through school and the whole data was analyze

Table 1: Stages of Study

Stage 1:	**Rapport building** and collection of **Socio-demographic data** of respondents of both the groups.
Stage 2:	TA-1 Test and Assessment of Group 1 and Group 2
Stage 3:	Quarter-1 (3 Month Program) Intervention Program for Group 1
	No Intervention in Group 2
Stage 4:	TA-2 Test and Assessment of Group 1 and Group 2
Stage 5:	Quarter-2 (3 Month Program) Intervention Program for Group 1
	No Intervention in Group 2
Stage 6:	TA-3 Test and Assessment of Group 1 and Group 2
Stage 7:	Quarter-3 (3 Month Program) Intervention Program for Group 1
	No Intervention in Group 2
Stage 8:	TA-4 Test and Assessment of Group 1 and Group 2
Stage 9:	Quarter-4 (3 Month Program) Intervention Program for Group 1
	No Intervention in Group 2
Stage 10:	TA-5 Test and Assessment of Group 1 and Group 2

3 Result and Discussion

After the data collection, it were analysed using the appropriate statistical tools

Table 2: Sociodemographic profile of respondents (n=480)

	Parameters		n	%		
Primary Natural Intelligence	i-Musical		31	6.46		
	i-Kinesthetic		43	8.96		
	i-Intrapersonal		59	12.29		
	i-Interpersonal		56	11.67		
	i-Linguistic		87	18.13		
	i-Logical		60	12.5		
	i-Spatial		58	12.08		
	i-Cosmic		31	6.46		
	i-Naturalist		55	11.46		
Dominant Thinking Pattern	Creative		242	50.42		
	Logical		238	49.58		
	Balanced		0	0		
Estimation Level	Highly Overestimated		0	0		
	Overestimated		8	1.67		
	Slightly Overestimated		22	4.58		
	Perfect Estimation		380	79.17		
	Underestimated		61	12.71		
	Highly Underestimated		9	1.88		
Family Type	Joint		200	41.67		
	Nuclear		280	58.33		
Family Size	Small		16	3.33		
	Medium		354	73.75		
	Medium Large		110	22.92		
	Large		0	0		
Parents			Mother		Father	
			n	%	n	%
Educational Status		10th	78	16.25	60	12.5
		11th	0	0	0	0
		12th	127	26.46	98	20.42
		B Ed	0	0	56	11.67
		BA	223	46.46	140	29.17
		BDS	0	0	0	0
		M Sc	12	2.5	37	7.71
		MBBS	0	0	0	0
		MA	40	8.33	83	17.29
		BE	0	0	5	1.04
		M Com	0	0	0	0
		M Ed	0	0	1	0.21
		MD	0	0	0	0
Occupation		Private	36	7.5	293	61.04
		Govt	12	2.5	182	37.92
		Not Working	432	90	5	1.04

As depicted in table 2, the study was conducted on a sample of 480 students. When they were assessed for their primary natural learning style, it was noticed that majority of them ie. 18.13% were linguistic followed by those who were logical, intrapersonal

and spatial learner. As few as 6.46% were cosmic and musical learners. In terms of thinking pattern, 50.42% had dominant creative thinking pattern and the rest portrayed logical thinking pattern. When their estimation level was compared, it was found that 79.17 estimated themselves perfectly whereas12.71% underestimated themselves. It was further known that 58.33% hailed from nuclear families while others belonged to joint

families. 73.75% respondents belonged to medium sized families. It was further addressed that parents of majority of respondents graduated as bachelors in Arts. However no one was illiterate. 90% mothers were not working while 7.5% worked in private sector and only 2.5% worked as government servants. In contrast, 61.04%of fathers worked in private sectors and 37.92% worked in government sector. Merely 1.04% of them were unemployed
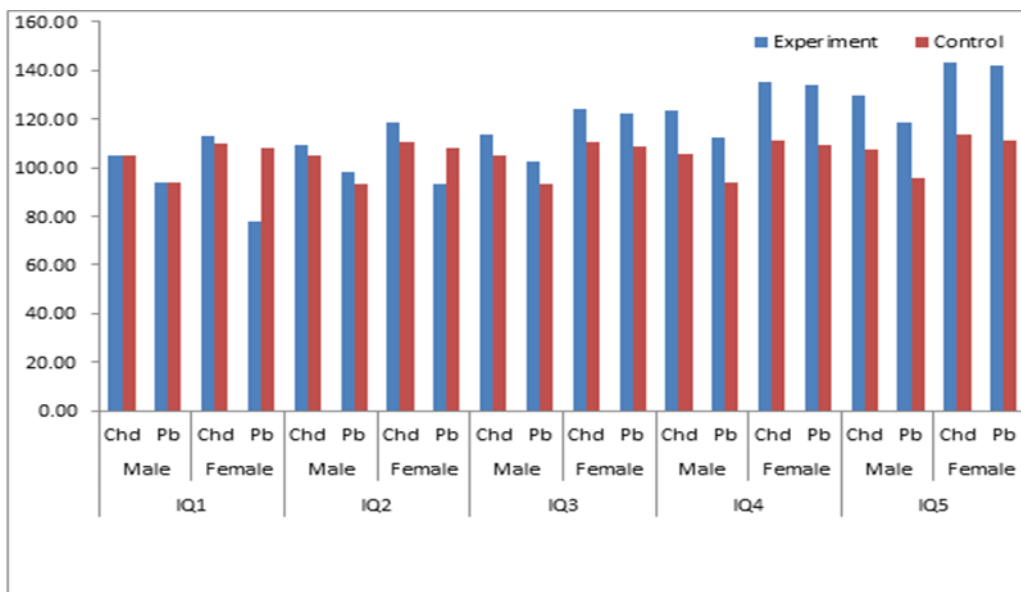

Fig.2: Mean difference in Intelligence Quotient of respondents (Age=7 years)

It is lucid from figure 2 that there were 53 male subjects in experimental group of 7 years old hailing from Chandigarh. The mean of their Intelligence Quotient in the pre-test taken was 105.17 whereas the mean of the Intelligence Quotient in the pre-test taken was 105.18 among their control group counterparts, whose count was 46. The difference was however not significant with t value of 0.005.In case of male subjects, 67 in number, in experimental group of same age in Punjab, the mean came out to be 93.74 and in case of their control peers with a count of 70, the mean was notified as 93.70, the difference being statistically insignificant with t value at 0.047. Further, when the results of Intelligence Quotient of Test 2 were compared, the mean value for Experimental Group in Chandigarh was calculated to be 109.43 while that of respondents in control group was found to be 105.02. It was witnessed that although there was an insignificant difference in the mean value of Intelligence Quotient among experimental and control group of Chandigarh claiming t value of 1.685, but a significant difference was notified in case of respondents in Punjab where the mean value among respondents of experimental group was 98.13 and that of control group came out to be 93.00 whose t value was traced as 5.771. As the third test was taken, the mean difference came through significantly high between Experimental and Control groups in Chandigarh as well as Punjab. This significant difference persisted in the later two tests including the post test. Precisely, in Test 3, the mean of Intelligence Quotient of respondents in experimental group was 113.69 as compared to 104.88 in control group in Chandigarh and the t value was 3.357. Likewise the mean value for Intelligence Quotient among respondents of Experimental Group in Punjab was 102.52 in contrast to their control group counterparts which were recorded at 93.12.In this case, the t value came out to be 10.277. It was clearly observed that the mean value of Intelligence Quotient in Test 4 of respondents in experimental group was 123.55 as compared to 105.48 in control group in Chandigarh; the t value was calculated at 6.806. Similarly, the mean value for Intelligence Quotient among respondents of Experimental Group in Punjab was 112.37 in contrast to their control group counterparts which was recorded at 93.58 at t value 18.015. On the contrary, the mean value of Intelligence Quotient in Test 4 of respondents in case of experimental group was 129.75 as

compared to 107.56 in control group in Chandigarh, and the t value recorded at 8.138. However, the mean value for Intelligence Quotient among respondents of Experimental Group in Punjab was 118.24 in contrast to their control group counterparts which was recorded at 95.42 where the t value was found to be 21.006 thereby making the difference statistically highly significant. When the Intelligence Quotient of pre test among males and females of Chandigarh's experiment group were compared, it was found that the difference was significant with t value of 3. 33. Similarly the t value of difference between the mean score of male and female respondents belonging to Punjab was 10.15 making the statistical difference highly significant. After 3 months when the test2 was conducted, it was found that the difference between the mean of intelligence quotient was significant with t value of 3.85 in Chandigarh whereas in case of Punjab it was again significant carrying t value of 3.160. In case of Intelligence Quotient 3, the difference between males and females of Chandigarh in this group was significant with t value of 4.352 which was significant in test 4 and test 5 as well. Likewise in case of Punjab, difference between Intelligence Quotient 3 of males and females was found to be highly significant and consistently it remained highly significant in Test 4 and 5. When the males hailing from Chandigarh and Punjab within the experimental group were compared in terms of pre test, it was found that there existed a significant between the two with a t value of 5.74. However in case of their control group counterparts the t value was 5.99 and the difference was highly significant. Moreover in Test 2, it was found that difference remained significant in both the cases.Furthermore when the male respondents of Chandigarh and Punjab in control group were compared, the significant difference was witnessed which persisted in test 4 and 5. Similarly in case of their counterparts, it was witnessed that the difference was significantly high. There was an insignificant difference between the experimental and control group females of Chandigarh in terms of their Intelligence quotient in pre-test whereas in case of their Punjab counterparts, the difference was notified to be highly significant with t value of 16.16. After three months, there was reported significant difference between the Intelligence Quotient of both the groups in Chandigarh as well as Punjab. In the later three tests over the next 9 months, the

difference between the experimental and control group females of Chandigarh and Punjab persisted in terms of their each successive Intelligence Quotients. Likewise when the male and female respondents of Chandigarh within the control group were compared, it was notified that a slightly significant difference existed between the two. On the contrary, their Punjab counterparts witnessed a highly significant difference. The trend remained in the same flight in each successive test assessing their Intelligence Quotient. It was noticed that there was insignificant difference between the Intelligence Quotient of respondents hailing from Chandigarh within control group while in case of the respondents of Punjab, the difference was found to be highly significant For a precise and concise analysis, when the female respondents within experimental group were compared for their Intelligence Quotient in pre-test, it was noticed that a significantly high difference existed between respondents belonging to Chandigarh and Punjab, whereas in case of those in control group, the difference was not significant. In the est2, the same trend was seen to find the significant difference between Chandigarh and Punjab female respondents from experimental group while their Punjab counterparts witnessed an insignificant difference
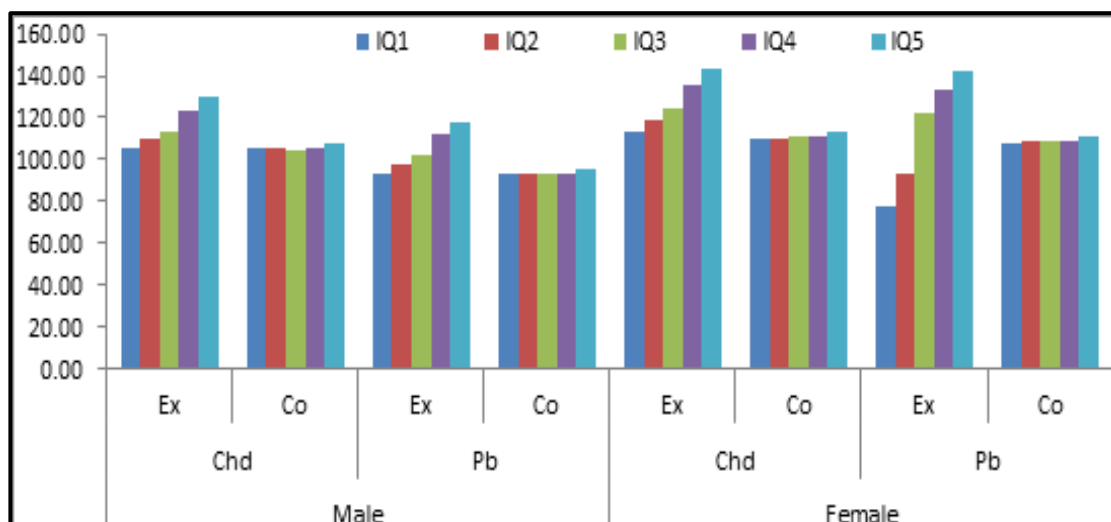

Fig.3: Means difference in Intelligence Quotient of Respondents in 5 tests

When the experimental groups were compared for the change in their intelligence level, it could be clearly seen from figure 3 that in case of each experimental group that there was in the intelligence quotient of pretest and the IQ assessed after 3 months. Similarly, highly significant difference was observed in their IQ1 and IQ3. The same trend was followed for their IQ1 and IQ4 & IQ1 and IQ5 difference. Later, IQ2 was compared with their IQ3, IQ4 and IQ5, significantly high difference was witnessed in each case. Thereafter, their IQ3 was compared with IQ4 and IQ5; eventually IQ4 was compared with their IQ5. In every case significantly high difference was depicted in experimental groups. On the contrary in every corresponding counterpart control group, insignificant difference was observed.

4. Inference
In a nutshell, it became evident that the intelligence quotient of the respondents belonging to experimental group surged significantly over the period of intervention, while in case of their control group counterparts, there had been merely an insignificant change in the intelligence quotient. A persistent rise was witnessed in the IQ of experimental group during the span of research. Therefore, it becomes quite apparent that if the customized education is provided to the students, it would increase their intelligence level. It is portrayed through the results that the intelligence quotient of students can be enhanced in a systematic manner if they get education utilizing their natural learning style. In the results, it was witnessed that the customized intervention had a significantly high impact on the intelligence quotient of the respondents in experimental group.

5. Acknowledgement

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