CHAPTER 6

SUMMARY, FINDINGS AND IMPLICATIONS

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6.1.0 INTRODUCTION

Information and Communication Technologies are defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realising the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system.These will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication devices, radio and television services, web based content repositories, interactive forums, learning management systems, and management information systems. The integration of Information and Communication Technology (ICT) in education has provided more variation in the process of teaching and learning. The function of ICT in systematic teaching and learning in Biology is to achieve the objectives of teaching and learning science at secondary level.

6.2.0 RATIONALE

Present 21st Century's education is student centric education. Students learn from multi sources and for this reason use of ICT & Multimedia is very much essential in educational field and simultaneously. So, present study has great need and significance because this study shows the application of ICT in teaching biology and its effectiveness on the student's achievement and interest.

6.3.0 STATEMENT OF THE PROBLEM

To find out the effectiveness of ICT Integration in class 9 biology in terms of achievement and interest.

6.4.0. OPERATIONAL DEFINITION OF VARIABLES

ICT tools: ICT as a pedagogical tool can be. understood as the knowledge, skills and attitudes teachers embody for best use of technology in their lesson-planning.

Student's Achievement: **Student achievement** measures the amount of academic content a student learns in a determined amount of time. Each grade level has learning goals or **instructional standards** that educators are required to teach. Student achievement will increase when quality instruction is used to teach instructional standards. Student achievement is based on three factors (i) Classroom instruction (ii) Learning abilities (iii) Learning styles

Learner's Interest: Interest is a basic emotion arises through a complex interaction between the user (e.g. the student), the object (language-specific content, non-language specific content, various activities), and the context (the various contextual features of the in-class and out-of-class environment). Student interest in language learning does not develop in a vacuum but in combination with the development of other enduring interests related to various objects (activities and contents). Understanding the interest construct in terms of its various features can help us to create opportunities to stimulate and maintain students' interest for effective learning in a learning context.

6.5.0 OBJECTIVES OF THE STUDY

To determine the effectiveness of various ICT pedagogical tools in teaching biology among class 9 students in terms of their achievement and interest.

6.6.0 HYPOTHESES OF THE STUDY

RESEARCH HYPOTHESIS

The research hypothesis is the actionable hypothesis that will be formulated at the 0.95 level of significance.

HR1.- There will be a significant change in achievement scores and interest of the students after the requisite intervention and treatment is given.

NULL HYPOTHESIS

The null hypothesis provide an approximate description of the phenomena to have rational statement. It is used to test the association between the variables based on rejection or acceptance of the null hypothesis. In inferential statistics, the null hypothesis is a general statement or default position that there is no relationship between two measured phenomena, or no association between variables.

The null hypothesis will be formulated at the 0.05 level of significance.

H01- There will be no significant change in the achievement score and interest of the learners after the requisite intervention and treatment is given.

6.7.0 DELIMITATIONS OF THE STUDY

It is evident that it focuses on the subject biology and applicable only to class 9 students. The study will be confined to a particular chosen school of urban setup based in Bhopal.The study was done taking consideration of the prescribed

syllabus suggested for secondary school education of class 9.The pedagogical tools used were constructed from NCERT textbooks of class 9.

6.8.0 SAMPLE

The sampling technique used for present study was 'Purposive Sampling' because it is applied on class 9 students of a secondary school situated in Bhopal.

The sample comprised of 40 students of a public school.

6.9.0 TOOLS

The research tools were developed by the researcher in order to fulfill the criterion of the research being conducted. Data is collected by distributing quiz and questionnaire. Filled-up questionnaires were gathered and collected for further data analysis to get the output and findings for the research.

6.10.0 PROCEDURE OF DATA COLLECTION

Primary data is collected from the quiz and questionnaire and the results were analyzed using suitable statistical procedure.

The data was collected with the help of research tools. The students were taught with ICT to collect the post-test data.

6.11.0 RESEARCH METHODOLOGY

Experimental research method is used to determine the cause and effect relationship between the variables. It is easier to interpret or infer relationships between the independent and dependent variables as they can manipulate the independent variable and see its effect on dependent variable.

.For the purpose of data analysis, the following statistical techniques will be used:

1. To compare the achievement scores of pre-test and post-test, the mean scores were measured with the help of Paired sample t-test.

2. To determine the level of interest in the subject biology, informal questionnaire was used in which personal statements were recorded for data collection and analysis.

6.11.0 DATA ANALYSIS

The post-test mean score was found to be statistically significant to conclude that after giving treatment to the sample population, they showed improvement in the achievement score. They show more interest in learning through ICT facilitated classroom in which ICT pedagogical tools were used.

6.12.0 FINDINGS

EFFECTIVENESS OF ICT PEDAGOGICAL TOOLS IN TERMS OF STUDENT'S ACHIEVEMENT The *p*-value[4] is .0001 which is less than 0.05 (typically ≤ 0.05) is statistically significant. It indicates strong evidence against the null hypothesis, as there is less than a 5% probability the null is correct (and the results are random). Therefore, null hypothesis is rejected, and research hypothesis is accepted.

EFFECTIVENESS OF ICT PEDAGOGICAL TOOLS IN TERMS OF STUDENT'S INTEREST

The students show more interest in class facilitated with the ICT tools. The no. of positive responses show that they find it engaging and fun.

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[4] A p-value, or probability value, is a number describing how likely it is that your data would have occurred by random chance (i.e. that the null hypothesis is true).
The level of statistical significance is often expressed as a *p*-value between 0 and 1.

There was an effective improvement in achievement scores and interest of the students of class 9 after using ICT as a pedagogical tool. The improvement was measurable and significant enough to conclude that using ICT as a pedagogical tool among students is the need of the hour to benefit students as well as teacher to improve quality of education.

6.13.0 EDUCATIONAL IMPLICATIONS

6.13.1 STUDENTS:

1. **Positive impact of use of ICT** as pedagogical tool in education indicates that teaching-learning process can be more effective in the classroom aided with ICT. Positive impact is more likely when linked to pedagogy It is believed that specific uses of ICT can have positive effects on student achievement when ICTs are used appropriately to complement a teacher's existing pedagogical philosophies.

2. It has been seen to slightly improve student performance on multiple choice, in the subject biology
Students when taught through ICT, has been shown to slightly improve student test scores in the subject.

3. Need for clear goals ICTs are seen to be effective (or ineffective) when the goals for their use are clear.

4. Mismatch between methods used to measure effects and type of learning promoted
In many studies, there may be a mismatch between the methods used to measure effects and the nature of the learning promoted by the specific uses of ICT. For example, some studies have looked only for improvements in traditional teaching and learning processes and knowledge mastery instead of looking for new processes and knowledge related to the use of ICTs. It may be that more useful analysis of the impact of ICT can only emerge when the methods used to measure achievement and outcomes are more closely related to the learning activities and processes promoted by the use of ICTs.

5. **ICTs are used differently in different school subjects**
Uses of ICTs for simulations and modeling in biology shown to be effective.

6. **Users believe that ICTs make a positive difference**
In studies that rely largely on self-reporting, most users feel that using ICTs make them more effective learners.

7. **ICTs interests teachers and students**
There appears to be a general consensus that both teachers and students feel ICT use greatly contributes to student interest in learning.

8. **Use of ICT in the classroom**
Placing computers in classrooms enables much greater use of ICTs for 'higher order' skills than placing computers in separate computer laboratories.

9. The 'pilot effect' can be an important driver for positive impact
Dedicated ICT-related interventions in education that introduce a new tool for teaching and learning may show improvements merely because the efforts surrounding such interventions lead teachers and students to do 'more' (potentially diverting energies and resources from other activities).

10. ICT integration in education generally means technology-based teaching and learning process that closely relates to the utilization of learning technologies in schools. Due to the fact that students are familiar with technology and they will learn better within technology-based environment, the issue of ICT integration in schools, specifically in the classroom is vital. This is because, the use of technology in education contributes a lot in the pedagogical aspects in which the application of ICT will lead to effective learning with the help and supports from ICT elements and components (Jamieson-Procter et al., 2013) elements and components (Jamieson-Procter et al., 2013)

6.13.2 TEACHERS

1. Today, more than ever, the role of educational technology in teaching is of great importance because of the use of information and communication technologies. With the help of various application, the Internet, teachers, and students themselves, they see the advantage in teaching-learning process.

2. Integration of Information, Communication, and Technology (ICT) will assist teachers to the global requirement to replace traditional teaching methods with a technology-based teaching and learning tools and facilities.

3. ICT provides the help and complementary supports for both teachers and students where it involves effective learning with the help of the computers to serve the purpose of learning aids (Jorge et al., 2003).

4. A technology- based teaching and learning offers various interesting ways which includes educational videos, stimulation, storage of data, the usage of databases, mind-mapping, guided discovery, brainstorming, music, World Wide Web (www) that will make the learning process more fulfilling and meaningful (Finger & Trinidad, 2002).

5. Use of ICT in teaching will enhance the learning process and maximizes the students' abilities in active learning (Finger & Trinidad, 2002; Jorge et al., 2003; Young, 2003; Jamieson-Procter et al., 2013).

6. Teachers need sufficient ICT skills to implement the technology and to have high confident level to use it in a classroom setting. Besides, teachers require insight into the pedagogical role of ICT, in order to use it meaningfully in their instructional process (Hennessy et al., 2005).

7. Teachers' role is getting more important especially in usage of ICT in pedagogy which could increase the achievement of the students and interest.