

Significance of Teachers' Education in Implementation of Multimedia Instruction as an Educational Technology Sub-System

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ABSTRACT

Identification of educational objectives of the community; apt utilization and assessment of the available resources to fulfill those objectives; and exercise the essential control over the obstructions in the process of teaching and learning are the barebones of the contemporary Indian Education system. In view to contribute for the same goal, the purpose of this paper is to report on the findings of a survey conducted to investigate the importance of teachers' education and the other relevant factors which have contributed to the continuing use of multimedia assisted teaching-learning by the school teachers in the schools of New Delhi, India. It also explicates the complications faced by the teaching staff in the smooth running of the multimedia learning in modern teaching practices. Evidence has been collected through a literature search, teacher questionnaires, and interviews.

Keywords – *Educational Objectives, Contemporary Indian Education System, Teachers' Education, Survey, Multimedia Assisted Teaching-Learning, Modern Teaching Practices, Teacher Questionnaires, Interviews.*

1. INTRODUCTION

Albert Einstein, very rightly said, "Education is what remains after one has forgotten everything he learned in school." Education is, by no means fertile, if a student is asked to just cram facts like 'year' in which particular battles were fought, formulae etc. By doing this, a student might score good marks and so called laurels. But, the foremost role

of education is, to train the minds to think; to make students acquainted with the nature, reasoning, questioning, causes and effects of a particular thing; and contribute to make the world work. Similarly, to guide the student in right direction, it is equally necessary to educate the teachers time to time and update them with the knowledge of the newer technologies and systems getting adopted in the contemporary education system. Education is not all about knowledge, it's about wisdom. Keeping this under observation, this paper brings to light, an urgent need to gauge the existing educational technology approaches; efforts made to train the teachers for their successful execution; and consequences of the same.

2. THE BACKGROUND STUDY

The background study for this paper include the study of 'Educational Technology' and its 'Subsystems'; and Implications of educational technology in Indian educational framework. Further, the traditional theories of learning and their inferences in today's teaching practices is carefully studied by means of available literature. The teachers' perspective on the use of multimedia assisted learning in their classes and prevalent multimedia learning systems are also studied before conducting the survey, which is discussed in the later part of this paper.

2.1 Educational Technology

The term 'Educational Technology' refers to the system which stimulates a careful application and utilization of the available human mass and learning resources, in order to provide apt solutions to the problems pertaining to teaching and learning. The system caters to the problems of 'quantity education' by means of 'quality education' and finally results in 'quality life' (Venkataiah N., 2009). Today's challenge in pedagogy and instruction is to strategize suitable systems which could enable the realization of identified goals of teaching and learning for present as well as future generations. To meet this challenge, it is very necessary to reverse the role of Educational Technology as an agent of transformation in the process of teaching-learning, which can even cater to the systemic concerns of education like its reach, equity, and quality for better future of children and society as a whole (Position paper, National Focus Group on Educational Technology, 2006).

Education technology is not only limited to the utilization of audio-visual technology and computer assisted instruction methods. It is a complete organization including a few sub systems (Mangal S.K. at el, 2011) and processes as depicted in fig 2.1. All these sub-systems and processes play their specific roles to make the process of teaching-learning successful.

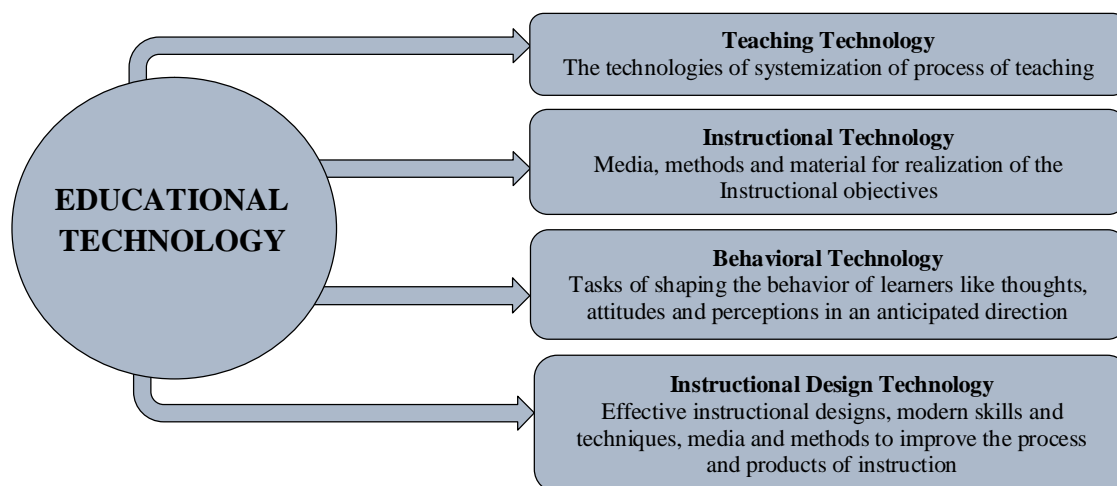


Fig. 2.1 Educational Technology and its Sub-Systems

The implications of Educational Technology and its sub systems in Indian Educational Framework include design, development and delivery of appropriate teaching learning systems; systematic broadcasting and telecasting of educational programmes; establishments of support systems to organize regular in-service and pre-service training of teachers; formation and utilization of language laboratories; development and utilization of multimedia assisted aids; appropriate educational networks for distance and open learning; introduction and development of ICT, online education; and providing a room for research in education followed by its apt application.

2.2 Traditional Theories of Learning & their implications in teaching practices

Learning requirements, theories and processes of learning keep evolving as a reflection of the then prevalent social environments. But, No theories have ever been completely outdated and none is said to be perfect in all times. Teaching practices of all times show dominance of one or the other theory of learning and a diminished presence of the others. Accordingly, the relationship of a teacher with his students has also evolved with time. Now-a-days, the teacher has become a facilitator of learning instead of the only source of

knowledge. Table 2.2 depicts various traditional ‘Theories of Learning’ (Don W. Edgar, 2012) in the light of their stated purpose of learning; motivational factors of learning; and the respective teacher-student relationship in classroom.

Table 2.2 (Transformation in Teacher-Student relationship according to varioustraditional theories of learning)

Chronology	Theories of Learning	Purpose of learning	Learning Motivated by	Teacher-Student Relationship
1900-1960	Behaviorism	Change in the behavior of learner in the desired direction	External Stimuli (No mention of internal mental state or consciousness)	The teacher can have full control on shaping classroom behavior of students by means of rewards and punishments. For example: <ul style="list-style-type: none"> • Exemption from the weekly test for finishing all the homework this week (Reward) • Extra assignments to be done by the students who do not bring their homework finished (punishment)
1960-1970	Humanism	Self-actualization, Development of personal potentials of learners	Learner’s control over learning process based on observing and exploring new things	The teacher, rather than a disciplinarian here becomes a facilitator, a role-model for student, who motivates and provide him with reasons for every new task of the learning process. For example: Guiding a student to solve mathematical problems by means of day-to-day situational problems prevailing in the area of student’s interest.
1970-1980	Cognitivism	Open the black box of learner’s mind by means of gaining knowledge and intellectual thinking	Thinking, memory, insight, information processing, problem solving	The teacher’s role here is that of a guide, who puts the student in a perpetual circle of knowledge acquisition, mental construction and problem solving. For example: Understanding, retaining and recalling a lesson by means of: <ul style="list-style-type: none"> • Summarizing important chunks into a significant sequences, solving questions on Higher-order thinking skills etc. • Using graphics organizers like tables, Venn diagrams and flow charts to create information structures and relate contents.
1980-1990	Cognitive Constructivism	Problem Solving, Active Learning, Create meaning from experience	Interact with a concept / problem, Critical thinking, acceptance of responsibility for active construction of knowledge	The role of a teacher in here, is to provide a student with opportunities to test the appropriateness of their current knowledge and construction of new knowledge by means of active enquiry and experience. For example: <ul style="list-style-type: none"> • Role playing in the class-room • Debates • Field Projects
1990-present	Social Constructivism	Active construction of knowledge	Social interaction, Sharing of experiences	The teacher and a peer group of students are equally involved in a joint initiative for constructing new learning by means of regular dialogues. For example, teacher supervised group

				projects.
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The traditional theories show their relevance and implications even in the contemporary classroom setup and teaching practices (as depicted in the table 2.2). From teacher-directed learning, teaching methodologies have evolved into student centered learning, e-learning, collaborative learning, computer and multimedia assisted technology based learning. The teachers' education at every step is required to make them capable to cope up with the changing educational scenario and do their best in terms of teaching the pupils.

2.3 Multimedia Assisted Learning – Teachers' perspective

The technique of multimedia assisted learning has three preconditions for its successful application in the process of teaching learning-

2.3.1 Design of Multimedia Learning content

Design of Multimedia learning content is a foremost principle for its triumph or defeat. Instead of adapting technology to suit the requirements of learners, if learners are forced to adapt themselves with the technologies available, learning will not materialize. The teaching approach is required to be learner centered instead of a technology centered approach. In a technology centered approach, a teacher uses the available multimedia lessons to provide students an access to information without understanding how a human mind with different socio-economic background works. Whereas, in a learner centered approach, the teacher focuses on how could the technology be used to aid human cognition and enhanced learning.

2.3.2 Teachers' Education

Teaching practices in present-day India are largely pre-occupied with two chief concerns "what material is taught in the class room?" and "in what way it is taught?" In this setting, the education process is viewed barely as the operational delivery of the program of study. The effectiveness of this practice is measured only through learning outcomes in the form of academic results. Whereas, the evolving role and development of skill sets of teachers, who are the key elements in the process of teaching-learning are largely

neglected. There is a continuous need to refine it time to time, to cope-up with the fast changing world of technologies and devices (NCFTE, 2009). Information technologies can best be integrated in pre-service teacher education as well as in in-service teacher professional development (Vrasidas C. et al., 2001).

2.3.3 Understanding of mandatory hardware and technical support

The unobstructed teaching and learning through multimedia assisted learning systems seems like a fairy tale in absence of availability of mandatory hardware and technical support throughout. The hardware support include projectors, computers, television sets etc. and technical support include time to time maintenance of hardware, electricity supply and power backup systems.

2.4 The Prevalent Multimedia Learning Systems in India

While, in a traditional educational setting, the teachers need to repeat monotonous facts by and again, in every class and year after year, teaching through multimedia can save time of teachers and allow them to discuss more challenging topics in class. It can replace ineffective learning activities with the productive ones; and increases teacher - student contact time for activity based learning. The intelligently designed multimedia learning content and its interactive delivery mechanism can accommodate best teaching practices, if aptly used. Various private education companies as well as government of India initiated design & development of multimedia learning systems and made them available to teachers and students at school level.

Govt. of India initiative	Private Initiatives (selected for the purpose of this study on the basis of their maximum clientages in schools of private domain)
<p>Computer Aided Learning (CAL), a programme under Sarva Shiksha Abhiyaan. (Overview on computer aided learning, 2009)</p> <p>VISION: To bridge the digital split between the rich and poor students and bring the government schools at par with the best school in private domain.</p>	<p>EDUCOMP Smart Class, by Educomp Solutions Limited (Educomp Annual Report 2013-2014).</p> <p>TeachNext, by Next Education India Pvt. Ltd. (“TeachNext solution for...” 2012)</p> <p>VISION: To provide digital teaching-learning solutions to engage with a generation of learners well-versed with gadgets and gizmos and solve problems relating to quality and access to education for all.</p>

3. TEACHER'S PREPARATION IN THE USE OF MULTIMEDIA TECHNOLOGY IN CLASSROOMS – A SURVEY

In order to study the teachers' perspective on the manner, extent of usage, and their preparation in the effective use of multimedia learning systems in schools; the barriers affecting its usage and success to the full potential, a survey was conducted in which 300 teachers from ten schools (150 teachers from government and private schools each) of New Delhi, India participated. The data was collected by means of teachers' questionnaires and personal interviews. The prerequisites for the identification of these schools were the availability and inclusion of either of the three selected pioneering multimedia learning systems (CAL / EDUCOMP / TeachNext) in their school curriculum and teaching schedule. A part of this survey is presented in this section of the paper.

3.1 Framework of Teachers' Questionnaire & Objectives of the Survey

Teachers' Questionnaire comprised of two parts A and B including two and five sections respectively. It consisted of five printed pages. This paper mainly presents the results of the survey based on the first four Sections of the questionnaire. These questions were based on the respective teacher's preferred teaching style; experience with computer and multimedia Technologies; the total amount of in-service trainings received till date on the use of technologies in the classroom; the access, extent and ease of use of the multimedia system subscribed by their respective school; and the impact of teacher trainings on the use of technologies in teaching practices.

3.2 Results and Discussion

The results of this survey pertaining to the aforementioned questions are discussed below-

Class Size

Average Teacher Pupil ratio influence learning. Reducing class size to increase student achievement is an approach that has been tried, debated, and analyzed for many decades (Zyngier D., 2014). Table 3.2a shows a cross tabulation between the teachers of two different type of schools studied (Government and private) and their respective class sizes. The data collected from teachers' questionnaire for class size varied from 28 to 63.

The study clarified that there were no government schools with a minimum class size ranging from 25-30. 47.3% teachers in government schools stated that they have class sizes ranging from 51-55 students, which is said to be a higher ratio. As per the norm under SSA, teacher to pupil ratio in a class should be 1:40 and but is sometimes not followed by the schools (RTE SSA final report, 2010). It is also interesting to note here, that there were no private schools having a class size more than 45 students. 59.3% teachers in private schools stated that they have class sizes ranging from 36-40 students.

Table 3.2a Average Class Size

% with in School type

Average Class Size_ Range	School Type	
	% of Govt. School Teachers	% of Private School Teachers
25-30	--	10.7%
31-35	5.3%	20.0%
36-40	8.7%	59.3%
41-45	14.0%	10.0%
46-50	17.3%	--
51-55	47.3%	--
61-65	7.3%	--
Total	100.0%	100.0%

According to the personal interviews of the teachers of schools under study (two teacher coordinators from each school, total 20), 12 out of 20 teachers showed their dissatisfaction with the teacher student ratio in their schools and stated, “It is very difficult to manage such large groups of students and maintain the quality of teaching. Moreover, checking notebooks is a tiresome job.”

Teaching practices and Extent of Integrating Multimedia Technologies with Teaching

The teacher’s preferred teaching methodology is one of the key elements that elects for the more and less involvement of the students in learning process. Teachers need to be trained in organizing learner-centered, activity based, and participatory learning experiences (NCFTE, 2009). Suitable integration of multimedia technologies with teaching can also help in making teaching learner centered. Teachers’ education programmes should also provide opportunity to trainee teachers for thinking and liberated studies on how to make teaching more learner centered, instead of finish up the training

schedules by training them with teacher-directed activities only. This programme can give them a platform to think and gain experience of constructive and Instructive teaching methods (McKenna P. et al., 2004).

According to our survey, Table 3.2b indicates that 62% of the government school teachers use more teacher directed than students centered activities in their classes. This statistics clearly account for the lack of constructive teaching methodologies, the teachers learnt during pre-service and in-service training programmes. Whereas, 60% of private school teachers use teacher directed and student centered activities in balanced form.

Table 3.2b Preferred Teaching Methodology

% within School Type

Preferred Teaching Methodology	School Type	
	% of Govt. School Teachers	% of Private School Teachers
Teacher Directed Lecturing	2.0%	0.7%
More Teacher Directed than Student Centered Activities	62.0%	5.3%
Balanced Teacher Directed & Student Centered Activities	22.7%	60.0%
More Student Centered than Teacher Directed Lecturing	8.7%	24.0%
Largely Student Centered	4.7%	10.0%
Total	100.0%	100.0%

Similarly table 3.2c depicts the results according to the frequency in the integration of multimedia technology in learning. 56.0% of government school teachers stated that they integrate multimedia lessons in their classes 1-2 times in a week. But, in case of private schools, this data is very distributed and range from no multimedia at all to multimedia in every class. Maximum percentage of teachers using multimedia in their classes 3-4 times in a week is 35.3%.

Table 3.2c Frequency of teaching through Multimedia Learning System

% within School Type

School Type	Frequency of teaching through Multimedia Learning System						Total
	Rarely	1-2 times in a week	3-4 times in a week	once everyday	In almost classes	In every class	
% of Govt. School Teachers	5.3%	56.0%	26.0%	12.7%	---	---	100.0%
% of Private School Teachers	9.3%	9.3%	35.3%	14.0%	19.3%	12.7%	100.0%

Total	7.3%	32.7%	30.7%	13.3%	9.7%	6.3%	100.0%
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Teachers' Education and ease of use in conducting classes with Multimedia systems

Teachers' pre-service preparation programmes offer usually one small course in educational Technology, which is not sufficient to make them proficient with the pedagogical knowledge of use of technology in the classrooms. Due to this, teachers often fail to take advantage of what technology can afford (Vrasidas C. et al., 2005). With continuous teachers' education, they can be made comfortable amidst technology oriented classes.

According to this survey, Table 3.2d and 3.2e respectively indicate the extent of in-service trainings teachers were benefited with and their ease of use in conducting classes with Multimedia. It is noticeable that 60% of the government school teachers did not attend any in-service trainings. 29.3% attended one day training programme and 10.7% teachers attended 1-3 weeks trainings. On the opposite side, only 15.3% private school teachers did not attend any trainings at all.

Table 3.2d In service Training for using Multimedia Technology in classroom

% within School Type

In service Training for using Technology in classroom	School Type		Total %
	% of Govt. School Teachers	% of Private School Teachers	
none	60.0%	15.3%	37.7%
1 day training	29.3%	36.7%	33.0%
1-3 weeks training	10.7%	34.0%	22.3%
4-10 weeks training	--	8.7%	4.3%
one semester training	--	1.3%	0.7%
More than one semester training	--	4.0%	2.0%
Total	100.0%	100.0%	100.0%

The results of trainings attended by 74.7% of private school teachers at various levels can be largely seen (table 3.2e) in their ease of using the technology in classroom. 92.7% of the private school teachers agreed (72.7% agreed and 20% strongly agreed) that they are at ease using multimedia technology in their classrooms. Whereas, only 18% of the

government school teachers agreed (7.3% agreed and 10.7% strongly agreed) that they are comfortable using multimedia technology for teaching.

Table 3.2e I am at ease with implementing Multimedia in Teaching Practice successfully

% within School Type

I am at ease with implementing Multimedia in Teaching Practice successfully	School Type	
	% of Govt. School Teachers	% of Private School Teachers
Strongly Disagree	25.3%	0.7%
Disagree	40.0%	4.0%
Neither Disagree nor agree	16.7%	2.7%
Agree	7.3%	72.7%
Strongly agree	10.7%	20.0%
Total	100.0%	100.0%

4. MAJOR FINDINGS – BARRIERS IN THE USE OF TECHNOLOGY

Once, a system becomes a part of curriculum and teaching schedule, it is assumed that it is running; and running for good. But to obtain the maximum output, it is necessary to keep observing its pros and cons and continuously strive for excellence. The major findings of this survey according to personal interviews and questionnaire data analysis are –

- a. Teachers resist to change their traditional teaching approaches.
- b. Lack of teacher trainings that can address the ever-growing usage of technologies in classroom and help teachers innovate newer teaching practices.
- c. Lack of free time for teachers to indulge in any form of new learning and research.
- d. Lack of technology infrastructure and support system in government schools, in terms of computers, updated multimedia teaching material, projectors, and equipped classrooms to conduct multimedia classes.
- e. Large student groups to handle especially in government schools.

5. LIMITATIONS AND FUTURE SCOPE

This survey accommodates the data collected on the basis of teachers' views on their preparedness for using technology in their classrooms. The views of the school administrations and the teacher training institutions can also be taken into consideration to understand the scenario as a whole. Further studies can be conducted with these

authorities to gauge the gaps in the frameworks of teachers' education and its authentic execution at pre-service and in-service levels both.

6. CONCLUSION

Entire output of teaching and learning is exemplified in the satisfaction level of teachers with their pedagogical skills. They use these skills in their day to day classroom practice and consequences of those is perceived in achievement of their students. This achievement is counted not only in terms of academic grades of the students, but also in terms of students contentment in getting educated in their own preferred learning style, developing a better understanding of concepts and ideas, so that the critical thinking develops, knowledge gets constructed with experience and lead them to lifelong learning. This complete circle of teaching and learning can be realized in concrete terms, if our teachers are well equipped to handle the technologies in classroom, and are trained in a way, that they can make most use of it. Theories show their implications in practice but to make this happen, the veiled potential of the teaching force has to come in action.

The stated goal of Educational Technology can only be achieved by means of enriched awareness; understanding, training of available mass; and careful application and utilization of the learning resources. Schools are like industries sprouting civilizations and societies. The cultivation of this industry, thus largely depends upon the teachers' preparedness to deliver instruction in a way that the whole process is proved to be a meaningful learning experience.

REFERENCES

- Building on Strengths to Reach Higher Potential, Educomp Annual Report 2013-2014, p. 2-7
- Don W. Edgar, Learning Theories and Historical Events Affecting Instructional Design in Education: Recitation Literacy Toward Extraction Literacy Practices, SAGE Open, October-December 2012: p.1–9
- Mangal S. K. and Mangal U., Essentials of Educational Technology, New Delhi, 2011, p.1-30

- McKenna P. and Laycock B., Constructivist or Instructivist: Pedagogical Concepts Practically Applied to a Computer Learning Environment, 2004, ACM 1-58113-836-9/04/0006
- National Curriculum Framework for Teacher Education (NCFTE), 2009, p.1-20
- Overview on computer aided learning (CAL) under Sarva Shiksha Abhiyan, [Online] Available: http://ssa.nic.in/quality-of-education/CAL-07.pdf/at_download/file
- Position paper, National Focus Group on Educational Technology, NCERT, 2006.
- RTE SSA Final Report, 2010, retrieved from: http://ssa.nic.in/quality-docs/RTE%20SSA%20Final%20Report.pdf/at_download/file
- TeachNext solution for digital learning in schools for the K-12 segment in English and Indian languages: Next Education India Pvt. Ltd, WES, May 2014. [Online] Available: <http://wes.eletsonline.com/2012/2012/05/24/teachnext-solution-for-digital-learning-in-schools-for-the-k-12-segment-in-english-and-indian-languages-next-education-india-pvt-ltd/>
- Venkataiah N., Educational Technology, APH Publishing Corp., New Delhi, 2009, p.1-20.
- Vrasidas C., McIsaac M S., Integrating Technology in Teaching and Teacher Education: Implications for Policy and Curriculum Reform, Educational Media International 38 (2-3), 2001, p. 127-132
- Vrasidas C., Gene V. Glass, Preparing Teachers to Teach with Technology, IAP, 2005 p. 4
- Zyngier D., 2014, Class size and academic results, with a focus on children from culturally, linguistically and economically disenfranchised communities, Evidence Base, issue 1, 2014, <journal.anzsog.edu.au>, ISSN 1838-9422 © The Australia and New Zealand School of Government.