

Measuring the Effectiveness of ‘Roopkothar Golpo’, a Digital Storytelling Program, on Children’s Cognitive Development: A Study on Kite Bangladesh Limited

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Abstract

Digital storytelling offers a highly natural and powerful means to convey, learn, and retain information. Human brain is also naturally wired to receive and remember every human experience within a structure of a story. So, there is a relationship between digital storytelling and brain development which is basically referred to cognitive development specially works for children. The purpose of this study is to measure the effectiveness of digital storytelling program on children’s cognitive development. In this study, exploratory research has been conducted to identify the measurement tools where true experimental design has been used to measure the impact of ‘Roopkothar Golpo’ a digital storytelling program, on children’s cognitive development. As a source of data collection process both primary and secondary data were used in this study where primary data were collected through survey and secondary data from different sources such as articles related to digital storytelling, prior research reports regarding related issues, journals and articles related to storytelling and other websites related to this topic. And the gathered data have been analysed by using discriminant analysis with the help of SPSS. From the findings of this study, it is denoted that this program helps the active processing of children’s brain, enhances children’s realm of imagination, increases interest, motivation and achievement in moral education which are also the elements of cognitive development. So, ‘Roopkothar Golpo’ a digital storytelling program, is an effective method in developing children’s cognitive development. As, it has been proven that ‘Roopkothar Golpo’ enhances the children’s cognitive domain. So, the application of that kind of literacy and development program must run through primary and pre-primary level schools with the help of government budget.

Keywords: *Digital storytelling, Cognitive development, Imagination, Motivation, Moral education etc.*

1. Introduction

Kite Bangladesh Limited (KBL), a private limited company envisions a society where everyone has access to quality education, affordable resources, and opportunity to build and develop their capacity for ensuring sustainable livelihood. Among different types of development programs of KBL, ‘Roopkothar Golpo’, a digital storytelling program is one of them where it adheres to develop children’s cognitive domain by intervening different projects on stories particularly folk tales through digital media.

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But now a days for the lack of cognitive development yet people affected by trauma and displacement often become isolated, depressed and withdrawn from society, which are mainly behavioural problem especially cognitive problems starting to grow from one's childhood. Cognitive problem can cause a noticeable decline in cognitive abilities, including memory and thinking skills. In most of the cases, cognitive disorders occur include a lack of proper interaction during vulnerable stages of cognitive development, particularly during infancy.

On the other hand, there is a link between storytelling and cognitive development. Because storytelling is an art form and way of interaction and sharing thoughts, perception with imagination, creativity and inspiration for individual interpretation which stimulates emotions and reflection, whereas cognitive development is a thought process that includes remembering, problem solving, and decision-making, from childhood through adolescence to adulthood. So, the main elements of storytelling and cognitive development are almost same.

But now a day, in the age of digital media, storytelling is moribund. So, to revive storytelling and develop cognitive domain of children, Kite Bangladesh Limited organized "Roopkothar Golpo", an annual digital Storytelling Program, among children of pre-primaries to primary level students of different schools within Mohammadpur area.

So, they think that this program is a kind of solution and has an immense value for society and human beings especially on children. They also think that this program develops children's understanding of visual perception, attention, desires, emotions, intentions, beliefs, knowledge, and thinking considered as cognitive development on children's behaviour.

In a sense, every individual person is a storyteller. Sometimes we narrate things that happen around us, or we only the narrate of our own lives. That means, using narrative is the most powerful way to not only express ourselves, but also to learn about ourselves and our relationship with the world. So "Roopkothar golpo" is the primal way in which human beings organise and compartmentalise their experiences.

So, Storytelling has an immense value for human being especially on children to structure and organize their behaviour from the very beginning of their lifecycle. On the other hand, "Roopkotha digital storytelling program" tries to develop children's cognitive domain. There are so many ways of children's cognitive development. Now a day, as children spent most of their time on digital media, so, digital storytelling can be one of the ways of children's cognitive development. That is why, authors intended to investigate the effectiveness of "Roopkothar golpo" on children's cognitive development.

1.1 Scope of the Study

The focus of this study is measuring effectiveness of the digital storytelling program on cognitive development of children's behaviour through storytelling within Mohammadpur area of Dhaka city. All the participants were parents of those children who have participated in the program 'Roopkothar Golpo' within five schools which are

three branches of Mohammadpur Preparatory School, Saint Paul’s School, Saint Joseph School, Mohammadpur Model School, Residential School, Mohammadpur.

This study can be helpful for some classes of people who can directly measure the actual difference on children’s cognitive behaviour or some other classes of people who can make change on children’s behaviour. Authors think that this study would be helpful for the following professionals-

- Educational experts
- Psychologists
- Parents of the children's
- Doctors who work on children’s behavioural disorders.
- Neurologists
- Students

Besides those classes of people, some other classes of people can be benefited from this study who is interested about knowing the relationship between digital storytelling and cognitive development.

1.2 Objectives of the study

The broad objective of this study is to measure the effectiveness of Digital storytelling program “Roopkothar Golpo” on children’s cognitive development, followed by a number of specific objectives as follows:

- a) To know about digital storytelling Program “Roopkothar Golpo”.
- b) To know the awareness level of “Roopkothar Golpo” a digital storytelling program of Kite BD Ltd.
- c) To identify the measurement tools of cognitive development.
- d) To identify the control group and experimental group.
- e) To know the opinion of experimental group and control group about digital storytelling program.
- f) To measure the effectiveness of digital storytelling program on children’s cognitive development.

The following section of the study covers the fulfilment of the broad and specific objectives.

1.3 Research questions

- a) What is “Digital storytelling program”?
- b) What is the level of awareness of this program?
- c) What are the measurement tools of cognitive development?
- d) How to identify control group and experimental group?
- e) What are the opinions of experimental group and control group about this program?

- f) How to measure the effectiveness of digital storytelling program on children's cognitive development?

1.4 Hypotheses

Effectiveness of the program is explored by comparing the group mean values of the experimental and control groups. Equal mean values denote ineffectiveness of the program whereas unequal mean values ensures effectiveness. Thus both the null and alternative hypotheses are developed based on this foundation and are as follows:

Ho: There is no significant difference between the mean values of experimental group and the control group.

H1: There is a significant difference between the mean values of experimental group and the control group.

1.5 Significance of the study

This study has immense value for society and human beings, particularly for parents of the children, educational experts, and psychologists. From this study, parents of the children can understand the benefits of participating on this program on a regular basis such as enhanced listening skill, broadened vocabulary, increased imagination, advancement in group dynamics and social skills, higher level reasoning, thinking and logic skills, and increased empathy and moral reasoning. This study helps educational experts to enhance children's literacy skills and make them understand that this program is an enjoyable and effective means of introducing children to reading. This study helps psychologists especially counsellors to understand that this program is a means of strengthening social skills in a non-threatening environment, where children are not forced to outwardly relate to each other. This study is helpful for doctor's who work on children's behavioural disorders especially with internalizing and externalizing problems. They can clearly understand that if they can increase the child understanding of their behaviour and its consequences, it can help them to reduce their aggression. This study helps neurologists by making them understand that emotions would be real only while a child telling stories and this thinking capacity enhances the development of brain.

So, it can be said that, this study has a great contribution to the society as it develops the cognitive domain of children, reduces the violence and makes the society peaceful.

2. Literature Review

Storytelling is a subject that has a plethora wide-ranging application to children's development, human learning, and society in general. This study focused the literature review primarily on storytelling, digital storytelling, cognitive development and elements of cognitive development. And how digital storytelling enhances cognitive development of children according to several cognitive theories and several studies are presented in this regard.

Definitions of Storytelling

Modern day educational theorists and researchers have narrowed down a variety of similar thoughts somewhat varying judgments about what basic elements constitute a definition of storytelling.

Stories are oral narration, instructional method and a form of written text in education. They can be presented as case-studies, role-playing and simulations. Nevertheless, educational researchers often defined storytelling as more narrow or specific terms.

The National Council of Teachers of English (2005) defines storytelling is a creation of mental images of the elements of a story through voice and gesture to an audience but it is related to one or more listeners, and they emphasize that it is not congruent with simply acting out a drama or reciting a story from memory or a text.

According to Caine et al. (2005), through storytelling people can access, express, and retain information and knowledge. They argue that information is naturally organized in our minds according to story form which confirms by a brain research.

Richter and Koppett (2000) Stories lay the main foundation of how one communicates, remembers, and integrates new information by placing them into a story format, which is a similar view of Caine et al (2005).

According to Eric Miller (March2011), Storying is the process of how an individual construct and considers his or her thoughts. Through the process of storying, children can develop a sense of story. A story can be regarded as a sequence of events. One-way one makes sense out of experience is to classify pieces of experience into stories.

Through the analysis of definition of storytelling, a pervasive similarity is seen among nearly all educational theorists and researchers on this topic is that storytelling is an underlying human way of making meaning of one’s lives and experiences. And it shows how past events and old knowledge can be bridged to new experiences and new knowledge.

Role and History of Storytelling

Storytelling and its role(s) in society antedates written human history that oral only tool available to people to preserve and share cultural customs, beliefs and heritage was oral storytelling. Story proved to be the oldest and the most authenticated means for humans to remember information (**Abrahamsen, 1998**). So, storytelling ensure that it is the highly effective way of coding knowledge in oral cultures and increase cultural awareness because it made them more memorable and easily passed on to others. In fact, Abrahamsen claims that for storytelling civilizations survived because they ensured the continuity of life experiences to subsequent generations.

According to Eric Miller (March2011), Storytelling enables children to think in term of series of progressions of events. This helps them to identify their patterns of behaviours and actions, in story and in their life. It makes a habit of organising data into sequences that progress from a beginning to a middle to an end and hold together to make a connection among them as a unit. Children understand characters' personalities and their actions and can enable to think about values, ethics, and principles of morality through storytelling. The children are then able to relate different kind of thinking to their

decision-making about how they might behave in their own real lives. In these ways, children can become more aware of their own and others' thoughts and feelings, and they can become more communicative and creative in talking about all of this.

Digital storytelling

Now a day's Digital storytelling is an emerging issue with the same capabilities as oral and written storytelling but offers other unique characteristics for mental growth and development. Digital storytelling is referred as telling stories and sharing information through multimedia.

According to the **Digital Storytelling Association, 2002**, "Digital storytelling as the modern expression and a way of using digital media to create media-rich through stories to tell, to share, and to preserve. Digital stories give a deep dimension and vivid colour to characters, situations, and insights through weaving images, music, narrative and voice together.

Porter (2005) suggests that, Digital story includes technical skills, collaboration, communication, oral speaking, creativity and visual images with sound literacy so that students can use multiple with their intelligence to expand their higher order thinking skills and become effective discourses, collaborators and project managers. **Hung, S. K. (2007) stated that**, digital storytelling is a method and technique by which one can explore the potential of teaching, visual art and culture through the digital medium. Chung concludes that one can solve problem and make decision that is relevant, personal, and meaningful that digital storytelling provides as an opportunity especially for art educators.

In general, they all revolve around the idea of combining the art of telling stories with a variety of digital multimedia, such as: images, audio, and video (**Robin, 2008**).

Cognitive development

The words cognitive itself is an adjective which is related to conscious intellectual activity involving thinking, reasoning, or remembering. Cognitive skills are some combination of skills that brain uses to think, learn, read, remember, pay attention, and solve problems. That type of skills is also measured to determine IQ. That means Cognitive development deals with how a person perceives, thinks, and gains understanding of one's world through the interaction of inherited and learned factors. Areas of cognitive development involve information processing, intelligence, language development, reasoning and memory.

Cognitive development is considered as a wing of childhood neurological and psychological development. Specifically, conception, perception, information processing, and language are the main bases on which cognitive development is assessed that are the indicators of brain development. As human awareness and understanding of the world increases from infancy to childhood, and then again into adolescence so, it is generally recognized that cognitive development progresses with age. Jean Piaget first described the process of cognitive development in his theory of cognitive development, (**Biology Dictionary**).

In 1952, French Psychologist Jean Piaget published a theory that the cognitive development of children occurs in four distinct universal stages, and each stage characterized by increasingly knowledgeable and conceptual levels of thought. Each stage builds on the learning of previous stage and always occurs in the same order. Sensorimotor stage (infancy), in this period, brain power is demonstrated through motor activity without the use of symbols. Though knowledge of the world is limited, but it is developing, because it is based on physical interactions and experiences. Second, Pre-operational stage (toddlerhood and early childhood), in this period, the power of brain is denoted using symbols, use mature language, and memory and imagination are developed, but thinking is nonsensical, non-reversible manner. Third, Concrete operational stage (elementary and early adolescence), is characterized by number, length, liquid, mass, weight, area, and volume. Intelligence is shown through logical and systematic manipulation of symbols related to proven objects. In this stage, operational thinking involving revisable mental action develops. Fourth, formal operational stage (adolescence and adulthood), in this stage, intelligence is demonstrated through the judgemental and logical use of symbols which is related to abstract concepts.

John H. Flavell Department of Psychology, Stanford University, Stanford, California published a theory and did research on the development of children's knowledge about the mental world. There he discussed a summary of the post infancy development of children's understanding of visual perception, attention, desires, emotions, intentions, beliefs, knowledge, pretence, and thinking which are briefly considered as intra-cultural, and inter-specific differences in theory-of-mind development. **Janet Wilde Astington published a theory in August 2010 on** “The Development of Theory of Mind in Early Childhood”. He emphasised on development during the first five years of life including social cognition. He mentioned social cognition is the ability of children’s heart to get along with other people and to see things from their point of view.

Table 1: Measurement scale

Measurement Tools	Sources
Imaginary power	The National Council of Teachers of English (2005)
Cultural awareness	(Abrahamsen, 1998)
Patterns of behaviour	According to Eric Miller (March2011)
Access, express, and retain information	According to Caine et al. (2005)
Proper guidance	Eric Miller (March2011)
Moral values	Eric Miller (March2011)
Technical skills, collaboration, communication, oral speaking, creativity and visual and sound literacy	Porter (2005)
Problem solving skills	Chung, S. K. (2007).
Visual perception, attention, emotions, intentions, beliefs, knowledge, pretence, and thinking	John H. Flavell Department of Psychology, Stanford University, Stanford, California

Most theorists tend to agree that storytelling offers the opportunity for improved learner engagement, information processing, and information retention over other more traditional forms of teaching and learning. Several studies were discussed on storytelling that underscores the transformational aspect of storytelling and the ability of storytelling which develops cognitive domain.

There is an enormous research literatures, with thousands of studies investigating about digital storytelling on different issues but there is no specific study on cognitive development of children's behaviour through any digital storytelling program. So, authors aimed to discuss that issue through this study.

3. Methodology

Prior to large scale survey, an exploratory study in the form of 15 in-depth interviews of some educational experts, psychologists, parents of the children's, doctors, neurologists, students has been conducted to identify the measurement tools of cognitive development followed by true experimental design through post-test-only control group design to differentiate the mean value of experimental group and control group on the measurement tools. Authors used same number sample that were in the experimental group and their children attended in the "Roopkotha a digital storytelling program" and on the other hand same number of samples who were in the control group, but not attended in this program. Both primary and secondary data were used in this study where primary data were collected through survey and secondary data from different sources such as articles related to digital storytelling, prior research report regarding related issues, journals and articles related to storytelling and other websites related to this topic. In this study, non-comparative scaling technique has been used. The scale developed as data collection instrument consists of 20 items of five-point Likert type questions prepared to measure the effectiveness of 'Roopkothar Golpo' a Digital Storytelling Program on children's cognitive development.

The total element of this study of interest is but not limited to 300 parents of participants aged between 3 to 11 from pre-primaries to primary level Schools (Three branches of Mohammadpur preparatory school, Saint Paul's school, Saint Joseph school, Mohammadpur Model school, Residential school, Mohammadpur) as per the association's directory and telephone book of KBL.

Stratified sampling by gender is used as sampling technique. To avoid under representing one subgroup in a study and yields more accurate results, Probability proportional to size (PPS) has also been followed. A total of 168 samples consisting of 109 female respondents and 59 male respondents were selected by following the formula below:

$$n = \frac{z^2 * P(1-P)}{e^2} \div \left(1 + \frac{z^2 * P(1-P)}{e^2_N} \right)$$

The gathered data have been analysed by using discriminant analysis with the help of SPSS Version 23 software. According to this study, the function of discriminant analysis is given below-

Here, D = Discriminant score, b’s = Discriminant coefficient or weight, X’s = Predictor or independent variables as follows Imaginary power, Cultural awareness, Patterns of behaviour, Access, express, and retain information, Moral values, Technical skills, Collaboration and communication, Oral speaking creativity, Visual and sound literacy, Problem solving skills, Visual perception, Attention, Proper guidance, Pretence, Emotions, Intentions, Beliefs, Knowledge, Thinking, Brain development tools.

4. Data Analysis, Findings and discussion

To analyse data authors used discriminant analysis because it is useful in determining whether a set of variables is effective in predicting category membership.

Table 2: Eigenvalues

Eigenvalues				
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	5.196 ^a	100.0	100.0	.916
a. First 1 canonical discriminant functions were used in the analysis.				

For each discriminant function the eigenvalue is the ratio of between groups to within group sums of squares. Large eigenvalues imply superior function. Here found in the above table the eigenvalue is greater than 1.00. So, the program is effective.

Table 3: Wilk’s Lambda

Wilk’s Lambda				
Test of Function(s)	Wilk’s Lambda	Chi-square	df	Sig.
1	.161	186.043	20	.000

Wilk’s lambda (λ) sometimes also called U statistics. According to Wilk’s lambda λ or each predictor is the ratio of the within group sum of squares to the total sum of squares. Its value varies between 0 and 1. Large values of λ (near 1) indicate that group means do not seem to be different. Small values of λ (near 0) indicate that the group means seem to

be different. And in this study, here the value of lambda is .161 which is small and near to 0. So, there is a significant difference in mean values between experimental group and control group.

Table 4: Functions at Group Centroids

Functions at Group Centroids	
	Function
Experimental & Control Group	1
Experimental Group	1.791
Control Group	-2.850
Unstandardized canonical discriminant functions evaluated at group means	

From the above table, we can see that group mean of experimental group is 1.791 and group mean of control group is -2.850. So, there is a significance difference between these two groups. Besides, there are some other statistical outputs which are shown in appendix. The interpretation of those outputs is given below-

a) Group statistics

The results of running two group discriminant analyses on the data using SPSS are presented in table 5 (which is shown in appendix). The result shows that the group mean and standard deviation of two groups varies largely. It appears that the two groups are more widely separated in terms of cognitive development than another group.

b) Tests of Equality of Group Means

The result of equality of group means is presented in table 6 (shown in appendix). The result shows that calculated 'F' value is greater than tabulated value. Here the tabulated value of degree of freedom (df2) for 112 is 3.92. And in this study, all the calculated 'F' value is greater than the tabulated value 3.92. So, all variables have an impact on this study and this study has significance.

a) Polled within group matrix

Polled within group matrix presented in table 7 (shown in appendix) indicated low correlations between the predictors of two groups. This study shows that most of the cases the values of predictors are less than 0.5. So, it can be said that there is a large dispersion between this two groups.

From the above analysis and findings, it is found that there is a significant difference between the mean values of experimental group and the control group. So H0 is void and H1 is true for this study.

5. Recommendations

Based on the findings of this study, it is visible that digital storytelling program has a great impact on cognitive development of children. So, for further implications, several recommendations are made from this study as follows:

- The awareness of that kind of program has to be increased all over the country.
- In every school, specialism on digital storytelling can be developed in order to develop children’s cognitive domain.
- Policy should be developed to create awareness among parents of the children on digital storytelling program and encouraged them to take participate their children in that kind of program.
- Need more Budget allocation for every school for that kind of program.
- Planning and implementation for that kind of literacy and development program should be started vigorously throughout the country.

If that kind of activities and programs are taken by the concerned authorities, then it can have spill-over effect on children’s cognitive development which in return would be beneficial for all stakeholders.

6. Scope for future study

Though this study has taken steps to measure the effectiveness of a program that develop children’s cognitive development, this study has certain limitations. Limitation of the data is the main problem here. Only a small number of respondents were used to collect data about the study. This data collection was limited to only Mohammadpur area, in Dhaka city, Bangladesh. Upon the collection of data, it was found that respondents were very similar in age, mainly within 28-40 years of age. Research findings could be different at a different age level. Upcoming researchers can exploit this opportunity to do their research with more respondents as well as in more diversified areas. Some of the diversified areas for future study are as follows:

- Study the impact of storytelling as a mentoring strategy with new faculty and/or staff within the technical college or other institution of higher education.
- Compare the effectiveness of storytelling between two groups of adult learners of universities.
- Study the impact that storytelling has on organizational development when an organization is faced with significant organizational change.
- Study how storytelling impacts organizational strategic planning processes and outcomes as well as buy-in to organizational mission, values, and vision.

7. Conclusion

In conclusion, the findings of this study reveal that, ‘Roopkothar Golpo’, a digital storytelling program, is an effective method in developing children’s cognitive development. Because, this storytelling program helps to enhance children’s’ realm of imagination, helps the active processing of children's brain, provides way for children to receive positive message and interest, motivation and achievement in moral education. This program also increases students' understanding of moral values because they are engaged actively in peer discussion. So, this kind of storytelling program is necessary for the further development of children.

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Appendix
Statistical output

Table 5: Group Statistics

Group Statistics					
Experimental & Control Group		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
Experimental Group	Imaginary power	4.1000	.88711	70	70.000
	Cultural awareness	3.8857	.80834	70	70.000
	Patterns of behaviour	4.2429	.89176	70	70.000
	Access, express and retain information	3.8000	.84442	70	70.000
	Proper guidance	3.7000	.64494	70	70.000
	Moral values	4.2429	.54999	70	70.000
	Enhance Technical skills	3.4143	.77071	70	70.000
	Collaboration and communication	3.5857	.69141	70	70.000
	Oral speaking	3.9714	.65875	70	70.000
	Creativity	3.6429	.66016	70	70.000
	Visual and sound literacy	4.1429	.68706	70	70.000
	Problem solving skills	4.0286	.88418	70	70.000
	Enhance beliefs	2.4571	1.05893	70	70.000
	Pretence	2.6571	.88278	70	70.000
	Visual perception	3.6857	.73313	70	70.000
	Attention	2.2286	1.03799	70	70.000
	Intentions	2.8143	.95239	70	70.000
	Knowledge	3.6571	.65686	70	70.000
Thinking power	4.1571	.47045	70	70.000	
Brain development tools.	4.3714	.51560	70	70.000	
Control Group	Imaginary power	2.8864	.94539	44	44.000
	Cultural awareness	3.0455	.80564	44	44.000
	Patterns of behaviour	2.4773	.95208	44	44.000
	Access, express and retain information	3.0682	.78940	44	44.000
	Proper guidance	2.7045	.82348	44	44.000
	Moral values	3.0000	1.23890	44	44.000
	Enhance technical skills	2.6364	.99044	44	44.000
	Collaboration and communication	2.7273	.99682	44	44.000
	Oral speaking	2.7273	1.18839	44	44.000

	Creativity	2.7273	1.18839	44	44.000
	Visual and sound literacy	2.8409	1.16026	44	44.000
	Problem solving skills	3.1591	.93866	44	44.000
	Enhance beliefs	3.8864	.72227	44	44.000
	Pretence	3.2500	.83874	44	44.000
	Visual perception	3.0682	.89955	44	44.000
	Attention	1.8409	.80531	44	44.000
	Intentions.	3.4091	.97213	44	44.000
	Knowledge	2.8864	.96968	44	44.000
	Thinking power	3.0000	.74709	44	44.000
	Brain development tools.	3.2273	.83146	44	44.000
Total	Imaginary power	3.6316	1.08296	114	114.000
	Cultural awareness	3.5614	.90265	114	114.000
	Patterns of behaviour	3.5614	1.25533	114	114.000
	Access, express and retain information.	3.5175	.89475	114	114.000
	Proper guidance	3.3158	.86542	114	114.000
	Moral values	3.7632	1.06682	114	114.000
	Enhance technical skill	3.1140	.93845	114	114.000
	Collaboration and communication	3.2544	.91990	114	114.000
	Oral speaking	3.4912	1.08282	114	114.000
	Creativity	3.2895	1.00198	114	114.000
	Visual and sound literacy	3.6404	1.09809	114	114.000
	Problem solving skills	3.6930	.99670	114	114.000
	Enhance beliefs	3.0088	1.17115	114	114.000
	Pretence	2.8860	.90972	114	114.000
	Visual perception	3.4474	.85282	114	114.000
	Attention	2.0789	.96985	114	114.000
	Intention.	3.0439	.99903	114	114.000
Knowledge	3.3596	.87368	114	114.000	
Thinking power	3.7105	.81711	114	114.000	
Brain development tools.	3.9298	.85930	114	114.000	

Table 6: Tests of Equality of Group Means

Tests of Equality of Group Means					
	Wilks' Lambda	F	df1	df2	Sig.
Imaginary power	.700	48.063	1	112	.000
Imaginary power	.793	29.268	1	112	.000
Cultural awareness	.527	100.511	1	112	.000
Patterns of behaviour	.840	21.325	1	112	.000
Access, express and retain information.	.684	51.825	1	112	.000
Proper guidance	.675	53.806	1	112	.000
Moral values	.836	22.018	1	112	.000
Enhance technical skill	.792	29.452	1	112	.000
Collaboration and communication	.684	51.659	1	112	.000
Oral speaking	.800	27.937	1	112	.000
Creativity	.664	56.703	1	112	.000
Visual and sound literacy	.818	24.912	1	112	.000
Problem solving skills	.644	61.932	1	112	.000
Enhance beliefs	.898	12.658	1	112	.001
Pretence	.875	16.053	1	112	.000
Visual perception	.962	4.448	1	112	.037
Attention	.915	10.371	1	112	.002
Intention.	.814	25.607	1	112	.000
Knowledge	.521	103.172	1	112	.000
Thinking power	.576	82.406	1	112	.000
Brain development tools.					

Table 7: Polled within group matrix

	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	q16	q17	q18	q19	q20
Correlation q1	1	0.365	0.586	0.569	0.445	0.159	0.231	0.15	0.238	0.219	0.199	0.581	-0.05	0.03	0.558	-0.45	-0.03	0.506	0.33	0.173
q2	0.365	1	0.592	0.514	0.434	0.25	0.142	0.07	0.151	0.193	0.239	0.597	-0.08	-0.07	0.529	-0.3	0.158	0.482	0.192	0.296
q3	0.586	0.592	1	0.58	0.52	0.264	0.188	0.151	0.306	0.312	0.227	0.627	-0.14	-0.06	0.486	-0.4	0.148	0.483	0.269	0.252
q4	0.569	0.514	0.58	1	0.508	0.3	0.036	0.277	0.246	0.239	0.259	0.562	-0.05	0.118	0.533	-0.53	0.126	0.5	0.297	0.373
q5	0.445	0.434	0.52	0.508	1	0.199	0.158	0.314	0.205	0.206	0.276	0.544	-0.18	0.058	0.423	-0.46	0.057	0.319	0.111	0.166
q6	0.159	0.25	0.264	0.3	0.199	1	0.082	0.383	0.4	0.406	0.379	0.308	0.099	0.291	0.359	-0.23	0.382	0.395	0.365	0.367
q7	0.231	0.142	0.188	0.036	0.158	0.082	1	0.311	0.397	0.242	0.419	0.157	0.164	0.083	0.171	-0	0.118	0.146	0.253	0.203
q8	0.15	0.07	0.151	0.277	0.314	0.383	0.311	1	0.53	0.415	0.377	0.225	0.137	0.277	0.24	-0.23	0.142	0.256	0.249	0.356
q9	0.238	0.151	0.306	0.246	0.205	0.4	0.397	0.53	1	0.661	0.346	0.23	0.195	0.187	0.238	-0.11	0.264	0.3	0.407	0.386
q10	0.219	0.193	0.312	0.239	0.206	0.406	0.242	0.415	0.661	1	0.416	0.237	0.148	0.154	0.185	-0.12	0.24	0.239	0.317	0.348
q11	0.199	0.239	0.227	0.259	0.276	0.379	0.419	0.377	0.346	0.416	1	0.316	0.154	0.22	0.318	-0.16	0.235	0.171	0.309	0.301
q12	0.581	0.597	0.627	0.562	0.544	0.308	0.157	0.225	0.23	0.237	0.316	1	0.051	0.181	0.605	-0.46	0.252	0.467	0.178	0.251
q13	-0.05	-0.08	-0.14	-0.05	-0.18	0.099	0.164	0.137	0.195	0.148	0.154	0.051	1	0.472	0.135	0.326	0.483	-0.14	0.095	0.09
q14	0.03	-0.07	-0.06	0.118	0.058	0.291	0.083	0.277	0.187	0.154	0.22	0.181	0.472	1	0.189	0.186	0.43	0	0.135	0.211
q15	0.558	0.529	0.486	0.533	0.423	0.359	0.171	0.24	0.238	0.185	0.318	0.605	0.135	0.189	1	-0.3	0.298	0.434	0.347	0.298
q16	-0.45	-0.3	-0.4	-0.53	-0.46	-0.23	-0	-0.23	-0.11	-0.12	-0.16	-0.46	0.326	0.186	-0.3	1	0.028	-0.39	-0.18	-0.31
q17	-0.03	0.158	0.148	0.126	0.057	0.382	0.118	0.142	0.264	0.24	0.235	0.252	0.483	0.43	0.298	0.028	1	-0.01	0.173	0.266
q18	0.506	0.482	0.483	0.5	0.319	0.395	0.146	0.256	0.3	0.239	0.171	0.467	-0.14	0	0.434	-0.39	-0.01	1	0.434	0.362
q19	0.33	0.192	0.269	0.297	0.111	0.365	0.253	0.249	0.407	0.317	0.309	0.178	0.095	0.135	0.347	-0.18	0.173	0.434	1	0.343
q20	0.173	0.296	0.252	0.373	0.166	0.367	0.203	0.356	0.386	0.348	0.301	0.251	0.09	0.211	0.298	-0.31	0.266	0.362	0.343	1