Effects of infographic designing on image processing ability and achievement motivation of dyscalculic students

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***Abstract*–Dyscalculia is a mathematical learning disorder in which the mathematical ability of students is found lower than the expected for a person's age, intellect and edification. There are various symptoms of Dyscalculic such as -having difficulty in counting objects, difficulty in processing and memorizing sequences and others. Infographic design presents simple brain exercises and activities for dyscalculic can be helpful in stimulating the network of neural connections in charge of processing numeric language which lead to minimize their cognitive difficulties that are associated with the process of learning mathematics and develop their image processing ability. The present study is aimed at achieving the objectives i.e., to identify the Dyscalculic students from the regular classrooms of junior level, to compare the image processing ability of Dyscalculic students taught by Infographic design and Traditional design, to compare the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design, to compare the image processing ability between rural and urban Dyscalculic students taught by Infographic design, To compare the achievement motivation between rural and urban Dyscalculic students taught by Infographic design, to compare the image processing ability between male and female Dyscalculic students taught by Infographic design, to compare the image processing ability between male and female Dyscalculic students taught by Traditional design, to compare the achievement motivation between male and female Dyscalculic students taught by Infographic design, to compare the achievement motivation between male and female Dyscalculic students taught by Traditional design. For achieving these objectives, Descriptive Survey research method has been employed. In the present study 48 dyscalculic students of junior schools were selected from Agra city by simple random sampling. Mathematics Academic Achievement Test, Mathematical Comprehension Scale, Image Processing Ability Test, Achievement Motivation Scale tools were used to collect the data.. These dyscalculic students were not different in their achievement motivation and image processing ability on the basis of rural and urban. The dyscalculic students were found different in their achievement motivation and image processing ability on the basis of gender.**

Keywords–Infographics; Image Processing Ability; Achievement Motivation; Dyscalculic Students

I. INTRODUCTION

Dyscalculia is a mathematical learning disorder in which the mathematical ability of students is found lower than the expected for a person's age, intellect and edification. Researchers have found indication that such type of a disability exists in real world and due to their result it is necessitate addressing dyscalculia as a chief educational concern in mathematics. Dyscalculic students present themselves with the difficulties in number processing and feel complexity in comprehending simple numeral concepts. They lack an intuitive grasp of numbers and face problems in learning facts and procedures based on numbers. In some cases even if they generate a correct answer or use a proper method, they may do so mechanically and without confidence. When a child's brain system cannot process the considerable and imperative stages necessary to make a head begin with numbers, the challenges they experience by means of mathematics suffer greater. Normally they tend to employ fundamental and disorganized counting actions and commit frequent errors and fall behind their peers. There are various symptoms of Dyscalculic such as - having difficulty in counting objects, difficulty in processing and memorizing sequences, seek extra help in counting forwards and backwards, having difficulty in recording calculations on paper, having difficulties in understanding place value, may be disturbed by the lack of confidence in estimation and find the sequencing of time difficulty. There are some biological reasons showed by researchers. According to Brian Butterworth (2012), The core number areas in the left and right parietal lobes of learners with dyscalculia have fewer nerve cells and/or fewer connections among them. These areas also activate differently in Dyscalculic learners: usually they are less active and in number tasks they respond differently from typical learners. If these students are diagnosed then the special treatments can be given to remove their difficulties in that specific area.

Simple brain exercises and activities for Dyscalculic can be helpful in stimulating the network of neural connections in charge of processing numeric language which lead to minimize their cognitive difficulties that

are associated with the process of learning mathematics. In general people remember 10% of what they hear, 20% of what they read, and 80% of what they see and do. So image or visuals are very effective mean of learning different subjects and it is also true for mathematics. By visuals, Dyscalculic learner can get rid of overloaded of text-based information that they continuously receive throughout the day. So it's no wonder that we need to implement visuals throughout learning opportunities.

In the present digital era, creative pedagogies have developed into an extensively conventional way of learning, and the usage of global network is inevitable in every education process. Ubiquitous learning integrates wireless, mobile and context awareness technologies in order to identify the situation of the learners and provide more seamless adaptive support beyond formal learning process (Shih, Chu, Hwang, & Kinshuk, 2011; Hwang, Chih-Hsiang, Tseng, & Huang, 2011). In order to support modern pedagogical approaches, as well as a variety of heterogenic learning resources within courses, ubiquitous learning environments need to be based on a powerful IT infrastructure. At the same time, in order to be efficient, ubiquitous learning environments need to be based on learning management systems (LMS) and integrated into an existing comprehensive curriculum. In true sense comprehensive curriculum is one which is able to cater the needs and interest of all kind of learner. For making learning effective various additional tools are developed and used in all levels of education. Information graphics is one of them which is known as "Infographic".

Infographic is a representation of information in a graphic format designed to make the data easily understandable at a glance. It can improve cognition by utilizing graphics to enhance the human visual system's ability to see patterns and trends. It can be also helpful in the image processing of Dyscalculic as it presents the content or knowledge in graphical manner. The image processing is the analysis and manipulation of a digitalized image, especially in order to improve its quality. These Infographics can make a fruitful contribution in the mathematics learning of Dyscalculic students. As the present teaching and learning has been changed a lot with the inclusion of smart classes, blended learning, synchronous and asynchronous learning, open educational resources, online certificate courses and various other advanced version of modern education. Different types of content creation tools, different type of e-resources are need to be implemented in the teaching learning process of Dyscalculic to make their learning easy and for developing the motivation towards their learning in mathematics. Infographics allow the students to easily summarize key learning in an interesting and motivating way which results in enhancing the active engagement of Dyscalculic in mathematics learning.

II. REVIEW OF RELATED LITERATURE

The researchers have reviewed the related literature relating to the Infopgraphics, image processing ability, achievement motivation and dyscalculia which is given below.

A. Studies Related to Infographics

Çifçi, T. (2016) revealed that using Infographics in geography lessons increase academic achievement and attitude levels of the students. It can also contribute to visual and verbal learning levels. Besides, these results can also provide guidance to teachers as they provide alternative and different instructional materials in geography lessons. Matrix, S. (2014) has explored that how incorporating a research-based graphic design assignment into coursework challenges and encourages students' visual digital literacies. Matrix, S. (2014) includes practical insights and identifies best practices emerging from the authors' classroom experience with the Infographic assignment, and from student feedback. The paper suggests that this kind of creative assignment requires students to practice exactly those digital competencies required to participate in an increasingly visual digital culture. Bellei, M., Welch, P., Pryor, S., & Ketheesan, N. (2016) revealed that Infographics is a unique, innovative and cost-effective method for producing digital media resources for tertiary level immunology teaching. The result was the production of original, high-quality and effective supplemental teaching resources that were extensively reviewed and pedagogically engaging for all the students involved.

B. Studies Related to Image Processing Ability

Aloraini, S. (2012) determined the impact of using multimedia on students' academic achievement in the College of Education at King Saud University and found significant impact of multimedia on the academic achievement of college students. Smeda, N., Dakich, E., & Sharda, N. (2014) studied the effectiveness of digital storytelling in the classrooms. The findings suggested that digital storytelling is a powerful tool which integrates instructional messages with learning activities to create more engaging and exciting learning environments. It is a meaningful approach for creating a constructivist learning environment based on novel principles of teaching and learning. Thus, this approach has the potential to enhance student engagement and provide better educational outcomes for learners.

C. Studies Related to Achievement Motivation

Santha Kumari, V.R. and Chamundeswari, S. (2015) have investigated the relationship between achievement motivation, study habits and academic achievement at the secondary level by using the Survey method. The results of statistical analyses showed a significant correlation between achievement motivation, study habits and performance of students and a significant difference was found between students in different categories of schools and gender pertaining to achievement motivation, study habits and academic

achievement. Franzis and others (2006) studied the role of cognition, achievement motivation and conscientiousness on academic underachievement among the students of grades 7 to 10. Results of the study presented all relationships between underachievement scores and need for cognition, achievement motivation scales, and conscientiousness showed linearity. Emannuel and others (2014) explored the relationship between achievement motivation, academic self-concept and academic achievement of high school students. The findings showed that, majority of the high school students were highly motivated, have high self-concept and performed well in the Mathematics Achievement test. This study also showed a significant correlation between self-concept and academic achievement. Again, there was a positive relationship between achievement motivation and academic achievement but the correlation was not significant.

Akpan, I.D. & Umobong, M.E. (2013) analysed of achievement motivation and academic engagement of senior secondary students in the Nigerian classroom. The analysis of the data revealed that achievement motivation has a significant impact on academic engagement with highly motivated students being more academically engaged than the moderately and lowly motivated students. Also findings presented that male students were more motivated than female student and, age also had a significant influence on achievement motivation. Achievement motivation could be seen as self-determination to success in whatever activities one engages in, be it academic work, professional work, sporting events, among others (Tella, 2007). Awan, Noureen and Naz (2011) examined achievement and its relationship with achievement motivation and self-concept among the secondary school students. The findings revealed that achievement motivation and self-concept are significantly related to academic achievement. Significant gender differences were discovered which were in favour of female students.

D. Studies Related to Dyscalculia

Castro, M.V.d., Bissaco, M.A.S., Panccioni, B.M., Rodrigues, S.C.M., Domingues, A.M. (2014) found that the virtual environment allows the students to integrate thought, feeling and action, thus motivating the children to learn and contributing to their intellectual development. Many virtual environments and computer games have been developed with educational goals to help children with learning disabilities. Previous studies have shown positive results for children with learning disabilities in reading (Nicolson, R.I., Fawcett, A.J., Nicolson, M.K., 2000 & Macaruso, P., Hook, P.E., McCabe, R., 2006). These studies showed that student performance has improved significantly by using computer-based games when compared with traditional computer-assisted teaching techniques (Chuang, T.Y., & Chen, W.F. 2009). Moreover, Landerl et al. (2004) found dyscalculia even when matched against controls with comparable spans. In this study, Dyscalculics (who were in the bottom 2% of their age group on timed arithmetic) were also matched on IQ. This suggests that general cognitive ability alone is not a sufficient explanation. There is abundant evidence now that it is possible to be excellent at arithmetical calculation with low general IQ (Butterworth, 2006).

After reviewing previous researches conducted in the field of Infographic designing, image processing and achievement motivation, the researchers have found that there is no study is designed to investigate all the variables for Dyscalculic students. Dyscalculic students always face difficulties in understanding the mathematical problems. Therefore, it is trying to solve their learning problems through Infographics, so that Dyscalculic students can also be more engaged in classroom learning.

E. Key Terms and Definitions

The key terms used in this study have been defined by the researchers in following words:

1. **Infographics**
   Infographics are also known as information graphics which presents graphic visual exemplifications of information, data or the knowledge envisioned to present information quickly and clearly with interesting features. According to the researchers, cognition can be improved by using infographics which enhance the human visual system's ability to see patterns and trends.
2. **Image Processing Ability**
   Image processing ability is known as the ability to analyse and manipulate the digitized images, pictures, symbols etc. especially in order to understand its relevance with the content.
3. **Achievement Motivation**
   Achievement motivation can be defined as the need for success or the attainment of brilliance. According to the researchers, achievement motivation can be defined as an individual's need to meet realistic aims, get feedback and experience a sense of accomplishment.
4. **Dyscalculic Students**
   Dyscalculia is a condition that affects the ability to acquire arithmetical skills. Dyscalculic students may have difficulty in understanding simple number concepts, lack an natural grasp of numbers, and have problems learning number facts and procedures.

F. Objectives

1. To identify the Dyscalculic students from the regular classrooms of junior level.
2. To compare the image processing ability of Dyscalculic students taught by Infographic design and Traditional design.
3. To compare the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design.

4. To compare the image processing ability between rural and urban Dyscalculic students taught by Infographic design.
5. To compare the achievement motivation between rural and urban Dyscalculic students taught by Infographic design.
6. To compare the image processing ability between male and female Dyscalculic students taught by Infographic design.
7. To compare the image processing ability between male and female Dyscalculic students taught by Traditional design.
8. To compare the achievement motivation between male and female Dyscalculic students taught by Infographic design.
9. To compare the achievement motivation between male and female Dyscalculic students taught by Traditional design.

G. Hypothesis

1. There exists no significance difference in image processing of Dyscalculic students taught by Infographic design and traditional design.
2. There exists no significance difference in achievement motivation of Dyscalculic students taught by Infographic design and traditional design.
3. There exists no significance difference in image processing ability between rural and urban Dyscalculic students taught by Infographic design.
4. There exists no significance difference in achievement motivation between rural and urban Dyscalculic students taught by Infographic design.
5. There exists no significant difference in image processing ability between male and female Dyscalculic students taught by Infographic design.
6. There exists no significant difference in image processing ability between male and female Dyscalculic students taught by Traditional design.
7. There exists no significant difference in achievement motivation between male and female Dyscalculic students taught by Infographic design.
8. There exists no significant difference in achievement motivation between male and female Dyscalculic students taught by Traditional design.

III. RESEARCH METHODOLOGY

The research methodology in this study comprises research method, sampling procedure, research instrument and statistical techniques. The suitable research method, sample, research instruments and statistical techniques have been selected according to the objectives of the study.

A. Research Method

Descriptive survey research method has been followed by the researchers to collect the information regarding the variables of the study.

B. Population

A population is any group of individuals that have one or more characteristics in common that are of the interest to the investigator. It may be all the individuals of a particular type or a restricted part of that group (Best, 1977). Thus a population refers to any collection of specified group of human beings or of non-human entities such as objects, educational institutions, time units, geographical areas or salaries etc. The population for the present study is the students of class VI in the Agra city.

C. Sampling

The researchers have first selected the schools from Agra city to select the sample for the present study. There are total 355 Higher Secondary Schools in Agra district in which 124 schools come under the rural region and 231 schools come under the category of urban region. By following simple random sampling technique the researchers have selected 10 schools from the rural region and 10 schools from the urban region. In the next stage of sampling, the students of class VI have been considered to identify the Dyscalculic students. Then Mathematics Academic Achievement Test and Mathematical Comprehension Scale have been administered upon the students of class VI. The students, who have attained less than 7 scores in the Mathematics Academic Achievement Test and come under the lower level of mathematical comprehension ability, have been identified as Dyscalculic students. Therefore, 24 Dyscalculic students (12 male and 12 female) have been selected from the rural area and 24 Dyscalculic students (12 male and 12 female) have been taken from the urban area. Total 48 Dyscalculic students have been selected in the present study.

D. Research Instruments

The researchers have selected some standardized research tools and also developed some research tools to collect the information regarding the variables of the present study. The brief description of the tools is as follows:

E. Mathematics Academic Achievement Test

Self-developed Mathematics Academic Achievement Test has been employed by the researchers to identify the Dyscalculic students. There are 40 items in this test based on IV class curriculum. These items have been prepared with the help of experts' opinion, item analysis and content validity. The content validity has been found 0.83. The reliability of this test has been measured through test-retest method and K-R method.

The test–retest and K-R reliability coefficient for this test is 0.78 and 0.82 respectively. One score is given for right answer and 0 is given for the wrong answer.

F. Mathematical Comprehension Scale

This scale has been developed by the researchers to measure the mathematical comprehension ability of the Dyscalculic students. There are 26 items in this scale with 5 response options i.e., always, very often, sometimes, rarely, never. After taking experts' opinion, items were analysed and its content validity and reliability has been measured. The content validity of this tool is found 0.77 and Cronbach's Alpha reliability is found 0.79.

G. Image Processing Ability Test

Self-developed Image Processing Ability Test has been used to study the image processing ability of the Dyscalculic students. There are total 45 items in this test. The items have been prepared from Mathematics subject of IV class. The items have been given in this test are in form of images. These items have been selected on the basis of experts' opinion and item analysis. The content validity of this tool is measured 0.81 and K-Reliability coefficient is found 0.84. 1 score is given for the right answer and 0 is given for the wrong answer.

H. Achievement Motivation Scale

Academic Motivation Scale developed by Bhuyian and Singh (2009) was used to study the achievement motivation among Dyscalculic students. There are total 28 items in this test which are related to three dimensions i.e., intrinsic motivation, extrinsic motivation and a motivation. In each dimension, 3 factors of intrinsic motivation, 3 factors for extrinsic motivation and 1 factor for a motivation, have been given each of which contains 4 items. There are five response options to each statement: Absolutely right, right, neither right nor wrong, wrong, absolutely wrong. A score of 5 is given to those responses showing maximum motivation while 1 is given to those showing lowest motivation level.

I. Statistical Techniques

The researchers have selected the sample through simple random sampling technique for the present study. It shows that each sample unit from the population has the chance to be selected. Therefore, the researchers have used parametric statistics to analyse the data. Mean, Standard Deviation and t-test has been used as statistical techniques.

IV. ANALYSIS AND INTERPRETATION

Objective 1: To identify the Dyscalculic students from the regular classrooms of junior level.

The identification of Dyscalculic students has been done by administering the Mathematics Academic Achievement Test and Mathematical Comprehension Scale upon the students of class VI. The criteria for identifying these students were as follows:

1. Not achieving the passing marks in the academic achievement test.
2. Lower level of mathematical comprehending ability in mathematical comprehension scale.

The following table shows the selected students with the problem of dyscalculia:

Table 1.0: Identification of Dyscalculic Students

Factors	Rural		Urban		Total
	Male	female	Male	female	
Mathematical Academic Achievement (Below 7 Marks)	12	12	12	12	48
Mathematical Comprehending Ability (Lower Level)	12	12	12	12	48

Therefore total 48 Dyscalculic students have been identified. There are 24 female and 24 male students who were taken from the rural and urban area equally.

Objective 2: To compare the image processing ability of Dyscalculic students taught by Infographic design and Traditional design.

The Following Table 1.1 shows the difference in the image processing ability of Dyscalculic students taught by Infographic design and Traditional design:

Table 1.1: Exhibiting Difference in the image processing ability of Dyscalculic students taught by Infographic design and Traditional design

Teaching Approaches	N	Mean	S.D.	T-value
Dyscalculic Students taught by Infographic Design	24	25.4	1.97	6.31
Dyscalculic Students taught by Traditional Design	24	7.84	2.52	

***Significant at 0.05 level**

The Table 1.1 presents the difference in the image processing ability of Dyscalculic students taught by Infographic design and Traditional design. The calculated t-value is 6.31 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in image processing ability of Dyscalculic students taught by Infographic design and Traditional design" is rejected. Therefore the result reveals that there exists significant difference in image

processing ability of Dyscalculic students taught by Infographic design and Traditional design. The mean value of image processing ability of Dyscalculic taught by Infographic was found higher. It may be due to the reason that Dyscalculic students face difficulties in process number in even simple problems of mathematics. In the traditional way of teaching mathematics these students feel bored because they are not able to compete with the other students. Infographic design provides an interesting way of learning which present the mathematical concepts in effective way.

Objective 3: To compare the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design.

The Following Table 1.2 presents the difference in the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design:

Table 1.2: Exhibiting Difference in the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design

Teaching Approaches	N	Mean	S.D.	T-value
Dyscalculic Students taught by Infographic Design	24	89.04	17.66	2.48
Dyscalculic Students taught by Traditional Design	24	51.24	9.99	

***Significant at 0.05 level**

The Table 1.2 presents the difference in the achievement motivation of Dyscalculic students taught by Infographic design and Traditional design. The calculated t-value is 2.48 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in achievement motivation of Dyscalculic students taught by Infographic design and Traditional design" is rejected. Therefore the result reveals that there exists significant difference in achievement motivation of Dyscalculic students taught by Infographic design and Traditional design. The mean value of achievement motivation of Dyscalculic students taught by Infographic design was found greater than other group. As Dyscalculic students present themselves with the difficulties in number processing and feel complexity in comprehending simple numeral concepts of lower class. They generally feel less confidence in solving the mathematical problems and not expect much with him/herself. In Infographic design they get the opportunity to take learning as fun. As soon as they get familiar with the minute presentation of a single concept, they grasp it and get motivated internally for their high achievement.

Objective 4: To compare the image processing ability between rural and urban Dyscalculic students taught by Infographic design.

The Following Table 1.3 presents the difference in the image processing ability between rural and urban Dyscalculic students taught by Infographic design:

Table 1.3: Exhibiting Difference in the image processing ability between rural and urban Dyscalculic students taught by Infographic design

Area	N	Mean	S.D.	T-value
Dyscalculic Students from Rural	12	25.58	1.97	0.62
Dyscalculic Students from Urban	12	25.16	2.12	

***Not significant at 0.05 level**

The Table 1.3 presents the difference in the image processing ability between rural and urban Dyscalculic students taught by Infographic design. The calculated t-value is 0.62 which is not significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in the image processing ability between rural and urban Dyscalculic students taught by Infographic design" is accepted. Therefore the result reveals that there is no significant difference in image processing ability between rural and urban Dyscalculic students taught by Infographic design.

Objective 5: to compare the achievement motivation between rural and urban Dyscalculic students taught by Infographic design.

The Following Table 1.4 indicates the difference in achievement motivation between rural and urban Dyscalculic students taught by Infographic design:

Table 1.4: Exhibiting Difference in achievement motivation between rural and urban Dyscalculic students taught by Infographic design

Area	N	Mean	S.D.	T-value
Dyscalculic Students from Rural	12	92.75	17.84	0.40
Dyscalculic Students from Urban	12	86.58	17.89	

***Not significant at 0.05 level**

The Table 1.4 presents the difference in the achievement motivation between rural and urban Dyscalculic students taught by Infographic design. The calculated t-value is 0.40 which is not significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in the achievement motivation between rural and urban Dyscalculic students taught by Infographic design" is accepted. Therefore the result reveals that there is no significant difference in achievement motivation between rural and urban Dyscalculic students taught by Infographic design.

Objective 6: To compare the image processing ability between male and female Dyscalculic students taught by Infographic design.

The Following Table 1.5 shows the difference in image processing ability between male and female Dyscalculic students taught by Infographic design:

Table 1.5: Exhibiting Difference in the image processing ability between male and female Dyscalculic students taught by Infographic design

Gender	N	Mean	S.D.	T-value
Male	12	27	0.85	2.33
Female	12	23.75	1.42	

***Significant at 0.05 level**

The Table 1.5 exhibits the difference in image processing ability between male and female Dyscalculic students taught by Infographic design. The calculated t-value is 2.33 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in image processing ability between male and female Dyscalculic students taught by Infographic design" is rejected. Therefore the result reveals that there is significant difference in image processing ability between male and female Dyscalculic students taught by Infographic design. The mean value of image processing ability of male was found higher than females in teaching through Infographics. It may be due to the reason that Infographic present mathematical concepts in graphical or visual way in place of text. Generally it is considered that the interest of male in mathematical and spatial problems is found more than the females. If male shows more interest in solving these problems then they will be able to manipulate the images presented in Infographic more efficiently which can result in their high image processing ability.

Objective 7: To compare the image processing ability between male and female Dyscalculic students taught by Traditional design.

The Following Table 1.6 presents the difference in image processing ability between male and female Dyscalculic students taught by Traditional design:

Table 1.6: Exhibiting Difference in the image processing ability between male and female Dyscalculic students taught by Traditional design

Gender	N	Mean	S.D.	T-value
Male	12	9.91	1.83	2.46
Female	12	5.75	1.05	

***Significant at 0.05 level**

The Table 1.6 exhibits the difference in image processing ability between male and female Dyscalculic students taught by Traditional design. The calculated t-value is 2.46 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in image processing ability between male and female Dyscalculic students taught by Traditional design" is rejected. Therefore the result reveals that there is significant difference in image processing ability between male and female Dyscalculic students taught by Traditional design. The mean value of image processing ability of male was found more than female in leaning mathematics through traditional design. It may be due to the reason that male are generally possess the higher spatial ability. So they get more opportunity to explore digital devices and understand visual representations of in formations which can result in the comparatively high understanding of visuals than the females.

Objective 8: To compare the achievement motivation between male and female Dyscalculic students taught by Infographic design.

The Following Table 1.7 exhibits the difference in achievement motivation between male and female Dyscalculic students taught by Infographic design:

Table 1.7: Exhibiting Difference in the achievement motivation between male and female Dyscalculic students taught by Infographic design

Gender	N	Mean	S.D.	T-value
Male	12	77.33	10.64	7.04
Female	12	102.33	13.87	

***Significant at 0.05 level**

The Table 1.7 exhibits the difference in achievement motivation between male and female Dyscalculic students taught by Infographic design. The calculated t-value is 7.04 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in achievement motivation between male and female Dyscalculic students taught by Infographic design" is rejected. Therefore the result reveals that there is significant difference in achievement motivation between male and female Dyscalculic students taught by Infographic design. The mean value of achievement motivation of Dyscalculic females taught by Infographic design was found greater than the male. It may be due to the reason that the girls are usually possess more sincerity and concentration in their studies and in the new situations presented in front of them. In learning mathematics through Infographic design the student get the opportunity to develop the ability of manipulating and analyzing the images related to mathematics so females assume to learn in more disciplined, motivated manner and which can result in showing the higher achievement motivation.

Objective 9: To compare the achievement motivation between male and female Dyscalculic students taught by Traditional design.

The Following Table 1.8 exhibits the difference in achievement motivation between male and female Dyscalculic students taught by Traditional design:

Table 1.8: Exhibiting Difference in the achievement motivation between male and female Dyscalculic students taught by Traditional design

Gender	N	Mean	S.D.	T-value
Male	12	43.83	4.74	3.36
Female	12	59	8.25	

***Significant at 0.05 level**

The Table 1.8 exhibits the difference in achievement motivation between male and female Dyscalculic students taught by Traditional design. The calculated t-value is 3.36 which is significant at 0.05 level. Therefore the null hypothesis that "There will be no significant difference in achievement motivation between male and female Dyscalculic students taught by Traditional design" is rejected. Therefore the result reveals that there is significant difference in achievement motivation between male and female Dyscalculic students taught by Traditional design. The mean value of achievement motivation of female Dyscalculic taught by traditional design of mathematics was found greater than male. It may be due to the reason that female are generally more concerned with their achievement and they receive the factors responsible for high achievement in to great consideration. It can be also true for the Dyscalculic female which leads to the high achievement motivation in them.

V. CONCLUSION

In the present study, the researchers have studied their image processing ability and achievement motivation after giving instructions with the help of Infographics designing and traditional designing. On the basis of results, it is found that Infographics based teaching create interest among the dyscalculic students for learning. The image processing ability and achievement motivation of Dyscalculic students is influenced by the Infographic design based teaching. The Dyscalculic students from rural and urban area show equal image processing ability and achievement motivation when they are taught through Infographics. Gender differences among the Dyscalculic students are found in image processing ability and achievement motivation whether they are taught through Infographic design or traditional design. The results also support that the image processing ability and achievement motivation of dyscalulic taught by Infographic design was better than traditional design. It is also found that girls show higher achievement motivation in both the teaching design and boys were found high image processing in both the teaching design.

Dyscalculia is defined as difficulty acquiring basic arithmetic skills that is not explained by low intelligence or inadequate schooling. These students generally present themselves with the difficulties in number processing and feel complexity in comprehending simple numeral concepts. These problems can work as a hurdle in learning mathematics by dyscalculic students. For mainstreaming these students with normal students, effective teaching methods should be implemented which will be helpful in developing their image processing ability. Infographics design work in this direction to enhance the mathematical image processing of dyscalculic and minimize their problems in general concept of mathematics subject. These students should be identified by parents and teacher by keen observation of their understanding in mathematics.

The present study suggests that Dyscalculic students should be taught through effective Infographics so that they will take interest and become curious to learn. They focus on images, diagrams and figures which are drawn by Infographics as well as they try to analyse that images. They try to solve then the mathematical problems by their understanding ability. They learn the things easily and for long time. Teachers should use the Infographic design in their teaching to make the mathematics subject easier and interesting for the students.

Educational Implications

This study can be beneficial for school administration, educators and parents so that they can understand the needs of dyscalculic students and help them in improving their weakness. The researchers have suggested following implications:

For School Administration

1. School administration should provide financial help to the staff for providing extra help to such type of students.
2. School administration should organize such activities which must be focused for dyscalculic and academically weak students.
3. Schools administration should prepare the time-table in which remedial programmes can be run well.
4. School administration should organize workshop, research programmes, conferences etc for teachers to make them updated and to learn new methodologies of teaching.

For Teachers

1. Teacher should use Charts, models, infographics based content to teach, so that the students can take interest in learning.
2. Teachers should evaluate the students also with the help of infographics.
3. Teacher can use new and modern techniques of teaching and learning for academically weak students.

4. Teachers should identify the needs of every students of his class and give them instructions accordingly.
5. Teachers should also talk to the parents about the problems of the students.

For Parents

1. Parents are the first person who is directly related with the child, so they should be aware about the weaknesses and strengths of the child.
2. Parents should motivate them and give positive environment for learning.
3. They should increase confidence among the children.
4. They should meet the teachers of their children regularly and take every information related to their child.
5. They should also give knowledge of mathematical calculations at home with help of images, pictures, short movies, videos etc.

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