Pedagogy and Technology (ICT) Integration practices in Science to attain the Learning outcomes.

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Abstract- *The Main aims of the teaching and study of sciences are to encourage and enable students to develop scientific attitude, scientific thinking and curiosity about science and the nature. Acquire knowledge, conceptual understanding and science process skills to solve problems and make informed decisions in scientific and other contexts.*

Our past education system is Teachers Centred Learning setting. But now the education lends itself to more Students Centred Learning setting. Thus the transformation of teachers centred to students centred will result in increase of learning for students and make opportunity for learners to develop their creativity and skills.

Thus the Learning outcome are Student Centered setting and it describe the measurable skills, abilities, knowledge or values that students should be able to demonstrate as a result of a completing a teaching.

> Learning outcomes are statements of what a student should know, understand and/or be able to demonstrate after completion of a process of learning.

Articulating learning outcomes for students is part of good teaching. If you tell students what you expect them to do, and give them practice in doing it, then there is a good chance that they will be able to do it on a test or major assignment. That is to say, they will have learned what you wanted them to know. If you do not tell them what they will be expected to do, then they are left guessing what you want. If they guess wrong, they will resent you for being tricky, obscure or punishing.

Learning outcomes help the teachers to:

- Decide, what should we teach?
- Decide, how best to teach?
- Decide how best to assess learning?
- Communicate expectations to students

Learning outcomes help students by:

- Creating a connection between teaching and learning, between teachers and students
- Taking much of the guessing out of the student's attempt to learn
- Enabling them to truly master the content of the subject

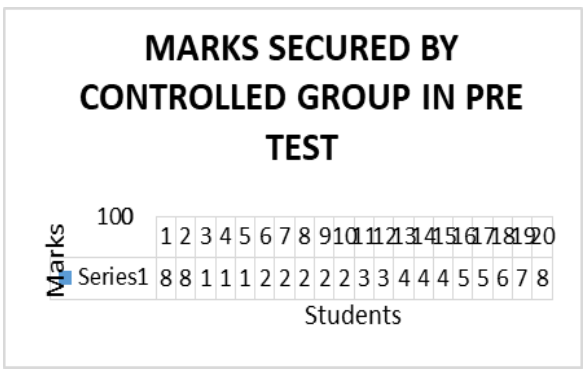
In teaching learning process, I myself experience very difficult while teaching some topic like Cell structure, Atomic structure, Photosynthesis, Frictions, Light and Internal level organs in middle schools and the learning outcomes of the student are not appreciable. I also used different methods of teaching like lecturer method, black board intervention method, still there has been some lag in concept understanding, in this situation a remedial teaching has to be carried out by me. Then I want to teach the concrete topic through ICT to attain the learning outcomes of the students.

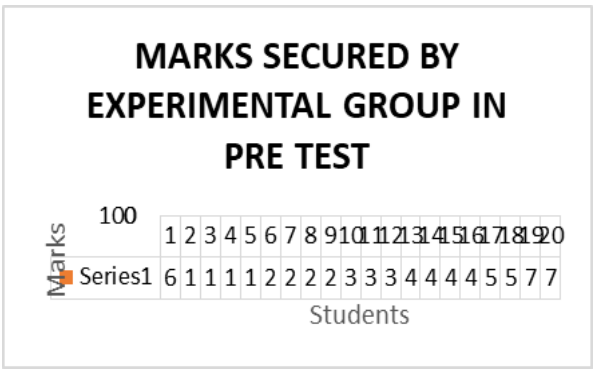
I have taken a model lesson in VII STD- Light to teach using ICT to attain the learning outcomes.

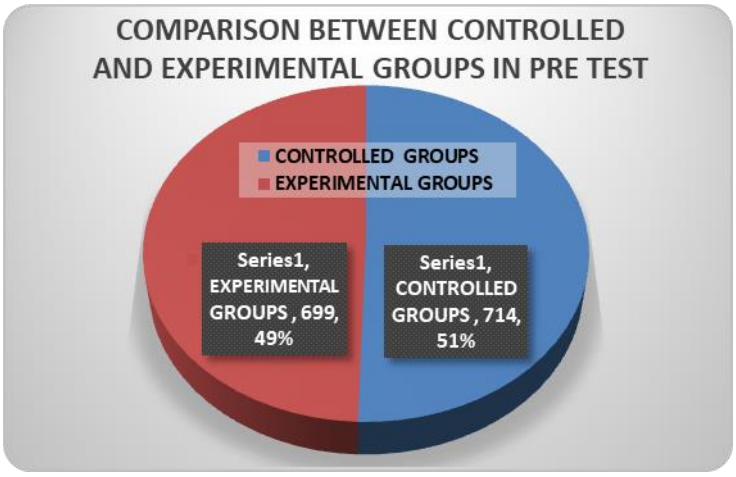
A research is carried out to the students by conducting pretest and post test to measure the learning outcomes. 8th STD with 40 students is divided into two groups. Control group and Experimental group according to their marks secured in the Pre test. In control group there are 20 students. In experimental groups there are 20 students.

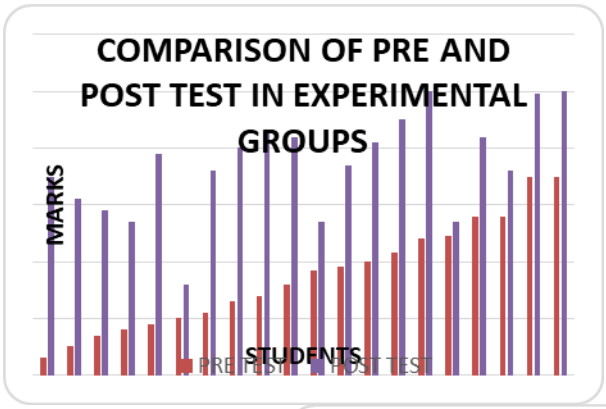
The post test is conducted for all the 40 students. In this it was identified that in my classroom teaching after the black board intervention method, the attainment of the learning outcomes like images formed by lens, converging, diverging, mirrors, Laws of reflection, measuring the angles of incidence and reflection, of the students are very low, for this I have carried out the teaching learning process using ICT among the experimental group students to test the learning outcomes of the students.

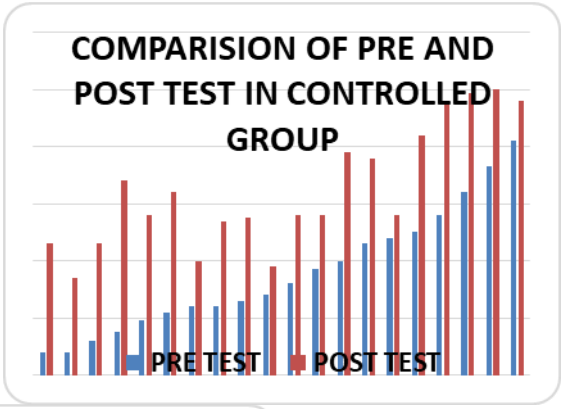
Best performance is observed in the experimental group after research teaching through ICT. Then the research through ICT is also carried out for the controlled group also and finally concluded that….

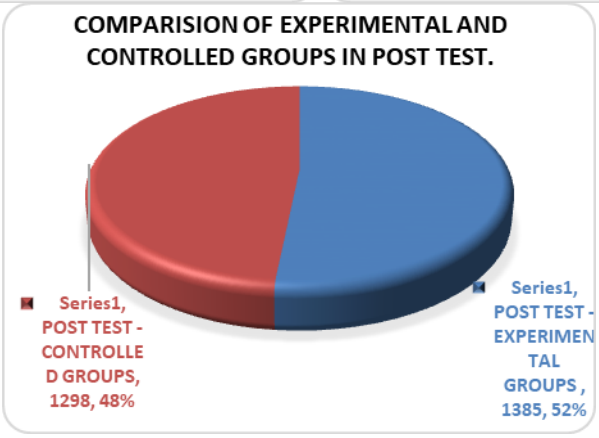












The teaching of science to the students is not just to explain the facts, whereas to understand, to apply and to theorize the environment they are exposed. In this modern period, teacher has to design the methodology based as on the ICT Education and make the students to visualize the theories and principal. Hence I can conclude that the strategies adopted have yield a positive result and increase the students' interest and involvement in teaching learning process. Teaching of science using ICT will give the best performance and achieve the learning objectives among the students and also science process skills like observation, investigating and critical thinking have been increased among the students.

So I carried my work and used ICT tools in teaching science for the Classes VII and VIII STD. The following activities are followed in my teaching learning process integrating ICT.

Virtual Reality Practical's

Science practical's are conducted by virtual reality practical's, like the images seen by microscope are focused and captured as videos and pictures by the cell phone then the videos and pictures are transferred to the laptops and displayed in the projector, so the students are easily able to see the enlarged picture as seen in the microscope.

Virtual reality practicals were conducted to the students by using ICT tools like cell phone, lap tab and projector, Microscope. It helped the students to understand the concepts easily. In this all the students were seen visually with media and easily grasp the knowledge.

For example, the structure of stomata is usually shown by the microscope. In schools we were using simple microscope. But the students were not able to see the stomata structure clearly. In this situation, the images and videos of Stomata structure captured by my cell phone camera and displayed in the projector. This helps the students to had clear view of opened and closed stomata structure. All students are had seen the enlarged images in projector as seen in the microscope. Thus the below mention practical's helps the students attain the learning outcomes mention in the column.

	Practical's	**Learning outcomes**
VIII	Light – Multiple images	Students are able to measure the angles of incidence and reflection.
	Identify of some Microorganisms	Students are able to describes the microscopic structures and their organs
	Plant Cell	Students are able to prepare slides using onion peel and describe their structure.
	Structure of Stomata	Describes the structure of stomata, how the photosynthesis are carried out in the leaves.

Projects are done by using Internets and newspapers

Some projects and assignments works are given to the students to be done by using internet in order to develop cooperative learning, High order thinking skills and Self-learning among the students

	Project and Assignment work	**Learning outcomes**
VII	Uses of mirrors and spherical mirrors	Students can identify difference between the mirrors
	Making of Electric circuit by the Students	Students able to draw and make circuits
VIII	Renewable and Non Renewable resources	Students makes efforts to protect environment and know the difference between the resources

Classroom Teaching

In classroom teaching I had used Projector in ICT lab and Projector in class room, power point presentation and Videos of the concern topics were displayed to the students while teaching for better learning outcomes.

VII	Nutrition in plants and animals
	Basis of classification
	Matter in our surroundings
	Eco system
	Water – A precious resource
	Combustion and flame
	Cell Structure
VIII	Atomic structure
	Air, Water and Soil pollution
	Electricity and heat
	Light

Innovative hands on activity to learn the Circulatory System in human body

The teacher draws five boxes on the floor and labelled it as shown in the figure.

- One student with red colour ribbon is made to stand in box 1.
- One student with green ribbon in box 3
- One student without any ribbon in box 4
- One student with yellow and blue ribbons in box 5

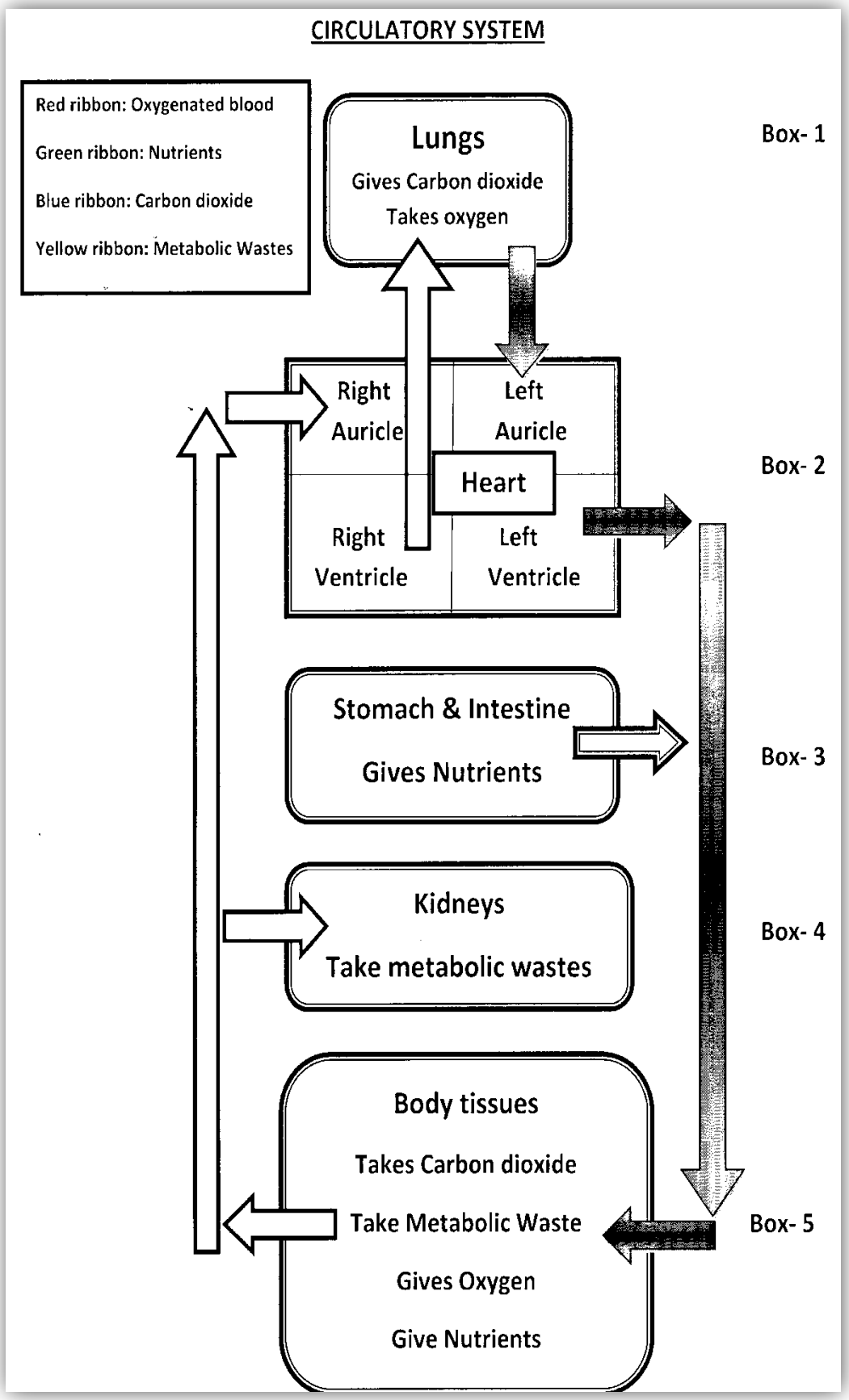
One student from the first box carries one red ribbon and goes to the second box (left auricle) and then he comes out from it and goes to the third box (stomach and intestine) and collects green ribbon from it and goes to fifth box (Body tissues) gives the red ribbon and green ribbon to the corresponding student and collects blue and yellow ribbon from him then he goes to the fourth box (kidney) and gives yellow ribbon to the student and goes to the second box(heart) and jumps with the blue ribbon to the first box. This process keeps on repeating for some more students.

Before starting this, the teacher has to instruct the Students to do this process by saying only the function of the ribbon and not the colour of the ribbon. For example, ": I am having the oxygenated blood, I go to the left auricle and then I collect the nutrients from the stomach then I go to the body tissue, there I give oxygenated blood and nutrients and I collect carbon dioxide and metabolic waste and I go to the kidney to give metabolic waste and carries carbon dioxide to the right auricle and then to the lungs and then I go out from the lungs.

Thus the learning out comes obtained from the above activity are

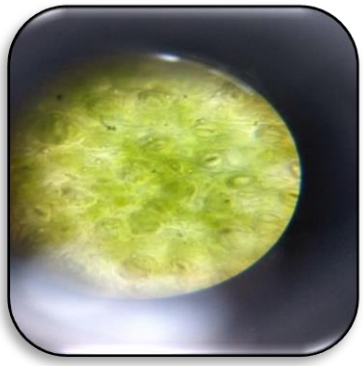
- Students can understand the function of the circulatory system.
- List out and explain the process of circulatory system.
- Links how one organ is interlinked with other.
- Able to analyse and describe the flowchart.
- Able to create a working model for circulatory system.

Like this we can do hands on activity for photosynthesis using colour pens to obtain the learning outcome," writes the word equation for photosynthesis"

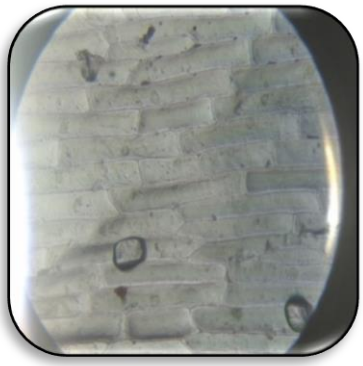

CIRCULATORY SYSTEM
Red ribbon: Oxygenated blood
Green ribbon: Nutrients
Blue ribbon: Carbon dioxide
Yellow ribbon: Metabolic Wastes
Lungs
Gives Carbon dioxide
Takes oxygen
Box- 1
Right Auricle
Left Auricle
Heart
Right Ventricle
Left Ventricle
Box- 2
Stomach & Intestine
Gives Nutrients
Box- 3
Kidneys
Take metabolic wastes
Box- 4
Body tissues
Takes Carbon dioxide
Take Metabolic Waste
Gives Oxygen
Give Nutrients
Box- 5

Structure of Stomata
Virtual- Reality Practical

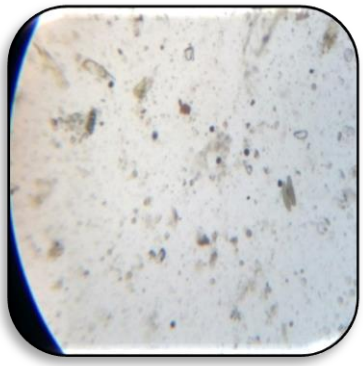




Plant Cell


Identify of Microorganisms


Light – Reflection and Multiple images

Project work
Making of Electric Circuit by the students using Media.

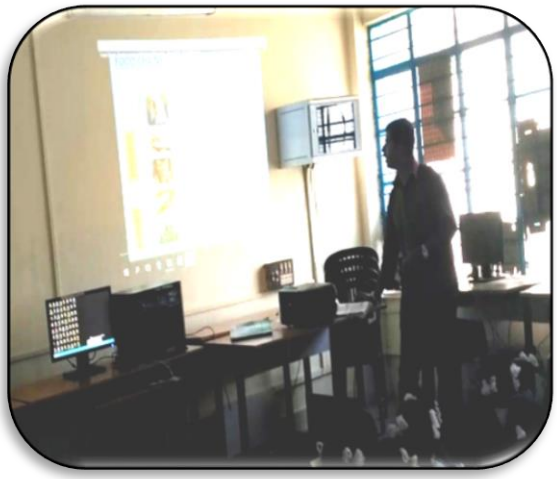
Classroom teaching
Cells -VII

Nutrition in plants and animals –VII

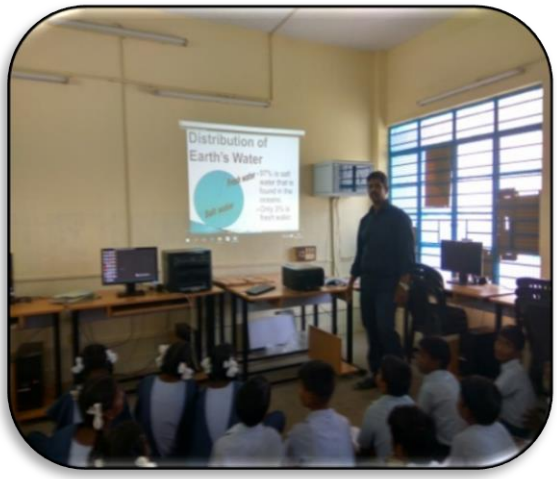
Basis of classification- VII


Matter in our surroundings - VII

Eco system-VII

Water – A precious resource-VII



Combustion and flame – VII

Light- VIII

Pollution -VIII

Atomic structure –VIII

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