Resolving the Problems in Understanding the Concept of Microorganisms among VIII Standard Students with ICT

An Action Research Submitted to the State Council of Education Research and Training, Chennai – 6.

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2023 - 2024

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CERTIFICATE

I **Mr.V.ELANGOVAN,**Principal, DIET, Thirumoorthy Nagar, Tiruppur District had Certify that "**RESOLVING THE PROBLEMS IN UNDERSTANDING THE CONCEPT OF MICROORGANISMS AMONG VIII STANDARD STUDENTS WITH ICT"** an Action Research was done under my guidance.

I also assure that this action research paper was not submitted in any seminar and conference.

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DECLERATION

I **Dr.K.PRABAKAR,** Lecturer in Zoology declare myself that "**RESOLVING THE PROBLEMS IN UNDERSTANDING THE CONCEPT OF MICROORGANISMS AMONG VIII STANDARD STUDENTS WITH ICT"** an Action Research was done by me.

I also assure that this action research paper was not submitted in any seminar and conference.

Dr.K.PRABAKAR
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ACKNOWLEDGEMENT

I am sincerely thankful to the ***Director and Joint Directors of SCERT****, Chennai – 6 for giving me a chance for this study with fund.*

I am immensely indebted to ***Mr.V.ELANGOVAN,*** *Principal, DIET, Thirumoorthy Nagar and my Colleagues for finishing this study.*

I acknowledge with a sense of gratitude the assistance I received from, Head Mistress, Teachers and Students of the P.U.M.S. Kannamanaickanur, Udumalpet Block, Tiruppur District for their sincere and spontaneous co-operation throughout the study.

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INTRODUCTION

INTRODUCTION

The destiny of the Country is shaped in the classrooms. This shape depends upon what teacher teaches and how it goes on moulding it. In other words destiny of our youngsters falls on the shoulders of teachers. "A teacher affects eternity, he can never tell where his influence stops." ***Henry Adams (1905)***

Technological progress, combined with a parallel evolution of pedagogical sciences, results in the belief that the integration of Information and Communication Technologies – ICT – into learning interaction may bring about a new era in the educational practice. However, the introduction of ICT in the educational practice is followed by essential gaps and encounters multifold difficulties. This fact turns ICT into a significant challenge for both the needs and the orientation of each and every educational system, imposing a complete review of their planning and organization, in order to make the transition to a new stage of systematic exploitation of technology possible. The use of ICT in education in most countries concentrates on routine type tasks, like sporadic and mechanical information retrieval from the internet. However, teachers and students have high expectation for using computers in their class rooms. This is because ICT can make science teaching and learning more versatile and goal oriented, motivate and activate students and promote cooperation, study in authentic context and creativity in learning.

Today, education encounters challenges in all aspects of social, economic & cultural life of an individual. Scarcity of trained technical and skilled teacher is one of them. Technological development & mass media are playing a significant role in teaching and learning by replacing traditional class room system. Now the student has opportunity to learn at any time and at every place. So, the teachers have to learn to handle the use the modern teaching technologies to make their teaching smooth and effective. To improve the educational productivity, the teaching staff ought to mainstream technology within education, developing traditional techniques & using new educational methods. Mainstreaming the technological media in education is called “Multimedia” which leads to infinite applications of computer technologies. The concept of this multimedia technology came into effect with appearance of sound cards, compact disks, use of digital camera and then the video which made computer an essential educational tool.

INSTRUCTIONAL STRATEGIES IN TEACHING OF SCIENCE

Teaching is the transfer of knowledge from teacher to pupils. It is the facilitation of the pupils by the teacher in the art of learning. Teaching is art and a science which is a social

act of influencing pupils by the teacher. It is doing anything that might lead to learning. According to ***N.L. Gage, (1963),*** "Teaching as an act of interpersonal influence aimed at changing the ways in which other persons can or will behave. Thus teaching is imparting knowledge or skill which involves doing all things that may lead to learning".

THE IMPORTANCE OF SCIENCE AS A SCHOOL SUBJECT

Science has a cultural value. The history of scientific discovery presents to the imagination vivid pictures of the work of great men and thus 'places science in the front rank of humanistic studies'. A knowledge of the methods of observation and experiment imparted by the study of the different branches of science leads to the development of a logical mind, a critical judgment and a capacity for systematic organization, while a knowledge, of the great questions with which science as a whole is concerned produces that breadth of imagination which is essential for the proper solution of the problems of life. Science, therefore, is too important an element to be omitted from general education. It is an important part of liberal education, of the equipment and preparation for life which the school is expected to give to its pupils so that they may become intelligent and useful members of the community.

NCF 2005 looks at Science is a dynamic, expanding body of knowledge, covering ever-new domains of experience. In a progressive forward-looking society, science can play a truly liberating role, helping people escape from the vicious cycle of poverty, ignorance and superstition. The advances in science and technology have transformed traditional fields of work such as agriculture and industry, and led to the emergence of wholly new fields of work. People today are faced with an increasingly fast-changing world where the most important skills are flexibility, innovation and creativity. These different imperatives have to be kept in mind in shaping science education.

PLACE OF BIOLOGY IN SCHOOL CURRICULUM:

Instruction in Biology starts at the primary School level. Biology constitutes a significant component of the Science and studied by all Students till the middle school level. At the Secondary School level, Biology becomes a part of Science textbook. The process of Channelization starts at the higher secondary level with a largely irreversible selection of future choice. Of course teacher has good content knowledge but sometime they failure in express themselves and other problem is lack of adequate resources through which teacher teach biology in better way (Ahmed, 2009).

OBJECTIVES OF TEACHING BIOLOGY:

As per Tomar (2005) and NCERT (2006) following are the objectives of teaching of Biology:

- Know the facts and principles of science and its application, consistent with the stage of cognitive development,
- Acquire the skills and understand the methods and processes that lead to generation and validation of scientific knowledge,
- Relate to the natural environment, local as well as global, and appreciate the issues at the interface of science, technology and society,
- Acquire the requisite theoretical knowledge and practical technological skills to enter the world of work,
- Nature and natural curiosity, aesthetic sense and creativity in science and technology,

Imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment, and cultivate 'scientific temper'- objectivity, critical thinking and freedom from fear and prejudice.

Science curriculum at the upper primary stage intends to develop:

- Scientific temper and scientific thinking.
- Understanding about the nature of scientific knowledge i.e., testable, unified, parsimonious, amoral, developmental and creative.
- process skills of science which includes observation(s), posing question(s), searching various resources of learning, planning investigations, hypothesis formulation and testing, using various tools for collecting, analysing and interpreting data, supporting explanations with evidences, critically thinking to consider and evaluate alternative explanations, reflecting on their own thinking.
- Appreciation for historical aspects of evolution of science.
- Sensitivity towards environmental concerns.
- Respect for human dignity and rights, gender equity, values of honesty, integrity, cooperation and concern for life.

BACKROUND OT THE ACTION RESEARCH:

Since over four decades, ICT was introduced into classroom practice it has gained much attention and ever growing confidence in its effectiveness. ICT is believed to be more than the core of the Information Society. It is supposed to be paramount to the education of knowledge workers. Although benefits of ICT use in education have been acknowledged teachers do not seem to integrate it into their teaching activities and thus the use of ICT

remains rather limited. Therefore, the question arises why teachers are reluctant to integrate ICT in their pedagogical practices.

What is ICT?

ICT as we all know is the acronym for Information Communication Technology. For the purpose of this presentation, ***ICT is defined as the integration and utilization of the innovation of Computer technology for the purpose of organizing, encoding, packaging and dissemination of information to target destination or consumer without the constraint of time and space*** (Adekomi, 2007). This is to say that an ICT –based instructional system operates a continuous lifelong training process. This process does not necessarily require the physical presence of an instructor but it demands the constant monitoring of the instructional process. The monitoring on most occasions is also ICT based. This definition no doubt implies more freedom for the teachers and more opportunity to use initiatives for the learners. The time gained by teachers will necessarily be employed for better scientific planning of instructional content and delivery strategies.

Why ICT for Science?

There are so many advantages when an instructional system is ICT driven. This is particularly true for the teaching and learning of Science. Luker (2000) in his contribution to the book "Preparing Your Campus for a networked Future" claims as follows that

a. If any institution of higher learning is to meet the instructional demands for quality Education, the system must be ICT driven.
b. ICT encourages and ensures effective distributed learning.
c. ICT removes age, distance and time constraints in any learning process.
d. The overall effectiveness of an ICT driven instructional system is relatively high.
e. ICT ensures immediate provision of knowledge in relevant areas with the ease and speed that could never be got from traditional learning system.
f. If the Library is the back-bone of any system of learning, then ICT provides a very strong and effective library services (Clifford, 2000, Adekomi 2004).
g. The multiplier benefit of a networked instructional system ensures a future of educational

   excellence, expansion and efficiency at reduced cost.
h. A networked instructional system makes working with your academic neighbors very convenient. It is like using your GSM phone to get information as at when needed. In

addition the information comes in the proper structure that allows the receiver to use it with minimum efforts.

Importance of ICT

Importance of ICT Information and communication technology was originally intended to serve as a means of improving efficiency in the educational process (Jones &Knezek, 1993). ICT in education can help to improve memory retention, increase motivation and generally deepen understanding (Dede, 1998). According to Wheeler (2000), ICT brings shared learning resources, autonomous learning and collaborative learning to the classroom. Kumar (2008) opined that, ICT can be used as a tool to improve the quality of education for preparing the society and its manpower to face the challenges of the future. ICT has a particular focus within the primary classroom. It is a tool which gives teacher a fun and effective way to raise students' motivation. In the initial stage of school education, students are not experts in reading and writing. Their content understanding increases if they are taught through visualization, animation etc. as it helps to attract the attention of children and keep them an active participant instead of passive listeners. Thus, ICT can make a critical contribution to children's learning in the primary school (Loveless & Loveless, 2002).

ICT is very advantageous for the schools, teachers and students. In case of schools, computer use would facilitate learning and therefore have a positive effect on performance. The strengths of ICT provision in primary schools includes – the increasingly effective use of ICT to support the whole class teaching; and better and more frequent use of ICT in the development of the children's' literacy and numeracy skills and in supporting children with special educational needs. It will provide access to learning resources both inside and outside the school environment. These new technologies will enable schools, libraries and local communities to collaborate on developing joint learning programmes. According to Wheeler (2000), the benefits that ICT brings to the classroom includes sharing of resources and learning environments as well as the promotion of collaborative learning and a general move towards greater learner autonomy.

The effective and efficient use of ICTs depends largely on technically competent educators/teachers. One of the most significant barriers to successful integration of ICT and transformation of learning has been teacher's lack of confidence, experience and pedagogical understanding in mobilizing the potential of digital technologies. Thus, teachers must have good knowledge of the nature and scope of the available resources and must identify effectively the opportunities to integrate and utilize ICT to support work in most of the curriculum areas. Upper primary teachers must have a positive attitude towards ICTs because

then only they can develop the same among their students which will enhance students' competency. ICT can be used by teachers to enhance the quality of the presentation of their planning as well as to prepare learning materials and to enrich the presentation and content of school displays and the children's project work. Meadows and Leask (2003) introduced teachers to the range of ways that ICT can be used to support teaching-learning process in the upper primary school. According to Verma and Verma (2008), the use of ICT in education lends itself to more student-centered learning settings. According to Fidalgo, Tornaqhi, Meirelles, Bercot, Xavier, Castro and Alves (2009), digital technology has become essential in everyday life and therefore demands have been placed on schools to educate students so as to make them technologically literate. It can be seen that students respond to ICT in a positive way and are motivated by ICT related activities. Children have high level of interest and enthusiasm when they work in ICT environment; they are motivated by the inclusion of ICT in their lessons as ICT changes the nature of motivation to learn (Forcheri&Malfino, 2000). The educational activities that involve the use of technology capture the interest of students, which facilitates their understanding of the content and provides a different way of expressing knowledge. Empirical research on this subject shows evidence that confirms a relationship between computer use at school and performance (Weaver, 2000). Mallik (1995) reported that, direct mode presentation of ETV was effective in terms of achievement of learners on school subjects. He also found that there exists positive effect of technology acquaintance of students at lower primary and upper primary stages on their achievement in ETV lessons. Kullik et.al. (1983) found that students with computer based teaching score better on final examination than did students in conventionally taught classes. Antonijevic (2007) in his study which included 47 participants countries worldwide found that, the use of computers in education contributes significantly to higher student performance in Science and not in Mathematics. Kumar (2009) reported that CD is effective in teaching Science at primary level. The ETV lessons in Mathematics and EVS taught to students of both class III and V significantly improved their learning achievement as compared to their counterparts taught through traditional method (Meenu, 2006). Chaudhary and Desai (2007) reported that both teachers and students of elementary level opine that computer-assisted learning has positive effect on learning of Mathematics, Science and English. Reddy and Ramar (1995) found that students of class VIII taught through multimedia modular approach performed better than those taught through traditional lecture method. Mahajan (1994) reported that computerassisted instruction was effective for teaching singular and plural to grade II. It has also been reported that computer - based instruction helps in developing the reading skills

among primary school children (Balasubramanian, 2000). Das, Joseph, Biswal and Goel (1995) reported the effectiveness of text-cum-graphic-cum-music method in teaching Hindi rhymes. Nisar, Munir and Shad (2011) reported that availability and usage of ICT improves the knowledge and learning skills of students. This indicates that existence of ICT is improving the educational efficiency as well as obliging for making policies regarding education sector. Kumari (2010) found in her study that CAI is effective in teaching English grammar.

Why to Teach ICT?

InformationCommunicationTechnology(ICT)isaconstantlydevelopingsubjectwithinsocietyandtheNationalCurriculum (NC).AreaswithinICTarevitaltoureverydaylives,and sometimesweforgetthatweliveinanInformationage.Itismoreconvenienttosolvethe problems and work more efficiently by understanding and making use of ICT tools. ICT more specificallyinside the classroom has developed immensely. Technology has become a part of our culturethereforeitisveryimportantthatweareeducatedinhowtouseit,notonlyforthe classroombutalsofortheworkplace.Thearticleinvestigateintosomeofthephilosophical, educationalandpracticalneedsoflearningICTthroughexperiencesofICTineducation,and how it has developed and evolved, as a desire for the subject.

Present Status of ICT in India:

The access to ICT facilities whether by students or teachers is of great concern in India. Though computers came to Indian classrooms in the year 1984-85, the level of adoption of modern technology in the teaching-learning process has been limited and uneven and computer awareness insufficient in schools. To meet the needs of the students two educational programmes viz., 'Gyanvani' and 'Gyandarshan' were started on All India Radio and TV respectively for learners of all ages from primary to university level (Berman, 2008). A survey conducted by Bhardwaj (2007) in the states of Gujrat and Karnataka revealed that the use of ICT in education is very limited in the country whether measured by the number of schools having an ICT department or unit (20.4%), the availability of a budget in schools for its implementation (6.5%), the number of teachers trained at ICT. In the 200 schools surveyed in Surendranagar there were only 2 multimedia projectors, 3 PDAs and 4 scanners; in Ahmedabad, there were only 589 desktop computers in 100 schools. He also reported that while there is relatively better availability of older technologies like the televisions, new technological products like multi-media projectors, laptops, PDAs which make learning more student-centric were scarce. In Gujrat and Karnataka, private school students used ICT marginally more than government school students. According to Chaudhary and Desai

(2007), computers have become more accessible in the schools. 'SarvaShikshaAbhiyan' has implemented the computer-assisted learning programme in elementary schools of Gujrat state. As reported by Sarapuria (2005), the status of computer education programme is poor in government and rural schools when compared with private and urban schools. He also reported that, students possess high level of interest in computer education programme and an average awareness towards internet.

Suggestions to Improve the Present Status of ICT in India:

Due to the present status of ICT at the school level in India, the NCF (2002), with respect to large scale introduction of ICT in schools, pleads for – adequate infrastructure facilities; children's access to global resources; professional development opportunities for teachers; development of appropriate curriculum models and pedagogy that makes the best use of ICT facilities; and availability of appropriate learning materials in support of the curriculum. According to National Policy on ICT in School Education (2008), the existing economic and digital divide needs to be bridged and implementation and integration of ICT into the educational system should address the following key-points

- Regardless of gender and financial status of students, education for every student should be the motto of ICT implementation.
- Provide cost-efficient delivery of education to build a strong equitable and economically strong knowledge society.
- Develop partnership with government and private agencies for delivery of ICT education.

  For the best practices, the teacher must be aware of the importance of the appropriate use of ICT to support their teaching and to enhance the children's learning. They must be enthusiastic about incorporating the use of ICT to stimulate children's interest in learning. The teachers must use the wide range of available software tools and ICT equipment more effectively to provide a more coherent and broader range of ICT experiences for the children.

ICT in Education

Information and Communication Technology (ICT) can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers‟ professional development and more efficient education management, governance and administration. ICTs are known as information and communication technologies which are basically various set of technological tools, gadgets and other resources utilized to

communicate, and to create, distribute, store, and handle information. These technologies consist of computers, the Internet, and broadcasting technologies like radio and television. 5 In recent years there has been a groundswell of interest in how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools. The use of computers and the Internet is still in its infancy in developing countries, if these are used at all, due to limited infrastructure and the attendant high costs of access. In India, both Central government and State governments are providing greater importance for introducing ICTs in education.

Advantages of ICT in education

- It improves concentration and comprehension. ...
- It promotes student flexibility and autonomy. ...
- It encourages critical thinking. ...
- It facilitates communication between teachers and students. ...
- Increased classroom productivity and collaborative work. ...
- It stimulates motivation.

ICT in Schools

Technological skills are highly important for curriculum transaction in schools. Application of ICTs in schools indicates that it is directly related to the development of schools and the teaching and learning environment. It is observed that new and emerging technologies are being integrated with the older technologies to make ICT applications in education more effective. ICT not only promotes teaching-learning process, but also provides children with opportunities to use modern technology to enhance their self-learning in all subjects. Computers and other items of information and communication technologies enrich the teaching and learning of language considerably. The Government of India has announced 2010-2020 as the decade of innovation. Reasoning and Critical thinking skills are necessary for innovation. Foundation of these skills is laid at school level. It is desirable that affordable ICT tools and techniques should be integrated into classroom instructions right form primary stage so as to enable students develop their requisite skills. 6 In India, the Information and Communication Technology (ICT) in schools have been subsumed in the RashtriyaMadhyamikShikshaAbhiyan (RMSA). Now ICT in Schools is a component of the RMSA. The Information and Communication Technology (ICT) in Schools was launched in December, 2004 and revised in 2010 to provide opportunities to secondary stage students to mainly build their capacity on ICT skills and make them learn through computer aided

learning process. The Scheme is a major catalyst to bridge the digital divide amongst students of various socio economic and other geographical barriers. The Scheme provides support to States / UTs to establish computer labs on sustainable basis. The Department of School Education and Literacy under Minister of Human Resource Development, Government of India brought out the National Policy on Information and Communication Technology (ICT) in School Education in 2012 which emphasizes promoting ICT enabled activities for learning in schools.

ICT AS LEARNING RESOURCE:

Now days, it is being observed that there is a paradigm shift in the teaching learning process and therefore in the support system that we use for effective teaching and learning. Information and communication technology is going through rapid and continuous change and therefore use of ICT is highly common in the teaching learning process. These changes are reflected by the change in the learning strategy of learners. Different researches proved that new generation of children are using these resources extensively and they share, use, develop and process information and technology for different purposes.

It is essential that the contemporary teacher has good ICT skills and is able to integrate ICT into the teaching and learning processes. It is highly recommended that after a good teacher education Programme, the newly appointed teacher demonstrates current knowledge and proficiency in the use of ICT in the following areas:

- Basic operational skills
- Information-technology skills
- Effective use of the internet
- Software-evaluation skills
- Pedagogical skills for classroom management.

Different ICT resources includes

1)ICT based learning objects- It refers to any digital resource that can be reused to support learning.

2)Multimedia Learning Resources- Computer-based multimedia learning environments - consisting of images, text and sound offer a potentially powerful setting for improving learner understanding.

3)Mobile Learning- The terms "M-Learning" and "Mobile Learning" are usually used to refer to teaching and learning with mobile technologies.

4) **The Internet and Social Networking** – Internet is a rich resource for teaching and learning. Web 2.0 refers to a more recent 2nd generation collection of web-based tools, usually involving social networking (sites like face book) and amateur publishing (like blogs and YouTube).

5)Interactive whiteboards, slide/PowerPoint presentations – In most of the schools, interactive whiteboards is used to deliver multimedia presentations in a classroom environment. Presentation software, such as Microsoft PowerPoint or Apple's Keynote, plays an important role in many fields, especially in learning.

The **National curriculum framework 2005** (NCF2005) has also highlighted the importance of ICT **in school education**. It is desirable that affordable **ICT** tools and techniques should be integrated into classroom instructions right form primary stage so as to enable students develop their requisite skills. **Digital learning materials** or e-**learning materials** are study **materials** published in **digital** format. These include e-textbooks, e-workbooks, educational videos, e-tests, etc. Innovate develops e-**learning materials** through the creation of e-tasks and supporting the delivery of existing and emerging e-**learning materials**.

Beyond curriculum...?

Computer tools in education may refer to a complete different line of thinking about the function of ICT in teaching-learning processes. The computer is no longer viewed as means to deliver information but as a tool to extend the cognitive power of the human mind. Computer can calculate much better, and store larger amounts of information and retrieve this information more effectively then human beings. Using the computer as a tool implies that people achieve results that would be otherwise beyond their reach. Including computer tools in education implies that there is a swift from learning from computer to learning with computers (cf. Jonassen& Reeves, 1996). The integration of ICT in learning refers to students entering into an intellectual partnership with technologies (Jonassen, Myres&McKillop,

1996). Learning is perceived as a research and discovery activity guided by the questions of the learner and promoting in-depth understanding. Also the way evidence of learning is given differs widely from traditional paper and pencil tests. In digital portfolio's students presents in hypermedia environment what they have learned. This revolutionary perspective asks for a rethinking of the curriculum concept. In this view a curriculum is no longer a plan for learning to be implemented by the teacher and followed by the students. On the contrary, the learners become the designers of their own curriculum. However, this does not imply that there is no significant role of teacher. Experiences with students surfing the Internet for educational purposes show that they need modeling and scaffolding from teachers. Otherwise they get lost in cyberspace, and, despite all the good intentions, learning turn to a negative and demotivating experience. So the role of the teacher becomes very prominent, because a pre-defined curriculum is absent. But, teachers do not have experiences nor professional routines to guide learning processes in open environments. It seems that teacher need to go through knowledge construction processes with computer technology themselves, before they may develop ideas how productively guide student learning in technology-rich open learning environments. University-school partnerships in which researchers and teachers collaboratively develop and investigate such environments seems to be a viable option to reconcile utopist ideas with down-to-earth practice. The revolutionary character of learning with technology is not only to be found in the role of the learner, but also in the absence of content divided according to the lines of academic disciplines. Especially the idea that students are engaged in authentic learning means that the content is situated in real-life contexts and therefore emphasizes cross-curriculum learning. Tools, such as databases, collaborative workspaces and all kinds of new tutees have the potential to support radical educational change; however, whether this potential becomes reality 11 depends on actions of human beings and not on technologies, how sophisticated they may be. Also the most technologically advanced educational tools may be used in very traditional way.

Biology occupies a unique position in the school curriculum. Biology is central to many science related courses such as medicine, pharmacy, agriculture, nursing, biochemistry, and genetics so on. It is obvious that no student intending to study these disciplines can do without Biology. These factors, among others, have drawn attention of researchers and curriculum planners towards Biology as a subject in the school curriculum (Kareem, 2003). In spite of the importance and popularity of Biology among students, performance at secondary school level had been poor (Ahmed, 2008). The desire to know the causes of the poor performance in Biology has been the focus of researchers for some time now. It has

been observed that poor performance in the sciences is caused by the poor quality of science teachers, overcrowded classrooms, and lack of suitable and adequate science equipment, among others (Abdullahi, 1982; Bajah, 1979; Kareem, 2003; Ogunniyi, 1979). Students perform poorly in Biology because the Biology classes are usually too large and heterogeneous in terms of ability level. In addition, the laboratories are ill equipped and the Biology syllabus is over loaded (Ahmed, 2008; Ajayi, 1998).

Computer plays an important role in different fields of Education. Nowadays, government provides good Infrastructural facilities like Smart Board, Computers, LCD Projectors under the scheme of Information and Communication Technology in Schools (ICT in Schools) during the XI Five year Plan between 2007-2012 to promote ICT based learning (MHRD,2010) and with the effort of teachers, teaching learning process makes effective and interesting.

NEED FOR THE STUDY

NCF 2005 recommends that teaching of science has to be recast so that it enables children to examine and analyze every day experiences, acquire methods and processes that will nurture thinking process, curiosity and creativity. The present text book deals needful concepts are cities expected to fulfill the social expectations in the competitive world. Science education should enable the learner to know the facts and principles of science and its applications, consistent with the stage of cognitive development, acquire the skills and understand the methods and processes that lead to generation and validation of scientific knowledge. The syllabus and content are clearly explained with many examples and different type of illustrations. The problem is making students to understand the concepts in Science in given time and they were express that they cannot deliver display and demonstrate all the content and different type of illustration given in the textbook. So, the investigator planned to organize a training cum workshop for the teachers who are teaching science and develop follow up mechanism for address the issues in teaching science concepts in upper primary classroom. It is aware that the present modern information technology has made are impact on the teaching learning process. The linkage of computer with the day to day activities of the teacher is inevitable. Especially the upper primary teachers should have the ICT skill for effective science teaching. Hence the present action research entitled "**Resolving the Problems in Understanding the Concept of Microorganisms among VIII Standard Students with ICT."**

OBJECTIVES OF THE STUDY:

- To identify and solve the problems which are responsible to minimize the understanding the concept.
- To understand the Microscopic organisms in and around.
- To make them realize that how this Microbes were used in our daily life with ICT.
- To improve the achievement of VIII Standard students in the Concept of Microorganisms.

STATEMENT OF THE PROBLEM:

Teacher's motivation to use ICT in the classroom is at present, adversely influenced by a number of constraints including, lack of time to gain confidence and experience with technology limited access to reliable resources a science curriculum overloaded with content assessment that requires no use of the technology and a lack of subject-specific guidance for sing ICT to support learning. While this technology can in principle, be employed in diverse ways to support different curriculum goals and forms pedagogy. Such constraints have fen stilled teachers' use of ICT in ways which effectively exploit its interactivity. Consequently well integrated and effective classroom use of ICT is currently rare. The investigator found that the teachers are facing issues in making students to understand the concepts in Science in given time and they expressed that they cannot deliver display and demonstrate all the content and different type of illustration given in the textbook. So, the teachers need guidance on using ICT tools in teaching science and the techniques to overcome this issue in future and make science learning is as it is originally designed and fulfills the objectives of science education.But the realization is the important phenomenon while learn the content, so the precise statement of problem is as follows, "Resolving the Problems in Understanding the Concept of Microorganisms among VIII Standard Students with ICT."

PROBABLE CAUSES FOR THE PROBLEM:

Many academic and situational factors were arising as barriers, which are responsible to mitigate the level of learning (Understanding the concepts). Though, the investigator had highlighted some important reasons as follows.

- Lack of proper knowledge about ICT.
- Might have inadequate and lack of interest about the ICTs among the science teachers.
- Teachers might have felt that the usage of ICTs in the class room teaching is difficult part.

- ❖ Lack of interest in the handling of technology.

ACTION HYPOTHESIS:

There is a significant difference between the mean scores of pre-test and that of post-test of students in understanding the concept of Microorganisms.

Or

There will be a significant improvement in the understanding the concept of Microorganisms.

METHODOLOGY

a. DESIGN:

The single group design was adopted for this study.

b. SAMPLE:

The purposive sample consisted of twenty one (35) students (16 boys & 19 Girls) studying VIII Standard in PUMS, Kannamanaickanur, Udumalpet Block in Tiruppur District.

c. RESEARCH TOOL:

In order to obtain required information needed for the study, the following research tool had been used.

A Questionnaire

QUESTIONNAIRE

The questionnaire is of open ended, objective type containing 20 questions, (05 choose the correct answer, 05 Fill ups, 05 matches the following and 05 True or False). The questionnaire was used in pre-test and post-test and to find out the difference in understanding the concept of Microorganisms in Science teaching after the treatment.

INTERVENTIONAL STRATEGY:

The investigator during the school visit and after interaction with the students found that they are not aware about the microorganisms, its types and its role in human being (both beneficial and harmful) and hence the investigator applied suitable methods.

1. **Lecture cum Demonstration method:**

The investigator motivated the students by interacting with them and gave detailed leacture about Microorganisms its types and its role in Plants and Animals. The following points were highly insisted to the students.

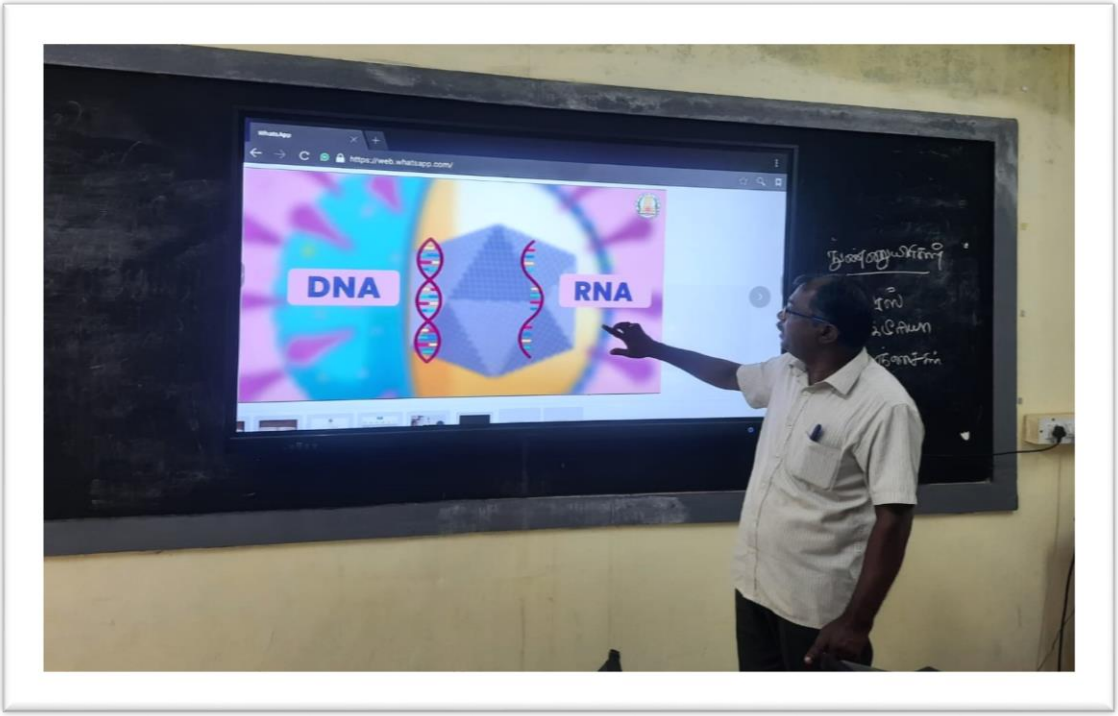
- ☞ What are microorganisms?
- ☞ What do you think microorganisms need to survive?
- ☞ Where do they live?
- ☞ Are microorganisms in our food?
- ☞ Are the microorganisms in our food harmful or helpful, or both?
- ☞ Microorganisms in human being?

The investigator during classroom demonstration assigned the students to collect the details of diseases caused by the microorganisms and its effect in humans.

Lecture cum Demonstration

2. **Teaching with an ICT:**

ICT-based teaching involves the integration of digital tools, devices, and platforms to enhance the educational experience. From interactive lessons to online collaboration, ICT has become a cornerstone in modern education, offering new possibilities for educators and learners alike.



Teaching with an ICT

COLLECTION OF DATA:

The data was collected by conducting pre-test and post-test. The questionnaire developed by the investigator was used as a tool to find out their response related to understanding of microorganisms. The investigator personally visited the school and conducted the test (before and after the treatment).

DATA – ANALYSIS AND INTERPRETATION:

The data collected through pre test and post test from 35 students (16 boys & 19 Girls) among VIII standard students had been analyzed and interpreted. The Mean scores abstained by the students in the pre-test and post-test were calculated. The significance difference between the mean scores of the students pre-test and the post-test is calculated which is the aim of the study.

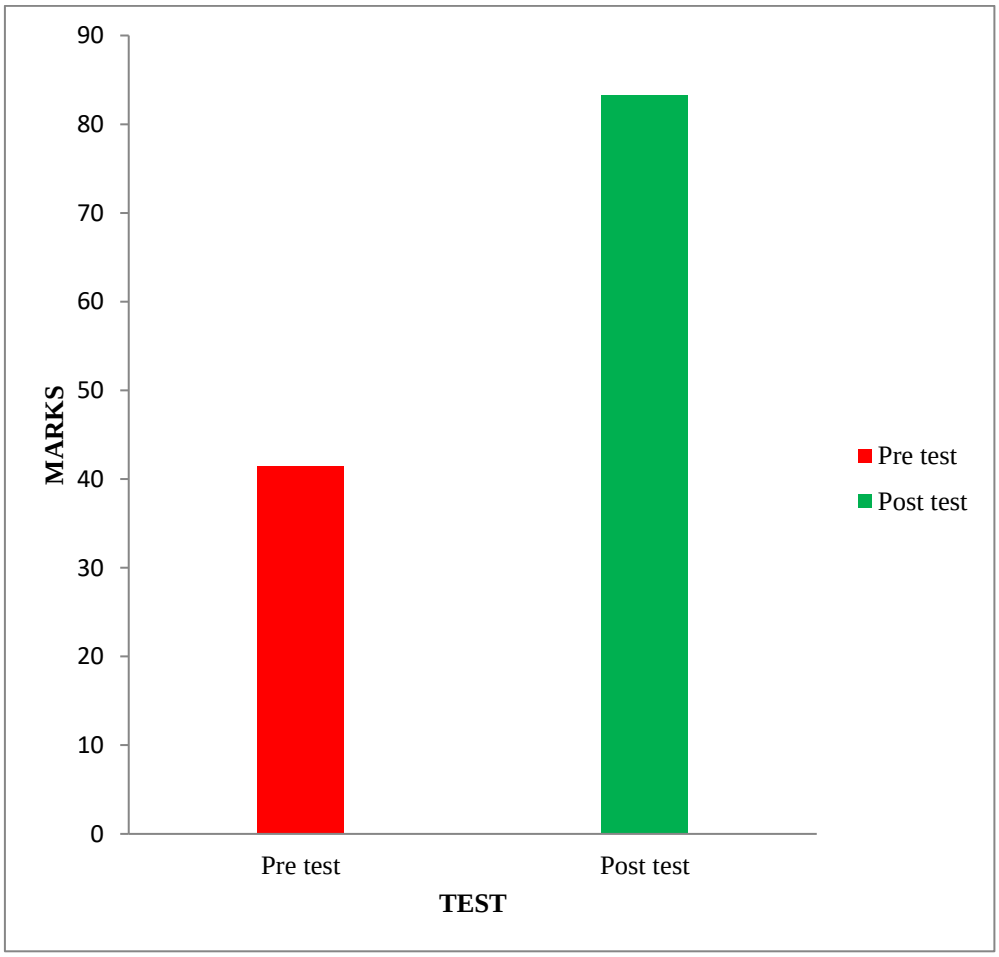
Table.1 **THE TABLE SHOWS THE PRE TEST AND POST OF TEACHERS**
(Marks converted into 100)

Sl.No	BOYS		GIRLS	
	Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**
1	40	90	40	85
2	60	100	45	75
3	35	80	35	70
4	30	80	45	90
5	45	95	50	100
6	50	90	55	100
7	30	80	45	90
8	45	90	60	100
9	45	90	40	80
10	50	100	45	75
11	45	85	40	85
12	30	80	45	100
13	25	70	40	70
14	35	75	40	80
15	40	80	40	75
16	35	70	40	70
17			35	70
18			40	80
19			35	60
Total	**640**	**1355**	**815**	**1555**

Mean scores of pre-test and post-test are presented in the table given below:

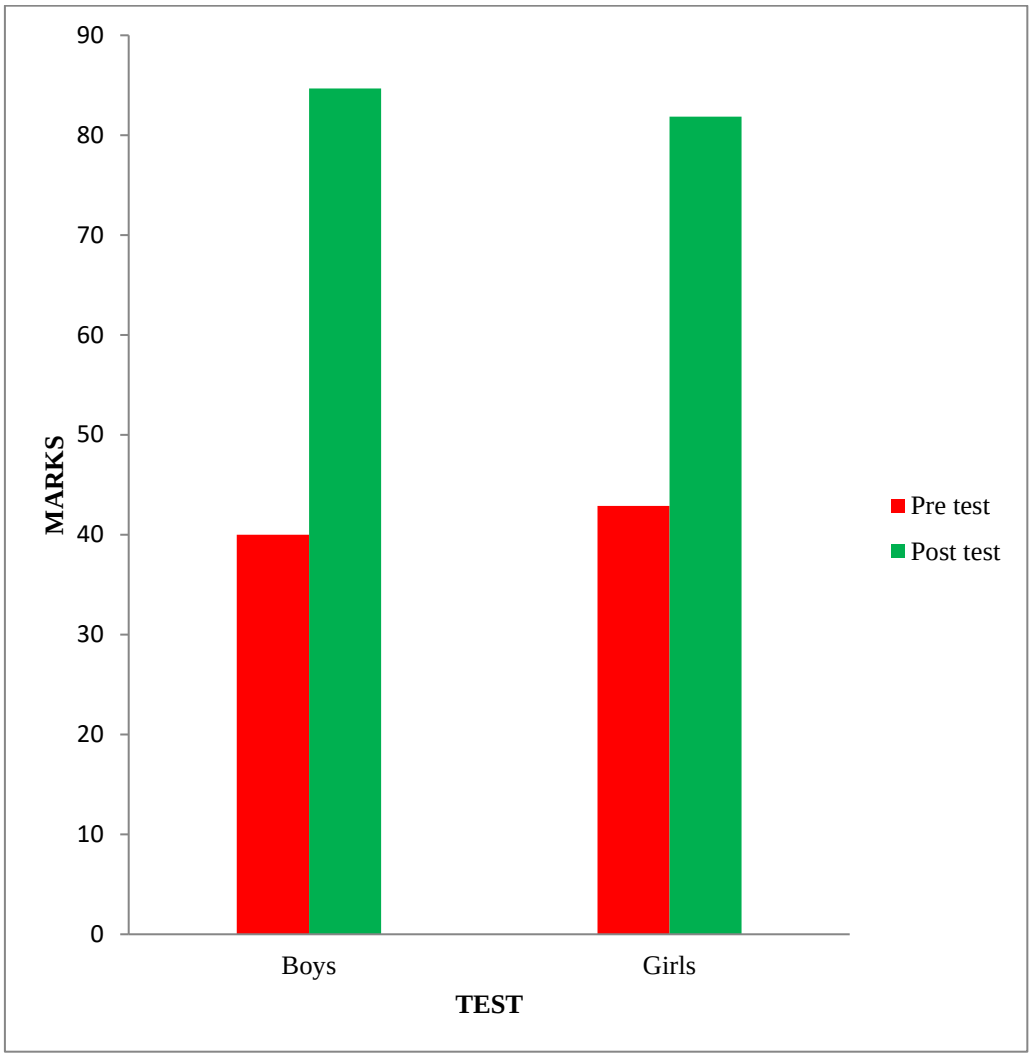
Test	Boys	Girls	Total
Pre test	40.00	42.89	41.45
Post test	84.69	81.84	83.27

Fig.1. The diagram shows that the difference between the mean scores of pre-test and post-test of the students.



The mean scores of the boys and girls student in pre-test and post-test are 41.45% and 83.27% respectively. Hence, the hypothesis is accepted. It is concluded that the VIII standard students has got significant improvement in the usage of ICT in Science Teaching among the upper primary level students.

Fig.2. The diagram shows that the comparison of Boys and Girls of their pre-test and post-test mean scores.



COMPARISON OF PRE TEST AND POST TEST:

In the pre-test the mean score of boys is 40.00%and the girls mean percentage is 42.89% and nearly 3% higher than boys. After the treatment in the post test students reach up to investigators expectation and the mean percentage score of boys is 84.69% and girls the mean percentage is 81.84%. The total means percentage between pre-test and post-test is 41.45% and 83.27% respectively. After the treatment almost all students understand about microorganisms and their beneficial and harmful effects on living organisms and the students had shown good and satisfactory performance in the post.

FINDINGS OF THE STUDY:

After the treatment in the form of demo-classes, training to the students, video classes and make them to participate in the all activities related to the concept there is a gradual improvement among the students in understanding the microorganisms and their useful and harmful effect. Maximum students have shown the expected improvement in understanding the concept.

The mean scores of students in post-test (83.27%) is comparatively higher than pre-test (41.45%), it is concluded that students well understood the microorganisms and their beneficial and harmful effects on living organisms.

- All the VIII Standard students have shown the expected improvement in understand the concept of Microorganisms.
- The mean scores of students in Post-test (83.27%) is comparatively higher than the Pre-test (41.45%), it is concluded that the VIII Standard students were understood well about the Microorganisms.
- The impact of ICT was very useful tool for the easier and effective science teaching in the Upper primary level of students.
- The use of ICT in Science teaching leads to positive attitude of teachers as well as students.
- The use of ICT leads to positive attitude of teachers as well as students towards ICT.
- When taught through ICT to the students feel more involved in studies, which help significantly in raising their achievement level.
- Learning tools and technologies like social learning platforms make it easy for teachers to create and manage groups.
- The teachers have also accepted equip themselves with relevant aspects of both content and methods of teaching (current) and their commitment, which create effective learning.

SUGGESTIONS:

- ❖ At the middle school level for eight standard Microorganisms topic is much wider but when proper and suitable method were adapted this will be possible.
- ❖ Students under this study will openly exhibit their views by actively participating in teaching learning strategies.

- ❖ Teachers should update themselves and should adapt suitable teaching learning strategies according to the content.

RECOMMENDATION

- ✓ Rapid changes in technology will ensure that ICT will proliferate in the upper primary classroom.
- ✓ It is predicted that there will be many benefits for both the learner and the teacher, including the promotion of shared working space and resources, better access to information, promotion of collaborative learning and radical new ways of teaching and learning.
- ✓ ICT also requires a modification in the role of the teacher, who in addition to classroom teaching will also have other skills and responsibilities.
- ✓ The use of ICT will enhance the learning experiences for upper primary children, helping them to think and communicate creatively.
- ✓ ICT will also prepare our children for successful lives and careers in an increasingly technological world.

EDUCATIONAL IMPLICATIONS:

- ✓ As a part of the revised syllabus for classes from I STD to XII STD students have several ICT components and activities in their text material. The new syllabus, which was released by the State Council for Educational Research and Training (SCERT), discussed the need to bring in ICT to make Teaching and learning more enjoyable for the Teachers as well as students to enable them to comprehend difficult concepts, develop critical thinking skills and a technological aptitude.
- ✓ There has been a strong evidence that the teachers under this study openly exhibit their views by actively participated in the teaching and learning strategies of Science teaching with ICT. The teachers have also accepted equip themselves with relevant aspects of both content and methods of teaching (current) and their commitment, which create effective learning.

CONCLUSION:

The use of Information and Communication Technology in science education is still occasional and limited. Almost all of the science subjects are taught by one means or the other of ICT. However, interactive boards are the most prevalent ICT media which have limited the use of other types of ICT elements as it is quite complete and contains adequate content to teach the required science subjects. Although science teachers are not aware of the various internet sources that they can refer themselves or recommend it to their students for further studies they do consult the internet to

update themselves in their field frequently. ICT based assessment methods have been adopted well with open arms by teachers of nowadays. Despite all the enthusiasm about the positive impact of about blended learning, there are still various obstacles faced by schools and/or teachers in implementing ICT in their everyday curriculum. In order to increase the usage of ICT in teaching and to make ICT as an Inseparable Pedagogy the whole educational systems needs to be exposes to the benefits of ICT .The government should promote the usage by providing the services at minimum cost, the management should make ICT as a Important agenda in the vision and mission of the school. Teacher should imbibe all the qualities required for the usage and promotion of the ICT and students should access and enhance their knowledge with various available ICT as their young minds have immense hunger for new knowledge and creativity for their holistic development.

The use of ICT and its effectiveness in different subjects; researcher concluded that ICT is also very useful for the achievement of students in biology subjects.ICT can be used as the supplementary tool by the teachers to overcome the problems of Science like lack of Visualization and it may minimize constraint of education.

ICT can never replace good teacher but it complements them and helps in easier and faster learning of content.

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Web Refernce:

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ANNEXURE

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PHOTOS

Action Research Photos