Teaching-learning through EduSat and Academic Performance of Children

A Study

MANOJ KUMAR DASH*

Abstract

The programme of Sarva Shiksha Abhiyan (SSA) aims at providing access to quality education to all and improving professional competencies of various categories of teachers. Distance Education Programme (DEP) under SSA is a special component to supplement the traditional approach particularly for in-service teacher education programme. Implementation of EduSat through Rajiv Gandhi Project for EduSat Supported Elementary Education (RGPESEE) is a challenge in the light of potimum utilisation of communication technology for improving learning of children at elementary level. The first phase of this project focused on Sidhi district of Madhya Pradesh. The present paper addressed to reflect the effectiveness of implementation of EduSat on improving learning achievement of children in Mathematics at primary grade (standard III and V). At the same time attempt has been taken to campare learning achievement of children (belonging to ROT and non-ROT schoals) in Mathematics. The findings of the study aim at develapment of innovative strategies for effective implementation of EduSat in improving learning of children at elementary level and achieving the target of improving quality of elementary education all over the country.

Introduction

Improving learning of children at elementary level under Education for All (EFA) and Universalisation of Elementary Education(UEE) is a challenge before us. Lack of infrastructure in rural areas and insufficient quality teachers are the main hurdles which adversely affect the efforts made at elementary level. Distance Education

**Programme Officer*, DEP-SSA, IGNOU, New Delhi.

Programme (DEP) is a special project functioning under MHRD, Government of India for improving quality of elementary education and reaching the umeached with quality input. The Indira Gandhi National Open University (IGNOU) has been entrusted with the responsibility to implement the project all over the country. It aims at providing recurrent training to teachers in a mission mode with the use of Information and Communication Technology (ICT) for professional development of teachers, at one hand, and improves learning of children, on the other hand.

ICT for Classroom Process

ICT is a medium which can promote more and more student-centred and interactive learning. Analysis of the potentials of ICTs suggests that there is a vast scope for application of this technology for accelerating access and equality at the elementary school level and also improving quality of elementary education in our country. Providing adequate inputs to children with optimal utilisation of this technology can bring a revolution in the field of elementary education. It is essential to work out short-term and long-term interventions to improve quality of education including elementary education through the use of ICT. Instructional design of ICT is based on constructivist theory. Children construct their own knowledge and understanding through experience based on interaction.

Education Satellites (EduSat)

The concept of providing educational programmes through satellites was effectively demonstrated for the first time in India in 1975-76 through the Satellite Instructional Television Experiment (SITE) using the American Application Technology Satellite (AATS-6). Programmes pertaining to health, hygiene and family planning were telecasted directly to about 2,400 Indian villages of over six different states. Later, with the commissioning of INSAT system in 1983, a variety of educational programmes are being telecasted. In the 1990s, Jhabva Developmental Communication Project (JDCP) and Training and Developmental Communication Channel (TDCC) further demonstrated the efficacy of tele education.

The Department of Space, Government of India has taken an effort in launching of exclusive education satellite (EduSat) on September 20, 2004, a dedicated satellite for education and development.The services of the satellite are available for 24 hours. The Department of

Space has activated one National Hub to support National Level Networks and activated five Regional Hubs to support regional/state level networks in the country. EduSat was launched to provide quality education at all level.

Rajiv Gandhi Project for EduSat Supported Elementary Education (RGPESEE)

The Indira Gandhi National Open University (IGNOU), in collaboration with Indian Space Research Organisation (ISRO) and Ministry of Human Resource Development (MHRD), Government of India has initiated a pilot project titled *Rajiv Gandhi Project for EduSat supported Elementary Education (RGPESEE)* to utilise EduSat capabilities in strengthening quality elementary education. The main objectives of this project are: (a) ensuring availability of quality online content and access devices in schools; (b) enrich the existing curriculum and pedagogy at different levels by employing all the technologies available through the EduSat including virtual classroom video on demand, etc.; (c) promote a shift from passive learning to active learning; (d) providing in-servIce and research training to school teachers for upgradation of their knowledge and skill; (e) create a suitable environment for the optional use of the EduSat; and (f) provIde training to teachers and master trainers in handling IT supported and ICT enabled education through EduSat.

The project focussed on Sidhi district of Madhya Pradesh which is one of the educationally backward and remotest districts of the state. In addition to Sidhi district, three blocks, one each from one district of Bihar, i.e. Vaishali, Chattisgarh, i.e. Koria; and Uttar Pradesh, i.e. Sonebhadra, were also covered under the project. These are the three adjoining states of Madhya Pradesh. In Sidhi district seven blocks (except Kusmi) and one block from each of the adjoining district of M.P., mentioned above were selected. Receive only Terminals (ROTs) and Satellite Interactive Terminals (SITs) have been installed in selected schools.

Receive Only Terminals (ROT)

Television transmission via satellite are intended for reception by large, high quality, high reliability ground terminals from which signal is distributed to the end users via terrestrial means. Receive only terminals were designed specifically for direct-to-home broadcast receiption Under the pilot project, at each selected school one ROT is

installed to receive the transmission through EduSat from Prantiya Shikshya Mahavidyalaya (PSM), Jabalpur studio. It has one way audio and one way video facility, i.e, from the learning end where ROT is installed teacher and students of that school can see the video(picture) and hear the audio that is transmitted from the teaching end (PSM, Jabalpur). No interaction between the teaching and learning end is possible through this ROT system.

Where Satellite Interactive Terminals (SIT) is installed, interaction is possible between teaching and learning end. But it was not installed in schools. All the selected schools were provided with ROTs only.

List of ROTs and SITs

S.No.	*State*	*District*	*No. of ROTs*	*No. of SITs*
1.	Madhya Pradesh	Sidhi	700	9
2.	Chhattisgarh	Koria	50	I
3.	Uttar Pradesh	Sonebhadra	50	1
4.	Bihar	Vaishali	50	1
	TotaI		**850**	**12**

The project was inaugurated on 07 December 2005. 700 ROTs and 9 SITs were installed in the Sidhi district over seven different blocks. A studio at PSM, Jabalpur was constructed as the teaching end for the project. Transmission (tele-teaching) has been started from 19 December 2005 for primary class children from Monday to Friday and for teachers on every Saturday.

In Sidhi district 700 Receive Only Terminals (ROTs) were installed in selected schools spread over 7 different blocks. In each adjoining states 50 Receive Only Terminals (ROTs) were installed spread over one block. Schools where ROTs are installed, children of those schools only get the benefit of teaching through EduSat

Rationale of the Study

The launching of EduSat on September 20, 2004, at one hand, and transmission through Edusat for elementary education from 19 December 2005 on the other hand, has widened access to quality education but it is yet to bring a revolution in the field of elementary education pertaining to improving professional development of teachers and improving learning achievement of children as well.

One of the objectives of this project is to promote a shift from current passive learning to active learning and help children to construct their own knowledge. In the context of effectiveness of EduSat to improve quality of teaching-learning process at elementary level DEP-SSA conducted a study recently at Sidhi district of Madhya Pradesh to find out the effectiveness of EduSat on learning achievement of children in Mathematics at primary grade.

Research Questions

- Does the teaching and learning through EduSat improve the level of achievement (learning) of children in Mathematics.
- Does the children taught through EduSat (where ROT is installed) able to compete with their counterparts of non-ROT (where no ROT is installed) school with regard to learning of Mathematics.
- Does the learning achievement of children in Mathematics at primary level improve as a result of implementation of EduSat.
- How this intervention of teaching and learning through EduSat be made more effective?

Objectives

- To assess the effectiveness of transmission through EduSat on learning achievement of children in Mathematics in Primary grade.
- To compare the learning achievement of children in Mathematics of standard III and V (Primary grade) of ROT schools with that of their counterparts of non-ROT schools.
- To suggest strategies, for further improvement of teaching learning process through transmission of EduSat for improving learning of children at elementary level.

Methodology

Sample

The Sample of the study constituted 328 children of Standard V (231 students were from ROT schools and 97 were from non-ROT schools) and 334 children of Standard III (230 children were from ROT schools and 104 were from non-ROT schools). The sample was drawn from 7 different blocks of the Sidhi district of Madhya Pradesh.

From each block 3 schools were selected randomly (two schools, where ROT was installed and one school where there was no ROT). All children of Standard III and V of the selected schools were covered in the study.

Tools

The competency-based achievement tests on Mathematics for Standard III and V were developed separately for the present study keeping in view the content taught through transmission of EduSat supported network and used in the present study to assess the achievement level of children pertaining to the study.

Statistical Techniques

Descriptive statistics like Mean, Mean per cent and Critical Ratio were used for analysis and interpretation of data

Procedure

A newly developed competency-based achievement test for Standard III and V in Mathematics were administered on sample children of Standard III and V respectively. The same test was administered in schools where ROT was installed and the schools where ROT was not installed as well. For each Standard overall Mean, Mean per cent were computed separately for children of ROT school and non-ROT school. A comparison was made between the Mean per cent of children of ROT schools and non-ROT schools by using the descriptive statistics Critical Ratio (CR). Similarly, comparison was made on the basis of gender and caste separately. Attempt was also taken to develop a category-wise (General, SC, ST and OBC) comparative profile of children belonging to two different schools (ROT schools and non-ROT schools) on the level of achievement in Mathematics.

Analysis and Interpretation

The present study assessed the effectiveness of transmission through EduSat on learning achievement (Performance) of children in Mathematics at primary grade. Scores are presented separately with regard to different category of children.

Table 1 presents results in respect of the level of achievement in Mathematics of children studying in Class V of ROT and non-ROT schools. The results indicate that the mean achievement percentage

TABLE 1
Learning Achievement in Mathematics in Standard V Children

Sl. No.	*Category*	*Gender*	*ROT Schools*		*non- ROT Schools*		*Diff. in Mean %*	*C.R. value*
			Mean	*Mean %*	*Mean*	*Mean %*		
1.	Gen	Boys	11.79 N=30	47.19	12,86 N=15	51.44	4.25	0.27
		Girls	13.74 N=28	54.96	8.14 N=14	32.56	22.4	1.61
		Boys & Girls	12.76 N=58	51.06	10.5 N=29	42.0	9.06	0.01
2.	SC	Boys	10.41 N=20	41.64	12.28 N=18	49.12	7.48	0.46
		Girls	10.21 N=15	40.82	10.96 N=9	43.84	3.02	0.15
		Boys & Girls	10.31 N=35	41.24	11.62 N=27	46.48	5.24	0.41
3.	ST	Boys	17.42 N=13	49.67	8.83 N=10	35.3	14.37	0.69
		Girls	13.5 N=12	54.0	12.25 N=4	49.0	5.0	0.17
		Boys & Girls	12.96 N=25	51.84	10.54 N=14	42.16	9.68	0.58

4.	OBC	Boys	11.82 N=73	47.29	9.82 N=16	39.27	8.02	0.59
		Girls	12.35 N=40	49.39	9.1 N=17	36.73	12.66	0.87
		Boys & Girls	12.09 N=113	48.34	9.51 N=33	38.04	10.3	1.04
5.	All (Gen+8C+ 8T +OBC)	Boys	11.61 N=136	46.44	10.95 N=53	43.79	2.65	0.44
		Girls	12.45 N=95	49.0	10.11 N=44	40.45	8.55	0.93
		Boys & Girls	12.03 N=231	48.12	10.53 N=97	42.12	6.0	1.01

of children in Mathematics belonging to ROT schools of Sidhi district are higher than that of their counterparts belonging to non-ROT schools. Though the differences are not significant, but are in favour of children studying in ROT schools. Similar is the situation with regard to other sub groups.

From these results, it may be inferred that in none of the groups and sub-groups the difference in achievement levels was found to be significant. Though the implementation of EduSat has brought some changes in the perception of teachers in the Sidhi district of Madhya Pradesh, but a lot yet is to be done to improve the effectiveness of this technology, so as to get desired results in improving the achievement level of children in Mathematics and improving professional competencies of teachers as well.

A perusal of Table 2 indicates that the mean percentage of children belonging to ROT and non-ROT schools of Sidhi district in Mathematic goes in favour of children belonging to ROT schools in certain groups like General Boys, general Girls, SC Boys, ST Girls and OBC Girls; whereas in all other cases like SC Girls, ST Boys and OBC Boys, it is in favour of children belonging to non-ROT schools. This shows that target of EduSat has been achieved to certain extent though teaching through this technology is yet to compete successfully for all sub-groups. It is also indicated from the Table 2 that no difference is found to be statistically significant under the groups and sub-groups. It is a challenge to the efficacy of teaching and learning through Edusat.

On comparison of all groups of children irrespective of groups and sub-groups, it is found that mean percentage of children belonging to ROT school (37.48 per cent) is slightly more than that of children belonging to non-ROT schools (36.72 per cent). Similar is the situation with regard to achievement of boys (41. 5 3 per nent for ROT schools and 41.90 per cent for non-ROT schools). Whereas the achievement (Mean per cent) of girls belonging to ROT school (37.32 per cent) is higher than girls belonging to non-ROT schools (31.56 per cent)

Findings Pertaining to Comparison of Learning Achievement in Mathematics of Standrad V

The mean per cent of children in Mathematics under ROT schools of Sidhi district is found to be higher than that of their counterparts of non- ROT schools (48.12 per cent for ROT schools and 42.12 per cent for non-ROT schools). This also holds good in case of boys (46.44 per

TABLE 1
Learning Achievement in Mathematics in Standard III Children

Sl. No.	*Category*	*Gender*	*ROT Schools*		*non- ROT Schools*		*Diff. in Mean %*	*C.R. value*
			Mean	*Mean %*	*Mean*	*Mean %*		
1.	Gen	Boys	12.17 N=27	48.66	10.15 N=10	40.59	8.07	0.44
		Girls	10.36 N=40	41.42	7.09 N=18	28.35	13.07	0.95
		Boys & Girls	11.26 N=67	45.06	8.62 N=28	34.48	10.58	0.95
2.	SC	Boys	10.93 N=20	43.71	11.0 N=14	44.0	0.29	0.02
		Girls	8.58 N=28	34.31	11.5 N=7	46.0	11.69	0.57
		Boys & Girls	9.76 N=48	39.02	11.25 N=21	45.0	5.98	0.
3.	ST	Boys	8.76 N=17	35.07	10.86 N=9	43.47	8.4	0.42
		Girls	8.25 N=14	32.99	7.36 N=17	29.44	3.55	0.18
		Boys & Girls	8.51 N=31	34.02	9.11 N=26	36.44	2.42	0.19

4.	OBC	Boys	10.3 N=48	41.2	9.95 N=13	39.81	1.39	0.09
		Girls	9.89 N=36	39.53	7.00 N=16	2.80	36.73	0.80
		Boys & Girls	10.09 N=84	40.38	8.48 N=29	33.9	6.48	0.62
5.	All (Gen + SC + ST + OBC)	Boys	10.54 N=112	42.16	10.49 N=46	41.96	0.2	0.02
		Girls	9.27 N=118	37.08	8.24 N=58	32.95	4.13	0.54
		Boys & Girls	9.01 N=230	39.62	9.36 N=104	37.46	2.16	0.38

cent for ROT schools and 43.79 per cent for non-ROT schools) and girls (49.00 per cent for ROT schools and 44.45 per cent for Non-ROT schools) as well. Performance of girls under ROT school is better than that of their boy's counterparts in one hand and counterparts of non-ROT schools on the other hands.

In all sub groups like General, ST and OBC the average achievement of children of ROT schools are on the higher side in comparison to children of non-ROT schools except in case of the children of SC category. On the basis of the comparison of performance of boys it is found that under general and SC category the mean percentage of achievement is tilted towards children of non-ROT schools where as in case of ST and OBC it is exactly reversed. It is worthy to note that performance of Girls in ROT schools under all categories are on the higher side than that of their counterparts of non-ROT schools.. Though the differences are not statistically significant, these are in favour of children of ROT schools. This clearly reflects the effectiveness in the implementation of technology in improving learning of children. That is effectiveness of Edusat is steadily increasing pertaining to improvement in learning achievement of children in Mathematics.

Findings Pertaining to Comparison of Learning Achievement in Mathematics of Standard III

Children of ROT schools in Standard III perform better over non-ROT schools (39.62 Mean per cent for ROT schools and 37.46 for non ROT schools). Similar is the situation with regard to average achievement of boys (42.16 Mean per cent for ROT schools and 41.96 per cent for Non ROT schools) and girls (37.08 Mean per cent for ROT schools and 32.95 for non-ROT schools) as well. In both ROT and non-ROT schools average achievement of boy is more than that of their girl's counterparts.

Mean per cent of children of general (45.06 Mean per cent for ROT schools and 34.48 for non-ROT schools) and OBC (40.38 Mean per cent for ROT schools and 33.90 for non-ROT schools) category belonging to ROT schools are on the higher side over the children of Non ROT schools but in case of SC (39.02 Mean per cent for ROT schools and 45.00 for non-ROT schools)and ST (34.02 Mean per cent for ROT schools and 36.44 for non-ROT schools) children the difference goes in favour of children of non-ROT schools. There is no significant difference between the mean per cent of children of Standard III belonging to ROT and non-ROT schools of Sidhi district but in many

cases it goes in favour of children of ROT schools like Gen. boys (49.79 per cent), Gen girls (38.20 per cent), Gen. boys and girls together (44.00 per cent), SC boys (39.70 per cent), ST girls (35.07 per cent), ST boys and girls (37.14 per cent) and OBC girls (38.19 per cent), etc. Children found to be benefited gradually to a great extent in developing their Mathematical skill and ability through the innovative teaching-learning process by the implementation of technology (EduSat).

Findings pertaining to the Discussion with the Field Level Functionaries like Teachers and BRCCs/CRCCs

The following important comments and suggestions are made by the functionaries working at the field in various blocks of Sidhi district of Madhya Pradesh:

- During teaching through EduSat more teaching-learning materials, models, illustrations, etc. may be used to make the process interactive and effective.
- Interactive CDs may also be used to develop the curiosity and interest of children at primary level.
- More emphasis should be laid on fundamental concepts and basics with innovative instructional strategies rather than routine teaching-learning process.
- Some clippings, SSA songs, weekly programme schedule, etc. may be transmitted as fillers in between two programmes.
- Tele teachers should use regional /locallanguage during teaching through EduSat for the benefit of children of standards I, II and III in particular.
- Content matter should be presented on the screen for a longer time so that children can read and note the points as required.
- Teachers should remain present during the transmission and act as a moderator/facilitator in explaining and clarifying the key aspects to children.
- It is important on the part of teacher to note the difficulties faced by them and children and discuss the same after the transmission.
- Programmes like yoga, value education administrative aspects and entertainment, etc. should be transmitted in Saturday for teachers as well as children.

- On Sunday or in other public holidays programmes related to roles and responsibilities of parent teacher association and mother teacher association and community related topics may be transmitted for the benefit of community.

Educational Implications

Findings of the present study have bearing on following implications for improving strategies of Implimentation of transmission through EduSat in general and to meet the needs of learning group in particular. Specific observation based on the findings of present study requires strategic planning improve learning of children through effective Implimentation of EduSat.

Training/orientation of teachers at cluster level particularly on academic aspects like classroom transaction, school effectiveness programmes, potentials of technology, pedagogy of the Implimentation of technology and changing roles of teachers to facilitate learning of children during transmission through EduSat, etc., will definitely help to make the transmission through EduSat beneficial for clilldren and improving professional competencies of teachers. This helps in utilising their services effectively in classroom for optimum benefit of EduSat transmission particularly for improving learning of children.

Information indicating details of the topic to be transmitted, class for which it is meant should be prepared for the whole session and sent to the learning end from the beginning of the academic session. Additional support material on each topic may be prepared and supplied to concerned teachers in advance. Participation of concerned subject teacher, immediately after the transmission for effective interaction/discussion with the children constitutes the major part of teaching and learning through technology. Teachers working at elementary level are encouraged to initiate pre and post transmission discussion with children to ensure their interest and motivate them towards learning through EduSat. Their role is more important as a facilitator rather than a transmitter of knowledge.

Trained and competent teachers, teacher educators from DIETs be invited and engaged during the development of content for transmission along with other resource persons. Suggestions of working teachers be invited and duly acknowledged by incorporating it in the development of tele-content. Resource persons who can easily communicate with local dialect be selected and invited for teaching from the studio (Tele-teacher). Mathematical terms used by tele-teachers should be clear to make it understandable for the target

group. Tele-teachers may be asked to use more and more examples, illustrations and activity to develop the curiosity of children and make them actively engaged in teaching-learning process.

Monitoring mechanism must be made effective at all level to ensure smooth functioning of teaching-learning processes. One ROT at each BRC and CRC and one SITE at each DIET may be provided in a district through which monitoring strategy can be strengthen and made effective. Teacher educators (DIET faculties) should be engaged in monitoring activities and accountability be fixed on DIET functionaries to make the monitoring more effective. Local community be involved in supervision and monitoring programme for developing a sprit of ownness and ownership towards school and school programmes. It facilitate learning of children and at the same time ensure enrolment of children and reduction of dropout as well.

Strategy related to transmission of content for each class be made systematic and regular. Instead of covering all subjects from Class II to VIII steps may be taken to cover one subject for each class, as a result of which children can get a concrete idea on a particular subject, delivered through EduSat. Time of transmission may be distributed class-wise so that in a day transmission may be made for more than one class.

Facilities like a separate room, seating arrangement, learning materials, etc need to be improved at every learning end to maintain academic atmosphere. Functionaries working at cluster block and district levels need recurrent training to get them mobilised and motivated for improving their competencies. A nodal officer may be appointed at each Block, who will be accountable for making necessary arrangement and maintenance of ROTs and T.V. sets including other technical aspects and ensure their effective functioning regularly.

REFERENCES

CEMCA. 2003. Prospect of Distance Education, Educational Media in Asia, Commonwealth of Learning, Vancouver.

DASH, M.K. 2007. ICT for Professional Development of Elementary School Teachers. A Study. *Indian Journal of Open Learning*, Vol-16, No- 3, pp-235-244., IGNOU, New Delhi.

DEP-SSA. 2005. Handbook on Distance Education Programme – *Sarva Shiksha Abhiyan*, An IGNOU-MHRD, Government of lndia Project.

Four Decades of Distance Education in India. 2005. *Reflections on Policy and Practice.* Viva Books Private Limited, New Delhi.

GARRETT. H.E. 2005, *Statistics in Psychology and Education.* Paragon International Publishers, New Delhi.

Handbook of Research for Educational Communications and Technology. 1996. Macmillan Library Reference USA,Simon and Schuster Mac Millan, New York.

ICT Initiatives for Quality Improvement in Elementary Education. 2006. Distance Education Programme – *Sarva Shiksha Abhiyan*, IGNOU, New Delhi.

JONASSEN, D.H. 1996. *Handbook of Research for Educational Communications and Technology.* Simon and Schuster Mac Millan, New York.

Open and Distance Learning. 2007. Indira Gandhi National Open University, New Delhi.

Prospect on Distance Education. 2003. Educational Media in Asia. Commonwealth of Learning, Vancouver.

Teleconferencing and Training Kit. 2005. Commonwealth Educational Media Centre for Asia. Common Wealth of Learning, Vancouver.