

Effectiveness of Infographics in the Learning of Mathematics at Elementary Level

Dr. Sindhu S¹

Abstract

The present study is to find out the Effectiveness of Infographics in the Learning of Mathematics at Elementary Level. This is an experimental study with pre test post test non equivalent group design. An interest inventory was used to find out students' interest in learning mathematics. From the findings of the study it is clear that infographic is effective in the learning of mathematics at elementary level and the students interest in learning mathematics is increased after the experimentation. The sample was selected randomly and divided into two groups- Experimental and Control. It can be concluded that the infographics is an effective tool in the learning of mathematics at elementary level.

Keywords: *Infographics, Mathematics Learning, Elementary Level.*

Introduction

An infographic (information graphic) is a representation of information in a graphic format designed to make the data easily understandable at a glance (Tufte, 2001). Informational graphics, or infographics are one kind of data visualisations that are designed and presented to inform readers. They can be every graphics which is intended to represent data in a meaningful way such as maps, charts and graphs.

People use infographics to quickly communicate a message, to simplify the presentation of large amounts of data, to see data patterns and relationships, and to monitor changes in variables over time. Infographics abound in almost any public environment, traffic signs, subway maps, tag clouds, musical scores and weather charts are just a few examples, among a huge number of possibilities. In the enterprise, infographics are used by all levels of management for high-level views of data. Infographics include bar graphs, pie charts, histograms, line charts, tree diagrams, mind maps, and network diagrams. Such tools are often components of business intelligence software. As the amount of data being amassed in the enterprise and elsewhere increases, infographics are being used more and more frequently to help people understand the information contained in that data.

Need and Significance of the Study

The continuous development of teaching and learning of mathematics has become so important in recent decades, with the intervention of mathematics as a key factor in various spheres of life, and constitute an essential element in learning many of the basic skills that serves as the basis for many other courses, so students' success in learning mathematics and its fundamentals, and understanding of the basic processes in the elementary schools would be a success factor to understand its applications in other courses. Despite the importance

¹ Associate Professor, N.S.S.Training College, Changanacherry, Kottayam, Kerala

of this stage and its role in the formation of mathematics at the level of students in the following stages of education, but many results of different studies (Coffey, 2011; Alexander 2011; McDevitt and Ormrod 2010) stresses the need to improve students learning at the elementary level in mathematics to ensure the positive impact of the transition from learning to subsequent stages of education.

Through the long history of using infographics, very few number of studies have been done in order to measure their effectiveness in the learning of mathematics at elementary level.

This study sought to analyse the effect of infographics in the learning of mathematics at elementary level

The following research question was posed:

Does infographics have any significant effect on learning of mathematics at elementary level?

Objectives

The objectives of the study are,

1. To find out the effectiveness of infographics in the learning of mathematics at elementary level.
2. To find out the interest in mathematics learning of elementary school students after the implementation of infographics.

Hypothesis

1. There is significant difference in the effectiveness of infographics in the learning of mathematics at elementary level after experimentation.
2. There is significant difference in the effectiveness of infographics in the learning of mathematics at elementary level while comparing experimental and control groups.
3. There is significant difference in the interest in mathematics learning of elementary school students after the implementation of infographics.

Methodology

The present study is an experimental study. Experimental design is the blue print of procedures that enable the researcher to test the hypotheses by reaching valid conclusions about relationship between independent and dependent variables. Of the different experimental designs, the pre test post test non equivalent group design was adopted for the present study. For the study, the investigator selected a random sample of 140 students at elementary level studying in Kottayam district of Kerala State. The pre test is given to both the groups, then the treatment to the experimental group and then the post test to both the groups. The investigator tested the impact of infographics in the learning of mathematics and interest of students.

Tools and Materials Used

1. Infographics
2. Test to measure the effectiveness of infographics in the learning of mathematics
3. Interest inventory

Statistical Techniques Used

Comparison using 't' test

Analysis and Interpretation

The mean, standard deviation and 't' value of pre test scores on the effectiveness of infographics on learning of mathematics and interest in the learning of mathematics of students at elementary level were found out.

Table 1 Mean, Standard Deviation and 't' value of Pre test scores on the Learning of Mathematics and Interest in the Learning of Mathematics at Elementary Level

| Group | Experimental Group | | | Control Group | | | t | Level of Significance |
|-------------------------|--------------------|-----------------|----------------|----------------|-----------------|----------------|------|-----------------------|
| | M ₁ | SD ₁ | N ₁ | M ₂ | SD ₂ | N ₂ | | |
| Learning of Mathematics | 29.36 | 6.8 | 70 | 28.49 | 7.11 | 70 | 0.74 | p > 0.05 |
| Interest | 73.81 | 8.1 | 70 | 73.20 | 6.43 | 70 | 0.49 | p > 0.05 |

The arithmetic mean and standard deviation of two groups were found out and it is clear that the arithmetic mean of the two groups were not having much difference. The mean scores of the groups were low. This means that the students learning of mathematics before experimentation were low.

The obtained 't' value is less than the table value when compared Experimental and Control Groups before experimentation at 0.05 level and hence there is no significant difference in the pre test scores of learning of mathematics in the experimental and control groups. This shows that the experimental and control groups are equated groups with respect to their learning of mathematics.

The obtained 't' value is less than the table value when compared Experimental and Control Groups before experimentation at 0.05 level with respect to interest and hence there is no significant difference in the pre test scores of interest in the learning of mathematics in the experimental and control groups. This shows that there is no difference in students' interest in the learning of mathematics in the experimental and control groups.

The mean, standard deviation and 't' value of pre test and post test scores on learning of mathematics of students at elementary level were found out. The details are given below.

Table 2 Mean, Standard Deviation and 't' value of Pre test and Post test scores on the Learning of Mathematics at Elementary Level

| Group | Pre test | | | Post test | | | t | Level of Significance |
|--------------------|----------------|-----------------|----------------|----------------|-----------------|----------------|-------|-----------------------|
| | M ₁ | SD ₁ | N ₁ | M ₂ | SD ₂ | N ₂ | | |
| Experimental Group | 29.36 | 6.8 | 70 | 67.84 | 4.68 | 70 | 39.27 | p < 0.01 |
| Control Group | 28.49 | 7.11 | 70 | 27.01 | 5.43 | 70 | 1.38 | p > 0.05 |

The arithmetic mean and standard deviation of Experimental and Control groups were found out. The arithmetic mean of pre test and post test in the Experimental group were having difference and that of the Control Group were having not much difference. The mean scores of post test in the experimental group was higher than pre test scores and that of control group was almost same. This means that the learning of mathematics of students at elementary level after the experimentation was high in the experimental group and having no difference in the control group.

The obtained 't' value is greater than the table value at 0.01 level of the Experimental group and hence there is significant difference in the pre test and post test scores of learning of mathematics in the experimental group. The obtained 't' value is less than the table value at

0.01 level of the Control group. Hence there is no significant difference in the pre test and post test scores of learning of mathematics in the control group.

This means the students learning of mathematics increased after the experimentation in the Experimental Group.

The mean, standard deviation and 't' value of post test scores on learning of mathematics of students at elementary level were found out. The details are given below.

Table 3 Mean, Standard Deviation and 't' value of Post test scores on the Learning of Mathematics at Elementary Level

| Group | Experimental Group | | | Control Group | | | t | Level of Significance |
|-------|--------------------|-----------------|----------------|----------------|-----------------|----------------|-------|-----------------------|
| | M ₁ | SD ₁ | N ₁ | M ₂ | SD ₂ | N ₂ | | |
| Total | 67.84 | 4.68 | 70 | 27.01 | 5.43 | 70 | 48.04 | p < 0.01 |

The obtained 't' value is greater than the table value for the Total sample when compared the Experimental and Control groups after experimentation. This implies there is significant difference between Experimental and Control groups in the learning of mathematics after experimentation.

The mean, standard deviation and 't' value of post test scores on interest in mathematics learning of students at elementary level were found out. The details are given below.

Table 4 Mean, Standard Deviation and 't' value of Post test scores Interest in the Learning of Mathematics at Elementary Level

| Group | Experimental Group | | | Control Group | | | t | Level of Significance |
|-------|--------------------|-----------------|----------------|----------------|-----------------|----------------|-------|-----------------------|
| | M ₁ | SD ₁ | N ₁ | M ₂ | SD ₂ | N ₂ | | |
| Total | 87.13 | 7.72 | 70 | 72.86 | 7.98 | 70 | 10.73 | p < 0.01 |

The obtained 't' value is greater than the table value for the total sample when compared the Experimental and Control groups after experimentation. This implies there is significant difference between Experimental and Control groups of students interest in learning of mathematics after experimentation.

Findings and Conclusion

From the findings it is clear that infographics is effective in enhancing mathematics learning of students at elementary level. It is revealed that the infographics had a significant positive impact on student's mathematics learning. The findings also revealed that the student's interest in the learning of mathematics increased through infographics. The results of this study corroborated with those of Mashhadi and Jamalifar (2014) and Ivan Sudakov, Thomas Bellsky, Svetlana Usenyuk and Victoria V. Polyakova (2016).

Educational Implications

- Infographics helps to meet the needs and interests of students and provides a variety of learning aids to attract and motivate students.
- Infographics is effective in enhancing the learning of mathematics.
- Children can understand the concepts very easily, clearly and accurately through the use of infographics.
- More infographics must be included while preparing the curriculum and syllabus for school students.

- Teachers must be encouraged to use infographics for the more concretisation of abstract ideas.

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