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ROLE OF ICT IN SCIENCE EDUCATION FROM PRIMARY TO SECONDARY SCHOOL EDUCATION IN KERALA

Ranjusha.A[1], Dr. K.P.Meera[2]
[1]*Senior Research Fellow, Department of Education, University of Calicut*
[2]*Professor, Department of Education, University of Calicut*

ABSTRACT

Education plays a very dynamic role in changing the society and its needs. In this world of technology the teachers should acquire and update the technological skill so that they can reach up to the needs of a student of present era and fulfil it.The learning realm of today's student is packed with computer and other gadgets. As this enhances their knowledge, the mastery over this becomes inevitable for the teacher trainers and the trained graduates.Then only the students of these teachers are benefitted out of it. It makes them more creative and scientific than the students of traditional class room. The total facet of society is being changed due to globalization and its demands are attained faster as the more techno-pedagogical skilled students work for it(Meera and Ranjusha,2016).ICT plays a very important role in the concept attainment of Science. ICT has improved pupils' understanding of scientific concepts, hypothesis testing, developed problem solving skills, scientific relationships and process skills thereby improving their scientific reasoning. This is an era of technology, Technological innovations are being actuated in almost all realms of society. ICT can be considered as an important mode of scaffolding in every social domain.(Meera and Ranjusha,2016)

This chapter is focused on the role of ICT enabled education in the field of science from primary to secondary school education in the context of Kerala.

INTRODUCTION

Introduction of ICT in the schools has changed the psycho social development of a child. The tools ICT have produced make it to have a great influence on school teaching and learning. The psychological-socio cultural learning environment has been changed with the arrival of ICT as it changes the processes of data capture, modeling and interpreting, logging and virtual experiments. School science classrooms gain more time for real discussion, interaction and interpretation due to the introduction of ICT tools. At the same time these tools help schools to have a connection with contemporary science as it is applied in various school labs and science centers. ICT also play a pivotal role during the learning of science processes and skills. By facilitating exploration and experimentation and by providing visual feedback in a short time, ICT support the development of the inquiring mind. They also provide motivation and inspiration among the students which help them to improve cooperative learning and self-regulation.

Though the effect of ICT in science learning is tremendously given importance, the current use of it in school science classrooms occurs in a dichotomist way. The curriculum content imposes the use of ICT in a linear way. It leads to a contextual separation for ICT from learning activity. ICT must be inseparable from the instructional objectives in a more free dialectical relationship with the object and subject of the activity establishing the methodological level of the whole activity. This approach makes ICT the means or methods and mediative tools between object and subject. (Meera and Ranjusha,2016)

ICT IN PRIMARY EDUCATION

We are living in the world of technologies. It has been reached out to every walk of our lives. It has been proved its inevitability in the field of human lives. Students are the most benefitted out of it. It starts to influence them from the beginning of their schooling, primary level. ICT enabled class room helps a student to develop his skills and achievements. ICT brings more joy and fun to their class room which creates a

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stress free learning environment. They engage in classroom activities in different forms and ways. The content of their lesson is showed to them in variety of forms which help them improve their creative thinking.

ICT enabled education changed the total facet of the learning process in primary education. The early childhood and primary education are the primitive stages of an individual's education. The visual materials and photographs become more effective and attractive than the mere oral explanations of the lesson content. The curriculum is enriched when the whole study materials in large size and number in different modes are included. The students' learning environment is expanded to the world outside their classroom. ICT is a tool for creative thinking and self-expression.

The science education in the primary level is titled as elementary science education. Biological and physical aspects are included in this curriculum. For eg. Living things, energy and force and environmental awareness etc. It is focused on plant and animal life and environmental care. The curriculum aims to develop science process skill, observing, understanding and analyzing. ICT provides a wide range of experiences for conceptual and procedural understanding. The biological and physical aspects of the world is termed as conceptual understanding while people's understanding about the scientific procedure is called procedural understanding.The moving pictures and cartoons help the child to familiarize with his surroundings easily. He is able to distinguish between living and non-living things. Through the stories and songs he watches on the screen, he is able to develop some social and emotional skills. This base fosters some basic qualities which help him to become a good individual.

Drawing and painting on computer helps the child in self-learning. He finds it interesting . He tries to do things on his own and extends this attitude towards character formation.

ICTIN SECONDARY EDUCATION

ICT provides a foundation to develop knowledge and understanding of the basics scientific principles in the secondary schools science curriculum of Kerala. An ICT class room motivates interactive learning environment by learner centered activities. The use of multimedia in classroom increases the quality of students learning.

ICT IN SCIENCE LAB

The dissection of human body parts like heart and eyes is not available all the time or cannot be repeated. But with the help of ICT enabled lab, this problem is solved. The videos can be repeated as the students need to do it. The animation pictures help the students understand the function of body parts. Absorption of water and minerals from soil by plants, the process of photosynthesis and the conduction of food materials animated videos make the concepts comprehensive

Different physical phenomenon, concepts like force, momentum, inertia are attained with the help of multimedia animation. Different chemical reactions, chemical processes, manufacturing of chemicals are available in ICT.

Teacher student relationship is continued even after leaving school since the internet access can be done from anywhere and anytime. Students are able to clarify their doubts as and when they wanted to have it through this medium. Thus they move to the next part of their content without leaving behind anything unclear. ICT enabled classroom also helps to improve the class attendance.

IT@SCHOOL

IT@ School project, which is now known as Kerala Infrastructure and Technology for Education (KITE), was formed in 2001-02 aimed to bring out as a surge in the ICT enabled education in the schools. It changed its title in to KITE in August 2017. It is considered as the first SPV (Special Purpose Vehicle) Company of the Education Department in the State, KITE is also the first SPV to get) and and investmentfund board. The arrival of KITE now has extended its service to fuel the ICT support to HSS, and even to Arts &Science, Engineering colleges and universities. General Education Department decided to form a project aimed to inculcate IT related activities in Higher grades. They named it IT@school and introduced in 2001. But it was first introduced in schools in 2005 as IT was made compulsory subject in tenth standard (IT@school,2018).

With the launching of EDUSAT schools were benefited with operations and broad band connectivity. IT @school's channel, the VICTERS became the first complete educational channel in the country. A scheme was introduced by centre ICT at school provided ICT infrastructure to 4071 schools during 2007-2012.the intervention of ICT extended to LP and UP section. They were introduced to ICT text books through 'kalippetti' and 'e@vidya'. Teachers from std 1 to 12 were empowered with ICT skills which improved their classroom transaction using ICT tools (IT@school,2018).

IT@school project under General education department,Govt. of Kerala was set-up to enhance the

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IT education in schools and also enhance the quality of IT education towards a complete ICT enabled educational system. The project visualizes enhancing the role of information technology as a teaching aid for learning all subjects(IT@school,2018).

IT@school introduced some schemes like 'samagra' content portal 'sampoorna' school management software and 'school wiki'. The aim was to conduct the collaborative content development process connecting 15000 schools. Another highlight of it was the 'high school kuttikkoottam'. Lakhs of students were given specialized training cyber safety, hardware, animation electronics and Malayalam computing. KTEI now transformed to a full-fledged company under the government. It is now capable of implementing various ICT programmes. KITE's implementations of Hi-Tech school programmes of the education department by which 45000 classrooms in 4775 schools are being made Hi-Tech. (IT@school,2018).

VICTERS (Versatile ICT Enabled Resource for Students)

Victers is the first complete educational channel in the country operated by IT@school. It is the first broadband network on EDUSAT for schools. It has two modes of communication, interactive and non-interactive. The interactive mode which is used for video conferencing and other such educational purposes is a highly demanded as it reaches to the whole school within a stipulated time. It offers a complete virtual communication classroom which helps the students to interact directly with subject experts and educationists. The non-interactive mode is an educational channel which is telecasted for 17 hours a day. It reaches out to 15000 schools in Kerala. Victers has been raised to the level of a complete educational channe of the state with the telecast of programmes on educational values, general awareness programmes and content on general interest. It has been the most sought channel by students, teachers and parents and the public. It also telecast curriculum based programmes on education particularly on science and technology (IT@school,2018).

A programme titled 'SSLC Orukkam', video classes which were prepared by experts in different subjects is telecasted to help the SSLC students (IT@school,2018).

SIET(State Institute of Educational Technology)

It is SIET which executes the planning, research, production and evaluation of digital contents like video and audio programmes, multimedia subjects, software etc. for educational purpose. It also aims to implement scheme to generate teaching technologies and learning processin the modern context. SIET Kerala is the latest in the array of 7 SIET's in the country. It was in 1998 that this SIET was sanctioned by Department of Education, Ministry of Human Resource Development, govt. of India (SIET Kerala, 2018).

SIET programmes consistently bagged awards for its high professional excellence, technical and academic quality and educational value.

1. SIET's implementation of CD library project in 1000 higher secondary schools, 2500 high schools, 3200 primary schools in kerala marked the first of its kind in the history of india.
2. A full-fledged e-learning project was successfully implemented in the state of Kerala.
3. Kerala SIET was selected as an excellent model after evaluating the performance of all SIETs by Panth commission constituted by the MHRD, government of India. He directed all the SIET s in India to follow the 'Kerala Model' in the field of E-Learning system (SIET Kerala, 2018).

STRENGTHS OF SIET

- **Prominent Institute in Educational Electronic mass medium**
  It is an important institute in Kerala which is working as an electronic mass medium for school education.
- **Experience panel of production teams**

An experienced panel of experts working as a creative human resourse for the production of audio,vedio, direction,scripting,camera work, editing,graphics and animation.

- **Creative facilities for outside production**

A well-equipped technical teams for taking up any assignment of audio-visual production right from formative research to final evaluation of the project anywhere in the state.

- **Strong training faculty in ETV production**
  An experienced training faculty is working for script writing, presentation and production techniques.
- **Strong Network in the State**
  It worked out for a strong network with teachers, students, Govt and non-Govt agencies and institutions in Kerala and succeeded in establishing it.
- **Enriched audio/video library**

It has a collection of over 2500 video/audio programmes covering wide range of topics from kid

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stories to mathematics to value education to personality development and so on (SIET Kerala, 2018).

Goals of SIET

- Production of educational/enrichment programmes for telecast/broadcast through TV/Radio and communication
- Designing and production of teaching aids
- To administer the educational technology programmes and assignment of work to agencies in both Govt. and Non-Govt sector
- Imparting training to production personnel and teachers
- Conduct research and evaluation of new media education materials
- Assist schools to set up infrastructure to schools and monitoring their utilization activities
- Dissemination of TV/Radio programmes through available commercial channels
- Patronizing production of TV and audio educational materials
- Implement CD library project in all the 140 constituencies of Kerala state and declare as the 100 percent e learning state
- Research and develop learning materials for blind students (SIET Kerala,2018).

TERMS

The project "TERMS" (E-Resource Management System for Teachers) aims at providing ICT contents for each subject classwise. The materials are either created by the members of Kasargode DIET or made available from other sources. Through various additional links they can access digital evaluation tools, sample teaching manuals and other supporting materials. Links to useful websites and edublogs are also made available (http://termsofdiet.blogspot.com/.,Ranjusha and Meera, 2016).

TERMS - e Resource Management System for Teachers is an initiative to strengthen the Govt. schools to improve the classes in the school and it has been told for a long time that IT‟s possibilities must be used to the maximum. Even the LP schools in Kerala have the necessary facilities for this. Teachers have received training, but the number of teachers using ICT in any school is very few. It is pointed out that the main cause of it is lack of time for constructing ICT materials and lack of experience. This is the main issue of schools in the past two years. As a solution for this the idea of a „Resource blog‟ is put forward by DIET, Kasargode. It was approved by the district education committee and they assured technical assistance through Kasaragod IT@ school. Education officers in the district, with the support of the teacher‟s associations encouraged the teachers and Head Masters. TERMS was inaugurated by the Honorable education minister, Kerala on 04.01.2016. All text books from standard first to tenth are available on TERMS.Videos,animations,audios related to all concepts or topics related to science are included on TERMS which help the students understand the concept easily. (http://termsofdiet.blogspot.com/.,Ranjusha and Meera, 2016).

EDUCATIONAL BLOGS

Blogs open a new way for students to communicate with other students and teachers and are e-learning tool for teachers and students.it creates a social interaction between students which help the students to become comfortable in their learning environment.it create better writing skills and encourage them to collaborate about their topics. students can post their reviews, comments and suggestions. A typical blog combines text, images and links to other blogs, web pages and other media related to its topic. Edublogs can be used as instructional resources, in which teachers can post ideas or topics to help students. The use of blogs in the classroom allows both the teacher and student the ability to edit and add content at any time. Blogs are used to publish text, video clips,audio clips,maps,photos,projects etc….some edublogs are www.bio-vision-s.blogspot.com,
www.physicsadhyapakan.blogspot.in,
www.jeevasasthrajalakam.blogspot.in

CONCLUSION

In other states ICT in education is limited only in learning computer basics. But Kerala has extended ICT to frame subject-wise content including multimedia animations and videos which help students to learn it better. The using of ICT tools helps the students learn the contents faster without wasting much time.In the primary sector the students who use ICT showed better achievement in academics. Influenced by ICT students get interested in programming and invention of new software.

The use of ICT in science education is classified into two when its appropriateness is considered, the tool application and learning through ICT. In the first phase ICT is treated as a set of software which enables students to do their task in an effective way. This category belongs to the use of word processing and spreadsheets in science learning activities. Students can create a power point

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presentation to demonstrate the science model. Spreadsheets, database, graphing tools, modelling environments can also be used as tools in science education. Learning through ICT denotes any interaction between a computer system and a student. Many interactive educational software or computer tutorials can be taken as examples for this type.

Email, chat rooms, blogs, news groups, video conferencing are used for educational purposes. Digital equipment connected with computers are also used in science education. A microphone, digital camera, web cam, computer controlled microscope are the examples of computer projection technology. Printers and scanners are also used in science education. Microcomputer-Based Laboratory and mobile technology are other possibilities in science education.

Since the world has brought out this much innovations in the field of education, a definite change is seen on the phase of science education. ICT made the way to science closer than it was a few years back. The cause and the result have been found so near now. As a whole, technology makes findings still possible within no time.

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