

# Effectiveness of animation as a tool for communication in primary education

## An experimental study in India

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# Introduction

- ▶ In any level of education, teaching is about establishing effective communication with the students in the classroom.
- ▶ Effective teachers are effective communicators nformation and communications technology
- ▶ (ICT) tools are encouraging a “playful approach” to learning, placing problems in “meaningful” contexts and leading to collaborative work and discussion
- ▶ The use of technological tools, such as animation, in the classroom is becoming more and more popular
- ▶ , as it helps to increase conceptual understanding by promoting the formation of dynamic mental models of phenomena.

# Introduction

- ▶ Computer animation facilitates students' understanding of complicated concepts (Karamustafaoğlu, 2012), and animated cartoons are effective in inducing scientific thinking among students
- ▶ Purpose
  - ▶ The current study aims to examine the effectiveness of animation as a tool for communicating ideas and information in primary schools, using Karnataka, an Indian state, as the study area.

# Literature review

- ▶ Use of ICT in education
  - ▶ ICT tools are used in the field of education to improve the quality of teaching and learning, and to improve information literacy among teachers and students
  - ▶ ICT is used in many educational institutions around the world making significant differences to the way learners learn, their speed in mastering a skill, and the ease of learning. ICT tools also help remove traditional barriers in educational communication

# Literature review

## ▶ Effectiveness of animation in teaching and learning

- ▶ Several studies have been conducted to understand the effectiveness of animation in the classroom. Hegarty and Kriz (2008) observed that when students see a static diagram in the classroom, they may have to mentally animate it to understand how the system works
- ▶ Animation may be more effective for the students with little prior subject knowledge because it shows the motion in a mechanical system explicitly and does not rely on the learner's ability to infer motion from static diagrams
- ▶ The success of the use of animations for classroom communication largely depends on the design of the animated instructional material.
- ▶ It is largely evident from these studies that animation is facilitating better learning among students. However, many of these studies were conducted in developed western countries, which are socially, economically, educationally and technologically empowered. Hence, the results of these studies cannot be applied directly in the context of developing countries, such as India.
- ▶ India has witnessed rapid development in the field of computer and mobile technology in the last two decades. According to the Telecom Regulatory Authority of India

# Literature review

- ▶ Understanding the effectiveness of the use of technological tools like animation, in the context of India, can give new insights into pedagogical methods to be used in other developing countries, and will also help to design a comprehensive educational communication strategy for modern day classrooms.
- ▶ following hypothesis was formed and tested in the study:
  - ▶ H1: The use of animation as a communication tool in education will have a significant effect on students' performance in developing countries, such as India.

# Research methodology

## ▶ Data collection

- ▶ The study included students from four different districts of Karnataka: Bangalore; Bidar; Chamaraj Nagara and Dakshina Kannada
- ▶ Using the cluster sampling method
- ▶ The study was conducted using the field experimental method, with a population size of 544 students. In every selected district, two schools were selected; one from a rural location, and another one from an urban location.

## ▶ Variable measurement

- ▶ The variables for the study were developed based on a review of the literature. The pre-test and post-test test papers are independent variables in the study. The marks obtained by the students in these exams (out of 20) were used to measure dependent variables in the study

# Research methodology

## ▶ Analysis

- ▶ A contingency table for the marks, for the pre-test and the post-test, was prepared.
- ▶ Means and standard deviation (SD) were calculated for every set, both for the pre-test and the post-test, using the Statistical Package for the Social Research software developed by IBM
- ▶ The hypothesis was tested using fuzzy-set-theory-based statistical tools.
- ▶ Out of 544 students, 271 students were placed in the control group, where traditional teaching methods were used. The remaining 273 students were placed in the experimental group, where animated instructional materials were used for teaching.



# Research methodology

Variables	No. of students	Percentage
<i>Gender</i>		
Male	284	52
Female	260	48
<i>Class</i>		
Second	174	32
Fourth	184	34
Sixth	186	34
<i>Medium of instruction</i>		
Kannada	251	54
English	293	46
<i>District</i>		
Bengaluru	167	31
Dakshina Kannada	120	22
Bidar	121	22
Chamaraja Nagara	136	25
<i>Locality</i>		
Urban	197	36
Rural	347	64

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**Table I.**  
Demographic details

# Research methodology

	Control group		Experimental group	
	Pre-test	Post-test	Pre-test	Post-test
Total no. of students	271	271	273	273
Mean score	7.31	10.58	7.18	11.25
SD	4.28	4.78	4.2	5.23

**Table II.**  
Details of the marks

# Results and discussion

- ▶ The current study clearly indicates that animation can be used as an effective tool for communication in pedagogy and, if it is used properly, it can improve students' academic performance in primary education, even in developing countries, such as India.
- ▶ students who studied with animated instructional material outperformed the students in the control group by an average of 0.8 marks. In the pre-test, the control group students obtained an average score of 7.31 and, after attending the class conducted using traditional teaching techniques, they achieved, in the post-test, an average score of 10.58. The difference between these two tests was 3.27
- ▶ In experimental group, where animated instructional materials were used in teaching, this difference was found to be significantly higher (4.07). Here, the average pre-test score was 7.18. For the post-test, after attending the classes conducted using animation, they achieved an average mark of 11.25. The difference between these two tests was 4.07
- ▶ In experimental group, where animated 72.27 percent of the students in the control group and 87.9 percent of the students in experimental group improved their marks in the post-test

# Results and discussion

- ▶ H1 is confirmed in the study
- ▶ The current study proves that use of animation positively contributes to enhancing the academic performance of the students, even in developing countries, when used in primary education
- ▶ The study shows that animation is a unique combination of audio and visual elements that helps a teacher to deliver messages through multiple channels and makes the process of educational communication effective, even for students from diverse socio-economic backgrounds.
- ▶ In this study, the teacher used animation for different purposes (to inform, to educate and to entertain the students in a classroom environment), and this had a positive effect on facilitating learning among the students.

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# Limitations of the study

- ▶ The study has some limitations. For example, the animation material used in the experimental study was prepared by the Ajim Premji Foundation, and was approved by the government of Karnataka. The researcher, therefore, had hardly any control over the design and content of the instructional material.
- ▶ Further, the instructional material was in 2D form only: the use of advanced animation technology may have produced different results.
- ▶ Finally, this study was conducted using samples from second-, fourth- and sixth-standard students using animation instructional content for mathematics, language and science only.

# Scope for future research

- ▶ In the current research, teacher is the “sender” of the message, and animation is used as a communication tool in the classroom. If interactive, animated instructional material were used by the students without the assistance of teacher, its effectiveness may vary.
- ▶ This could be studied by comparing two different scenarios. Research could further be extended using more sophisticated statistical tools to identify the motivational, behavioral, cognitive and psychological factors influencing students while animation is used in a primary school setting. R
- ▶ Research could also be further expanded to include a comparative analysis of the performance of students in developed countries and developing countries.

# Implications

- ▶ Teaching in a digital classroom environment can better equip students with the skills and talents needed to face various challenges, and to make the most of the opportunities that such innovations bring, both for students and teachers, emphasizing the need to move from traditional “chalk-and-talk” methods to a computer-mediated classroom environment.
- ▶ new digital tools are making teaching and learning more innovative and interesting. Tools, such as animation, are adding an element of entertainment and fun to classroom communication and student learning
- ▶ Animation also has the potential to offer new and improved learning opportunities, and to improve the participation and performance of all students in the classroom.
- ▶ Finding good teachers is one of the biggest challenges in rural areas of India; however, the use of animation could reduce the discrepancy that exists between the quality of teachers in urban and rural schools in India.



# Recommendations and conclusion

- ▶ In India, most of the state, government-run schools provide primary education in regional languages. There are a limited number of content creators in English and Hindi, but finding good multimedia content creators in regional languages is extremely difficult.
- ▶ The government should form a panel of experts in every regional language to develop multimedia content, according to the requirements of the state and central syllabi
- ▶ The lack of digital infrastructure is also a big challenge that the Indian education sector faces. Many of the schools in India still do not have a computer.
- ▶ Many primary school teachers in India still lack the technical skills necessary to work with classes in a multimedia-enabled environment. Special training should be given to teachers on the usage, and mode of presentation, of animated instruction in teaching.
- ▶ the use of these modern pedagogical tools in primary education is even more important than in developed countries, because primary education not only lays a firm foundation for a student's future, but also for a country's economic future.