Impact of Digital Media on Science Learning at Upper Primary Level in Government Schools

Somasundharam. D
Coordinator, Samagra Shiksha, Directorate of School Education, Puducherry
Email: sds121979@gmail.com

Abstract- *Towards Effective Science Learning, a lot of emerging technologies like Information and Communication Technology (ICT) @ Schools, Smart cum Interactive Boards, Mobile Apps, etc., are playing a vital role. Scientific concepts are now easy to interpret among children to understand & response. So here I can use New and Emerging Digital Media as a tool for effective learning of Science at Upper Primary Level. Most often we handled the class using TLM, doing some experiments from Science Kits, field trips, etc., In this project, effective usage of New Digital Media like Smart cum Interactive Board, DIKSHA App, etc are taken as a tool for Pedagogy to learn Scientific concepts easily & quickly with complete understanding.*

Keywords

1. OMR Sheet – Optical Mark Reader Sheet
2. QR code – Quick Response code
3. NROER Portal – National Respiratory of Open Educational Resources Portal
4. DIKSHA Portal – National Digital Infrastructure for Teacher Portal
5. e-Pathshala Portal - A platform for students, teachers, teacher educators and parents

Introduction

"A good teacher can inspire hope, ignite the imagination, and instil a love of learning"

- Brad Henry

As you aware, Advertisement makes remarkable achievement in marketing a product. So, the same procedure is adopted to achieve Learning Outcomes as a product from students by using Media as a tool/weapon. Today's world is enveloped with media in all aspects. But they are used for entertainment rather than education. Media is a powerful tool to kindle the youngest minds towards scientific temper. In connection with Science Learning, several methodologies and approaches were played an important role to enhance Science Communication among children. To support this, innovative approaches through new and emerging media like Smart Board, e-Pathshala, Dhiksha Portal/ App, using QR scanner and reader, etc., in science teaching learning process is now taken into account.

Methodology

Target Group: VI- Standard students

Sampling:

- **School Selection:**
  - Selection of 8 Schools under the control of Joint Director (School Education), Deputy Director of Education (Women) and Chief Educational Officer, Directorate of School Education at Pondicherry District.
  - List of Schools selected for the study with the condition of student's strength; availability of Smart board, Projectors, etc.; Rural and Urban; Medium of Instruction; Type of schooling; Level of Schooling, etc.,
- **Student Selection:**
  - This study is census based assessment. So all the students from the selected school/ section will engage in this study.
  - If two or more sections available in the selected school, the students present in "A" section will taken into account.

Planning

Table – 1: Overall planning for the study

S. No.	Purpose	Date	Time period	Enclosure/ Remarks, if any
1	Approval from the Head of the Institution	24.08.2018	Third Week of August 2018	Memorandum enclosed
2	Preparation of programme schedule			See page Nos. 7 and 8
3	Sample selection			List of Schools with particulars enclosed
4	Preparation of Tools (Pre - Test and Post – Test Questionnaire)			Copy of the Tools enclosed
5	Preparation of TLM – Smart Booklet, Energized Flash cards, QR code generation, Charts, collection of some real materials etc	31.08.2018	Last week of August 2018	Copy of Smart booklet and Worksheet enclosed

6	Preparatory work to Conduct Experiments in Characteristics of Matter, Diffusion and Compressibility (Including Recording)			Model Science Lesson Plan using Digital Media enclosed
7	Visiting Schools	From12.09.2018 to 26.09.2018	Month of September 2018	OMR sheets, Photos and Videos enclosed
8	Data Collection			
9	Findings	From 27.09.2018 to 30.09.2018	Last week of September 2018	Report Sheet enclosed
10	Analysis			
11	Conclusion	From 01.10.2018 to 06.10.2018	First week of October 2018	Copy of the study enclosed
12	Paper Submission			

Strategies/Methodologies

Sample selected:	8 Schools (Government)
Standard:	VI- Std
Unit:	3. Matter around us
Topic:	Matter – Definition, Particulate nature and Physical states (Understanding the Concept of Mass, Shape, Volume, Diffusion and Compressibility of States of Matter)

General Objectives for the Study

- Provide empirical information on the achievement level of Student by the impact of media and take further steps to improve their learning level.
- The primary aim is to focus on the improvement of learning outcomes to be developed among the students after the impact of Digital Media at the end of class.
- This kind of study wholly designed by keeping in mind of the local context will help us to focus on the fields to be improved in the academic performance of the students.
- To measure the impact of media on Science Learning among Class VI students who have used the New Text book developed by Tamil Nadu Board.
- This assessment is based on knowledge, understanding, skills, Application and connect day-to-day life, process knowledge in Science etc.,
- Learning outcomes are helpful for working out the standards that we will apply when we measure students' achievements using various assessment instruments and processes. Achievement Level of the children somewhat increased due to the impact

of media and also to ensure the following Expected Learning Outcomes from children:

- S603. Classifies materials, organisms and process based on observable properties
- S610. Applies learning of Scientific Concepts in day-to-day life

Development of Assessment Tools
Tool Preparation

i) An Assessment Tools (Pre- Test and Post – Test) are being developed based on BluePrint.

ii) These tools have to be prepared carefully to assess the following concepts based on Knowledge, Understanding, Skill and Application (facing Real life problems) levels of the children:

- Basics of Matter – Physical Nature & Characteristics of particles
- Mass, Volume & Shape of States of Matter
- Diffusion
- Compressibility

iii) These Assessment Tool comprise of

- A Blue Print of the question paper [element 1]
- Instruction page [element 2]
- Question paper [element 3]
- Answer key [element 4]
- Response (OMR) sheet [element 5]

Nature of the Tool

- The Instructions to students are given in a front sheet.
- Bilingual tool has been prepared.

Tool Implementation

- Field investigator will be implementing the tools.
- Out of the six elements of the tools, they will be receiving Element no.2, 3, 4 and 5. (Refer Tool Preparation). Element no. 2 and 3 for conducting the test and element no. 4 and 5 for evaluation purpose.
- Unified District Information System for Education(UDISE) Code and Student Unique Identification (SUID) Number are used in the OMR Sheet to collect general information about the school and the students.
- The field Investigator will be going to their respective schools allotted and conduct the Study for half a day.

- After finishing the tests the investigator has to evaluate the papers with the help of the answer keys and fill in the OMR Sheet using the codes given below. Four codes are used here A, B, C, D

Classroom Procedure using Media

The actual classroom transaction comprises of 90 minutes for which 40 minutes for the conduct of Pre & Post Tests and 50 minutes for using digital media. While taking the class, after pre-test, approximately 30 minutes was utilized for projecting videos and conducting experiments/ activities. The Complete Programme Schedule is as follows:

Table - 2: Complete Programme Schedule

S. No.	Duration	Time Management	Topics covered	Remarks
1	60Minutes	60 Min	Preparatory Work – Checking the Connectivity of Smart board & Projector with Sound System	
2	90 Minutes	20 Min.	Introduction and Conduct of Pre - Test	50 Min. Class which includes 30 Min.utilized for projecting videos and conducting Experiments/ activities
3		15 Min.	Basics of Matter – Physical Nature and Characteristics of particles	
4		15 Min.	Mass, Volume and Shape of States of Matter	
5		10 Min.	Diffusion	
6		10 Min.	Compresibility	
7		20 Min.	Conclusion and Conduct of Post - Test	
8	30Minutes	30 Min.	Evaluation	
Total Duration		180 Min.		

Table – 3: Time management for the usage of Digital Media

Play List No.	Videos Played	Source from	Time covered (in Minutes)
1	Working of Scanning Electron Microscope	You Tube	1.17
2	Matter is Made up of Particles	NROER	3.00
3	Particles have space between them	You Tube	4.17
4	Particles Attract Each Other	NROER	0.44
5	Diffusion in Liquid	You Tube	0.45
6	Diffusion- Tamil	DIKSHA	2.25
7	Movement of Particles - Live	NROER	5.00
8	Compressibility of Solids, Liquids and Gases	You Tube	1.55
Total time covered (in Minutes)			19.23

Table-4: Time management for the conduct of experiments/ activities

Sl. No.	Experiment/ Activity Designed	Time covered (in Minutes)
1	Imaginary "Thought experiment" using thread or paper - Activity	1.30
2	Particles have space between them - Experiment	2.00
3	Particles Attract Each Other – Game Activity	1.00
4	Grouping Objects based on similarities and differences - Activity	2.00
5	Molecular arrangement in States of Matter - Activity	1.00
6	Diffusion in Solid, Liquid and Gas – Experiments	2.00
7	Compressibility of Solids, Liquids and Gases - Experiments	2.30
	Total time covered (in Minutes)	12.00

Results/ Findings

A part of the lesson was redesigned according to the need of students' understanding. Here, teaching-learning was given opportunity to students for applying their reasoning and understanding visually. Inclusion of certain images, QR code for visual reference and conduct of activities in the classroom transaction made the students' own learning by giving immediate feedback. It made them comfortable in sharing their ideas.

- Students were given opportunity to form hypothesis, perform the activity again to check their hypothesis by showing graded videos.
- Repeating the activity facilitated by playing them to monitor and assess their own learning.
- They were facilitated to construct their own explanation of their observation.
- All students got equal opportunity to participate in teaching-learning process. They organised their thoughts to express themselves.
- Playing videos followed by the flow of continuous dialogue and interaction with students make students moved beyond rote memorisation.
- In addition to video clippings, inclusion of some activities has enhanced their learning levels.

In this study, the following findings are noted:

Table-5: Performance of Sampled Students

Sl. No.	Name of the School	UDISE Code	No. of Sampled Students	Pre - Test	Average	Post - Test	Average
1	Jeevanandam GHSS, Karamanikuppam	34020100610	22	139	6.3182	285	12.9545
2	GGHSS, Kalapet	34020101502	38	247	6.5000	460	12.1053
3	NVGMS, Pillaichavady	34020107301	24	172	7.1667	234	9.7500
4	Perunthalaivar Kamaraj GBHS-Muthialpet	34020112839	32	189	5.9063	474	14.8125
5	NJGGMS, Veerampattinam	34020200716	19	111	5.8421	206	10.8421
6	KVGHS, Selliamedu	34020205803	30	163	5.4333	283	9.4333
7	TVKGHS, Arumparthapuram	34020303303	35	222	6.3429	310	8.8571
8	Pavendar Bharathidasan GHSS, P.S.Palayam	34020306004	24	152	6.3333	262	10.9167
Total			**224**	**1395**	**6.2277**	**2514**	**11.2232**

Highlights – Above table reflects that the average performance of sampled students is increasing from 6.23 to 11.22. This implies that there is an impact of digital media in classroom transaction which enhances the learning outcomes of the children.

Discussion / Analysis

Here, current practice of frequent paper-pencil test in the name of formative assessment should be minimised. By exploring some innovative ways of approach by projecting lots of information as visual, practical ways of method of learning happened. The following tables show the improvement in learning level of students Gender-wise, Mediumwise and Area-wise in this course of study:

Table-6: Gender-wise Analysis of Average Performance of Sampled Students

	Pre - Test			Post - Test		
Gender	**Boys**	**Girls**	**Total**	**Boys**	**Girls**	**Total**
Average	6.1905	6.2755	6.2277	11.2381	11.2041	11.2232

Table-7: Medium-wise Analysis of Average Performance of Sampled Students

	Pre - Test			Post - Test		
Medium	**Tamil**	**English**	**Total**	**Tamil**	**English**	**Total**
Average	6.4744	6.0959	6.2277	9.6154	12.0822	11.2232

Table-8: Area-wise Analysis of Average Performance of Sampled Students

	Pre - Test			Post - Test		
Area	**Rural**	**Urban**	**Total**	**Rural**	**Urban**	**Total**
Average	6.0000	6.4397	6.2277	9.8241	12.5259	11.2232

Highlights - Above tables reflect that using available digital media at school/home leads a great achievement in learning of students with proper guidance/ directions by the teachers/ parents. Another analysis in my study on Learning Outcomes (Two sample schools are taken) which also brought out the important aspects of Learning Level of Children is on ascending order.

Table-9: % of Expected Learning Outcomes

Sl. No.	**Name of the School**	**% of Expected Learning Outcomes (S603*)**		**% of Expected Learning Outcomes (S610#)**	
		Base-line Assessment (Pre-Test)	**Achievement - line Assessment (Post-Test)**	**Base-line Assessment (Pre-Test)**	**Achievement - line Assessment (Post-Test)**
1	NVGMS - Pillaichavady	39.17	55.00	27.78	48.61
3	N.J GGMS - Veerampattinam	20.00	55.79	19.30	61.40

Note:-

(S603*):	Classifies materials, organisms and process based on observable properties	No. of Common Test Items taken for analysis from both Assessment: 5
(S610#):	Applies learning of Scientific Concepts in day-to-day life	No. of Common Test Items taken for analysis from both Assessment: 3

Highlights - Above table reflects that the % of children responded correctly as twice/ thrice in respect to Learning Outcomes mentioned above from Pre - Assessment to Post – Assessment. This is easily looking at that the digital media make rapid impact in classroom transaction.

Conclusion

Participation in innovative approaches/ activities can keep students engaged in learning. Students can enjoy learning with new flavour in classroom processes by using Digital Media as a weapon. Teachers need to realise that students have a range of background knowledge and varying motivation to learn. I will hope that the usage of emerging digital media like Smart Board, Projector, Portable Media Player etc., in the field of education leads a vital role at present and also in future.

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