National Teachers Science Congress

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Abstracts

of selected papers

Theme

Design Literacy for Effective Science Communication by Educators

Sub Themes

- New and emerging media for effective science learning
- Transition to STEM education
- Science communication for all
- Science learning for sustainable development
- Innovations in science communication

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ST5/053

Science Club as a vehicle to enhance science teaching and learning in Telangana State Model School, Ghanmukla, Telangana

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Abstract

It is a well known fact that students learn joyfully through performing activities than from text books and class room teaching. The conventional system of education does not allow the students to do self expression, independent research, constructive activities etc. In the normal class room, students are restricted to formal learning and the predefined curriculum only. The school curriculum of Telangana State Model School consists of formal, informal and non-formal dimension. The secondary schools in Telangana, give more emphasis to formal curriculum activities. It is generally understood that the first experience of science influence scientific interest in the children. Keeping this hypothesis, this paper presents about the use of science club as a vehicle to promote science activities in Telangana State Model School, Ghanmukla. Science club gives children the chance to do science related activities that gives enhanced experience. Science clubs provide opportunities to explain areas of science not covered by the curriculum and give the club members to get hands on experience. Science clubs carryout regular activities to motivate and educate on latest development in the fields of science and technology. The science clubs organize exhibitions, projects, intra and inter class competitions and group activities. The Science Cub Activities acts as a platform for the budding scientists. As part of this study different science clubs are formed in the school i.e. Biology, Physics and Chemistry clubs. Students actively participated in the activities of the science club.

Keywords: Science club, Curriculum, Co-curricular, Science and Technology, Exhibitions, Projects.

ST5/045

Introducing innovative activities in science and measuring their impact on the interest and achievement level of class VIII students

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Abstract

Science is a process as well as a product. By process we mean a system of acquiring knowledge and by product we mean an organized body of knowledge i.e. theories and laws invented by the scientists. In schools more tress is given on this product part. A student without understanding the principle memorizes the principle and able to fetch good marks in the science examination. This study gives more importance on the practical aspect of teaching science, because learning by doing enhance interest and critical thinking of the students. Therefore, the purpose of this study is to measure the impact of introducing innovative activities on Achievement and Interest of the students towards science. He took 30 students as sample and one group Pre-test, Post-test design for the study. He administered Pre-tests on achievement and interest inventory before introducing innovative activities. Each Saturday in the afternoon students gathered and do the activities followed by discussion. This continued for 3 months. After 3 months Post-tests were administered on achievement and interest inventory. Mean scores of achievement and interest inventory were calculated. Statistic such as 't' test was applied to find out the significance difference between two means (pre-tests and post-tests). I was found that post-test means were higher and significant than the pre-test means of achievement and interest inventory test. Therefore, we can conclude that introducing innovative activities have a positive impact on achievement and interest of the students towards science. So, in schools more importance should be given on activities and practical aspect of teaching science.

Keyword: Innovative Activities, Achievement, Interest, Process of teaching Science.

ST1/040

Impact of visual learning-based teaching module on deaf students in science

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Abstract

This paper presents impact of visual learning-based teaching module for deaf students. Deaf students faced a barrier in learning process and receiving information. In the experiment 20 deaf (age 12 -18) upper primary school students were taken from government school in Agra received visual learning-based teaching module in science. Deaf students who received module performed better in posttest than did in pretest. The result showed that visual learning-based teaching module significant impact on academic achievement of deaf students.

Keywords: Visual Learning, Deaf Students.

ST1/053

Visualization of Physics and Teaching Physics Concepts with Live, Interactive Visuals and 3-D Plotting with Vpython

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Abstract

Vpython is the visual module of python programing language is an easy and open source free software can be used to teach the physics with visuals and 3D plots. We have developed a bunch of programs, covering Projectile Motion, Law of Conservation of Energy and Simple Harmonic Motion (S H M). These OOP (object-oriented programs) explore the concepts, visually, interactively along with instantaneous data measurement, recording and plotting of live 3D graphs simultaneously. 3D graphical, interactive visual exploration is used to gain more profound understanding of underlying physics concepts. We present these programs as a New and Emerging Media for Effective Science Learning and observed the effect and the student's response to this visualize exploration.

Keywords: Vpython, Visualization, Projectile, Law of Conservation of Energy, SHM, OOP.

ST3/052

Combating ill effects of Malnutrition (some strategic learning activities)

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Abstract

The paper focuses on the ill effects of malnutrition and follow up activities to take up preventive measures through experiment conducted by the teacher. He (myself) developed a teaching-learning plan in which both theory and practical activities were incorporated. Now malnutrition related diseases are common among children, women and even adults. In India, the people living below the poverty line hardly ever gets balanced diet. As a result, they fall victim to many diseases. Problems relating to

malnutrition is commonly observed among babies' pre-scholars, school going children and adolescents which tends to retarded growth. The objectives of the study were (1) To generate awareness among the students, family members and community about the ill effects of malnutrition. (2) To develop teaching-learning strategies for class room transaction both in theory and practical activities like growing kitchen garden, taking balance diets and visiting nearby PHCs & CHCs. (3) To assess their performance through evaluation and analysis of the results of pre-test and post-test as an effect of the intervention. It was a double group experimental design. Newspaper cuts, sample of food items the pulses and vegetables were demonstrated in the class in interactive mode through questions. They were asked to interview with selected local people and the Health Workers (Asha Karmi) to acquire basic knowledge about the food deficiencies among the babies and children. Audio-visual aids were exhibited in the class and discussions were made for clarify of doubts. It was revealed from the study that the students underwent improvement pertaining to knowledge and understanding in relation to malnutrition and its effects.

Keywords: Malnutrition, Vitamin deficiency, Kitchen garden, Anemia, regular health check-up.

ST5/005

Journey of Food (Human Digestive System)

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Abstract

In today's society a variety of challenges need attention because they are considered to affect our well-being. There is still an urgent need to make science communication activities more effective, both in terms of quality and quantity. Many of these challenges can be addressed with new innovations, yet they may also introduce new challenges. Communication of these new innovations is vital. Science communication has played a vital role in communicating new technology developments like print media, audio-visual media, folk media, interactive media etc. This communication is more than encouraging scientists to explain their research, making the public aware of and helping them understand technological advances. Teacher is a very important part of education. Teacher is the custodian and architect of student's future. Teachers play a vital role in fostering the intellectual and social development of children during their formative years and ultimately contributing in making them more responsible and aware citizens.

ST1/088

Effect of Developed Instructional Material on Attitude of Pupil Teachers towards Constructivist Approach

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Abstract

The present study investigated Effect of developed Instructional Material on attitude of pupil teachers of Biology at B.Ed. level towards Constructivist approach. So, for this purpose researcher organized an orientation program with the help of developed instructional material. Experimental group get the treatment of orientation of constructivist approach with the help of developed instructional material and the controlled group get the treatment of orientation of constructivist approach without the help of developed instructional material and after completed of orientation program researcher administered the attitude scale to know the attitude of pupil teacher towards the constructivist approach. Statistical analysis reveals that the developed instructional material based on constructivist approach has affected the attitude of pupil teachers towards the constructivist approach. It means if pupil teachers are oriented

with the help of developed instructional material their attitude towards constructivist approach will be tempered.

Keywords: Constructivist approach, instructional material, Attitude.

ST5/052

Innovations in science by Working Models and e-Learning Classes

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Abstract

परंपरागत और आधुनिक शिक्षा पद्धति के समायोजन एवं समन्वयन से विद्यार्थी को शिक्षा देना एक सरल एवं सार्थक तरीका होगा, आज शिक्षक एवं विध्यार्थी के बीच की दुरी को कम करने के लिए E – learning तकनीक एक सेतू का कार्य कर रही है, internet Bases Teaching या वेब लेर्निंग कक्षाओं में श्रव्य एवं दृश्य माध्यमों से बच्चों को कई तरीकों से शिक्षा दी जा सकती है । तथा इन कक्षाओं से बच्चों में पढ़ाई के प्रति रुचि का विकास भी किया जा सकता है ।

ST4/053

Beauties of Ponds- Goa's Monsoon Glory

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Abstract

Give Earth a chance was a slogan given on the EARTH DAY which was first observed in the year 1970. Can we all Indians say' YES' to It. well I doubt it very much. If u see in any Direction we will notice how careless we have been towards the need to conserve our beautiful planet EARTH. Think about the earth and what immediately comes to our mind is beautiful, FORESTS STREAMS, PONDS, LAKES ETC No wonder why earth is called ''WATER PLANET'' These ponds, rivers and lakes is a BOON TO GOA but unfortunately most of the biodiversity of these is endangered. So, our project is on lotus plants and wild flowers. THIS IS A THOUSAND-YEAR-OLD FLOWERING CYCLE AND THESE LOTUS PLANTS ARE EVOLVED INHABITANTS OF GOA AND UNFORTUNATELY A LITTLE attention has been paid to them.

ST1/026

Dynamic Innovative Methods of Teaching Chemistry: Blending Traditional Method with Technology

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Abstract

It is an age of science and technology. The use of multiple illustrations and representations is considered as substitute for present educational needs. This study examined the blending of traditional method of teaching with technology which makes the teaching effective with achievement in chemistry. The sample for the study was from class XI and XII students of school divided into control and experimental group. The control group was subjected to traditional lecture with chalk and talk method and experimental with normal classroom teaching by same teacher supported by multiple representations

approach embedded in the power point lectures- texts, pictures, video clips, models, illustrations, animations and simulations of chemistry concepts and processes of theory and practical. After treatment by the same teacher, the two groups were evaluated by the same questionnaire prepared by investigator regarding topics. To analyse student's achievement by pre to post-test after completing two theory and one practical topic, t test was applied to know p value which indicates whether the method is significant or not. The findings of the study indicate that blending of traditional/conventional teaching along with technology had significant effect on students mean score for theory and practical.

ST2/014

Reference in the field of Science and technology communication/teaching

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Abstract

Sandar Sarukkai has authored the chapter titled Challenges for STEM Education in India'. I had the opportunity of interacting closely with him on the framework of science as a window of opportunity to pursue truth. An interesting take –away from the discussion was about need to consciously adhere to the agenda of science and not tweak it with any personal philosophical agenda. The book has another interesting chapter from the Indian context by Chelluri and Avvari titled 'Corporate Social Responsibility Program me for STEM Education: Cases from the Indian Technology Cluster City of Hyderabad'. The chapter and the Next Generation Science Standards: an opportunity to improve Science Education in the USA'. Is intersection because it lists eight science and engineering practices and seven cross- countries and all levels of learning seamlessly. I often am asked about the pervasiveness of the science and technology in the lives of citizens in all walks of life, especially with reference to the indicators of scientific temper that can be identified or perceived. I have no a railway station balancing heavy weights on his/her head has enough scientific temper to balance it appropriately. They ensure the contents did not fall off and move swiftly with minimal stain. An auto rickshaw driver is able to plough his/her way through heavy traffic without causing any accidents: yet abide by the laws of traffic. The ability to balance weight and drive through the maze are exciting manifestations of scientific temper. This ability to stay focused and deliver the best is true also of cooks, who build on their abilities to deliver the best, without losing their own identity. These capabilities to stay focused and mix and match for optimal benefits can be interesting entry points for dialogues/ engagement with people who pursue their own innate abilities .in this process, it is essential for the communicator to remain absolutely credible in so far as the agenda and the objectives are concerned. It gravitates to one simple human value and that is to respect other points of view and inclusiveness.

ST1/002

New emerging media techniques and tools employed by Science teachers Of Amity International School, Vasundhara

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Abstract

The present study sought to observe some new emerging media techniques and tools employed by science teachers in Amity International School to compare science teachers' report of their classroom practice with their observed classroom practices and also to show the impact of these techniques used in class. An observational study design was adopted for this study. The sample of the study consisted of 21 science teachers from grade 6 – 12. The data collecting instruments were the teachers' classroom practice observation checklist (TCPOC), the teachers' classroom practice checklist (TCPC) and direct observation. The study revealed that the science teachers utilized various techniques, technologies and

tools in their classroom instructions and that there were no significant differences in science teachers report of their classroom practices and their observed practices. Based on the study findings, it was concluded that since science teachers in Amity are encouraged to attend many workshops, seminar and lectures, which make them aware of the latest media technologies to be used in class, they are in line with current research findings and curriculum policies. Also, a comparative study was done to teach magnetism in class 10 using various media tools and it was found that the class which was taught with the media techniques (videos, slides, TedTalks, etc.) could understand better and faster than the class taught by chalk and talk method (control class).

ST4/068

A Study of Differential Ability test for the students of standard IX

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Abstract

Differential ability test has been designed for the students of class IX. The tool consists of 8 abilities such as Verbal ability, Numerical ability, spatial ability, closure ability, mechanical aptitude, psychomotor ability, reasoning and clerical ability. The objective of the study to study the level of reasoning ability of Secondary school students. In the present study, all the students of English medium secondary schools of Ahmedabad, Gujarat were constituted as the population and 1500 students are considered as sample by stratified random sampling. The objectives of the Study is to study the level of Reasoning ability of Secondary school students and to compare the Reasoning ability of male and female secondary school students. Tool in the present study is Differential Ability Test. Method used for research was Survey method. Data Analysis is done by determining Q1 and Q3 to find the level and t-test was applied to test the hypothesis. Findings were Most of the students possess higher Reasoning ability. Male students had more reasoning abilities than female students.

ST2/024

Overcoming the Difficulties in Learning Chemistry by Concept formation through Games

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Abstract

The use of games in teaching Chemistry has been considered by the educators as a motivating tool for the learning of different aspects of chemistry. However, although there are proposals of games that approach several concepts of the discipline of Chemistry, there is no instructional game that addresses the teaching of the Periodic Table. So, we propose the development and application of a game that uses the Periodic Table as a board with elements name, atomic number, valency in boxes arranged in the form of modern periodic table. Then we prepare some cards containing important information like i) valency, ii) compounds of elements in the form AB, AB2, AB3 etc., iii) uses of elements as detergent, medicine in cancer therapy, catalyst etc iv) physical state as solid, liquid and gas and then distribute each student in the class one card. After that we ask students to place their respective card in the box in the periodic table board where they think their card will match. This set will bring the students' interaction with the teacher, making the class dynamic, as well as relating the content to the current context and allowing them to know the position of elements and their properties through tips, answers and explanations. Prior to that knowledge about position, group number, period number, valency will be taught using the names of days of the week.

Keywords: Chemistry, periodic table, valency, chemical bonding etc.

ST5/043

Innovation in science communication by viable technology-Isolation of genetic material

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Abstract

DNA is an acronym for Deoxy ribo-Nucleic Acid it is a genetic material in most living organisms. DNA is a macromolecule with double stranded polynucleotide. It is made up of millions of smaller units called nucleotides. Nucleotides are the building blocks of DNA. DNA was first identified and isolated by **Friedich Meischer** in 1869. In 1953, **James Watson** and **Franklin Crick** proposed the DNA double stranded structure. DNA duplex is the Coil of life. DNA is present in Nucleus, Mitochondria and nucleus of plant genome. The four bases found in DNA are Adenine, Cytosine, Guanine and Cytosine. The genetic material should be stable enough not to change with different stages of life cycle, age or with change in physiology of an organism. The stability of dsDNA form not only on the GC content but also on sequence, and also length. DNA can be twisted like a rope in a process called DNA super-coiling. The expression of genes is influenced by how the DNA is packaged in chromosomes in a structure called chromatin. DNA can be damaged by many sorts of mutagens, which change the DNA sequence. DNA usually occurs as linear in eukaryotes and circular in prokaryotes. The set of chromosomes in a cell makes up its genome, the human genome has approximately 3 billion base pairs of DNAs arranged into 46 chromosomes. The information carried by DNA is held in the sequence of pieces of DNA called genes. DNA contains the genetic information that allows all modern living things to function, grow and reproduce. Modern methods have been developed to purify DNA from organisms such as **phenol-chloroform extraction**.

Key words: Pea, DNA, extraction, super-coiling, genome.

ST1/034

Effective Teaching Learning Methodology of Science

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Abstract

Teaching is one of the ancient cultures of the world. This is a changeable process depending on age, subject, standard etc. Present day demands the transformation of didactic lecture method of teaching to an effective teaching methodology. Effective teaching includes joyful learning, creates interest, attentiveness, high retention capacity, student satisfaction, clearing of knowledge etc. Here is a new experiment in four modules of teaching methodology based on innovative and original idea in science education depending on different types of science lessons: Module-1: Common didactic lecture method, Module-2: Presentation of overall idea and relate with the real-life experience of learner, Module 3: Audio visual presentation through projector, Module-4: Activity learning through practical and demonstration. From the above experiments done on 20 students of Cl-VIII the positive response and questioning after teaching, retention capacity of the students after 15 days of teaching and formative activity during teaching have been recorded and analysed. The Module-3 shows the best result in positive response, retention capacity and questioning of the students. But Module-4 results best formative evaluation. Profuse use of these method in school level science subject by the teachers is enhancing the scientific awareness as well as scientific approach of 5E model of the students.

Keywords: Effective learning, Transformation, Formative activity, retention.

ST1/015

New and emerging media for effective science learning

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Abstract

It is a thing of the past when teaching and learning were restricted to classroom sessions prominent with white chalk, dusters, and blackboards. It is imperative to see that mentors are finding newer ways to strike balance between traditional classrooms and classrooms equipped with digital technology to instill 21st century skills in our learners. I have been equipping my classrooms with various digital platforms and developing a culture of active engagement, curiosity and making learning more interesting for students using various strategies. According to my research and findings, it has been observed that smart classrooms enables the children to reach to their potential by ways and means of targeting individual leaners and differently abled groups. Children are more connected with each other through educational social networking tools to be part of active learning program. The learners are getting an opportunity to be part of virtual tours such as CERN, Nuclear research organization, national Museum of Australia without crossing the physical boundaries and learn so much from the real-life experience. The simulations help them to do more variation than the hands-on experiments without actual use of devices. The online formative tools have created a culture of thinking classrooms where each child reaches to the mastery level of a particular concepts.

ST5/042

The Effect of Teaching Trigonometry through Real Life Applications among Secondary School Students

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Abstract

In this paper a noble method of teaching trigonometry to secondary school students has been proposed. This new method of teaching is based on explanation of real life example and applications of trigometry which are available in daily life and nature to the secondary level students. The superiority of this method over the conventional rote to memorization method has been established by means of practical experiments. The purpose of study was to determine the students' involvement and their interest in learning Trigometry through giving ideas in real life application of trigonometry. Students of class ten from two sections were randomly selected from a secondary school. The mean age of the students was 15 years. Before teaching was started a general mathematics, achievement test was taken for two groups. Two methods were used in teaching, by rote to memorize and by giving example of real life application of Trigonometry. After teaching process was completed, a questionnaire was used as the instrument of the study. Data was analyzed using percentage, weighted mean, median and frequency curve. The study was highlighted and some suggestive remarks on the method of teaching are also given which are based on the findings those practical experiments.

Keywords: Trigonometry, real life application, communication, sustainable.

ST4/086

Science Learning for Sustainable Development

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Abstract

Science learning for sustainable development is a key for future resources procurement. To inculcate the practices of applying science learning for sustainable development amongst students, the present research involved the selection of a global issue of water preservation and building protocols of saving the resources within the school premises by selecting students of secondary school. In order to educate students for a sustainable future, the students were made sensitized about the present problems of water availability in the city as well as globally and in order to foster systems thinking and affective aspects of competencies for science students, we suggested outdoor as well indoor approach that support thinking in a systemic way, feeling interconnectedness with the natural world and understanding social, economic and environmental values of the natural system and developing an intention to act for sustainability. There is a need to re-examine the goals of education and with this, the goals of science education. It is suggested that education for sustainable development has little to do with accumulating a body of scientific knowledge and is far more aligned with the development of personal and social aptitudes leading to responsible student and citizenship.

Keywords: Future resources procurement, building protocols, systems thinking, competencies for science students, outdoor and indoor approach of education.

ST4/024

Study of the climatic changes in our locality

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Abstract

Our mother earth is favorable weather that helps for the survival of living beings in the Universe. We also know that the climate of the earth is getting changed by global warming which is caused by the senseless and irresponsible activities of human beings. In the past 100 years the average temperature on the earth has been increased by more than 0.6^{o} C. though the increase appears unremarkable it changes our world. In the decades in the world is going to face the problem of shortage of food and water due to the changes in the climate. Even our health and lives are endangered. Because of these changes droughts and other natural calamities are occurring frequently. There is possibility of increasing these disasters drastically. So a project has been under taken to make the people aware of these changes in the climate and their consequences and try to minimize the losses by making them partners in the project. To study the climate changes with my experiences gained through MHRD Programme related to Climatic changes a weather station has been established in our school (APJ Abdul Kalam Science Club, Podalakur). The daily temperature, the humidity, the rainfall, rate of evaporation etc. have been recorded and a comparative study with those of district weather center and agriculture station Podalakur collected for the past 10years, has been done. It is observed that the climate changes have been growing gradually. The students in our school and in the neighboring schools have been made to understand, by low cost and no cost material, how the greenhouse results will be, what are the effects of these results and how the ice at the poles is melted due to global warming causing the increases the water level in the oceans and how the coastal areas and the islands are damaged by this increase. A good response was noticed in the students through these activities. Two surveys have been conducted in this project with the cooperation of the villagers. In the first survey the changes in the seasons (summer, winter, rainy, and Kharif and Rabi) for the lost fifty years have recorded by asking the older people in the villages. It was observed that the changes in the climate caused by the changes in the seasons including the Kharif and Rabi and also caused by pesticides used on crops. Because of these seasonal changes the yield in the dry lands has been decreased by 20%. The decrease in the yield of various crops is as follows: Paddy by 14%- 30%, Sugar cane and cotton by 30% - 35%. We were also informed that people are suffering from man diseases such as Malaria, Dengue, etc. particularly in the rainy season just because of the changes in the climate. Through the second survey we were able to find out the role of human beings in causing the changes in the climate and also calculate the number of greenhouse gases we release in a

year. We informed the people of what sort of changes are necessary in their ways of living, through our school children by finding out the quantity of carbon foot print of their families, it was noticed that they had reduced the carbon foot print from 50% to 23% by possessing the right way of thinking. A rally was conducted in the villages so as to explain the climate changes and their bad effects through wall posters, pamphlets and activities of awareness through Swatch Bharath, Swatchthe Seva in this campaign door to door canvass was also conducted. The villagers were advised in this campaign to grow as many trees as possible, to use electricity and water economically, to minimize the use of plastics and to give up own vehicles and use public transport for convenience in the use of plastics in order to minimize the climate changes we discussed about the climate changes with our friends and family members. We are confident that we can minimize the changes in the climate and save our mother earth with the help and cooperation of the teachers, school children, the officials and the voluntary organizations.

Keywords: Climate changes Global warming, Malaria, Dengue, Kharif, Rabi, Carbon foot print.

ST5/087

Presentation of any science concept in innovative way and co-related to our life

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Abstract

My topic is the presentation of any science concept in an innovative way and co-relate to our life. First of all I taught the students about Gravitation that is universal law of Gravitation in traditional method means chalk and talk method. Then the whole class is divide is seven groups each group contents ten to fifteen students. The concept gravitation is introduced through a riddle /sonnet which leads to the topic. Some questions are put to the group relating to their life style of the locality/family. Since most of the pupils belongs to fisherman or farmer/family so I put the questions relating to their family life which directly relates to the topic then I explained the concept with help of some objects available in the classroom or no cost teaching aids. Next day the questions are collected from different groups and tried to be solved by the other groups where ever necessary I helped them to solve. I personally meet the students in different situations like in the playground or when their gossip and discussed the topic in this situation friendly. At last I evaluate both traditional method and my innovative method. Finally, I observed there is far gap in achievements i.e., my method is very effective with respect to number of students and time.

ST5/020

Enhancing Science Thirst in Children

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Abstract

The world is looking for a technically - centred children than with routine skills. We teachers play the important role in finding out the ways to motivate students and promote their Excellency in science. We can ensure this by increasing the students' participation, the youth of today will have a successful tomorrow. Making science lessons lively has always been a major challenge for teachers. It is in the hands of the teacher to bring the science classes intellectual and interesting with the skill of teacher's creativity. Science should always be learnt as the context of real life and not just as mere topics for passing examinations. If the students are not paying attention, it is essential that the teachers should find a way to keep their class interesting enough that the students take in the information by any one of the ways like Creating a simple science experiment, Allowing students to work together as a team, Hands

on activities, relating class content to their lives, make review time fun, etc., Hereby, in my paper I have suggested the few ways in detail given with my own experience as a case study of each to nurture the seed into the students' mind and could wait for a ripe fruit out of it to strengthen the intelligence of upcoming generation.

ST/3/063

School Science Clubs: Impact on Rural Indian Society

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Abstract

Science Club is a place where students and Science teachers work together with pleasant minds. Initially science clubs were started in schools for getting heartfelt participation of children in learning process. It also aimed to improve problem solving skill, creativity and co-operative thinking among students. In the present-day context administrators and educationalist identified school and school children as a living mass media to ignite the minds of all sections of people in the society to think about some of the environment problems, social problems and modern life style. By keeping the above idea in mind, they suggest programmes of school in the society and for the society. For example, conducting rallies, debates. To estimate the impact of science clubs on Rural Indian society we prepared a questionnaire related to recent activities done by three science clubs. To get the opinions we have selected 120 people by stratified sampling technique from six villages. Out of six villages only three villages are accessible to Science club activities. The total sample consists of (1) 60 men and 60 women, (2) 60 people below 18 years old and 60 are above it, (3) 60 are accessible to science club activities (4) 60 people are not accessible to science club activities. After collecting data, we analysed it. From the data it was clear that almost 80% people, who are accessible to science clubs are aware of 75% scientific facts mentioned in Questionnaire, all most all members of this group are able to say at least one slogan. More no. of people said that they have changed some of their habits after awareness brought by science clubs. Where as in other group of people only 10% of people are aware of 75 %of scientific facts mentioned in Questionnaire. Just 23% of people in this group are able to say at least one Slogan related to environment. From the data it is concluded that the impact of Science clubs on rural India is significant.

ST1/112

Project Tab

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Abstract

ICT in education is the key to unlocking the skills and knowledge of our future generation of young people. It is the tool for learning for the 21st century. I hold the viewpoint that Information communication technology comprises a range of tools and system that can be utilized as tool to help us improve our teaching and assist our pupils to learn better. Kendriya Vidyalaya IIT Powai is among the pilot batch of Kendriya Vidyalaya Sangathan to deploy tablet service to class 8th students. The tablets are enabled with multi-device management software that can be used by the teachers to find out whether the student used the tablet at all for studying, what material was accessed and for what duration. The idea is to ensure they not only access the reading material online, but they can also submit their assignments for online evaluation. It will become easier for teachers to evaluate them as tests will be conducted using the tablets so they don't need to spend time checking their copies. The move will not only reduce the burden of the heavy bag but it will enhance learning too. The tablet program wants

students to use technology in their daily classroom teaching. Right from animation, charts and graphs, learning will become more interesting for them. This will supplement the knowledge the students get from their books in the science, technology, engineering and mathematics subjects using technology.

ST3/084

Science and Swachh Bharat

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Abstract

No doubt, India today stands on 5th position economically but its population is increasing day by day. Space of living is limited, urbanisation is increasing. Due to it, there are many problems for dampness of garbage, shortage of water, decreasing of natural resources, devastate in Kerala, U.K, and H.P is due to urbanisation and encroachment of natural land by people's mistake. Science subject is not for the students but it's for all. It has not living in limited area but starts from kitchen and end at universe. So, every citizen of the society should be aware about surrounding. Temperature is rising and our atmosphere is polluted, due to this people are suffering from diseases like heart attack, diabetes, obesity, asthma, cancer, stress, Brain disease is increasing due to all types of pollution. Every day 91Lakh Kg garbage is thrown in ocean. Why we are facing the water crises, eating pesticide food? Why sparrows, frogs, butterfly has been disappeared, as they are our Eco system indicator. How society can contribute to make 'Swachh Bharat. It is not possible to teach lesson on Environment and waste management in school but will have to aware parents also. Unless and until people will not learn, how to mitigate the pollution. Swachh Bharat planning will not be successes, we are not safe outside. We are also not safe in our own houses because our homes are polluted with noise, air pollution due to modernizations. People are suffering from high B.P, asthma in their own houses. We all teachers, students and parents together on one plate form on P.T.A meeting and teach them 3R technique. How can mitigate garbage, save money and live healthy life style by making ''Bio-Enzymes'' Organic fertilizer. How they can reuse and save water for coming generations because ''water is life''? How can fresh air be created inside homes? In 2016, we started to grow own vegetables in school campus than encouraged people to grow own vegetables either in pots or at the roof of their houses. So, they can eat healthy without pesticides. In the next meeting, we observed parents looked happy and stress free. Education is a transformation from one generation to another, so we learnt ''PAPER MESHING' from the old ladies of the village, how to reuse waste paper. In this way, we can clean the environment & success the slogan of 'Swachh Bharat'.

According to Chinese proverb

Tell me, I will forget

Show me, I will remember

Involve me, I will understand.

ST4/014

Orienting the secondary school students about disaster management

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Abstract

This paper highlights the training inputs, process and evaluation based on disaster management. Time has changed due to global warming and related ecological degradation; natural disasters affect people

and the victims suffer from untold miseries with loss of lives. The young students studying in Secondary and Higher Secondary schools need to be oriented on disaster management, who can educate the community in an informal manner. It is learnt from text books of secondary student that how a class VIII student saved the lives of people from the sudden attack of Tsunami which she communicated to her family members and the neighbours and prevented them from going on morning walk on the sea beach and ultimately, they were saved from Tsunami. With this background the Researcher decided to take up a study on titled "Orienting the secondary school students about disaster management". The study was conducted in the school area which is purely an industrial belt. i.e. Damanjodi, NALCO. As there was a forest nearby the students were taken on field trip to know how far the forest helped the people in different ways. Natural calamities like flood, cyclone, tsunami are common now a days and the victims are the worst sufferers. The young students were imparted training on disaster management.

ST4/105

Studying the water bodies in the locality

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Abstract

"Water is life, and clean water means health." - Audrey Hepburn

Water is vital for all living organism of the world. As water is the primary reason for survival, explorations are under process in Moon and Mars in search of water. In Sustainable development goals (SDG) of Agenda 2030, there are 17 goals wherein Goal 6 and Goal 3 speak on water in detail. 30 number of class 8 students from M.T.V.S Government High School, Reddiarpalayam, Puducherry were involved in the Study. It is an urban school situated in Oulgaret Municipality, Puducherry. Audio video on water resources and the common ways of contamination of water were shown to the Students. Students are instructed to explore the local water bodies in person and to take photographs of the same. Students along with the teacher listed the water bodies and selected the water bodies for the study. Conducted field visit to those local water bodies and observed the Flora and Fauna. Listed the pollutants of that water bodies. Water samples were collected from those 3 water bodies in a transparent glass bottle. Students compared the water samples in three parameters viz., Colour, Smell and Acidity. Observations were noted and analysed. This study helped the students to understand themselves about the condition of the water in those water bodies and to take necessary possible action by him and along with his friends and family for safeguarding the water bodies. For attaining Goal 6 and 3 of Sustainable Development Goals, Students, Parents and the whole society will work in hand with the Government. This kind of study will create awareness and understanding on the importance of water bodies to the society through students.

ST5/072

Understanding about global innovation index in infusing excitements of science & technology in schools-A practitioner's panorama

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Abstract

India has silently become one of the world's leading economies with GDP 8.1% and it is expected to become one of the key driving economies in global trade in coming days. Indian economy is heavily

dependent on the development of Science & Technology for which necessary impetus need to be given by educational institutions from time to time. In spite of mind-boggling scientific advances, technological developments our country is still struggling to protect its border, prepare lifesaving drugs molecule, cerate critical infrastructure & innovate alternate method for nonconventional energy sources etc. India is far behind as compared to our neighbouring countries in several counts like Science Citation Index, Human development Index (0.64) world happiness index (133), Global Innovation Index (57) etc. Therefore, the urgency is to rejuvenate our education system as soon as possible. An attempt has been made here to undertake a study entitled "Understanding about global innovation index in infusing excitements of science & technology in schools. A practitioner's panorama" with objective to evaluate the understanding of teachers about the global Innovation Index while dealing with teaching science at secondary level. The population comprised of English medium CBSE Schools of the Gujarat state and the sample comprised of 25 Science Teachers having qualification (M. Sc, B. Ed) with 6 years teaching Experience) working in six CBSE schools of Navsari district of the state Gujarat. The instruments used in this study consisted of researcher made Science Innovation Awareness (SIA) questionnaire. The major statistical technique used is percentage, Intensity Index. Major findings were: problems are inter connected with people (society) and to so solve problems critical thinking is necessary. Suitable evidences and logic can be used for verifying scientific facts and theories and some time it can be challenged also. What is the need is the basis of critical thinking science? The wave of innovation can be created through constructive challenge of present status of scientific information. It means ideas can be generated through questioning existing practices in science. Also, it indicated that questioning is an important skill which can be activated from the beginning of the learning process. Understanding scientific development in world requires reference of reputed science magazines & journals. Attending seminars / workshop help us to keep oneself ready for teaching and research. From the study it was inferred that teachers do not know to challenge available scientific information and its authenticity. Scientific hypothesis formulation technique and its verification technique is not known to teachers. As many as teachers (40%) cannot perceive disruptive innovations in science for which necessary orientation is required. Therefore, more number of training sessions are required for it. Referring cutting edge research in science by teachers brings scientific temper and rigour to our classroom teaching. "How to think" need to enter to our learners' mind in science class and that need good preparation for science teachers to conduct science discussions i.e. "Science process skill" which seems vital for all science teachers. Field work constitute a bigger player in learning process and due emphasis and weightage need to be given to it by the science teacher. Also, more amount of hands on activities to be infused into science classes to ensure curiosity in the subject. Research and development is a continuous process which need to be carried further for which onus lies on teachers. More brain research is needed for innovation in science and science need specific stimuli which is the job of a science teacher. Social media platform is having two side i.e. it may either help students to internalize good thing for science, on the same way it may drag them to go for pseudo-science which is detrimental to learning science that is reflected from recent happenings of "Momo" and "Blue" whale challenge" online games. Human intelligence is superior to artificial intelligence. Artificial Intelligence & Technology may over power us which raises a serious concern over the fact that human being may be slave to machines and those machines will dictate us which is a great concern for human existence. Innovation brings changes in science and technology revolution and brings more awareness towards pseudo – science that is prevalent in our society. Technological development ensures suitable development in products and services. The overall intensity index (II) for the science innovation awareness is found to be 3.2 which seems inadequate to promote scientific innovations for which necessary steps to be taken right from the school level.

ST1/022

Development and Try-out of Educational Programme based on Video Lecture Technique for Teaching of Biology Subject

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Abstract

In 10 + 2 pattern of education and especially in Science streamed standard 11th is considered as an important year for the development of the students' future educational career. Therefore, the present study was conducted on 11th standard students. The present study was an experimental research. The experiments were conducted in total four different phases in order to check the effectiveness of the video lecture method from different point of view. In all experiments 'two groups, only post-test' experimental design was implemented. Here the groups were made equivalent on the basis of their marks obtained in Maths and Science in S.S.C. In the first phase of the present research, the effectiveness of Video lecture method was checked with reference to the traditional method. In the second phase the effectiveness of two different approaches of video lecture method presentation through television and presentation through projection were compared. In the third phase the effectiveness of the video lecture method for supplementary teaching with reference to self-study method was checked and in the fourth phase, as a supplementary teaching method the effectiveness of the order of the implementation of video lecture method and self-study method were compared. For the statistical analysis of the data SPSS programme was used. The finding of the present research shows that the video lecture method and the traditional method were equally effective with reference to Students' educational achievement for the teaching of Biology. The two approaches of the video lecture method presentation through television and presentation through projection were equally effective, and Video lecture method was more effective than self-study method for the supplementary teaching and for supplementary teaching first study through video lecture method and second through self-study method was as effective as first study through self-study method and second through video lecturer. In a developing country like India, when television is more popular and wide spread then computer, this kind of video lecture material can be produced in order to provide the students better audio-visual experiments – this can be said on the basis of the present research. The teachers of different subjects will be able to develop video lecture material and will also be able to take decision related to use it for their subjects by taking the findings of the present study into consideration.

ST3/066

Communicating Science with News paper

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Abstract

Newspaper is the classical medium for communication. In this silicon era there are many developed media for communication, but still the newspaper has an independent role. Now a days most of the news are analysed through Newspaper. Science communication is also possible through newspaper. The better way of studying and communicating science is through experiments. Here is the study of the role of newspaper not only for science communication but also for science experiments. Newspaper act as a good medium for science communication. Most of the dailies have a page in every week for science communication. Contributing to this is the first part of the study. Searching maximum experiments and activities using newspaper is the second part of the study. A lot of experiments is listed using newspaper and other paper. The third part of the study is how this newspaper can be used as a learning aid in the class room. That is this study is the search for finding new experiments with newspaper and to analyse the constructive knowledge created after a set of experiments. Used Newspaper is the economic and eco-friendly material available everywhere. With this we can do many experiments and tip activities in physics and other branches of science. The experiments and activities with paper can be done by everyone as it is no cost. Various activities with paper are listed here. More activities and origami with other type of paper can be done. With newspaper we can create eco-friendly bags and paper pens. It is

a symbol to love nature avoiding plastic. Most of the experiments from Sound, Mechanics, and some experiments from other branches of science can be done very well with newspaper. It is easy to link the

different subjects like STEM using newspaper. Some moral stories and other lecturing will be more powerful if we used paper as an aid. There are plenty of crafts can be created using newspaper. Here is a journey of 50 experiments with newspaper and assessment after a set of newspaper experiments.

ST1/025

Constructivist Approach in Science Learning

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Abstract

Constructivism is a theory of knowledge that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. It is important to note that constructivism is not a particular pedagogy. In fact, constructivism is a theory describing how learning happens, regardless of whether learners are using their experiences to understand a lecture or following the instructions. The theory of constructivism suggests that learners construct knowledge out of their experiences. However, constructivism is often associated with pedagogic approaches that promote active learning, or learning by doing. Constructivism is an umbrella term that includes a number of learning theories. Despite minor variations, each shares a set of core assumptions. Research has established that Constructive learning methods of science teaching have been much more successful than the traditional methods. Teachers can use various strategies to promote and strengthen the students' abilities to think and think about their thinking. To find out the effectiveness of constructivist instruction we have adopted parallel group experimental design. Two equivalent groups were randomly selected from IX standard. One group was treated as the control group and the other the experimental group. Two groups were taught the content, one group through the conventional method and another group Constructivist approach. Pre-test and post-test for both groups were conducted. From the findings of the study it is concluded that the constructivist instructional strategy is more effective than the traditional teaching strategy for improving achievement levels. Implications of the study are discussed and recommendations were given.

ST4/049

A new approach of science learning for sustainable development

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Abstract

Raising awareness about sustainability has been an urgent need for the last few decades. In recent issues of noteworthy journals, natural scientists have argued for the improvement of science education (Alberts.2005, Blumstein, 2007, Kennedy, 2007, Rowe D, 2007). It is acknowledged that science education can works as an important context for educating sustainability. Earlier research on ESD (Education for sustainable development) implementation has mainly focused on educational outcomes of students (Berglund, 2014, 2015) Nowadays current society is faced with a multiple environmental challenge. The aim of this paper is to use science education as a tool to involve the children in joyful learning towards facilitating sustainable development.

ST4/131

Kitchen gardening experiment with school kids as a tool to enhance urban resiliency and climate change adaptation - A case study of Rajkot city

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Abstract

According to the report by (UNHABITAT, 2011) cities produce about 70 percent of greenhouse gas emissions (GHG) worldwide and that if cities are a major part of the cause and are suffering the most impacts, it must play a primary role in finding appropriate solutions. One of the major challenge climate change poses is urban food security impacting urban poor the most. Stark reality of increasing poverty, water and energy crisis would need increasing efforts to mitigate and adapt to climate change and necessary shift to adopt sustainable development. While awareness is its first step, building knowledge base and creating a community who practices city farming / Kitchen gardening not just as a matter of hobby but also as a climate change adaptation strategy by way of micro greening and support food and nutrition security while providing economic security to the urban poor is the foresight. With the ever-increasing influence of technology and virtual world this experiment holds important as it focuses on moulding children as change agents. It not only educates children principles of science and connects it to the importance of greening through practice but also focuses on connecting future leaders back to nature which would hold as an important step in nature conservation as well.

ST1/023

Role of Emerging Media in Enhancing Learning Outcomes

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Abstract

Media are the communication tools to store and retrieve information. These media are gaining popularity both in electronic and print form. These are showing their impact on every aspect of life i.e. people, lifestyle, health, tourism, business or education. With the help of media, information can be disseminated in its real form easily to a large no of people in a very less time. Children of today are well versed of using laptops, desktops, mobile phones, TVs, newspaper, magazines, internet, websites and also desire to incorporate these media in their class room teaching. Now a day's great onus lies on the shoulders of a teacher to find out appropriate media which suit to the needs and necessities of the students and could be easily manageable within the resources of life.

ST4/147

Science learning for Sustainable Development

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Abstract

With ongoing urbanization, over half of the human population now lives in cities. Rapidly growing

cities present pollution hotspots and challenges for resource provision. New approaches to organize social life, infrastructures and research and technological innovation are urgently required. The quest for such new approaches is often framed by 'Sustainable Development', which seeks to reconcile economic activity with social progress and environmental protection. Raising awareness about sustainability is an urgent need and as such education for sustainability has gained relevancy for the last decades. It is acknowledged that science education can work as an important context for educating on sustainability. The goal of the present paper is to describe activity about recycling old newspapers, old books or any type of paper waste. Plastic has become as an inevitable part of our society. Whatever we buy from shop we get plastic wrappers with it, instead of throwing it into dustbin we collecting it and ultimately it helps us to prevent the environment from pollution. This activity helped us to know how it affected students' perceptions concerning sustainability, their degree of involvement and the type of competencies manifested while involved in it. This is qualitative study, adopting an interpretative orientation. Participants were 41students from 8th grade of BGS National Public-School Bangalore. (Average age 13 years old). Data analysis was inductive. This study shows the importance of bridging science and sustainable education. By proceeding this way, students became implicated with the theme under discussion and learnt about the curricular topic 'Conservation of Nature and Natural Resources'.

ST5/066

Communication of Chemistry in the classroom

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Abstract

Science is the pursuit of application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. It experiments and tries again and again, sometimes failed and sometimes success and so bit by bit adds to human knowledge. Today's system of teaching is really challenging. The role of a teacher is to motivate and facilitate children's learning, not to teach them. Children shouldn't be taught, they should learn. The success of learning depends on the way science is communicated at the schools. Of all the subjects, to learn, chemistry is just like an alien subject to study - hard to understand, unable to conceptualize, difficult to handle, tough to score good marks. One of the main reasons is lack of practical and hands on experiments at an appropriate level of learning. The current study is taken up to simplify these entire hurdles.

ST4/079

Hands on Environmental Education for Sustainable Development

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Abstract

Environmental Education should attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, and provide criteria and standards and present guidelines to problem solving and decision making. There are a number of reasons as to why Environmental Education should be included in the school curriculum, these to its scope and appropriateness, pedagogical importance, urgency, feasibility and practicality. Implementation of Environmental Education in schools is major challenge due to different geographic, cultural, social and economic contexts. Environmental Education not merely through books and lectures. In this project Environmental Education to be taught i.e. in a participatory, hands on, experiential way and field trips. Which encourages learners to explore and learn about their environment develops critical thinking, decision making and encourages real life actions and proper utilization of environment. In this project,

we take 50 members sample group of students in class room conduct the pre-test to the group on Environmental Education. In pre-test we asking 25 questions. After pre-test awarded marks to the group

and prepare rank list from 1st rank. Group is division of parallel (half) groups by written test ranks. 1 Group A: control group, Group B: Experimental group we provide 20 Hands on Environmental Education activities to the experimental group. Next, we conduct a post-test to A and B groups together. Pre-& post-test has to be equal weightage, all questions in both papers are to be standardized. Award the marks to all the students and prepare the rank list. We analyse the date with help of statistics. After post-test we observe good response in experimental group. Marks were increase 30% to 65% we apply all statistics tools to analyse the phenomena. The NCF-2005 defined Environmental Science is questioning, children curiously the questions are concealed in Environmental science itself. The hand on activities, in fact, is to find them out. Children to express their own ideas and opinions on Environmental aspects. All the genuine concepts culminate into efficacious Environmental science teaching, make the teaching learning interactions in the class room and field very effective and really become useful for the children to face the life challenges and Environmental superstitions efficiently. The teaching of Environmental science has to encourage children to think and work scientifically. Also, it must enhance their love towards nature. In this project to educate the future citizens who are sensitive towards their responsibility for their environment and are able to take decision that will create sustainable world. In this project we give some suggestions to teachers' scope for future work in 'Hands on Environmental Education' and implementing Environmental Education in school through eco-clubs. We realized that the learning of Science and scientific thinking are not more drilling of the lessons but in fact a valuable exercise in motivating the children to explore solutions to problems all around by themselves systematically and preparing them to meet Environmental challenges properly.

ST3/089

Science Education and Development Model

Deeps

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Abstract

With the world progressing rapidly in the field of science and research, it becomes imperative that the young minds of the country must understand and build a strong foundation of scientific learning so that they become the torch bearers of knowledge and guide the way to advancements and innovations. This thought triggers the need for an effective plan to make science communication for all an indispensable reality. Education should not be considered as a luxury, only acquirable to the privileged but, must be accessible to all in the best way possible for a balanced and collective development of the society.

ST3/028

A study of activity-based teaching science of peer group at secondary school and academic achievement

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Abstract

The purpose of this study was to examine the study of activity-based teaching science of peer group at secondary level and academic achievement. In this study an achievement test (Pre-test / Post-test) covering seven chapters was used as measuring instruments. Depending upon pre-test scores, 56 science students of class 10 were divided into two equal group (n=28) named as experimental group and control

group. The experimental group was taught with peer group activity-based method and the control group was taught by traditional lecture method. Both the group were taught for a period of four weeks (45 minutes period per day) the post test was administered at the end of treatment. The pretest and post-test scones of the experimental and control group served as data for this study. The analysis of data revealed that on whole, experimental group showed better performance than controlled group. Furthermore, the experimental group performed significantly better than control group in the domain of knowledge, comprehension and application. Hence ultimate results of the study indicated that peer group's activity-based teaching was more effective as compared to traditional lecture method of teaching at secondary schools.

ST3/051

Awareness in community about BMI & Academic Performance relation of Std. 9th students in Shrimant Chh. Pratapsinh Vidyalaya, Limb

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Abstract

This study will ease the unscientific belief that most parents & teachers have – the overweight persons are sluggish, lazy & sleepy. Therefore, they would not do well in academic performance at school. This cross – sectional study investigated the relationship between BMI & Academic Performance. MI calculator Sem – 1 written score were used to collect data. Researcher has collected responses from Std.9th Gurukul students of S.C.P.V. Limb. BMI was calculated from each students' height & weight recordings. Academic Performance was determined by each students' mark %age of total of six subjects. Researcher used analysis technique to identify the relationship between both categories. There is lower significant association between BMI & Academic Performance. Students in the normal BMI category had significantly more written scores than students in the overweight category.

ST4/161

Scientific Attitudes among Secondary School Students in Adilabad District in Telangana state-An Investigation

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Abstract

A scientific attitude can be defined as way of viewing things, with a curiosity to know how and why things happen with an open mind and governed by facts. Scientific attitude is governed by factors like intellectual honest, open mindedness and creativity. Having a scientific attitude means accepting only facts that have been carefully verified, together with a willingness to discard old theories that new facts tend to displace. The importance of the scientific attitude is that it leads to truths, and these truths are bases upon objectivity, coupled with a fair degree or scepticism and humility, as opposed to overconfidence and bias. A scientific attitude is also important because it dictates that answers to questions be arrived at through a process of critical and rational thinking. Scientific attitude is solving a problem objectively by using logical thinking without bias. A person views everything around him based on his scientific knowledge. He accepts everything in a scientific background. Scientific attitude comprises curiosity, questioning, making hypothesis, rationality, objectivity, open mindedness, aversion to superstitions etc. as characteristics of behaviour. In the present investigation an attempt has been made to study the scientific attitude of Secondary school students in Adilabad district in Telangana state. The study also tries to find out whether there exists any significant difference between characteristics of scientific attitude between the various subsamples like Gender, Locality and type of management of

school. The sample consists of 160 students of secondary schools in Adilabad district. Investigations used descriptive statistical techniques for the analysis of data.

ST5/128

Mixed punch to tough facts

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Abstract

This research was undertaken to inculcate curiosity, stimulate thinking and develop deep understanding of the topic by active engagement of learners. To bridge the gap between thinking level of teacher and perception of the learner, researcher had created a heterogeneous group of classes 9 and 7students through purposive sampling. A survey was conducted through a questionnaire to detect problematic areas of class 8- chemistry and class6 -biology. Subsequently a feedback was collected from it. Based on it, proper teaching strategy was planned by merging positive aspects of various teaching methodologies to fill lacunae in the way of science communication. In inquiry-based learning, heterogeneous group of learners need to identify problems, frame logical guess for solution. Then tried to prove it which provides environment to construct their own knowledge on the basis of facts collected from tools –hands-on activities, low cost teaching- aids, self-designed experiments, deducting conclusion and provide a variety of activities-experiments, field trip, games etc. which enables learners to adopt the suitable learning style and take the ownership of learning. Flipped learning provides 24X7 hrs accessible information through e-mail, videos which help the learners to learn at their own pace. Also acquaints parents with various concepts, spread science literacy on large scale. Learner's understanding will be evaluated by peer assessment in small groups via co-operative learning.

ST1/046

5-Es Model of teaching with local resources- An effective media for science learning

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Abstract

One of the most popular and quite often instructional models based on constructivist theory is 5E's Model which is developed by Roger Bybee. This study aims to measure the effectiveness of said model for secondary level students with usage of local resources. It was hypothesized that objectives of NCFSE-2005 can be achieved through 5Es model of teaching and students taught through such method would do better in comparison to the conventional methods of teaching. The methodology adopted to test the hypothesis was Experimental Method. Pre-experimental design was selected for carrying out the experiment. Twelve nos. of selected students were taught by Discussion-cum-Demonstration method. At the end of the week an achievement test was administered. After six weeks same practices were repeated with intervention of instructional tool i.e. 5Es Model of Teaching which was the Independent Variable of the study. After completion of every class Rubric for both process and product assessment was prepared to know the extent of understanding gained by the student M.C.Q. & S.B.Q. were used as the measuring tool for pre-& post Test. Recorded scores of the tests were analysed. In order to quantify the extent of variation, scores of pre-& post-tests was calculated by Quartile Deviation method. Result of the study reveals that there is an upward progression in the learning outcomes of the students. Hence the intervention of the 5E model of teaching is effective.

ST5/054

शासकीय माध्यमिक शालाओं में विज्ञान एवं गणित शिक्षण के लिए स्मार्ट क्लास की भूमिका

The role of smart classes on government middle school for science and maths teaching

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Abstract

कक्षा शिक्षण में विषयगत कठिन अवधारणाओं को सरलता से पढ़ाने के लिए आई. सी .टी . प्रभावी माध्यम है। । स्मार्ट क्लासेस आई. सी .टी . इन स्कूल एजुकेशन की एक महत्वपूर्ण योजना है। यहाँ हम शासकीय जवाहर माध्यमिक शाला छिदंवाड़ा की स्मार्ट क्लास में विज्ञान - गणित सिखाने की गतिविधियाँ , मूल्यांकन की प्रविधि एवं प्राप्त अपेक्षित परिणाम का अध्ययन करेंगे। शासकीय जवाहर माध्य. शाला छिदंवाड़ा की स्मार्ट क्लास में सिखाने एवं मूल्यांकन की गतिविधियाँ PPT से शिक्षण- स्मार्ट क्लास के लिए कक्षा 6 , 7 एवं 8 के लिए दो - दो दिन आवंटित है । शिक्षक दिनेश राव भट्ट ने अपनी चर्चित विज्ञान पुस्तक " जानो तब मानो " की पी पी टी तैयार की है। इस पुस्तक में भौतिक की बीस अवधारणाओं को बेहद रोचक , चित्रात्मक और सरलतम रूप में समझाया गया है। शिक्षक दिनेश राव भट्ट ने " रक्त : संरचना एवं कार्य " एवं गणित की विभिन्न अव धारणाओं की PPT पी पी टी तैयार की है। ग्राफिक्स से शिक्षण - स्मार्ट क्लास में विषयगत अवधारणाओं को समझाने के लिए ग्राफिक्स से शिक्षण कराया जाता है। सी डी से शिक्षण- स्मार्ट क्लास में विज्ञान -गणित का शिक्षण एनिमेशन एवं विषयगत अवधारणाओं की लगभग 50 सी डी से कराया जाता है इंटरनेट से शिक्षण - स्मार्ट क्लास में स्वान इंटरनेट कनेक्शन है। विभिन्न विषयवस्तु के वीडियो अपलोड कर बच्चों को दिखाए जाते हैं। कम्प्यूटर में अपलोड पाठ्यपुस्तक - कक्षा 6, 7 एवं 8 की सभी पाठ्यपुस्तकों को कम्प्यूटर में अपलोड कर लिया गया है। प्रत्येक पाठ बच्चे टी . वी . पर देखकर पढ़-समझ लेते हैं। PPT से विज्ञान -गणित का मूल्यांकन & सभी विषयों के प्रत्येक पाठ के मूल्यांकन के लिए वैकल्पिक प्रश्नों पर आधारित PPT सीडी तैयार की गई है। स्मार्ट क्लास की गतिविधियों से गणित- विज्ञान शिक्षण के उपरांत प्राप्त वार्षिक परिणामों की समीक्षा विज्ञान में प्रथम श्रेणी औसत प्रतिशत ¾ 72 % , गणित में प्रथम श्रेणी औसत प्रतिशत ¾ 75.5 % अंत में - इस प्रकार हम देखते हैं कि शासकीय जवाहर माध्यमिक शाला छिदंवाड़ा की स्मार्ट क्लास में विज्ञान - गणित सिखाने की गतिविधियाँ , मूल्यांकन की गतिविधियों के माध्यम से छात्र सक्रिय होकर विज्ञान - गणित में गुणवत्तापूर्ण शिक्षा प्राप्त कर रहे हैं।

ST5/107

Crafting of "FUSION" approach in teaching

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Abstract

School educational system is among the most researched area. Aimed at continuous improvement, these researches have given rise to a number of enhancements subject to their implementation. There have been new reforms, new techniques, and new methods in modern school education every day. While, these reforms have proved to be milestones in achieving the objectives of school education system, at the same time it has given rise to confusion among the practitioners. What exactly is required and how much of every aspect introduced is required remains a dilemma for them. Whatever is required, it should be as per the learner's situation and requirement. This happens only through live and keen observation, experience and exploration. Different concepts of improving learner's education are required to be "fused" together to develop an efficient mix that would propel them towards the objectives of quality education. Fusion is not a completely new method but is an integrated cultural classroom which consists of several methods like, do by mistakes, 17 Minutes theory, use of ICT, Peer tutoring, collaborative learning etc. In this paper, the author tries to confirm her idea when she got lots of improvement among her students while applying "Fusion" for the topic Rational Numbers (representing on number line) a topic covered under Mathematics in class 7 in a school.

ST4/033

Purify Water, Become Water Smarter

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Abstract

My project is based on the sub theme "**SCIENCE LEARNING FOR SUSTAINABLE DEVELPOMENT**". Under this sub theme my focus was on the presence of salts and metals in potable water and simple, improvised bio-filtration methods and technology aided solar water distillers. In the past few years we have seen a rapid change in quality and also quantity of water. This change has affected human community a lot. There is a need to find cause and solution for this problem. My project focuses on filtration of impurities such as iron salts, calcium carbonate, calcium bicarbonate and metals like lead, cadmium and many more in water which led to the ill health and lack of hygiene in the society. Impure water which contains heavy metals and soluble salts have toxic chemicals in it. Intake of these substances causes health problems such as heart diseases, osteoporosis, yellowing of teeth etc. The water can be purified using mechanical, highly technical filters which many people could not afford. In the past few years a rapid change in the methods of filtration of water is seen. Due to the high cost of filters and also some of the filtration techniques tend to demineralize even the salts that are important to the body. So, there is need to bring out simple and easier water filtration and distillation techniques. I have chosen a few bio-filtration techniques and improvised solar water distiller. These methods bring a lot of reduction in the percentage of impure salts. So, I with the help of my students conducted a survey among different localities like Uppal a densely populated area, Nacharam an industrial area, Sagar road a polluted area to find out about source of water and health status of people living there. Gave questionnaires, collected samples of drinking water from those places and tested them in our school laboratory and also, we went to vision labs to check the metal content in the water samples collected. We have consulted Doctors of various fields to find out the diseases caused by polluted water in adults and children's and also about the side effects of some filtration method. From the survey results I found that most the water in these localities have least to medium proportion of salts and heavy metals which can affect the health status of the people in those areas.

ST1/041

Development of ICT based learning material in science and evaluation of its effectiveness at secondary level

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Abstract

In the present study researcher developed an ICT based learning module. It was a kind of self-learning material, which was based on the principles of programmed learning. In the present study an ICT based programmed learning material was develop on the topics "Matter in our surroundings" and "Is matter around us pure" from NCERT Science text book of class IX Students. A Sample of 180 students of class IX was select for the present study. A quasi experimental research design was adopt for the present study. This study involved the dependent variables as -Treatment Groups (Experimental Group Vs Control Group) and independent variable as- Achievement scores of students. An ICT based Programmed Learning Material, Pre and Post achievement tests developed by the researcher. The data was analyzed by using the Mean, S.D. and Analysis of variance. Analysis of data revealed that the teaching with an ICT based programmed learning material was more effective for the students as compared to the conventional method of teaching.

ST5/085

Six easy ways of demonstration of electromagnetic induction

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Abstract

The declining number of students enrolled in physics various level is certainly endangering some prospects. The decline is caused primarily by notion the study of physics is very difficult and student have no grounding in physics concept. This trend is alarming and needs to handle urgently by all of us, especially the academic fraternity. The problem lies with the presentation in the class. The researcher is of the opinion that no single method is suitable for effective subject communication. Mix media methodology for subject communication is found effective and feasible. Seeing is believing has probably the best educational technique ever employed. Students learn most quickly by doing something and seeing something done. It is difficult to surpass the learning impact by the combination of -

LISTENING + SEEING + DOING

Teaching by demonstration is considered to be quite effective as well as successful with the emphasis on the objective to help the student realized how law of physics are derived from. In the paper presented an attempt has been made through low cost apparatus and devices for the students encouraging them to understand electromagnetic induction - laws and some of its application. Notwithstanding the difficulty of facing the risk of deviating from the prescribed syllabus and curriculum, innovation of several live demonstration methods to help student to have their original approach to the laws governing the physical phenomenon. The result of the study shows a significant difference in the achievement of student as compared to traditional chalk and talk method. It is found that this method of demonstration kept curiosity level high stirred the dormant scientific temper in student.

ST5/070

Learning Science through Film Making

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Abstract

Digital video is an exciting emerging technology that can be used in schools to support, extend, or change pedagogy and curriculum outcomes. This paper outlines the results from a recently completed research project that investigated the use of student-made digital video across the class K to XII curriculum in five schools of Bokaro, Jharkhand. This paper particularly examines the teachers' rationales, students' learning outcomes and the ways in which pedagogy was enhanced in the schools through the use of student-made digital video projects.

ST5/127

Innovative methods for learning parts of plants. 1) Root 2) Stem 3) Leaves 4) Flower 5) Fruits and seed

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Abstract

Plants are important because plant provide us food as well as oxygen which is our life. Every part of plant has its own value. On the earth variety of plants are present having different characteristics. So, the students must know that there are some similar properties and some different properties are present in plants. Although every plant and its organs are unique. By the traditional method of teaching of this topic only explanation of plant parts by using charts or by drawing diagrams. Students only listen, there is no active participation of students. Researcher's opinion is that by this innovative method, students have active part in lesson. The role of teacher is side by guide. From collection of samples to study every part of plant is done by using study material in their hands. They can find out variety of plants in their class. While searching for the sample they are curious about the parts of plants. To overcome the traditional method researcher, use this innovative method in which along with study so many activities are done like plantation of tree, making bouquet, floral rangoli and seed ball making. That means view of researcher is not only teaching the unit but also creating awareness about nature. So, researcher's opinion is that this method is very useful.

ST1/014

Response of 7 and 8 grade students towards online assignment work of science through blogger

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Abstract

Students now a day are very much active into gadgets and technology. This should be taken into consideration when thinking about how to attract student's attention in learning. Educators are also encouraged to integrate technology into their classrooms because today's student is exposed to all sorts of digital devices in their daily life. Blogging in science is an excellent way to use the internet. Blogging capitalizes on student interest in the internet. When students are at home then blog is a tool which can help in classroom integration. In this study the Blogger is used for giving science assignment during the winter break of 7^{th} and 8^{th} grade students of Jawahar Navodaya Vidyalaya, Jaffarpur Kalan, New Delhi. Response towards an online assignment was analysed by using google form at the end of winter break. It was found that 145 students given the response out of which 58.6% students liked it very much, while 4.1% of students disliked this platform. 89.7% students used the smartphone to complete this assignment. 18.6% students felt difficulty due to unavailability of internet devices at their home. 65.7% students didn't feel any difficulty in opening the shared link of blog. 50.7% students had taken the help of other to complete the online assignments on blogger. 89.7% parents were satisfied by the online platform of blog as home assignment. 98.6% of the students prefer to work through online assignments for the next time.

ST2/023

Learning the Concepts of Geometry in Paper Folding

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Abstract

Mathematics is an important subject in our school curriculum. But most of the students in our schools think that it is the most difficult subject. One reason for this, it has little or nothing to do with real life. Another reason is the incorrect approaches and processes associated with the teaching and learning of mathematics. It needs to be learnt with joy and delight. Also, it needs to be related with to their real-life situations to create interest for learning. But the concepts of mathematics in the text books are found to

be lack of supportive experiments and often fail to generate concern that may lead to effective understanding of the concept. In this present paper an attempt has been made to develop some paper folding activities for the learning of the concepts of geometry. The paper is also in the suggestion of introducing such activities in the teaching of geometry chapters in the class room. This paper aims to show how a teacher can choose ordinary, cheap and easily available material such as sheets of paper and use them in to very effective learning aids in mathematics. As these activities are child-centred, low cost, interesting and easier to do, it can make teaching-learning of geometry a fun and at the same time instructive. It can also motivate the learners in developing mathematical skills.

ST3/045

Study on what makes biology learning difficult and effective

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Abstract

This study aims to determine the biological topics that students have difficulties in learning, the reasons why students have difficulties in learning biology and ways to improve the effectives of students' biology learning at high school level. For this purpose, a questioner was used to collect the data. The data was analyzed qualitatively and quantitatively matter cycles, endocrine system, hormones, aerobic respiration, cell division and genetics are the most of the difficult part of learning. The main reasons for learning difficulties were the nature of topic, style of teaching, students learning habits and lack of resources. To overcome these difficulties participants suggested some strategies like teaching biology through visual materials, practical work, reducing the content, using various study techniques teaching biology through connecting topics with daily life, increasing the number of biology questions in various exams.

ST5/062

Gamification of interaction of energy and economic incentive in household environment as a holiday assignment of the 7th standard students

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Abstract

Science teaching does not always involve big Lab set up and high-tech apparatuses, however teaching learning process of science could be innovative-in approach by using simple low-cost experimental models. This study identifies gamification as a self-directed literacy model to establish stimulatory tasks thereby achieve enhanced learning and application-based adaptability of the learnt skill-set. Model for gamification comprised of five-step process: "understanding the target student population and relevant context of topic to be taught", "defining learning objectives", "structuring the experience", "identifying the resources", and "applying gamification elements". Target student population in this study was middle school, 7th standard students and gamification task was auditing and reducing electricity bill. Students were explained about the section of the electricity bill comprehensively. Learning objectives were to identify how to lower the electricity bill by identifying areas of reduction of the bill. Students were asked to structure their learning by understanding the house environment and modifications that can aid in reducing the electricity charge. The resources suggested were taking off any gadgets that remain in the socket, insulating the windows and minimizing opening of doors, keeping temperature of air conditioning at a regular level. Students learnt the gamification elements of reducing the energy loss and conservation as the primary endpoint of this teaching/learning model. Students also learnt selection

of key areas of improvement as an economic incentive and lastly, they integrated the concept of energy and economic incentive in their household environment.

ST4/134

Attitude towards science practical among high school students

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Abstract

"To learn science is to do science. There is no other way of learning science."

– Dr. D.S. Kothari.

The research study focused on Attitude towards Science Practical among High school students. Normative Survey method was employed to collect the data through questionnaire by adopting simple random sampling technique. The questionnaire was constructed and validated by the researchers and administered on high school students. The sample size of this study comprises 488 school students, among them 262 were boys and 226 were girls studying in various districts of Tamil Nadu. To fulfill the objective of the study is to assess the Attitude towards Science Practical among high school Students and to find the Attitude towards Science Practical and its dimension such as Demonstration, Experiment, Motivation, Subject Knowledge and Activities among High school Students based on Gender, and Type of school. The results indicate that, the Attitude towards Science practical among High school Students is high in nature. It is also found that there is a significant difference in Attitude towards Science Practical and its dimensions of High school Students with respect to Type of school and there is no significant difference in Attitude towards Science Practical and its dimensions of High school Students with respect to Gender.

ST4/128

Blended Learning to Promote Education for Sustainable Development

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Abstract

Education for Sustainable Development is a visionary approach to education that seeks to help students better understands the world in which they live, to conserve, protect and restore the health and integrity of the Earth's ecosystem, knowing that they can play a role in addressing the complex and interdependent problems that threaten our future. This Paper explores how students develop their understanding and apply that in real life situation to improve quality of life and their environment. It describes a case study that was implemented in K.V.2 Bhopal with the participation of 41 students of grade VIII over a period of six months, specific changes in the pedagogical practices were planned, pertaining to the content, time, availability of resources, objectives of NCF etc. The instructional design incorporated extended learning beyond classroom walls implementing a seven-stage instruction session. Every stage is evaluated using Rubrics, concept test, knowledge survey and formal assessments. The blended learning environment has been created to develop critical and reflective thinking in the pupil, which is one of the key skills within education for sustainable development as it requires a shift in our thinking and impact our decisions and actions. Children construct knowledge by connecting new ideas to their existing ideas based on how things are presented to them. They become enthusiastic and actively engage to investigate and understand the world overcoming real world problems. They also enable to present information in more dynamic, compelling and interactive way with engaging environment.

ST4/076

An Investigation into Water Quality Assessment and Some Activity based Project Work with Reference to Ecological Significance

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Abstract

In the present education system, Sarva Siksha Abhiyan, DPEP, Secondary Education Program of Action POA-1992, Kothari commission, New Policy 1986 suggested some activity based enjoyable programme learning by doing activity programme in education is necessary to aware about the environmental problem related with our surroundings. To put emphasis on water quality available at our district, students contributes their responsibility to participate in the team find what types of water available at our environment. To know how about BOD, Cod, PH, Salinity, Acidity, Impurity, Conductivity of water with reference to chemically, bio chemically elements in our drinking water and hardness of water. To know all this parameter of our surrounding environment children of senior secondary school of our academic field visited 20 views from villagers, members of Gram panchayats, farmers, officers of Gujarat Government agriculture field and teacher to found various answers about water qualities and after got 1000 views from various gained some innovation finding and apply such useful suggestion to improve water quality assessment. To find various data by collecting innovative information by tools and techniques used are questionnaire, inventories, interviews, and observation. With the use of various computer programs like NRT 2010, QB 2013 we found out the average value of facility value, standard deviation and reliability. By doing this activity-based project work (experimental action research) of senior secondary students gained tremendous virtues related to our local environmental problems related to a water quality.

ST4/064

Introducing importance of Sustainable Development Goals to students through teaching

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Abstract

Sustainable development goals (SDGs) have set the 2030 agenda to transform our world by tackling multiple challenges humankind is facing to ensure well-being, economic prosperity, and environmental protection. The SDGs provide a holistic and multidimensional view on development. The most important thing is how to develop, principles of SDGs in young generation especially in teenagers to obtain a better future. My work is based on the continuous teaching of SDG principles through academics, visual learning and with the help of different surveys and activities. Nevertheless, what will be the outcome we should try to spread SDG principles as possible as and try to achieve them through our daily and work, this theory is always motivating and helping. I could achieve only some of the principles successfully because overall it is a tedious task to teach all principles through teaching. Improvements in my work and more integration are expected.

ST4/013

Water Sustainable Literacy Campaign

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Abstract

Groundwater is a valuable resource both in the United States and throughout the world. Where surface water, such as lakes and rivers, are scare or inaccessible. The volume of ground water in storage is decreasing in many areas of the United States in response to pumping. Ground water depletion is primarily caused by sustained groundwater pumping. The water shortage problem is the lack of sufficient available water resources to meet water needs within a region. It affects every region and around 2.8 billion people around the world at least one month out of every year. More than 1.2 billion people lack access to clean drinking water. India's groundwater depletion is a national crisis. More than half of wells show declining groundwater levels. The challenge is particularly acute in northwestern India, where baseline water stress is extremely high, Water problems involve caused by water shortage, water stress and water crisis. The relatively new concept of water stress is difficulty in obtaining sources of fresh water for use during a period of time, it may result in further depletion of available water resources. Water shortage may cause by climate change, such as altered weather pattern, increased pollution, and increased human demand and overuse of water. The term water crises noted a situation where the available potable unpolluted water within a region is less than that region's demand.

ST5/012

Flip Side of Conventional Learning: A Comparative Study between Conventional Teaching and Flipped Learning Methods

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Abstract

Age old traditional methods of teaching learning are giving way to innovative methods like flipped learning. Availabilities of online contents to teachers and students alike have brought this revolutionary change. This study was done to analyze the effectiveness of flipped learning over conventional learning in the subject of Biology. (1) To compare improvement between conventional learning and flipped learning groups. (2) To compare improvement between two different approaches in flipped learning groups. Total 40 students were taken 20 students were Taught by conventional method. The flipped method group was further divided into power point and poster group of 10 students each. A pre-test and post-test were conducted to each group. Means score was significantly higher in the flipped method group than Conventional group (p=0.000). The difference between mean scores of pre-test and post-test in flipped learning was significantly higher than the difference in mean scores noted in conventional teaching. However, difference between the two mean scores of power point and poster presentation was not significant. Flipped learning seems to yield better results than conventional learning.

Keywords: Conventional learning, flipped learning, power point, poster

ST4/118

Hands on science is an effective tool in science communication

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Abstract

Children, especially younger ones, learn science best and understand scientific ideas better if they are able to investigate and experiment. Hands-on science can also help children think critically and gain confidence in their own ability to solve problems. ... But, hands-on science can be messy and time consuming. The purpose of this study was to investigate how an experimental-based curriculum that tied scientific concepts can help students. Students of 5th and 6th class understand concepts of root

system, property of Acids and Bases, sublimation, states of matter, types of motion, principle of thermometer etc. as well as increase their technological literacy. In addition, our goal was to increase our knowledge of pedagogical strategies that can help facilitate students learn the process of design in the upper primary school level (6th, 7th & 8th classes). Initially directed the concepts to the students of MPPUP School, Juvviguntapalem of Kavali & MPPUP School Ramachandrapuram of SPSR Nellore District of Andhra Pradesh and collected data during a four-day science camp for 150 upper primary school students from diverse economic and racial backgrounds. Data was collected through questionnaire and group discussions at the end of each day of instruction, as well as students' pre-posttests. After careful observation, Findings indicated significant improvement in students' capability to connect the scientific content, knowledge of basic concepts in general science as well as improvement of some technological literacy skills. Whatever it may be Hands on experience is an effective tool to communicate the scientific concepts among the school students.

ST4/044

Desertification!! Are we Responsible? Is It Reversible? How Can We Contribute?

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Abstract

Desertification is a menace faced by the whole world today. We are progressing in the field of science and technology in leaps and bounds, So, there has risen a competition between countries based on who is the more developed and tech savvy, as a result of which everybody is in the race to supersede the so-called developed ones. While bringing about development, sustainable paradigms are overlooked, which results in environmental problems. If this is not checked, then Earth, the elixir of life, will turn into inhibitor of life, though, we are standing on the verge of destruction, we can still try to amend our mistakes and once again with cooperation bring back the past glory. Use of seed bombs is a positive step in the right direction. Hence, it is imperative that future generation makes a scientific study by experimentation and observation and find the facts for themselves. Learnt lesson the gets etched in the memory of young minds, shows up in their thought process and compels them to make a sustainable decision in all their endeavours. An effort was made in this direction by arranging a seminar for students followed by enquiry method to gather data, which proved to be fruitful.

ST1/010

Teaching of science using virtual reality practical and media

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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 and curiosity about science and the natural world. Acquire knowledge, conceptual understanding and 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. In this technology world, teaching learning process should shape the need of the individual fulfilment and sustainable development of knowledge. This can be achieved by using Media (Students Centred Learning) in science teaching. In teaching learning process easy in science, I used the following activities using media and Resources for classroom teaching, Practical's and Assessment.

ST4/155

Impacts of activities-based teachings on the learning efficiencies of students of class-VII in VKV, Ziro, Arunachal Pradesh – A comparative study

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Abstract

In fact, all teaching and learning processes involve the communication of ideas, through sense perception, through the medium of speech and through learning-by-observing/doing in Science Learning. Hearing and seeing are more important in this respect. Our sense organs act as gateway of knowledge. But by observing and getting on hands-on-experience, we learn quickly. So providing direct experiences in education to the children is necessary. This helps in completing the triangular process of learning *viz*. motivation, stimulation and comprehension possible. In my study, the same is tried with the students of Class-VII for learning their Science through various activities of observation, performing by self and on hands-on-experience. There are nine chapters chosen from their Science Textbook and they were taught with various possible activities of the concerned chapters. They were assessed their learning through pen and paper tests, which were conducted in two phases *i.e.* with science activities undertaken and without science activities undertaken. Overall, the outcome of the study is highly positive and encouraging as the students performed better irrespective of their heterogeneity after undergoing various science activities in comparison with chalk and talk method of teaching.

ST4/011

Making Interesting Activities in Trigonometry in Class 10 and Verifying its Result

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Abstract

Math fear is global phenomenon. Research shows that more that 85% students fear mathematics. They fear mathematics because everybody around them tells that math is difficult. People around them narrate their stories how they used to bunk mathematics classes and score pass marks in the subject. They even go to the point of telling that even today they are very poor with mathematics. The environment around them makes it more difficult and students develops a mindset that math is difficult. Mathematical activities like puzzle, game, project is very useful to develop interest in mathematics. Here is the research paper in trigonometry of class 10 students. Researcher teaches one group with the activities and one group without activities. He compares the effects of the interesting activities. In this study there are not achieved remarkable change in the marks of the group learned by the interesting activities. Students like such activities, so teacher performs such activities in unit wherever possible in the unit.

ST5/088

Unleash the Math Magician in You

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Abstract

Math is one of those subjects that is very crucial to learn. Its concepts are applied in almost every area of life – many problems can frequently be solved through the application of math concepts; thus, it is

commanding to learn and understand how to solve math problems. Moreover, math problem-solving skills and strategies can help to foster accuracy and inspire confidence. The state of a student's math development as they begin school determines what they must learn and how to achieve mathematical proficiency.

ST4/043

Science Teaching through Learning by Doing Followed by Social Media Need for Effective Education, Maintain Sustainability

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Abstract

Science is a form of knowledge and technology as a form of activities. Science is concerned about general explanation of reality; technology is concerned about finding workable solution to practical problems. Traditional method of teaching science and mathematics has no use in day to day life. It is only rotting and rotting and vomiting in examination hall. In secondary level the student is of 15 to 18 age group. They have curiosity in mind and ability to exercise their brain in solving the problems. So, the laws, theories and formulas reading in Class room should be given scope for practical utility. The students should guide accordingly and encourage them to prepare different devices in class room situation. The Devices should be low cost and general utility in day to day life. The world is vast but now days it seems to contract to a great extent and we can easily reached to one corner of the globe to the other corner with a fraction of time though social media, and internet. So, through the use of social Medias like, Face book, WhatsApp group, you tube, Google etc. We can send our message, our invention our findings & achievements to other easily. Hence one smart phone can crake your life may smart and more comfortable. My findings are based on general laws, theories and formulas of the course and curriculum of class IX and X. The devices are prepared by the students under my direct guidance. After going through the theoretical teaching, I always try for its practical utility in the society. After my findings test the device for its long-term effect. After that I sometimes visit to the nearby villages with the students to orient the villagers' bout our projects. We also create WhatsApp group and school website, and school Facebook to inter link with each other and for wide spread. In my project I stressed upon learning by doing, and science should be utility based as per the need of the society. The intermix of science & technology create interest among students, pave the way towards the new invention and creates scientific attitude of mind and self-dependent world.

Keywords: Science, Technology, Intermix, Secondary level, Handsome Device Machine, Social Media, Theory & law, Self-dependant.

ST4/056

Effect of Activity based Teaching Method in Science

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Abstract

This Research paper is based on the study conducted to find out the effectiveness of activity base teaching method on the learning of science students. The purpose of this research paper was also to explore the linkage between teaching technique and student learning. In this study, the post-test was taken. This was based on two chapters on the text-book. Students were divided into two groups; this is experimental and control groups. Each group was consisted 25 students. The control group was taught by lecture method; and experimental group was taught by activity base method. The duration of teaching

for both the groups 30 minutes per day for 15days. At the end the post test was taken. The data of the study was get compared with both experimental as well as control group. The data shows that the performance of controlled group is less effective than experimental group. There was significant difference between the performance of experimental group as compared to control group with reference to knowledge, comprehension, application and skill. Overall, the findings of the study show that the activity-based teaching was much effective than lecture method.

ST1/087

A study on effectiveness of GeoGebra software in learning geometry concepts in mathematics at secondary level students

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Abstract

The rapid growth of technology for learning includes the introduction of educational software. The use of technology in the pedagogical process is growing at a phenomenal rate due to the vast availability of gadgets. As a result, educationists see the urgent need for integrating technology in students' mathematical activities. Therefore, the purpose of this quasi experimental study was to investigate students' understanding in learning geometry concepts using GeoGebra. However, rare reports were found that provides evidence on the effectiveness of this software. This study investigates the effectiveness of using GeoGebra software on Mathematics learning among 82 students in Warangal. Results show that students have positive perception towards learning (m =4.26) and have better learning achievement using GeoGebra ($p < 0.05$). Available free online, GeoGebra can benefit students Mathematics learning and diversifying learning geometry concepts in classrooms. The over flown of resources triggered students' interest to learn Mathematics however, the selection of software has to be properly planned.

Keywords: pedagogical process, geometry, geogebra, secondary level, mathematics.

ST1/109

Use of ICT to resolve difficulty in Integers

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Abstract

This research study tries to cover a very crucial problem of learning difficulty in Mathematics for Upper Primary students, especially in case of Integers and their operations. I observed that they found difficulties in understanding number line, negative integers and operations with integers. Even though the teachers are trying hard to teach them by drawing number line in blackboard, still the students found hard to concretize the concept of integers and to perform the operations (addition, subtraction, multiplication and division). If the students got promoted to upper classes without clearing the concept, they got stucked in some point of learning mathematics and science. That is why they become less attractive towards Science and Mathematics and this is how we get very little number of students in science stream. This project is the part of research using Mixed (Qualitative and quantitative) approach involving 91 students of 4 schools having different type of learners including first generation learners, tea garden students, minority students and urban students of class vi. This research shows the impact of use of ICT and TLM like "Number-Comb Model" in understanding number line, negative integers and performing operations with it. To overcome the challenges and to equip the students with greater

knowledge of Integers I have started this project. I created a model from trashes named "Number-Comb" model and showed them the number line and teach them how they can perform operations of integers (Both positive and negative). To make this process more attractive I took advantage of ICT and cloud systems because ICT in education is a very effective way to transacting a class. It makes learning very interesting to 21st century learners. So, first I built the model and uploaded the creation video to YouTube. Then we showed the video and practiced them with hands on activity. As they built their own model and able to explore themselves our STEM approach worked and in the final assessment I got the improvements.

Keywords: Number comb model, Integers, operation with negative integers, TLM, ICT, Cloud system.

ST2/031

ICT in Evaluation- A comparative study of PEN PAPER & ICT based exam at school level

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Abstract

This project is an effort to include ICT into evaluation procedure as for today efforts are done only to include ICT in instruction for imparting education so as to bring more clarity of subject resulting into good learning. The objective of including ICT in evaluation is to prepare students for future exams both mentally and skill wise as major exam. are held online and at the same time reduce the time wastage that happens due to marking of bundles of sheets and this also becomes environment friendly as it results into lesser use of paper and saving time by auto evaluation and at the same time it concerned teacher will be well acquainted with diff. ICT based tools available to him.

ST3/038

Sensitising the local community through Literacy Cards on Science about the occurrence of some common diseases & preventive measures.

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Abstract

The study highlights the cardinal points with brief description of the common and severe diseases that the people encounter during their life time. It is because of their ignorance and carelessness. The Researcher took an attempt to sensitise the normal people regarding the reasons of occurrence of diseases and how to take preventive measures to lead a disease-free life. The major objective of the study was to sensitise the rural people against the attack of disease by launching campaign against the spread of diseases. Materials like SCIENCE LITERACY CARDS, POSTERS, VISUALS were used to draw in attention of the people. Sharing of ideas through interactive discussion were also held for strengthening the ideas. Than a feedback questionnaire was administered and the output of the programme was found out and it was found that they were well informed and they developed a positive mind to take necessary steps to check the outbreak of the diseases in the locality. More than 50% of the participants were made aware of the reasons and preventive measures for the diseases.

ST4/008

Quadratic equation in secondary level, its uses

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Abstract

We deal with many real-life situations using mathematics. We have studied different types of polynomials. Quadratic polynomial having form $ax^2 +bx+c$, $a=0$ is one of such polynomials. When we equate this polynomial to zero we get a quadratic equation. Introduction of quadratic equation in the syllabus of class-X (secondary level) makes some students uncomfortable to digest. Quadratic equation arises in several situation in the world around us and in different fields of mathematics. Some opine that Babylonians were the first to solve quadratic equation. Greek mathematician Euclid developed a geometrical approach for the solution of quadratic equation. However, credit goes to our ancient Indian mathematicians. Bramhagupta gave an explicit formula to solve a quadratic equation in the $ax^2+bx = c$. Sridharacharya derived a formula known as quadratic formula. Bhaskara II gave an idea for solving a quadratic equation by the method of completing the square. An Arab mathematician Al Khwarizm also studied quadratic equation of different types. Abraham bar Hiyya Ha-Nasi in his book "Liber embadorum" published in Europe gave complete solution of different quadratic equation. A project work was undertaken to find the effectiveness of communicating different procedures for solution of quadratic equation by traditional method with comparison to constructivist method taking six groups of Class-X students of three different High Schools such as Sree Ramji Nodal High School and Nichuapada High School of Morada Block in the district of Mayurbhanj of Odisha. Standard form of quadratic equation is $ax^2+bx+c=0$, $a = 0$ can be solved by factorisation method, by complete square method and by quadratic formula method. The sustainability of knowledge skill and competence can be ensured only by this method. Learners being the adolescents having innovative curiosity in everything can be nurtured, hence they will not remain as cook-book person.

ST1/037

Effect of manipulative on science learning of student with dyscalculia at primary level

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Abstract

Science Education plays a vital role in the progressive development of the nation. This paper highlights the problem faced by student with Dyscalculia in learning science and how teaching with manipulative helps in achieving the desired level of science learning. The main goal of the researcher is to point out ways of achieving learning excellence by usage of modern educational means. This bold aim can be reached by resorting to manipulative within the teaching and learning process. Researcher used single group pre-test and post-test experimental design. The result of the study reveals that there is a significant effect of manipulative on science achievement of student with dyscalculia of class V students.

ST5/121

Blending traditional teaching with ICT

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Abstract

In the changing scenario of education system, Information and Communication Technology has become an integral part of Teaching and Learning. As 'SEEING IS BELIEVING', Teaching without Teaching Aid is just like telling stories. Low or No Cost Teaching Aids have been designed. Focusing on OPTICS, I have designed an Optic Box from a simple card board shoe box by making alterations and adjustments. It covers more than 20 phenomena of Optics. Yet there are some others, which are explained by doing Experiments. Some still cannot be explained like Natural Occurrences. I took the help of ICT i.e. searched various Search Engines GIFs and YouTube Videos and explained on ROT screen. I think no tool alone is sufficient to make science learning effective and interesting. To promote effective science practices with innovative approach, traditional teaching should be blended with ICT. I have made videos (45 for Optics only) of my experiments and working of Optic box to communicate Science to masses. Students should be trained for E-books, doing on-line Puzzles and questionnaires and making PPTs. Their PPTs are available on Internet. I have made my Blog 'Learning Science by Doing' on Web and also Science Innovative group is on Face book.

ST5/033

A strategical approach in science and environmental communication among the learners: an innovative best practice

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Abstract

The application of an art form which helps young people to develop insights and understanding through searching, planning, shaping and presenting dramatic material can be one of the most thrilling events in school life (Somers 1995). Dramatic methods, which have the potential to arouse excitement, curiosity and interest towards a subject matter, can be quite effective in capturing the imaginations and attention of young people. Since the responsibility of teaching and learning across the curriculum should be shared by both students and teachers, it is important to allow young people to accept responsibility for their own learning. In order to achieve this, an environment where the teacher can cooperate with well-motivated students should be established; one way to do this may be via the use of dramatic methods. The art form introduced in this paper is "drama," termed "drama in science education". It is not to be understood as a substitute method for traditional didactic strategies, but rather as a complementary teaching activity. This paper deals with imparting science education based on environmental issues in a sustainable way through cultural tools like Drama, Group Song, Dance, Movie etc. along with environmental activities like Orchid Culture.

ST5/069

Communicating Science to differently abled secondary students of open Education special Education School: A design thinking-based lesson study on photosynthesis in clinical settings

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Abstract

A design thinking-based lesson study was done on the topic of photosynthesis for class X student of open school system with learning disability of dysgraphia. The objectives of the study were: (1) To design think a lesson plan and document it using the elements of visual symbols and their reading; (2) To transact the lesson plan as a process and workout a standard procedure for classroom practice; and (3) To discuss and implicate the format for creating the exemplary material for non-word visual symbol

readings of school science. Science teaching to children both in general education setting continues to be matter of concern both teacher-centred and student-centred models of classroom instruction. Since most learners are visual learners and more so the children with special needs, led to design think the present intervention which is being preferred over problem solving method these days. The study done in a systematic phase of pre-active, interactive and post active phases and it took two weeks to complete. The sample of the study was the child with writing disability (Age: 14; Grade: V, NIOS; Years in special education=9; middle socio-economic background) in clinical setting with special educator and two observers including this investigator. A discussion (N=3; One hour; special educator and two observers) was held after the clinical try-out was over. The recommendations lead to refining the lesson plan; procedure and creating three examples of the non-word visual symbol sheets on science concepts from the textbook.

Keywords: Design thinking, learning disability, lesson study, open education, science teaching, special education.

ST5/031

Mobile Phone Microscope

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Abstract

Now a day's Microscope is used to study the Micro-organisms but sometime if Microscope gets damaged student cannot study or do experiments in laboratory. Teaching learning process will be successful when we use appropriate teaching learning materials. Slides are to be used along with Microscope while teaching especially the lessons like all structures, Micro-organisms in Biology. But the use of these objects is restricted and limited because of non- availability of Microscope or the small adjustment of instruments or lack of sufficient light. So, this instrument has been made to teach the matter in corporate in slides with help of mobile camera. But phone becomes a minimum need for human beings in modern era. Even school children also utilizing mobile phones in their daily life. Being a Science Teacher I need Microscope in my class. I had an idea to do teaching learning process with the help of mobile phones which is best teaching aid in the classroom.

ST2/062

A Practical Approach to Learn Geometry of Triangles Based on Structural Design

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Abstract

Students are introduced 2D and 3D shapes at the early ages, even when they are not well versed about the geometrical properties of shapes. However, understanding geometrical properties and their applications in real life has been a challenge to many students of middle school. Triangle is one of the most basic shapes in geometry. Any polygon can be constructed using two or more triangles. Students of the age group 10 to 12 years study the various geometrical properties of triangles, which form the basis of their conceptual understanding of the higher order shapes, such as quadrilaterals. An attempt is made in this paper to introduce tools and learning strategies that seek engaging the students more effectively and thus enhancing their learning experience. Far away from the text book curriculum, students are introduced to real life scenarios that are familiar to them. They learn how the geometry of triangles is used in these applications.

ST4/154

Prevention is better than cure - to attain healthy sustainable development

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Abstract

Environment Plays crucial role in health of the people. Mosquitoes became major problem to human health. They spread number of diseases throughout the world. To protect our health, one should able to control the population of mosquitoes, so that we can reduce diseases like malaria, Dengue, Chicken Gunya and Viral fevers. Government also implementing many programmes for decreasing these mosquitoes, still the hospitals are filled with diseased people. They are spending a lot of money for treatment some people using all out, good night liquids and some people are using coils to get rid of mosquitoes. They are chemical based products causes side effects like headache, burning of eyes, coughs, skin allergy and lungs problems with that less development. To attain sustainable development. I am able to find out a good solution to this problem without any side effects and less cost, locally available material and natural repellant and can control mosquito population with soup nut juice, dried leaves of lantana camera, Leaves of Mary gold and juice of Tella juviki leaves.

ST5/006

Awareness of global warming among XI standard students in Thoothukudi Educational District

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Abstract

This study is designed to find out the awareness of global warming among XI standard students in Thoothukudi Educational District. Survey method of research is used in this present study. The sample consisted of randomly selected 250 students from Thoothukudi Educational District. Awareness of Global Warming Questionnaire sheet were used to collect data. Percentage Analysis, Arithmetic mean, Standard Deviation, t-test and ANOVA test were the statistical techniques used for analyzing and interpreting the data. The result showed that, there is no significant difference in awareness of global warming among XI Standard students with respect to their gender, residential locality, Nature of School, Medium of institution.

ST5/064

Blended teaching learning classes involving technology aided activity based flipped class room

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Abstract

As objectives at junior secondary stage are to nurture the curiosity of the child about the world i.e. natural environment, people and other living things, to acquire basic skills through observation, classification, inference, students were often taken for field visits, nature walks. They were asked to just observe and find many answers related to all the things around them.

ST4/022

A survey on menstrual health and hygienic sanitation and its relation with cervical cancer among rural women in the age group of 20-45 at D. Vadipatti village, Theni district, Tamilnadu state

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Abstract

"Cervical Cancer is the leading cancer in Indian Women and the second most common cancer in women world-wide" This information is the origin of our research. Our D. Vadipatti village is a small village of Theni district in Tamil Nadu. We have decided to create awareness of Cervical Cancer among our rural women. We have done our research under five Hypothesis –Illiteracy, knowledge, Economic, social factors and Awareness with Rural women's Menstrual Health and Hygiene. First, we have collected data to understand their knowledge and awareness in Menstruation Health, Hygiene, and Practice and about Cervical Cancer. The data analyzing gave the results as the rural women have a lack of knowledge in it. We have conducted Medical Awareness Program by Medical Officers and VHN. We have created knowledge about menstruation practicing methods, medical check-up, taking screening test awareness… We recommend our village panchayat to increase the public toilet facilities and fix 'Incinerators' at them. We have our idea to product 'Bio – Sanitary Napkins' by coconut coir with cotton to our village Self Help Groups. Our survey is very useful to attain the third Goal "Good Health and Well – Being" of Sustainable Development among 17 goals. We hope, our survey has created some positive changes 7 among our rural women at the basis of menstruation. And they have got Awareness in Cervical Cancer and Breast Cancer.

ST2/072

Effective science communication through STEM education

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Abstract

STEM stands for science, technology, engineering, and mathematics. STEM is important because it pervades every part of our lives. Science is everywhere in the world around us. Technology is continuously expanding into every aspect of our lives. Engineering is the basic designs of roads and bridges, but also tackles the challenges of changing global weather and environmentally-friendly changes to our home. Mathematics is in every occupation, every activity we do in our lives. By exposing students to STEM and giving them opportunities to explore STEM-related concepts, they will develop a passion for it and hopefully pursue a job in a STEM field. A curriculum that is STEM-based has real-life situations to help the student learn. Programs like Engineering for Kids integrates multiple classes to provide opportunities to see how concepts relate to life in order to hopefully spark a passion for a future career in a STEM field. STEM activities provide hands-on and minds-on lessons for the student. Making math and science both fun and interesting helps the student to do much more than just learn.

ST1/114

Game Based Approach for Learning of Medicinal Plants

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Abstract

The present paper shows the study of card game of common medicinal plant which is used in our kitchen as spices. This game was played between the school and college students. The game is useful to learn about medicinal plants, their usage in our food and importance for health to achieve sustainable healthy lifestyle. The students able to know the name, uses of medicinal plants this can provide Nature Remedy for different diseases and understand the relationship between food, health, and nature for sustainable healthy living. The objective of the game is to motivate for healthy diet, good eating habits, Yoga, Exercise, Walk, Skipping for Happiness and Healthy Living and knowledge about common medicinal plants. These plants are very helpful for our health. Game based learning is new and emerging method for interactive learning of difficult concepts of science.

Keywords: Game based learning, Medicinal plants, Spices Usages, Health and Well-being.

ST5/083

To study the effect of 7E model of constructivist learning on student's achievement in science

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Abstract

The aim of the research was to study the effect of constructivist learning on the achievement in science. The study was conducted on the IX grade students. Pre-test, post-test, control group, experimental group design was used in the study twenty students for control group, twenty students for experimental group. For control group researcher used traditional method which include lecture, demonstration, explanation, and discussion. For experimental group researcher used 7E constructivist learning model which contain 7 phases Elicite, Engage, Explore, Explain, Evalute, Extend. Researcher used different strategies for effective communication. Researcher used different strategies of co-operative learning i.e. think pair share, jigsaw techniques, and hands on activity, digital media for effective communications. After completing the experiment researcher conducted post-test the study showed that experimental group had mean score 17 which is higher than mean score of control group is 14.9. Standard deviation of Experimental group is0.9746 and control group is 2.002 and t value is2. 958.This value is greater than the entry of 2.09 at 0.05 level that means experimental is effective than control group. 7E model of constructivist learning was more effective than the traditional method in terms student's achievement student's effective communication in science learning is must for educational development of students.

Key words: 7 E model of constructivist learning, Control group, experimental group, cooperative learning

ST3/067

Introduction of the concept of bacteria to different groups using various communication methods.

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Abstract

The paper is written under the sub theme of "Communication for all". The aim of the project is to introduce the concept of good bacteria and bad bacteria to the students and to encourage them to inculcate scientific attitude. Examples from daily life were used to explain the idea. Efforts were made

to enhance observation skills and creativity among the students. This project was introduced to 3 different groups of girl students from three different schools in Pune Municipal Corporation area under Inclusive Education Scheme. A) Normal Students B) Hearing disabled students C) Visually Challenged students These students were from 7th to 9th std. Looking at the varied skills of the groups, different methods were adopted for communication, teaching and evaluation the topic was difficult for students to understand. To make it simple, easy and interesting following activities were employed. a. Oral explanation. b. Games. c. Visual Aids. d. Use of smell. e. 3D pictures. f. Question and answers. g. Group discussions. h. Oral Examination. All these activities were modified to suit the need of the particular group. For every group, 4 sessions were used. The students were tested for their pre-knowledge by using a pre-test. Five different tests were used for evaluation. The performance of all the groups are compared and the results are presented.

Keywords: Types of micro-organisms, Useful bacteria and harmful bacteria, Bacterial names and pictures, learning through experiment, learning through observation

ST4/116

Innovative methods in teaching science for middle school

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Abstract

Education plays an important role in today's world. Over the decades there had been rapid increase in the higher education system. Our education system is geared towards teaching and testing knowledge at every level as opposed to teaching skill. Our students are tired of the old school approach to learning a language –they want something practical, relevant and useful for their professional life. Exploratory research methodology is used here to analyse the data. Data was collected from multiple sources such as journals, books and blogs to understand the teaching learning paradigm. Productive science methods allow students to explore science ideas through experiments, personal projects, and laboratories that are guided by the teacher with the use of ICT aids. After finishing the lesson, students can produce the simple models, working models, preparing specimens, writing scripts, writing songs and various productions. (Paris et al., 1998). To effectively engage and teach students, school systems must be outfitted with a prerequisite of ICT resources, and curriculum must be de-signed to promote a collaborative learner-cantered environment to which students will relate and respond. This will be a true amalgam of technology with science in addition to smart board and internet access. We need to develop video games based on scientific concept and topics in addition to productive method to generate interest in the subject.

Keywords: Productive Method, ICT, Video games.

ST4/135

The Effects of Inquiry based Learning on Attitudes and Science Achivement of Students in Biological Science Classes at Z.P. High School, Basapuram

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Abstract

In traditional science teaching practices students are expected to remember large volumes of information and there is no time to understand it all. More over the information is often disconnected from real life and therefore it does not make sense to students. Scientific inquiry is an instructional strategy that

requires students to engage in scientific problem solving by identifying a problem, designing an investigation and supporting conclusions with evidence. The purpose of this study is to examine the effectiveness of inquiry-based learning on attitude, achievement in a high school Biological Science classes in Zilla Parishad High School Basapuram. Participants were from 10th class (N=40). The experimental group (N=20) received Inquiry based instruction, while the control group (N=20) received traditional instruction. Pretests and post tests were used to measure student's academic achievement and attitudes during 3-week study. Collected data were displayed in bar graphs and diverted stacked bar charts to detect patterns. It was found that Instructional based learning in class room has a similar effect on student's achievement and motivation as the traditional approach but can increase student attitude by promoting discussions and increasing student learning through errors.

Key words: Inquiry based learning, Student achievement, attitude, Motivation.

ST1/068

Effect of an LMS on conceptual understanding and problem-solving ability

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Abstract

The present study used a schema based instructional module to teach solving of Physics story problems for grade 11 students in a systematic way. The schema-based learning employs templates that condense the skill and learning required to master a type of tasks. Thus, schemas help in exploring the situational and structural characteristics of a problem type and generalise the problem-solving procedure for that type of problems. The instructional module dealt with seven problem types of One Dimensional Motion in Physics. The module was presented as an online e-learning package on Moodle platform and also through chalk and talk method in a face to face mode. The effects of these interventions were compared against a control group which was taught by the usual drill type instruction. The study revealed that Schema Based Learning by means of e-learning was effective in increasing the Problem-Solving Ability and Conceptual Understanding of Physics story problems among grade 11 students in Physics when compared to the usual drill method of teaching problem solving. The study also suggests that Problem solving Ability does not assure Conceptual Understanding of Problems.

Keyword: Story Problems, Problem Solving Learning Environment, Schema Based Learning, Problem Solving Ability, Conceptual Understanding.

ST1/076

Impact of Digital Classes on Developing Science process skills and Learning Outcomes of Biological Science at Secondary Level

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Abstract

This study is focused in terms of research on impact of digital classes aiming for betterment of learning outcomes of science in secondary schools. The study revealed that a digital class followed with interaction with subject teacher had allowed students to actively explore science ideas from an abstract knowledge and helped further to handle experiments and personal projects that are guided by the teacher. The research was carried on participants who were in a ninth standard in Zilla Parishad High school Jookal, Chityal Mandal, Jayashanker Bhupalpally-district, Telangana, India. The majority of students' grades drastically increased between the pre and post-test after completing a topic in a digital

class. The results indicated that students' enjoyed learning through the digital method of teaching and developed science process skills instead digital class is an abstract, which one could not handle by own as performing lab activities by students. Most of the learning outcomes of science were achieved by the majority of the students.

Key words: Digital class, abstract knowledge, science process skills, learning outcomes.

ST3/043

A study on the importance of visual literacy in respect of water cycle

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Abstract

Visual representations are particularly helpful in introducing abstract concepts in science when appropriately used by the teacher. Textual and visual literacy were found to be effective tools in imparting knowledge levels in secondary school students regarding operation of water cycle in biosphere. Visual tools although could able to improved application levels but they needed to be augmented with text materials for achieving goals of science teaching. It could be concluded that pictures could not yield beneficial effects on concept learning but effective combination of text and visuals can be used for organization, interpretation and transformation of knowledge levels among students

Keywords: Text, Visual Literacy, Water cycle.

ST4/093

Sustainable Development and Eco-Friendly Waste Disposal Technology for the Local Community

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Abstract

Solid waste disposal and management is both an urban and rural problem. Every person is a potential generator of waste and thus a contributor to this problem. To generate waste is one thing, the type of waste generated is another and yet also the way the generated waste is managed or disposed of is quite a different issue. This study was carried out in Mohali district in Punjab. The main objective of this study was to explore the level of public, student participation in solid waste management in Mohali, in light of the challenges and prospects for future management. The purpose behind the concept is to develop effective decision-making attitude among the residents, students with regard to vision of global sustainability since the social, environmental and cultural systems are closely linked. Any attempt to develop a shared global stage which aims at solving the problems as a result of human- environmental interactions, we need the curriculum (formal, informal education) at school level to create a dynamic connection between the knowledge imparted and its applications. Sustainable development is a society project and science play an important role in solving the technical problems related to society.

Keywords: Sustainable development, Human environmental interactions, need for shared global stage, Nurturing scientific, Ethical values.

ST5/039

Street Walk (A Mathematical Game)

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Abstract

Mathematics is the important part of human life. There is lot of student who have phobia related to mathematics because they could not easily solve problem of mathematics. In addition, many students feel that mathematics is boring subject although they score good marks in mathematics. Quadrate geometry is the critical area of mathematics where most of the time teacher fined that student could not easily visualise the quadrants plane. In addition, Student faced so many difficulties in quadrant axis and location of any point in quadrant plane. Gaming method of teaching is the so effective method to teach student because student gave full engagement in game they try to play with games more and more and student always ready for playing game. We can improve the school education with the help of gaming method to introduced mathematics topics. Keeping these statements in our mind, I have developed a game named Street walk under the guidance of Dr. Jyoti Sharma to introduced Quadrant planes and location of any point. At the time of field trial of this game, I found that student getting improvement in quadrant planes and their interest in this area of mathematics. Our target group is upper Primary level student.

Keywords: Board game, mathematical game, mathematical operation, mathematical calculation, game-based learning, hidden way.

ST1/075

Impact of Flipped Classroom Design on Higher Secondary Student's Performance, Attendance and Attitude for Biology

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Abstract

Observed marked decline in student's attendance, academic performance and interest in Biology subject at Higher Secondary level, has prompted the researcher to try a new pedagogical approach of teaching and learning i.e. Flipped Classroom. It can be defined as a teaching model where students are introduced to content by video lecture at home and they practice and apply working in the classroom. Face-to-face time in the physical classroom is used for clarification; apply learning through problem-solving and discussions. In this regard an empirical study was conducted in Biology subject for the topic Respiration in the academic year 2018-19 in a junior college in Kalyan. Descriptive and inferential statistical tools were used to analyse the impact on the attendance in two divisions of XII A and XII B. To find out the performance the control and experimental groups were formed consisting of 20 students each from the XII B students and named TMG and FMG, respectively. The TMG group was taught by the traditional lecture method, while the FMG group was taught by the flipped classroom method. Examination scores before and after the implementation of the flipped classroom method was compared by Pre-test Post-test research method and student's T- test. Further, to study the change in the attitude of students for Biology in the selected topic a questionnaire incorporating a standard Lickert scale was deployed to collect the data and analysed statistically. The results indicate a significant increase both in student engagement and positive attitude towards the subject learning by the FMG group over the TMG group.

Key words: Flipped Classroom, Questionnaire, Lickert Scale, Mobile phone, TMG, FMG -Traditional and Flipped Method Group

ST4/159

Knowing our water foot print- a way toward sustainable development

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Abstract

Science education for sustainable development empowering every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable present and future. This includes key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, sustainable consumption (water foot printing, carbon foot printing), renewable& non-renewable natural resource, pollution, biotic components, and a biotic component. It also includes teaching and learning styles that not only motivate and empower learners to change their behaviour but also take appropriate actions for sustainable development by reaching the common people of our country and inculcating competencies like critical thinking, imagining future scenarios and decisions making for our future generation. Water is at the core of sustainable development and mandatory for the existence of ecosystems and for human survival itself. It is vital for reducing the global burden of disease and improving the health, welfare and productivity of populations. Water is also at the heart of adaptation to climate change, serving as the crucial link between the climate system, human society and the environment. Water is a finite and irreplaceable resource that is fundamental to human well-being. It is only renewable if well managed. Today, more than 1.7 billion people live in river basins where depletion through use exceeds the process of natural recharging. Water can pose a serious challenge to sustainable development but if managed efficiently and equitably, water can play a key enabling role in strengthening the resilience of social, economic and environmental systems in the light of rapid and unpredictable changes happening today. So, Today I would like to talk about water foot printing which can enables a large number of groups to realize that the water footprint can form an important basis for assessment of how products and consumers can contribute to the global problem. People use lots of water for drinking, cooking and washing but even more is used for growing our food and for making our clothing, cars or even candies. The water footprint measures the amount of water used to produce each of the goods and services that we use. It can be measured for a single process, such as growing rice, for a product, such as a pair of jeans, for the fuel we put in our car, or for an entire multi-national company. We all are aware of direct use of water but through science we will be able to explore the virtual use of water which we are not even aware of instance can be a kg of rice require on an average 3000litres of water. Its wastage is using a large amount of water. It is also possible to calculate the water footprint to measure the amount of water required to produce all the goods and services consumed by the individual or community. This also includes the direct water footprint, which is the water used directly by the individual(s) and the indirect water footprint – the summation of the water footprints of all the products consumed. The interest in the water footprint is rooted in the recognition that human impacts on freshwater systems can ultimately be linked to human survival and thus to sustainable development.

Key words: Water Footprint, Water Conservation.

ST5/067

Experimental learning on optics in classroom

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Abstract

Learning by doing refers to a theory of education expounded by American philosopher John Dewey. He theorized that learning should be relevant and practical, not just passive and theoretical. He implemented

this idea by setting up the University of Chicago Laboratory School. His views have been important in establishing practices of progressive education. Experiential learning is the process of learning through experience, and is more specifically defined as "learning through reflection on doing". Hands-on learning is a form of experiential learning. Experiential learning is distinct from rote learning, in which the learner plays a comparatively passive role. The general concept of learning through experience is ancient. Around 350 BCE, Aristotle wrote in the “Nicomachean Ethics”

"For the things we have to learn before we can do them, we learn by doing them".

ST5/002

To Study Which Teaching/Learning Method is Best Understand and Liked by Students of middle Standard for Science Subject

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Abstract

I decide to study which teaching/learning method is best understand by students and creates/develops interest in students of middle standard in learning of science subject. I adopted following here teaching/learning methods of r this purpose. 1) Traditional Block Board method (T.B.B.M.), 2) Demonstration Method (D.M.) and 3) Learning by Doing Method (L.B.D.M.). For this I selected the topic- Acids, Based and salts form **Seventh Class** NCERT Text Book. Students are allowed to understand this topic by all the three methods one by one and evaluated at each step. There are twenty (20) students in seventh class. I divided them in two groups each group contains 10 students; a questionnaire of 20 questions was given to students to access their achievement level at each level. On evolution of these questionnaire and comparison I found that average achievement level of students after T.B.B.M. was 44.25% and achievement level of students after D.M. was 63.75% and average achievement level after L.B.D.M. was 82.75%. On data analysis it is clear it is clear that average achievement level after T.B.B.M. is very low i.e. 44.25% it increases to 63.75 after D.M. which further increases to 82.75% after L.B.D.M. We can see that difference between D.M. and T.B.B.M. is 19.50% and difference between L.B.D.M. and T.B.B.M. is 38.50% so we can conclude that L.B.D.M. is best understood by middle standard students. I gave one more question to students to know which teaching/learning method out of the three methods preferred/liked by students. On evaluation of question and analysis of data I found that 70% students like L.B.D.M. and 30% Like Demonstrating method but no. one like T.B.B.M. for teaching science subject. Then students will understand concepts easily and in a joyful manner.

Keywords: T.B.B.M. – Traditional Black Board Method, D. M. – Demonstrating Method, L.B.D.M. – Learning by Doing Method, A. L – Achievement level

ST3/092

Water Analysis by pH metry

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Abstract

Near about 3/4th of the earth is occupied by water and 97% of this water is salty and present in seas. It means only 3% of water is fresh and can be used for drinking and other domestic purposes. Thus the fresh water is valuable resources. A safe and convenient water supply play a vital role in public health

and well-being of the society. While there are numerous conventional techniques are available to check the purity, freshness, hardness, pH, chlorides, minerals, acidity, basicity, and other factors which are harmful for human being.

Keywords: Water analysis, pH measurement.

ST5/010

Simple Experiments for Joyful Learning

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Abstract

There is a saying "doing and discovering has been natural and normal process through which the many kinds has been able to gather gradually to this day the vast fund of knowledge about and all-over various facts and events. By following the same process as the teaching learning process." It would be possible to make learning more absorbing and meaning full experimental and stable. Objectives are 1) The students should understand the principle of science by experiment or direct experience of the scientific phenomena. 2) On the basis of observation, the students can cancel the wrong deduction and understand the real facts of the phenomena and final results. 3) They may adopt scientific attitude in each and every behaviour pattern. 4) An attitude of testing the traditional belief may develop. To fulfil these objectives, I had selected forty students from class VIII of law achiever for the purpose. A pre-test has been taken with some basic questions pertaining mathematics, physics, chemistry. Then they were advice to collect card board, wooden piece. Metal wire, plastic cups, playing cards, scale, balloons, straw, thread, thermo cool etc. By using this low and no cost materials they prepare teaching aids like atomic structure or sodium, molecular model of methane, trigonometric value detector, Experiments on Newton's Third Law, reflection and refraction and some other experiments. The above low-cost material displayed in class room situation in appropriate topic. It not only aroused interest among the students but also provide opportunity to handle those models and experiments. As a result, learning difficulties were eliminated and students were able to understand abstract things. Post test results prove that maximum students achieved up to 80% - 90%. Discipline was maintained and students gain knowledge though learning by doing.

Keywords: Learning Absorbing, Scientific Phenomena, Experiments, Low Achiever.

ST4/106

Effectiveness of Field trip Approach in Science Teaching Learning Process

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Abstract

The purpose of the study was to provide the primary school students with the experience of field visit to Meteorology Centre to make a connection between reality and theory about the topic "Weather and Climate" of class VII. The whole class was divided into two parallel groups to compare the field trip approach with regular class room teaching. The first group was the controlled group in which students experienced regular classroom teaching and the experimental group experienced field visit. Observation schedule, Interview schedule and achievement tests were used as tools. The investigator followed the single group pre-test and post-test design to see the effect of the method on the achievement of the students in science. Data were collected from teachers, Meteorologists and students of class VII. The investigator found that this method enhanced the achievement level of the students. All the teachers opined that field trip approach was highly effective as student's participation, interest and achievement we're concerned.

Key words: Field Visit, Weather, Climate, Meteorologists, Experimental, Controlled, Instruments.

ST5/023

Teaching science by the use of word wall, sentence wall, and diagram wall

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Abstract

Science subject consists physics, chemistry and biology. Average 30 percent students are having poor scientific vocabulary in secondary classes. Due to poor vocabulary they are unable to write correct answers during tests and examinations and they score less marks. Science students can make a difference if they have sound knowledge of scientific vocabulary and knowledge of actual and correct facts and definitions. Some students are lagging behind in academics due to poor vocabulary in science. Biology part of the science needs well decorated language as well correct labeling of diagrams. Physics and chemistry part need correct definitions, correct formulae and correct equations so one should have sound knowledge of vocabulary and sentences. Science word walls, sentence walls and diagram walls in classrooms stimulate the interest of students in the subject and an opportunity for them to illustrate different concepts. In an advanced technique, a more in-depth understanding of different scientific terms can be made possible with pictures that accompany the words. Science word walls, sentence walls and diagram walls in classrooms stimulate the interest of students in the subject and an opportunity for them to illustrate different concepts. In an advanced technique, a more in-depth understanding of different scientific terms can be made possible with pictures that accompany the words. This is also an option to help them better understand words with multiple meanings. I design creative word walls, sentence walls and diagram walls. I also asked some high achiever students to contribute to the idea weekly. Science word walls, sentence walls and diagram walls in classrooms may benefit to the students in the following manner: (1) Increase scientific vocabulary of the students, (2) Help students make connections between and among concepts and units, (3) Provide opportunities for productive and meaningful interaction among classmates, (4) Make students accountable for their own learning, (5) Facilitate student directed learning and (6) Serve as either formative or summative assessment. Science word walls, sentence walls and diagram walls increase inter- personal relationship of students and the teacher. This project helps in management of the class rooms in a disciplined way. During teaching learning process, I used Science word walls, sentence walls and diagram walls and I observed that this method of teaching enhanced the vocabulary, sentence power and diagrammatic skills of most of the students. For teaching digestive system in tenth class, I made word walls, sentence walls and diagram walls of all vocabulary. I asked students to arrange the parts of digestive system from mouth to anus in a sequence. Then I asked them to find the functions of each organ of digestive system. After it I asked to fix word cards on a boundary lined diagram of human digestive system. By above method students understood the facts and process of human digestive system and they enjoyed a lot. Students took part with great enthusiasm. They tried to make their own paper strips for definitions, facts. Some of them made their own flash cards to paste on walls. Some of them made diagrams on chart papers and paste them on walls of the class rooms. Science word walls, sentence walls and diagram walls in classrooms benefitted to the students in increasing scientific vocabulary of the students, helped students make connections between and among concepts and units, provided opportunities for productive and meaningful interaction among classmates, made students accountable for their own learning, facilitated student directed learning, served as either formative or summative assessment. This technique made the teaching-learning process more interesting. After implementation of this project all students of class 8th, 9th and 10th performed well in periodic assessment first and half-yearly/periodic assessment second of this session. More than 30 percent students scored 90 percent and more marks in science in periodic assessment first of this session. This project helped in management of the class rooms in a disciplined way.

ST4/160

Empowering Young Minds by reorienting education through Sigma 6Q for Sustainable Development

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Abstract

The complexity and the challenges in present era have compelled us to think towards the need for a teaching approach that prepares students for better sustainable consciousness and citizenship with right decision-making ability. Change is the law of nature while awareness and analysis are major milestones for transformation. Hence this research is taken up to sensitize and measure the consciousness of students with both conventional pedagogy and sigma 6Q pedagogy on environment sustainability. For the primary data, a total sample of 180 students of 7, 9 and 11 grade of our school were chosen randomly to study the effectiveness of sigma 6Q pedagogy on students which revealed that if the students are informed of sustainable development at initial stages of middle schooling, they are able to process, analyse and experiment with no rigid outlook and freely come out with solutions which can help them to develop and further inculcate habit to solve real-world sustainability problems. Henceforth our education system having factual knowledge with text-based curriculum and conventional teaching methodologies, needs transformation with evolved pedagogy having a solution-based approach for environmental issues for meeting the needs of present age students.

Keywords: Sustainable Development, Curriculum, Pedagogy, Transformation, Sigma 6Q

ST4/026

Meeting Challenges to Sustainable Development through Science Communication and Learning

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Abstract

Raising awareness about sustainability in an urgent need and as such education for sustainability has gained relevance in the last decade. The focus is on how to used science education and learning as a tool for facilitating sustainable development. Science education and learning is shown to ft in very well with the tenets of education for sustainable development. Here, the objective is to allow the female students to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable development; here it is in the field of waste disposal with reference to the menstrual waste. The objective is to allow the female students to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future and empowers learner to change their behaviour and act for sustainability. Here, the problem under consideration is tried to be solved by utilization of a set of principles that reduces or eliminated the used or generation of hazardous substances keeping in view the Manitoba Protocol I. e. in the reduction of disposable sanitary napkins waste. The awareness is created among the females about the proper disposal of menstrual waste and about the consequences of disposing them with domestic garbage or flushing them in the toilets. Implementation of modern techniques if properly utilized can help to reduce the waste. Also, awareness is created to emphasis the use of reusable sanitary products or the other better alternatives available. Efficacy of science communication can be improved by design in providing an in depth and holistic understanding of scientific concepts and their real-world application. The present study revealed that if full information is given to women about the products available and what are their impacts on the environment and on their body and empower them to choose, to change their behaviour and act for sustainable development.

Keywords: Sustainable development, science education and learning, waste disposal, menstrual waste, sanitary napkins.

ST1/061

An experimental study of development and assessment of qualitative e-content of biology for students of secondary level

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Abstract

The study aimed to develop e-content in Biology discipline and assess its effectiveness on the achievement of students of ninth class. The study was a two-phased process with the objectives (i) To develop and validate e-learning modules of Biology and (ii) To assess the effectiveness of developed e-learning modules of Biology. To achieve first objective study was carried out as, **Developmental phase** where e-content in Biology on the topic of **Cell structure** was developed. To meet out quality criteria of e-content development, instructional design as ADDIE (Analysis, Design, Development, Implementation and Evaluation) model was adopted for the e-modules. To fulfill the second objective of the study as **Experimental phase**, experimental research design of randomized control group pre-test post-test was employed. A standardized achievement test of e-module of Biology was administrated before and after the experiment. Statistical techniques of calculation of means and standard deviations were employed to compare the means of pre-test and post-test scores of control and experimental groups. The positive results of the study established the effectiveness of e-modules of Biology and product of the study as website www.learning-afresh.com continues to serve instructional needs of learners as well as educators.

Keywords: e-content, Instructional Design, ADDIE, pre-test, post-test, randomized control group, Subject Matter Expert.

ST3/075

Universe inside (a limitless mind)

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Abstract

Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to everyone. –Albert Einstein

The modern world of education needs the improved science learning and exciting opportunities for meeting the demand in life. Science is the way of thinking and understanding the environment. It starts from observations, explanations, experiments, conclusions and applications. Every individual should motivate to understand the surroundings. The experiences gained by science can promote positive attitude, motivate students, problem solving and help them to live as an useful citizen to the society. To develop such essential skill the fundamental ideas expressed in proper language to every lay man, which is called as science communication. The objective of scientific communication is to accurately and clearly communicate (new) scientific knowledge, hence it is intimately linked with the scientific method. So, this paper suggests various methods that can be more attractive, interesting and thus gain attention of the students and help create better scientific environment in schools. In this paper "UNIVERSE INSIDE (A LIMITLESS MIND)", we will discuss about importance of teaching science in school, types of learners and creative methods for teaching science.

Keywords: Science, science communication, teaching science, types of learners (auditory, visual and kinesthetic) creative teaching, comic strip, TV commercial advertisement, interdisciplinary teaching.

ST2/016

Seeing and observation on motion, energy and pressure involving experiments with low cost teaching aids.

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Abstract

A lot of articles like bottles, syringe, magnets from broken radios, etc. are thrown away uselessly at any places but by collecting these locally available articles, we can develop number of low cost teaching aids. Teaching aids are important because they create a visual and interactive experience for the students. As the students become more engaged, they are more likely to understand the topic being taught. Low cost teaching aids title as "seeing and Observations on motion, energy and pressure involving experiment with low cost teaching aids" will help to involve students and enhance the learning experience and this paper will help in the fields of teaching and pedagogy. This paper reveals three parameters- (i) Motion and force (ii) Law of conservation of energy (iii) pressure using experimental work with low cost teaching aids which are designed to involve students, promote interaction, and promote faster learning and better comprehension. Being able to see and hear, students tend to get more involved in a topic creating as much better method for learning.

ST3/009

A Survey Report on the Analysis of Students' Difficulty in Transferring Calculus Concept to Physics Subject: The Case of Langmeidong Higher Secondary School

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Abstract

This survey investigates about the transferring of calculus concept to physics subject among the students of higher secondary level in the remote area like Manipur. Three different topics viz. (i) Pure Calculus, (ii) Physics with calculus and (iii) Physics without calculus, are taught very deeply to the students of Class XI Sc. and Class XII Sc. of Langmeidong Higher Secondary School, separately. Three different tests of about 20 marks each also conducted separately for Class XI Sc. and Class XII. And, a relation is established among the gaps between Low Mark Obtaining (LMO) students and High Mark obtaining (HMO) students in the respective disciplines like- pure calculus, physics with calculus and physics without calculus. The percentage of low mark obtaining students in pure calculus is 4 times that high mark obtaining students, in physics with calculus, the percentage of low mark obtaining students is about 6 times that of high mark obtaining students, however, in physics without calculus both low mark obtaining group and high mark obtaining is nearly equivalent. This indicate that the students of higher secondary level in remote area like Manipur, are hardly to conceive the knowledge of calculus, they have low perception of calculus or they have low level of logical thinking. Therefore, teachers need a special attention in teaching calculus for physics subject.

Keywords: Calculus, Lagmeidong, Comparing table, Relationship between LMO and HMO.

ST5/032

Study of Problem Arising on Learning Science in High School in Wangkhei Area, Imphal East, Manipur

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Abstract

Science communication is one of the important links to non-expert i.e. students by the teachers in the

school level. I take up the project area from Wangkhei area. Out of eight (8) high schools, I select four (4) schools randomly and collect the necessary data from this area from this school by supplying questionnaires and personnel interview from the school principal and students. Firstly, I collect the different status of subject passing in HSLC of this school of three subjects (mainly Mathematics, Science and Social Science) for five (5) years and get a conclusion as the students are very weak and boring in the study of science in their high school level. 20% of the students have a problem in language i.e. most of the private school instructed on the English medium communication. According to NCF-2005, the medium of instruction should be regional language. The mode of instruction is based on the traditional method of teaching which makes them boring to study the terminology of Science. By changing the methodology student start to learn and motivate in study of scientific terms in high school level. Lastly, I conclude that most of the students in Wangkhei area are very weak and neglect their studies during the learning of science terminology in this present situation.

Keywords: Personnel-interview, weak and boring, problem in language, medium of instruction.

ST1/116

Role of ICT and television in learning science

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Abstract

The use of ICT in the classroom teaching-learning is very important for it provides opportunities for teachers and students to operate, store, manipulate, and retrieve information, encourage independent and active learning, and self-responsibility. ICT motivate teachers and students to continue using learning outside school hours, plan and prepare lessons and design materials such as course content delivery and facilitate sharing of resources, expertise and advice. This versatile instrument has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills. ICT is a New and emerging media for effective science learning especially reference with Television. The television can play a significant role in learning science in primary to secondary level. As the result of our study we find that teaching with television along with classroom teaching facilitated student to learn science. In this paper, the discussion is focused on television as a medium of instruction for School education in India. The objectives of this study are as1. Find out the use of ICT and television as a new and emerging media for effective science learning. 2. Find out the result that how to make effective use of different types of television programs in learning of science. 3. To teach science subjects and improve the quality of instruction in sciences. 4. To overcome the dearth of adequately qualified secondary school teachers. 5. Learning science without extra resources. 6. Use television as a low-cost teaching material. Study was done for the secondary school students studying in Government Excellence School Shajapur, Dist-Shajapur Madhya Pradesh. As the study was experimental in nature therefore only hundred students of Class 9th studying in School were taken via simple random sampling for experimental treatment. All hundred students are divided randomly as group “A” and group “B”. The study was further delimited to the subject of Science, textbook the only 3 chapters were taught during experiment to both groups. 4 As it was an experimental study therefore we have chosen pre-test post-test technique for data collection. In order to compare the academic achievement of students of both groups, two different questions papers were prepared in subject of Science for pre-test and post-test purpose. One paper was administered among the participants of both group „A” and “B” before treatment and the other paper was administered after the treatment. Here treatment means group “A” was taught by conventional methods and use TLMs. While the other group “B” was taught by classroom teaching along with ICT and TV broadcast program/videos of related topics. In this way, data was collected through pre-test and post-test technique. As the result of pre-test and post-test we find that group “B” is performed better than group “A” which was taught through TV program along with the classroom teaching. As result of data analysis, we can conclude this study as ICT and TV program are intended primarily to educate learners and provide additional sources of information, support face-to-face teaching and learning. Some

educationist may regard use of ICT and watching a television programs in the classroom as a form of passive learning, but as the result of this study we can say that use of ICT and Television programs provide better opportunity to develop learner's knowledge and understanding of the science. Through scientific programs in the television, we can see the place that science has within our world, both at a local and a global level. The challenge in using television as an educational resource may arise in finding suitable material within the huge variety and quantity available. For effective learning to take place, the program needs to be relevant to the lesson and to bring another dimension or viewpoint to the learning experience.

Keywords: ICT, television, broadcast, learning science, academic achievement, classroom teaching.

ST2/071

Effectiveness of STEM education in teaching science - A constructivist approach

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Abstract

Indian Prime Minister Narendra Modi's 'Make in India' initiative that aims to make India a prominent global manufacturing hub is going to put a lot of demand on the country's academic institutions, especially in the science, technology, engineering and mathematics (STEM) fields to produce the highly skilled graduates. STEM is a curriculum based on the idea of educating students in four specific disciplines — science, technology, engineering and mathematics — in an interdisciplinary and applied approach. The purpose of this study was to evaluate the effectiveness of the STEM program using constructivist approach while teaching science. Here the participant teachers were first oriented about the need, importance and various strategies of STEM activities as well as about the Roger Bybee's 5 "E" model of constructivism theory and then asked to conduct mock classes prior to its implementation on a particular topic of physical science. Major findings of this study show that Stem programme not only makes the learning environment more active and meaningful but also it is the need of the hour at the larger interest of the nation.

Keywords: STEM education, Constructivist approach, Make in India, Engineering.

ST4/122

Science learning through - documentation of wild edible plants

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Abstract

During the process of survey and documentation students were able to collect the information, ample knowledge of the work done after analysis of the data collected, botanical names of the plants collected for which wild edible plants have had an important role in cooking for many years. No doubt, wild edible plants were eaten for their flavors long before it was recognized that they possess various other beneficial properties. Adding wild edible plants to dishes needs experience, judgment and care. The nature of the herb itself, whether it is in the fresh or dried state, and the method and time of the cooking processes are all important factors. Stepping, distilling, infusion or addition at just the right moment may be necessary. The dish may be needed for immediate consumption or for freezer storage or it may need time to mature. Four main botanical families supply the majority of culinary herbs: the timbelliferae, the labiatae, the compositae and the cruciferae. The present study yields 31 different types of wild edible plants, which are subdivided as: (i) Trees (ii) Shrubs (iii) Herbs and creepers. And it reveals that they were used as vegetables and condiments.

Keywords: Survey, Herbarium, Indigenous recipe, Alternative source, Mapping.

ST3/018

Science for all through multiple teaching designs

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Abstract

While marching towards next generation Science, design literacy is an innovative strategy aimed towards the communication of science for all starting from school level to society. The stake holders and beneficiaries of this great task especially the teachers and students engage in hands on to accomplish the goals. In a normal class room structure of students with varying learning approaches it is necessary for the teachers to take up the creative role of teaching designers. Basic science concepts in general involve the different levels of cognition such as knowledge, understanding and application. Hence a monotonous methodology of chalk and talk needs to be replaced by multiple teaching designs targeted towards the learning community. To create a scientifically literate populace curriculum developers must downplay the conceptual structures understood by the scientific elite and instead emphasize the professional teachers at every level starting from school to universities and research institutions to focus towards exciting examples and every day applications of science. This will no doubt create a wide network of science community in reality to achieve sustainable development for the mankind.

Keywords: Next generation science teaching – Learning approaches – Multiple teaching designs – Science for all.

ST2/009

Teaching and Learning of Mathematical Science using GeoGebra in Teacher Education

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Abstract

The purpose of this study is to investigate how GeoGebra can be used to teach the major concepts of angle in primary level and enhance the teaching methodology. It attempts to reveal the participations and affordability of using ICT in teaching mathematics. The focus is to experiment with 60 D.El.Ed students in DIET Pondicherry for teaching geometry using GeoGebra. In addition to that, how effectively they adapt to teach mathematical concepts to primary school students in a time period of two weeks and following discussion and responses were collected through questionnaire. This paper explores what is being taught to them and how student teachers learn the geometrical ideas significant by using this tool. GeoGebra is a vital tool to grasp the ideas in experimental ways of teaching and learning, problem solving method and research-based learning in mathematics. This study concentrates in knowing the learner ability and adaptation of ICT based learning environment. Analysis of the survey showed that D.Ed. students were able to articulate their geometrical imagination and perceptive of mathematical concepts before and after the investigation. Hence, using GeoGebra will make the classroom teaching more effectively and interesting.

Keywords: GeoGebra, Geometrical ideas, ICT, Student teachers, Problem Solving Method.

ST2/058

Assessing the process skill & interest of elementary students towards mathematics: A case study on STEM education in my school

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Abstract

The sense organs are the tools of a learner for construction of knowledge. Lack of experience in hands-on & senses-on activities in mathematics from elementary school creates trepidation among students towards learning of science & mathematics. This leads to incompetency in science process skills in later stage. Science process skills in this context refers to observing, measuring, communicating, classifying, formulating hypothesis, interpreting data, experimenting & formulating models. Lack of scopes for proper use of mathematical instruments & making different mathematical models from early age creates a gap between theoretical knowledge acquired & its application in the field of science, technology & engineering. To address this issue, a qualitative study was conducted among 15 students of class 8 of Alipingal Nodal High School, in a rural area of Jagatsinghpur district in Odisha. To explore the cause of falling academic achievement of these students in mathematics, their process skills in using mathematical instruments & interest towards mathematics were observed. Results of the research indicated that the theoretical knowledge does not reflect in practical work. Introducing STEM education in schools from elementary stage is considered to link the gap between theoretical knowledge & practical work of learners.

Keywords: Hands-on activities, mathematical model, science process skills, interest, STEM education.

ST1/090

To study the effect of blended learning approach on the academic achievement of students in science

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Abstract

Blended learning is a relatively new technology-based teaching approach. Few attempts have been made to use this approach in science education in India. The aim of this study was to assess the effectiveness of blended learning approach on academic achievement in science of students of elementary VII class. This quantitative experimental study involved 70 VII class students, from two schools of Noida region of Uttar Pradesh, India. The students were randomly divided into two groups: 30 were taught by the traditional approach (face-to-face) and 40 taught by blended learning approach (both electronic and face-to-face). The effect of blended learning was evaluated from students' performance in the achievement test. It was found that the achievement of the students taught through blended learning was statistically significantly better than traditional learning. The findings suggest that elementary students, are open to new methods of learning. The blended learning approach is an effective method for teaching science and may be applicable to other school subjects.

ST5/097

Guided Teaching: An innovative design to induce critical thinking in students

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Abstract

Over the last two centuries, there has been tremendous progress in scientific knowledge and it is a

challenging job of a teacher to prepare the younger generation to be able to imbibe that huge amount of knowledge and contribute to the future development of science. But the present science teaching methods rely more on loading the accumulated information to the students and little effort is made towards inducing research-provoking thoughts. This is one of the reasons why most of the students do rote learning to pass the examination. This study is focused on assessing effectiveness of an innovative method of science teaching in which the teacher acts as a guide and helps the students to gather information themselves and raise questions independently. It is strongly felt that innovative methods of teaching science may help in preparing students for future challenges in the field of science.

Keywords: Critical, thinking, learning, research, aptitude, guidance.

ST5/034

Teaching Science for Not- Believing What is seen: An Action Research Project

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Abstract

One of the main objectives of teaching of science is to enable students to ask questions and think rationally. The students should not blindly believe what they see; we teachers need to develop scientific temper amongst the students. The researcher took up the action research project to integrate activities with the science curriculum of middle school to ignite the spark of questioning and rational thinking among students. The researcher carried out the interventions: (1) hands on activities (2) writing science stories (3) dramatization.

ST3/072

Effects of science drama on students of upper Assam-A case study

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Abstract

This study was aimed to investigate the role of science-based drama as a non-formal means of science communication and science popularization. The study also aimed to analyse the present trend of growing interest of students towards science-based drama and the effect of science drama on students‟ academic performance and scientific temperament. 40 numbers of students participated in this study in which the quantitative method was used. The results of the study group indicate that there were statistically significant differences in both the pre-test and post-test data. The number of student participants and number of schools increased in the consecutive years. It was recorded that there is an enhancement in the academic performance and scientific temperament of the students after six months from performance of the drama. Thus, this study showed that the science drama is a very effective tool as a means of non-formal science communication. The study recommends popularization of science drama among the students.

Keywords: Science drama, science communication, science popularization, scientific temperament, academic performance.

ST4/088

Promoting Sustainable Development through Scientific Experiments in Schools

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Abstract

This paper discusses some of the activities carried out in a school setting in order to make students understand the importance of sustainable development and to encourage them to adopt an environmentally friendly living. This has been done with the help of hands-on scientific experiments and activities. The idea behind undertaking such exercises in the school is to motivate students to innovate ways and methods which will help them to live a Sustainable life. The paper emphasizes that today's students are tomorrow's leaders in all spheres of life, and so it is of paramount importance to inculcate environmentally friendly habits and way of thinking in them. This can be achieved by integrating such exercises in the syllabus as well as a little orientation of teachers. The positive results derived from these activities witnessed in the form of students coming out with several innovate ideas for saving energy, managing wastes etc. indicate that these small activities can go a long way in creating an awareness among students about the need of securing and protecting environment and furthering the process of sustainable development.

Keywords: Sustainable development, environmental resources, science teaching, hand on activities.

ST1/107

Uses of mobile and social media to improve skill in learning science

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Abstract

वर्तमान युग तकनीक का युग है, जहां ज्ञान और विज्ञान किसी देश की दिशा और दशा निर्धारित करता है। विज्ञान आज भी जन-जन तक न पहुँचकर एक विशिष्ट वर्ग तक ही सीमित रह गया < जन-जन तक विज्ञान का संचार तब तक ही संभव है जब किसी लोकप्रिय माध्यम से विज्ञान का संचार हो। विशेष भूमिका निभा सकता है "सोशल मीडिया" । सँचर के माध्यमों ने व्यक्ति की सामाजिक स्थिति में बहुत परिवर्तन किया है। स्कूली छात्र-छात्राएँ विज्ञान की कठिन अवधारनाओं को संजने में भी मीडिया का भरपूर उपयोग कर रहे है। एसी अभिक्रियाएँ जो प्रयोगशाला या कक्षा कक्ष में समपन्न करना संभव नहीं, सोशल मीडिया के माध्यम से संभव हो पा रहा है। यदि सोशल मीडिया निष्पक्ष रूप से अपने समस्त क्रियाकलाप को संपादित करते हैं, तो उनमें युवा वर्ग विशेषकर श्रूली छात्र छात्राओं का समाजीकरण स्वस्थ रूप से हो पाएगा। इस शोध का मिख्या उद्देश्य विज्ञान शिक्षण में मोबाइल और सोशल मीडिया का उपयोग कर विज्ञान प्रयोग में छात्रों की कुशलता व दक्षता वृद्धि पीआर पड़ने वाले प्रभाव का अध्ययन करना है। इस अध्ययन के लिए कार्यक्षेत्र शासकीय उत्कृष्ट उच्चतर माध्यमिक विध्यालय, बडौद जिला आगर मालवा म. प्र. की कक्षा 11 में अध्यनरत विज्ञान विषय के छात्र छात्राएँ है। इस हेतु निम्न 2 प्रायोगिक कार्य कक्षा 11 के छात्रों लिए भौतिकी विषय से चयनित किए। 1) वेर्नियर केलिपर्स की सहता से बेलनाकार वस्तु का व्यास मापन । 2) गोलाईमापी की सहयता से उत्तल लेंस की वक्रता त्रिज्या मापन । इस आध्ययन हेतु कक्षा 11 के 40 विध्यार्थोयो का चयन रैन्डम आचार पर के उन्हे दो समूहो में विभक्त किया गया। प्रथम समूह A जिसमे 20 विध्यार्थोयो को चयनित किया गया तथा द्वितीय समूह B जिसमे विध्यार्थोयोका चयन किया गया। भौतिक विषय के चयनित दो प्रयोगो को सर्वप्रथम दोनों समूह को प्रयोगशाला में ले जाकर दोनों प्रयोगों को समझाकर दोनों समूह का प्री टेस्ट लिया गया। टेस्ट में उपकरण की समझ, उपकरण का प्रयोग तथा पाठ्यांक लेने के तरिको का परीक्षण किया गया। प्रयोगिक कार्य की कुशलता में अधिक सुधर हेतु समूह A को पुनः प्रयोगशाला में प्रयोगो को पूर्वानुसार समझाया गया। किन्तु समूह B को प्रयोगशाला में न ले जाकर मोबाईल प्र यू ट्यूब प्र दोनों प्रयोगों की पूरी कार्यविधि को छात्रों को वोडियो के रूप में दिखाया गया । पुनः दोनों समूह का टेस्ट लिया गया । पोस्ट टेस्ट के परिणाम का अध्ययन करने पर पाया की समूह A की तुलना में समूह B जिसे प्रयोगशाला के साथ मोबाइल पर सोशल मीडिया के माध्यम से विज्ञान के प्रयोगिक कार्य में और अधिक कुशलता हेतु अतिरिक्त प्रशिक्षण की व्यवस्था की गई थी का प्रदर्शन समूह A की तुलना में बेहतर रहा। शोध से यह परिणाम सामने आया की विज्ञान में उपकरण की समझ, उपयोग एवं पाठ्यांक लेने के कौशल में वृद्धि की जा सकती है । मोबाइल का उपयोग विज्ञान शिक्षण में एसे प्रयोग या गतिविधि जो स्कूल परिसर में संभव न हो, वहाँ यू-ट्यूब पर उपलब्ध अनिमेसन या विडियो के माध्यम से समझाना आसान होता है।

ST4/012

Conceptual Maps: New First Year Engineering Students Perception on Sustainable Development

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Abstract

This paper analyzes the use of conceptual maps(C-Maps) as tool to measure the knowledge acquired by students when taking a sustainability course. And investigate the student's perception about their knowledge on SD before and after C-Maps. The quantity methods are used such as discussion and observation of first year engineering students in polytechnic college, Tamilnadu. The output showed that most of the students are clueless about SD at the entry level. They did not know how to elaborate and explain on SD. Because, they have not been exposed previously. The definition of SD was not explained successfully by them. But most of them self-interest do involved some aspects of their daily activities, such as energy, power, automobiles, population, placement, lifestyle and so on by the way of C-Maps.

Keywords: Conceptual Maps, Sustainable Development, Perception, Engineering.

ST3/047

Enriching Lives

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Abstract

Science communication is a growing area of practice and research. In many ways it is different from general awareness or understanding of science, scientific culture, and scientific literacy. It is a body of appropriate skills, media, activities, and dialogue to produce one or more of the following responses to science (the AEIOU vowel analogy): **Awareness, Enjoyment, Interest, Opinion-forming, and Understanding**. Fundamental to the ideal picture is the belief that developing scientific literacy should be the focus of science education in the compulsory years of schooling. This paper dwells on the current educational ecosystem which shapes the basic understanding of the concept of science of general masses & the various methods which can facilitate to make "science communication" as a high priority for all citizens, helping them to be interested in and understand the world around them, to engage in the discourses of and about science, to be skeptical and questioning of claims made by others about scientific matters, to be able to identify questions, investigate and draw evidence-based conclusions, and to make informed decisions about the environment and their own health and well-being.

ST5/025

A Study of the Impact of Design Thinking when Employed as a Tool for Designing Textbooks for Middle School

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Abstract

This paper intends to critically analyse the way science communication happens in school. It also analyses the impact of employing design thinking as a tool to bring a change in the structure and design of the contents of the textbooks used for teaching science in middle school. Science education forms an integral part of learning in the schooling years. The fundamental reason why science was brought in into the syllabus is to familiarize with the scientific knowledge and build scientific temper. Irrespective of the career choice each student must be able to creatively use the science learning to enhance the ability to solve problems and make informed decisions. The textbook has a vital role to play in this, it is the carrier of all knowledge and a majority of science communication happens through the textbook. In 1941, Graham noted that "The textbook is an old instrument in learning and teaching processes" and traced the origin of the textbook that can be dated back to the Greek classical era. With the invention of the printing press, textbooks became omnipresent in every school. Science educators unanimously agree that textbooks play an important role in teaching and learning process (Clement, 2008; Koppal & Caldwell, 2004). The paper recognizes that all in not well within science education and that there are concerns related to how the curriculum and the textbooks are designed and used in the classes. It is perceived that changes in the way the content in the textbooks is organised and presented may positively impact the learning.

Keywords: Innovation, school science, science textbooks, analyse, impacts, curriculum, design thinking.

ST5/113

Motivating Youth by Use of Innovative Reinforcement Games

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Abstract

Playing games during teaching learning process (in the classroom) increases overall motivation. Learners become more motivated to learn, engaged in given tasks and pay attention. Apart from this they can also be a great example of classroom management tool. The study examined that using innovative reinforcement games for science communication for different topics in different subjects can increase the achievement levels of the learners. Students of class VII were tested for the same innovative strategy. The investigator used pin wheel game to reinforce the concept of chemical formula. The investigator predicted that using innovative reinforcement games in the classroom during teaching learning process can increase the achievement level of the students. After using pre-test and post-test design for the controlled and experimental groups, the t test statistical analysis was performed which showed the result in favor of the given prediction. The same strategy with different ideas like cards sorting game on structure of atoms, molecules and compounds, board game on simple machine, share the pair, pin wheel for hydrogen and for other topics etc. were used in different classes to motivate the students and making the teaching learning process more interesting. After teaching new topic to the class, if we use these innovative reinforcement games, it will consolidate their understanding and reflection and also will be helpful in making connection with what they already know.

ST3/094

Activity aided group learning to promote effective Science communication in class room

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Abstract

Active participation of all the students in a class has been a problem for me from the beginning. A minority (5-6 out of 30) will be active throughout the period whereas others will be passive listeners. I understood from the internet search (http://www.teachhub.com/top-12-ways-increase-student-participation) different ways to improve student's participation. I discussed this with my Principal and coach and decided to move forward with the topic-Activity aided group learning to promote effective Science communication in class room I have selected class 8 A students since I observed and learned from anecdotal records that they are poor performers both in the class and in the assessments. The class was divided into seven groups and each group was given a particular topic to discuss and explain in the class. Students were in their convenient groups in the beginning, as the lesson progressed the discussion among the groups were serious and they started to frame their own questions to ask and discuss with other groups. Some students showed good sense of responsibility and they started teaching in their groups. Students invented their own activities to explain a particular concept which made other students better understand and enjoy the class.

ST1/050

A Solomon Four- Group Design based Quasi- Experimental Study about the Effect of Uses YouTube based Study Materials on the Academic Achievement of Students

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Abstract

A study was carried out to investigate the impact of use of YouTube (an online internet-based video sharing service of Google) in academic study materials on academic performance of senior secondary students. YouTube is one the important tool of Web 2.0 technology. It was a quasi-experimental educational research, which was designed on the basis of Solomon Four Group among. The total sample size was 44 (22 in experimental groups and 22 in control groups). Simple convenience random sampling technique was used to assign the four groups into experimental and control groups for the study. Researcher developed study materials as per the syllabus of the schools concerned using YouTube videos for treatment to the experimental groups. For collection of data on the academic achievement, Students' Achievement Test (SAT) was also developed by the researcher. Reliability of the SAT was 0.89 using test-retest method. Null hypothesis was formulated, which was tested on the basis of mean, standard deviation and t-test calculated for the data collected on of pre-test and post-test scores of the students using SAT. It was found that experimental group had increased their achievement to a greater degree than the control group. The t-test concluded that difference between the academic achievements of experimental groups and control groups was significant at 0.05 level of significance and null hypothesis was rejected. The findings of the study demonstrated that YouTube based study materials is more beneficial in improving academic scores.

Keywords: Academic Achievement, Senior Secondary, Solomon Four-Group Design, Study Materials, YouTube.

ST5/003

Efforts to Making Science Teaching Effective and Interested

(विज्ञान शिक्षण को प्रभावी एवं रुचिकर बनाने के उपाय)

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Abstract

विज्ञान के क्षेत्र में लगातार विकास हो रहा हैं, परंतु आवश्यक हे कि यह विकास युवा वर्ग में हो क्योंकि आज का युवा ही देश का भविष्य है अतः निश्चित रूप से वैज्ञानिक दृष्टि माध्यमिक स्तर के छात्रों में उत्पन्न होनी चाहिए। तभी हम भावी भविष्य के लिए वैज्ञानिक दृष्टिकोण वाले नागरिक तैयार कर सकेंगे। विज्ञान की शिक्षा, वैज्ञानिक गतिविधियाँ भावी पीढ़ी की अभिरुचि, अभिवृति का उन्नयन कर सृजनातमकता तथा नवाचारों की ओर प्रेरित करती है। इसके साथ ही विज्ञान के अध्ययन द्वारा समुदाय के व्यक्तियों में चिंतन वह तार्किक क्षमताएं, अंधविश्वासों व चमत्कारों की वैज्ञानिक व्याख्या भी की जा सके। इसके लिए माध्यमिक स्तर के छात्रों को प्रयोग प्रदर्शन, रोलप्ले, व चार्ट मॉडेल निर्माण द्वारा ग्रामीण परिवेश व शहरी क्षेत्र के विध्यार्थियों, शिक्षकों व अभिभावकों से कुछ विचार जाने गए तथा प्राप्त परिणामो के आधार पर निष्कर्ष निकाले गए। शोधर्थी द्वारा समाज में वैज्ञानिक दृष्टिकोण उत्पन्न करने की दृष्टि से विज्ञान मेला, विज्ञान सेमिनार, बाल विज्ञान काँग्रेस विज्ञान, क्विज़, चमत्कारों की वैज्ञानिक व्याख्या के माध्यम से विज्ञान लोकप्रिय बनाने के प्रयास किए गए। बाल विज्ञान कोंगरी के जिला समन्वयक होने के नाते न केवल विध्यालय बल्कि जिले में भी छात्रों में वैज्ञानिक दृष्टिकोण वैज्ञानिक अभिरुचि विकसित करने की दृष्टि छात्रों की विभिन्न प्रतियोगिताएं जैसे प्रोजेक्ट निर्माण, टीचिंग एड, चार्ट मॉडेल निर्माण फ़िज़िक्स विद फन, वेदर, रॉकेट निर्माण शिक्षण सहायक सहायक सामग्री निर्माण के कार्यक्रम लगातार आयोजित किए जा रहें हैं विभिन्न प्रकार के प्रशिक्षणों के माध्यम से शिक्षक को विज्ञान पढ़ाने के सरल तरीकों से अवगत कराया गया। पिछले 7 वर्षों में करीब 3000 शिक्षकों को प्रशिक्षित किया गया और शोधार्थी के प्रयास से अब तक तीन सौ तीन बच्चे राज्य स्तर पर तथा 98 राष्ट्रिय स्तर पर विज्ञान की अनेक गतिविधियों में राजस्थान का प्रतिनिधित्व कर चीके हैं। और शोधार्थी द्वाररा यह भी पाया गया की समाज में इससे वैज्ञानिक अभिरुचि का विकास हो रहा हैं । शोधार्थी द्वारा लगातार इस दृष्टि से क्षेत्र में फैले अंधविश्वास तथा कुरीतियों को मिटाने का प्रयास जारी हैं और यह प्रयास आगे भी जारी रहेगा।

ST4/091

Learning science through 5'D approach

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Abstract

The purpose of the study was to provide the upper primary students experience of conducting experiments on their own way by using the resources on their surroundings, learn by self, in peers. The students of class-VII were divided into small groups. Each group was given the material (soils) from their surrounding along with some kit, some chits. They are also supplied with other materials nearest to them and instruction sheets, a table at the end each experiment, evaluation after each experiment, was the uniqueness in this experiment. The lesson plan was furnished with 5'D model (Doing, Discussing, Defining, Deliberating and Developing idea.) The students were given chances to explore their surroundings to learn on their own way in a joyful manner of playing role, preparing some project, self-evaluation. To acquire the 4' Pillars of learning that is learning to do, learning to know, learning to live together, and learning to be. The teacher was just acting as a facilitator. The learning can be achieved through the construction of their knowledge by relating the previous experience to the present facts. As a result, the learning can be done on their own way, with a storming to their brain and becomes permanent.

Keywords: 5'D (Doing, Discussing, Defining, Deliberating and Developing idea.) Model, Explore the Surrounding, Brain Storming, 4Pillars of learning, Construction of knowledge etc.

ST3/073

Impact of Awareness-cum-Training Programme for Science Teachers in Plasma and Its Applications

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Abstract

A national level training program for higher secondary and graduate science teachers was organized in collaboration with NCSTC at five locations in India catering to teachers from all the states of India. Around 250 teachers from across India were introduced to the topic of plasma science and technology and trained in the basics of plasma and its applications as part of this programme. This paper describes the methodology adopted for the training, the hands-on experiments as well as some statistics based on the feedback from the participants of the training programme to describe the impact of the programme. As a result of this training, many of the trained teachers have started holding their own training programmes in their areas using the resource materials provided to them. This is one of the most promising outcomes of this programme, as continuity is the most essential key for success of any such programme.

Keywords: Plasma science & technology, applications of plasma, energy from Fusion.

ST3/079

A Comparative Study of Methods and Technology Adopted by Science Teachers during Science Communication with Students of Upper Primary Level in Haryana

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Abstract

New technologies, innovations, research and developments have made it mandatory to step for science communication in all areas. Teacher being a future planner of a pupil should be responsible for developing scientific temper, decision making ability, technical and innovational awareness, desire for truth and problem-solving ability among his students. Present study deals with comparative analysis of methods and communication for science adopted by computer proficient and non-proficient science teachers. Total forty science teachers of upper primary classes were selected randomly. Self-developed questionnaire was administered to collect the data. Study was performed with three main objectives by calculating and using t test. A significant difference was found in methodology of using teaching aids by computer proficient and non-proficient teachers. There was no significant difference in strategies for real world demonstrations performed by proficient and non-proficient science teachers.

ST5/057

Integration of 21st Century Skills in Science Communication through 'Project 'Explore the World of Energy'

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Abstract

This action research looked at the impacts of Integration of 21st Century Skills in Science Communication through experiential learning. This complete project "Explore the World of Energy" was conducted to study the effect of collaboration in the activity-based learning on the students of primary, middle, secondary & senior students. Five activities during this project were conducted at different levels comprising 195 students. This project shows the great impact of visual literacy, storytelling & role play in teaching learning process for pre-primary children. The researcher utilized the observations, questionnaires, teacher assessments, parents' feedback, self-assessment techniques pre and post assessment tests to gauge the knowledge and understanding of students in various activities organized to communicate the topic "Energy" in science. Through this approach students' academic scores increased, imbibed scientific attitude, social and moral values enhanced, problem solving skills, confidence, communication skills, critical thinking, creativity, interpersonal skills, ICT skills, leadership, teamwork skills are developed. This approach allowed the students to connect their learning to the real-life situations and provide them the opportunity to exchange their ideas in science with interdisciplinary connect with community and across the world through social media.

Keywords: Collaboration, Communication, Visual Literacy, ICT, Social Media, Experiential learning.

ST3/087

Storytelling in Teaching Science

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Abstract

The present study was conceptualized keeping in mind the **learning challenges** that students face in learning of Science. The study aims at **inclusion of storytelling** in Science teaching in order to stimulate the interest of students towards the subject. When the teacher is hammering through a relatively difficult topic in class, one easy way to explain it is to illustrate the concept with a story. Also, it has been observed that when students experience difficulty in learning abstract concepts in Science, they usually resort to **rote memorizatio**n. I have selected a story from the book –**The Forest Nymph**, written by **Kalvi Gopalkrishnan.** The story relates to **parts of a flower** and how the wedding takes place in the plant kingdom.

ST3/044

Student Participative Methods of Teaching: An approach towards increasing effectiveness of Science Education Communication

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Abstract

The paper highlights the need to check progressive decline in performance of students in science subjects as they move to higher class. The paper also suggests various methods that can be helpful in checking this progressive decline. These methods such as flipped classroom, peer buddy system, experimental learning, and project-based learning were used in a classroom of around 20 students for three months. The results of this three-month experiment showed impressive behavioral changes in attitude of students. They showed a lot of improvement in their involvement in science learning in classroom and outside classroom. The students also showed improvement in academic scores which was measured by comparing percentage of marks received by students in quarterly exams that were held before implementation of these methods with the percentage of marks obtained by students after

implementation of the methods. As all these methods included involvement of students rather than one was lecture by the teacher, we can conclude that state of scientific education can be improved by implementing techniques which ensure participation of students.

Keywords: Science education, flipped classroom, peer buddy system, experimental learning, and project-based learning

ST4/037

Influence of Hands on Experiments on Skill Development

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Abstract

A competitive, modern industry requires a specialized work force equipped with theoretical as well as practical knowledge. Professional training is an extended process that best begins in school. We introduce the concept of Vocational and Skill development in the field of physics. This paper reviews the current state of education, skills development, and employment for Indian youth, and considers the challenges facing India's skills development system. The paper discusses recent initiatives to facilitate young people's transition to the world of work. In India young people will soon be entering the labour market, constitute the largest segment of the demographic structure. The majority of young people have limited access to education and training, and most find work in the informal sector. The objectives of the studies are: 1) to train the students to use the materials of daily life and engage by "Learning by doing" which is the key to Vocational and Skill development program. 2) To understand through the review of literature the effect of "Skill development in India" initiative on employability. 3) To analyse through the review of literature if he Skill Development measures will help to bridge the gap of existing skills and required skills of workforce and labour force in India. Thus, this paper tries to find out the effect of skill development of employability and scope for the same. It is important to focus on the development of the skills of Indian labour force to become eligible enough to fit in to the Industry requirement. As reviewed, it is found that only 10% of the workforce receives formal training to acquire skill requirement. But out of the actual industrial training requirement of the 22 million workforces, only 4.3 million of workforces are actually getting formal training. While India has a well-institutionalized system of vocational training, it has not sufficiently prepared its youth with the skills that today's industries require. Thus, to speed its economic growth and take advantage of its "demographic dividend" the country needs to embark on drastic reforms to accelerate skills development. These reforms can lead to important changes, both in the school and institutional level.

Keywords: Challenges, Skill development, Vocational and Technical Education.

ST4/163

Different innovative ways of learning science for sustainable development especially designed for school children

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Abstract

Sustainability is the need of hour. It is intricately linked to habitat, resources, access & distribution and one such central issue linking all of them is water. Billons of people across the world are affected as there is very much stress on fresh water sources. In some area over utilization has led to serious scarcity of water. Ground water level is falling in many areas. River & ground water are increasingly polluted

by industrial untreated effluents & sewage water. In this scenario water plays a very important role for the sustainable development. Just as water, Bio diversity too is an important resource for sustaining life Understanding this diversity is important because many species are likely to disappear if ecosystems are not conserved. The United Nations designated 2011-2020 as the United Nations Decade on Bio – diversity. Various plant & animal species depend on each other & all these diverse species ensure natural sustainability for all life form. So, we have worked on these two important issues-water and Bio-diversity. In this case we have designed and planned some interesting activities for the upper primary and secondary students. We have done a pre and post assessment survey on the water-sustainability programme. We have found that understanding, application and skill level of the students have increased. So, this innovative way of learning science for sustainable development is really helpful. Though the pre and post assessment are not done for bio-diversity & sustainability activity for the lake of time, they are also very innovative tool in learning science for sustainable development.

Keywords- Sustainable development, water-sustainability, bio-diversity & sustainability

ST5/004

Hassle-Free (SCQP) 2 Methodological Communication

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Abstract

Assessment of scientific attitude through communication in students by collecting information about their performance through various methods has been an integral part of the teaching and learning process. Performance tests, exhibitions, project, multiple choice, portfolios, observations, student interviews, student self-assessment and objective type questions are effectively used to assess basic content knowledge in students. The main objective of assessing the students through communication is to check the scientific temperament among them. This paper analysis $(SCQP)^2$ viz. (Social Dimension – Student questionnaire, C- cognitive Dimension - Classroom Activities, Q- Quantitative Q-Qualitative, P - Pen Paper- Psychological Assessments) methodology to measure scientific attitudes in 31 students of Std. VI, VII and VIII in our school. The students were finding difficulty in remembering the periodic table, atomic number, elements and symbols as per their syllabus which made the learning difficult. Action plan was made and remedial classes were conducted by the researcher for 15 days and assessment of students was done by using $(SCQP)^2$ methodology which includes 9 types of multiple intelligence. The scientific attitude was scaled by using Likert scale, Guttman scale and the Q-sort technique. Each and every student actively participated in the research. This was proved effective as revealed from the post-test results.

Keywords: $(SCQP)^2$ methodology, Likert Scale, Guttaman Scale, Q-Sort technique, Multiple intelligence.

ST4/054

Every Science that is Eco-friendly is Leads to Sustainable Development

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Abstract

Environment is the natural surroundings of the people which contain both living and non-living components of nature. Human beings have been practicing a lot of methods for their living in day to day life. Most of these were ecofriendly process. But now a day we are doing many developmental works like industrialization, urbanization and communication etc. which leads to serious problems not

only for human society but also for total environment. So, in this contest we should balance both the traditional practices and modern technique by which sustainable development is possible. This should be the aim and objective of science in current age. This type of practices done in Kisinda High School taking secondary school students in their locality. It is found that almost all student and their families following most traditional and eco-friendly practices for management of their natural resources which we can say sustainable development without hampering our beautiful nature.

Keywords: Ecofriendly, gully plugging, biodiversity, NRM, flora, fauna.

ST1/069

Progress of Computer Animated Package for High School Students in Algebra and Its Efficiency: A Study

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Abstract

The world of science and technology it is education that determines the level of property, welfare and security of the people. The development of human resources is dependent on the development of educational system. Now the world has witnessed four educational revolutions. Science and technology are used under educational technology. A more powerful animation technique often employed in games and educational software is cast-based animation, which is also known as sprite animation. Cast-based animation involves graphical objects that move independently of a background. Cast-based animation simulates movement using graphical objects that move independently of a background “A sprite is a graphical object that can move independently of a background or other objects.”

Keywords: Animation, graphical objects, sprite animation, human resources, arithmetic.

ST4/006

Creating Interest in Science Learning through Research Projects

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Abstract

In our classroom we usually give projects to students, which is a short-term project it mainly focusses on content enrichment. These projects will not create problem solving attitude or interest in science learning. On the other hand, when long-term science research projects are given to students, they frame a hypothesis and design their own methodology to solve the issue. If one hypothesis fails, they construct another and work on that. They also refer books from library and retrieve the relevant information from internet. They collect data from different sources and do experiments by following scientific method. They tabulate and analyze their recordings before arriving conclusion. This act as a strong motive force and help them to leap forward with scientific temper. The objectives of the study are to inculcate scientific temper, to induce interest in science learning, to enhance observation and experiment skill and correlating the impact of project method as behavioural change. Class IX students are selected for the study. Pre-test was conducted to ascertain their interest in science learning. Long term science research project is given to the whole class and at the end of sixth month post-test is conducted. The difference in scores are studied. Correction of pre-test and post-test scores shows that the scientific interest is increased by an average of 8.37. Data analysis shows that the coefficient of variation is decreased by -3.55. It indicates that the science research project method of learning has induced the interest of learning science. Long term Science Research Project is also studied in terms of behavioural changes, marks

obtained in SSLC public examination 2016-17 by project students was 83.4 whereas the other student average is 64.93. Likewise, 80% the project students after completion of X Std selected Science as their subject in next higher grade. It was again proved that project method made the students to learn science in systematic manner with conceptual understanding. On comparing long term and short-term projects; long term science learning. In our country most of the top achievers select software / white collar job as their profession. It the passion on research has been inculcated in their young age, in future they will select Research and Development (R&D) as their profession. It will make our nation prosperous with new inventions.

ST1/065

Using Hybrid Tools for Effective Physics Teaching and Learning

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Abstract

In this paper a detailed discussion is given on how the Hybrid Tools with Computer was used to make 1. A working Model to explain Doppler Effect in Sound 2. Simple Pendulum Experiment with Photogate and coded Arduino to find out the acceleration due to gravity and analysing the error in comparison with Traditional method and simulation method 3. Analysing the phase difference between current and voltage in an AC circuit with Resistance, Inductance, Capacitance and all the three in series with a kit containing the said circuits and coded Arduino and 4. A Web Application developed for the effective self-learning of Senior Secondary level Physics and to take chapter wise/customized online test. The major objectives of using Hybrid Tools are (1) to inculcate scientific temper among the students. (2) to compare the hybrid tools with simulations and the traditional tools in respect of error. The New and Emerging Media discussed above has rightly achieved its goal. An expected transformation for the joyful and effective teaching-learning takes place with all the above discussed New and Emerging Media.

Keywords: Traditional Tools, ICT Tools (with net connectivity), Hybrid Tools i.e. ICT Tools (without internet connectivity), Comparison.

ST4/057

A need for better Environment – Establishing School as a role model for Sustainable Development

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Abstract

“Development is the fundamental characteristic”

Development is the fundamental characteristic of evolution. Every living organism which ever played or playing their role in the ecosystem has thrived to become an example for the quote “Survival of the fittest”, except mankind. Because humans are gifted with the knowledge to manipulate nature for their own betterment. While every members of the ecosystem are struggling for their survival, human race exploited the environmental resources for their comfortable and luxury invariably where they are from. According to historical sources it is evident that they have understood their responsibilities and duties regarding environment protection either they were leading a tribal or autocratic lifestyle. They respected the role of every other organism in the ecosystem and provided space for their co-existence. As centuries passed human obsession for comfort and luxury made human society to set aside their responsibilities towards eco protection and resulted a fragile and degrading environment. If we feel it’s our right to

enjoy the fruit of technological advancement it is also mandatory to follow the rules for Sustainable Development. Our study project mainly aims to establish our school as a Resource Center for dissipating knowledge to others as what they can do on their own level to protect environment and execute their responsibilities in future. We have collected fundamental information from all available sources, made field visits to study and meet resource persons and after many sessions of discussion we have established many initiatives to convert our school premises as an eco-friendly school. We also invited other students and conducted activities, social outreach programs to make them understand their role in protecting environment and expecting them to become a future generation with appropriate knowledge regarding sustainable development.

ST3/078

Science teachers' professional development through Information & Communication technology (ICT)

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Abstract

The role of Information and Communication Technology (ICT), in education plays an important role, especially in the process of empowering the technology into the educational activities. 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. The present study is to investigate the effectiveness of ICT program for teachers in relation to-Views, Knowledge and Use of ICT conducted on 30 teachers. The data are collected through a self-designed questionnaire on the views about ICT, knowledge about ICT and use of ICT by teachers. Based on the responses percentages are calculated and used to compare the result of pre-test and post-test. The study results concluded that training in ICT would be most effective for teachers' professional development. Now more teachers have started using ICT in their teaching learning process. The teachers must have the skills, knowledge and attitude necessary to inculcate ICT in to the curriculum. Without maintaining the quality of teachers no innovation should be expected. The teacher is required to use ICT to enhance students learning and the Govt. should introduce more ICT training programs. ICT can lead to improved student learning and better teaching methods. It is proved that an increase in student exposure to educational ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of "Knowledge Comprehension"· "Practical skill" and "Presentation skill" in subject areas such as mathematics, science, and social studies. The advantages and disadvantages of ICT are also discussed.

Keywords: Professional Development, Information and Communication Technology (ICT), Knowledge, teaching learning process.

ST5/044

Resolving the obstacles of middle school teachers in teaching science using Exploratorium science snacks

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Abstract

The Researcher during her school visits, observed the teachers and found that the teachers have not acquired the Science Snacks skills. So, the Researcher decided to promote Exploratorium Science Snacks among middle school teachers. The main objective of this study is to know the basic of

Exploratorium Science Snacks, to incorporate hands-on Science Snacks to promote Exploratorium, and to integrate the science Snacks with classroom lessons. The study is conducted on a sample of 25 Middle School Science Teachers (625 students) working in Tharamangalam Block, Salem. In order to assess the entry behaviour Exploratorium Science Snacks of the sample a pre-test is conducted and the same may be used for the post-test also. With the help of teachers, a course book, was prepared and prepared materials are visualized. Demonstrated students' video are recorded then it was uploaded in you tube channel. I concluded that Teachers and students are the creation of a Science Exploratorium which would provide students with a hands-on, interactive centre for learning basic scientific concepts through the use of self-developing models, scientific experiments and other immersive learning approaches.

Keywords: Resolving, Obstacles, Exploratorium and Snacks.

ST3/059

Information and communications technology for inclusive education

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Abstract

Inclusive Education (IE) is a new approach towards educating the children with disability and learning difficulties with that of normal ones within the same roof. It brings all students together in one classroom and community, regardless of their strengths or weaknesses in any area, and seeks to maximize the potential of all students. It is one of the most effective ways in which to promote an inclusive and tolerant society. It is known that 73 million children of primary school age were out of school in 2016, down from a high of over 110 million out of-school children in the mid-1990s, according to new estimates by the UNESCO Institute for Statistics (UIS). About Eighty percent of Indian population lives in rural areas without provision for special schools. It means, there are an estimated 8 million children out of school in India (MHRD 2009 statistics), many of whom are marginalised by dimensions such as poverty, gender, disability, and caste. Today, what are the needs and challenges for achieving the goal of inclusive education? How will an inclusive environment meet the needs of children with disabilities? Therefore, inclusive schools have to address the needs of all children in every community and the central and state governments have to manage inclusive classrooms. Keeping in view these questions, this paper presents and evaluates the development of an educational technology curriculum aimed at pre-service, primary education and undergraduates; the focus is on the incorporation of ICT competences for inclusive education. Students were able to monitor the development and implementation of SEVERI tools for special needs pupils in the schools, and plan teaching and learning in SEVERI eLearning environment within their course project work. This was achieved against the backcloth of the baseline learning objectives of autonomy, inquiry, creativity and innovation. In focussing more specifically on the use of ICT for special needs pupils, the aim is to carry into effect the principles of equality, diversity and inclusive education. The research questions considered within the paper are: (1) How the project work based on SEVERI e-learning environment to promote the learning objectives of autonomy, inquiry, creativity, and innovation in ICT implementation in inclusive classroom? (2) How is the project idea based on needs assessment in pedagogical practice? (3) How were the procedures of lesson planning conducted and how lesson plans used in lesson performance were?

Keywords: Inclusive Education, pre-service teacher education, inclusive education, special educational needs, e-learning environment for special educational needs, competences

ST4/103

Application of Innovative Pedagogy for Developing Conception and Analytical Thinking in Physical Science for Upper Primary and Secondary Level in Specific and for UEE in General

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Abstract

The present-day school system emphasizes mainly on informational teaching based on rote learning imparted chiefly through chalk and talk method. Here a teacher is the supreme player in the class-room situation and the students remain as passive listeners. Thus, teachers can reach only about 5-10% students of the class. The most unfortunate part of this approach is that formation of misunderstanding or misconception of any subject; teaching-learning methods that are exercised in the classroom situation are also partly responsible. Teachers' responsibility always remains activating children's mind-set through interesting methods and ignites an enquiring mind within them. It is always seen that children can grasp any subject easily by hand in activities and learning any subject by doing some activity. It has already been demonstrated to be successful to teach the schools' curriculum through hands-on lessons that are actually performed by the students in small groups. This group learning generates a symbiosis among the group members and gives rise to a vibrant atmosphere fuelling joyful learning. Alternate pedagogical approach i.e., learning science by well-planned activities and experiences in a well-engineered programme causes student to rely on the evidence instead of reposing blind faith upon authority where everyone instructs the student what to do and when to do it. These hands-on experiment-based study provides students with a similar set of experiences, so everyone can participate in discussions on a level playing field regardless of their socio-economic status mode. This method gravitates the students towards thinking by requiring interpretation of the observed events, rather than memorizing facts and figures. It encourages questioning of the observed events and the resulting data. It promotes cause and effect thinking. Successful implementation for this method teaching –learning process through administrative method is not possible. More Over the present evaluation system is a very pertinent issues from which we used to mark or grade a student as Excellent, Good, Average or Below Average. We all certainly aware that there are lots of lacunas in our evaluation system in school education. A huge gap is created between the learners thinking abilities, their analytical power, and their level of understanding and their outcome of an examination. We mainly facilitate a rote learning process where a rote learner commonly assessed as high achiever. In our evaluation system there is no place for showing leaner's competencies regarding understanding level, creativity and innovation. If we use the activity based instructional method in our classroom then the so-called low achievers commonly perform well than the high achievers, but we have no scope to record his / her enterprising abilities, entrepreneurship, innovations and creativity in practical field. In our study we have set exclusively understanding based questions in Physical Science Subject Disciplines and collect answers of those questions from the students of age group-12-15 and from their serving experienced teachers. The result was too much interesting that the learners and their teachers perform similarly bad towards these understanding level sets of questionnaires. It is surely enough to prove that there must be some serious loopholes in our understanding level and conception building in our school education system from quite earlier and rigorous orientation of teaching personnel is very much required to fulfil the gaps between lesson transaction and evaluation. We have conducted four days State Level residential orientation workshop (ROW) as a Master Resource Person in Physical Science where 70 serving teachers from Govt. Aided and Govt. Sponsored schools were present as trainee who will act as a Resource Person in their districts to propagate the innovative pedagogical approach using Activity Based Instruction in classroom situation. We have minutely analysed and assessed the Pre and Post Assessment feedback of the teachers and from there we tabulated the marks and represented graphically. The Findings are in brief are as follows: Knowledge Level (KL) in Bankura ROW: i) In ROW Bankura, none of the resource person can update their Knowledge level up to 80- 100%, 4 teachers can update them up to 60-80%,9 teachers can uplift them up to 40-60%, 17 teachers can uplift them up to 2040%. Understanding Level (UL) in Bankura ROW: ii) In ROW Bankura, one resource person can update their Knowledge level up to 80- 100%, 14 teachers can update them up to 60-80%,9 teachers can uplift them up to 40-60%, 5 teachers can uplift them up to 20-40%. Application Level (AL) in Bankura ROW: iii) In ROW Bankura, 3 resource persons can update their Knowledge level up to 80- 100%, 1 teacher can update them up to 60-80%,18 teachers can uplift them up to 40-60%, 7 teachers can uplift them up to 20-40%. Skill Level (SL) in Bankura ROW: iv) In ROW Bankura, one resource person can update their Knowledge level up to 80- 100%, 18 teachers can update them up to 60-80%, no teachers can uplift them up to 40-60%, 8 teachers can uplift them up to 20-40%. Knowledge Level (KL) in Jalpaiguri ROW: v) In ROW

Jalpaiguri No resource person can update their Knowledge level up to 80- 100%, one teacher can update them up to 60-80%, 7 teachers can uplift them up to 40-60%, 13 teachers can uplift them up to 20-40%. Understanding Level (UL) in Jalpaiguri ROW: vi) In ROW Jalpaiguri 2 resource person can update their Knowledge level up to 80-100%, 2 teachers can update them up to 60-80%, 10 teachers can uplift them up to 40-60%, 12 teachers can uplift them up to 2040%. Application Level (AL) in Jalpaiguri ROW: vii) In ROW Jalpaiguri one resource person can update their Knowledge level up to 80-100%, only one teacher can update them up to 60-80%, 15 teachers can uplift them up to 40-60%, 7 teachers can uplift them up to 2040%. Skill Level (SL) in Jalpaiguri ROW: viii) In ROW Jalpaiguri 8 resource person can update their Knowledge level up to 80-100%, only 10 teachers can update them up to 60-80%, no teachers can uplift them up to 40-60%, 6 teachers can uplift them up to 2040%.

Keywords: Orientation, Training, learning by doing, Low cost-no cost materials, Physical Science, geography, Hands on activities, *UEE= universalization of Elementary Education.

ST1/018

Development of Localized and Vernacular Digital Content using Different ICT Tools

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Abstract

The National Policy on Education 1986, as modified in 1992, stressed the importance of ICT in education to improve the quality of education. The significant role ICT in school education has also been highlighted in the National Curriculum Framework 2005 (NCF) 2005. Given the diversity of the country's educational, linguistic and social situation, there exists a need for a wide variety of digital content and resources for different subjects, curriculum, ages/grade levels and languages. This project aims at preparing local resources (Lecturers/Masters/Teachers) to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all-round development of the nation and global competitiveness. Since from decades we are facing shortage of teachers in our education department besides this we don't have subject experts in our schools, this innovation will bridge that gap by creating the digital content from our own subject expert teachers working in our education department. The digital library so created will be made available on zonal level, district level and state level for easy access to every student of the state. Developing the digital library can serve a best tool to provide immediate education (online mode/offline mode) in case of disasters (Earthquakes, Floods or Strikes). In some societies where a girl is derived from the basic right of education not allowing her to go out of her home, this project aims at providing education to such girls making the content available to them both in online or offline mode, thus boosting the "Beti Bachav Beti Padav" mission in our nation. This innovation will harvest the power of ICT in education to meet the challenges of the 21st century and make education relevant, responsive, and effective for anyone, anywhere, anytime and has the potential to let students explore the world in cost-effective and safe ways. Multimedia Videos can bring movement to static textbook lessons. Overall, these videos reduce the learning time it takes students to reach a variety of learning objectives by an average of 30%. Most of schools are facing staff shortage or lacking the subject experts, it is difficult for government to full fill such demand; however, the power of ICT can be utilized to bridge this gape. Using these videos, the student can get all the quality education and will not be affected by the shortage of staff or lack of subject experts by the availability of all kinds of subject oriented multimedia videos.

ST4/124

Use of Patri-"Ekavishati" in Ganapati Festival-A holistic approach of nature conservation

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Abstract

Vakra-Tunndda Maha-Kaaya Suurya-Kotti Samaprabha |
Nirvighnam Kuru Me Deva Sarva-Kaaryessu Sarvadaa ||

A God with the twisted trunks, huge (board) bodied brilliant as thousand suns, bless me with freedom from obstructions and hindrances in all my works and for all times. In State of Maharashtra "Lord Ganesha" is worshiped as "Aadya Daivat". Lord Ganesha is God of intelligence and knowledge. Thus, is worshiped by "Shodarshopchar Pooja". This Shodarshopchar pooja having tradition of offering 21 different 'patris' (leaves) called as "Ekavishati". "Ekavishati" are offered to God Ganesha with 21 separate Sanskrit shlokas. Apart from spiritual significance there is also an element of health consciousness. As all 21 plants are medicinal plants and commonly used in Ayurvedic Medicines. Conservation of these plants was the only reason behind deliberate use of Patri - "Ekavishati" for worshiping God Ganesh by our ancestors. Present study was carried out to create awareness of holistic approach behind conservation of nature established by our ancestors for 145 students of Mumbai region for the year 2016-2017. In this project students have collected information of medical properties of all 21 plants. They have planted those plants in school garden, grown with due care exhibited to other students and society.

Keywords: Lord Ganesh, Ekavimshati, Medicinal plants, environment conservation

ST4/164

Investigation of Simple and Cheap Source of Natural ACID-BASE Indicators through collaborative investigation, to avoid Toxic and Harmful effects of Chemical Indicators present in Laboratory Wastewaters

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Abstract

This study explores sustainable development, Education for Sustainable Development and interpretations of the meaning of collaborative learning. It suggests that collaborative learning can be an ideal method for achieving the goals of Education for Sustainable Development. Chemistry laboratories in schools produce huge amount of laboratory wastewater that contains different types of chemical acid-base indicators (phenolphthalein and methyl orange) which cause harm and are toxic to the aquatic environment. Synthetic indicators are ideal choice for acid-base identification and titrations, but due environmental pollution, availability and cost, the search for low-cost and natural indicators from flowers was started. Promising results were obtained when the natural indicators were compared against standard synthetic indicators. Titration showed sharp color change at the equivalence point. The equivalence points obtained by the flowers extract coincided with the equivalence points obtained by standard indicators. These natural indicators are found to be a very useful, economical, simple and accurate for the said titration. Natural indicator could also act as universal indicator. This entire process was done by collaborative learning method. Data collection method included a pre and post-test survey. Here, teachers had to assume the leadership role in the group work in the classroom and ensure that the purpose and process of collaboration are clearly defined. The result showed remarkable improvement in student attitude and behaviour. The students also popularized the method in other schools too. From the observations of the investigator and the responses obtained by the students, it can be stated that this technique of learning was effective, enjoyable and interesting for students.

Keywords: Natural indicator, Synthetic indicator, Acid-base titrations, collaborative learning.

ST5/084

Group Activity Based Learning in Science

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Abstract

Present article paves one the many ways in a direction to include those students in main stream having low learning level as a result of the ignorance. Case study was carried out on a group of 54 students of 9th standard. In order to investigate the impact of group-based learning, all students were partitioned into three categories based upon their learning level and subsequently grouping was made by taking one student of each learning level. Evaluation of all students in terms of written examination based upon different assignment revealed interesting and encouraging results. Present work highlights the need of precise analysis of students learning levels followed by designing specific strategies to fill the literacy gap. Moreover, the article also shows that along with traditional classroom teaching practice, new innovative methodologies are also required.

ST4/080

Ignite Young Minds

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Abstract

Science in not restricted to self-centred inventions. It is there to create awareness among the humans to take care of Mother Earth instead of running after technology, and as science educators, it is our responsibility to ignite the young minds and expose them to the pros and cons of science and guide them towards sustainable development. Children are swift to learn and are ready to adopt the methods for sustainable development, so we, as the felicitators have to help them. In our school we have basically adopted the following systems for the students so that the effective science learning for sustainable development can be given to them: 1. Recycling unit for waste papers 2. Vermicomposting 3. Rainwater harvesting 4. Sprinklers The students are contributing in the maintenance of these systems and are aware of the positive outcomes. The students are fortunate that they have these systems in the school premises itself, but the same can be adopted by schools which have limited resources. Like: 1. The teacher can teach them to make something useful form paper waste 2. They can be taught to separate biodegradable and non-bio degradable waste. 3. The process of rainwater harvesting can be explained to them by making working models.

Keywords: Recycling of waste paper, Segregation of waste, Disposal of sanitary napkins, Vermicomposting

ST1/079

M-Learning: Anyone, Anytime, Anywhere Emerging Digital Trend in Science Communication

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Abstract

Computers and information technology have increased the opportunities and opened the way to new teaching/learning methods in the education sector. Mobile learning (i.e. m-learning) in the field of school education has come up with many possibilities as well as challenges for all the stakeholders. Rapid growth of mobile network sector has caused the development of a large number of mobile software applications to attract the subscribers. Modern programming languages try to add as much user-friendliness as possible with new attractive features, while retaining their full programming functionality. Therefore, it is necessary to understand whether the teachers and the students are interested or not, and aware to adapt to this new paradigm before deciding to implement teaching learning approaches based on mobile technology. To address the issue, the present study was carried out to find the perception of 50 secondary school regular science teachers regarding the m-learning, and to identify the requirements of science teachers as they relate to new mobile technologies and how they can improve student's learning inside and outside of the classroom. The main findings claim majority of the teachers have positive attitude towards m-learning. The study report the lack of awareness and barriers of language as major challenges to m-learning.

Keywords: Mobile Learning, Information Technology, Science Communication, Teaching/ Learning Methods

ST5/048

Detection of Contaminants in Water; through Low Cost Water Testing Kit

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Abstract

In present study, an extensive investigation of Physico- chemical parameters of water scruples of river Yamuna at Allahabad was carried out. For this, these sampling sites were selected along river Yamuna at Allahabad depending upon their pollution index and usage viz. Kakrahaghat, Gaughat and Arail. Six samples of water were collected during July 2018 to September 2018 at an interval of 15 days from their sites. The observed values of different physico- chemical parameters like, Temperature, Turbidity, alkalinity (TA), Electrical conductivity (EC), pH, Dissolved oxygen (DO) and Biochemical Oxygen demand (BOD) of samples were compared with standard values recommended by WHO (World Health Organization). According to result obtained by analyzing various physico-chemical parameters of Yamuna River in Allahabad city Maximum BOD and DO was recorded at S-3 and minimum at S-2 whereas maximum DO was observed at S-1 and minimum at S-1. On the basis of our experimental result it was found that the values of turbidity, pH, BOD, TH, TA were highest at S-1. Reason of high level of pollution at Arail is attributed to the disposal of untreated sewage and industrial waste water and cremation of dead bodies. Regular monitoring of River Yamuna water quality is necessary to have a check on surface water pollution for the sake of healthy living of human. Correlation coefficient were calculated between different pairs of parameters to identify the highly correlated and interrelated water quality parameters.

ST4/058

A green approach for a green future

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Abstract

Global change is creating enormous challenges for humanity. The rapid population as well as economic growths are bringing environmental problems including air, water, and soil waste disposal to wider areas of the globe. The ecological problems caused by us like worsening climate change, depletion of ozone layer, loss of forest cover area burning examples. At the same time social conditions continue to worsen in many developing countries. It is estimated that more than one billion people now live in poverty without sufficient food, basic education opportunities or any possibilities of political participation. So, we like to think in terms of a "GLOBAL VILLAGE", our efforts to enshrine environment protection and development as the common task and responsibilities of all countries. The international community embraced at 1992 UN conference on "Sustainable development", is the key aim of 21st century. It reconciles environment protection & development together, in this context science must play an important role in the pursuit especially following categories 1. Water 2. Energy 3. Biodiversity 4. Waste. Environment is over exploited beyond its capacity and irreparable environmental losses. Improving our understanding of the effectiveness of developmental strategies in ensuring that no one to be left and the fundamental guiding principle for the implementation of the 2030 for sustainable development. Sustainable development is the development that meets the needs of the present without compromising the ability of the future generation to meet their own needs. (World commission on environment and development 1987). The study deals and developing the concept of sustainable development through Eco-Club & Non-Eco club schools. 50 students were selected each from two schools, who were taught adopting two different methods. One group was taught through Eco-Club methods who were constituted the experimental group and another group knows as control group taught through Non-Eco Club methods. After extending intervention over period of two weeks the performance of both the group was assessed on the difference in achievement mean were found out. It was seen that the students taught through Eco-Club schools perform better than the students taught in Non-Eco-Club schools. Thus, the Eco-Club schools proved effecting in developing the concept of the sustainable development. It was because the control group concentrated on the text book while the experiment group was given treatment using combined methods and approaches which includes road play, field visits, research, enquiring approach and collaboration approach. The mean achievement score was found significant at 0.01 levels which prove the effectiveness of Eco-Club schools.

Key words: Sustainable Development**,** Eco-Club**,** Green Energy**,** Plastic Pollution**,** Cleanliness and Sanitation.

ST1/100

Comparative Analysis of Classroom Learning and Activity based Learning

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Abstract:

Learning science by class room lecture method does not concentrate students towards basic science concepts. If the same topics are discussed by different activities it will be easy to grasp the subject by learners in the present research method, comparative analysis of the two groups which are having 26 students each, had been conducted. Both groups were subjected to class room lecture method and activity-based learning method for Newton's third law, epithelial cell study and acid base identification by self-prepared litmus paper for 5 periods. The results revealed that, the student's involvement in understanding the science concepts is directly proportional to activity-based learning method. It is evident from the present investigation that, the mean value for class room lecture method for Newton's third law, epithelial tissue cell structure and acid and base identification by self-prepared litmus paper is 3,2.88 and 2.7 respectively and the mean value for activity-based learning method for some respective concepts are 5.77,6.44 and 6.44 respectively. Here the gain value is 2.77, 3.56 and 3.74 respectively. The analysis and results are evident that present research on the activity-based learning method is more effective than classroom lecture method learning.

ST4/162

Science Education for Sustainable Development

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Abstract

Sustainable development is the development which satisfies the needs of present without disrupting the opportunities and need of future generation. To understand the practice & policies of sustainable pathway of development education is the only tool. The traditional method can only make the student listen the lecturer which can't be practiced day to day life of pupil. To overcome the problem, we have to educate and train the sustainable practices through various activities done by students which make a strong impression in young minds. To involve the student in learning I include my 5-step learning method. Step -1: Dividing the class into small groups of 10 students each. Step -2: Each group distributed their task to collect data from their grandparents. They have to form a team and have to choose educated senior citizens of their locality to collect data in the given field they assigned to do. Induce them to make a data about the natural resources pf previous kind the pureness of the resources of that time and pollutants of now – a- days. Step -3: Discussion of collect data with a group of experts in their class to clarify their doubts and to meet their urges for development of a better society. Step -4: Use of electronic media to know the hazards of environmental disturbances. This facilitates: 1) To understand the practice and policy of sustainable pathway to develop. 2) To appreciate some of the scientific understandings of sustainable development. 3) To apply relevant aspects of the science and policies of sustainable development to your own practice. 4) To understand how various attributes of sustainability (environmental, economic & social) can be applied by practitioners.

ST5/109

Magical Model of Mathematics

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Abstract

In this paper, we briefly explained the concept of Magic Model of Mathematics. This model proved various activities from class 1st to Graduation classes. In the end of this paper, we explained the benefit of this model to school students. Also, an open problem is introduced.

Keywords: Magic Model, Mathematics, Activities, t-test, mean and difference of means.

ST4/002

Menstruation Cleanliness Management-"Jago Sakhiya"

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Abstract

विश्व स्वास्थ्य संगठन के अनुसार गर्भाशय के मुंह का कैंसर के कुल मामलों में 27 प्रतिशत भारत में होती है और डॉक्टरों के अनुसार माहवारी के दौरान साफ-सफाई की कमी इसकी प्रमुख वजह है। क्यों नहीं इस पर चर्चा होती? क्यों नहीं इस पर भी संवाद स्थापित किया जा सकता है ? आज अगर समाज में इस विषय पर संवाद स्थापित किया होता और इस प्रक्रिया को समझा होता तो महिलाओं

और लड़कियों को जो समस्याएँ आती है वह नहीं होती कितनी यह लड़कियां ऐसे समस्या मानकर स्कूल जाना छोड़ देती है । अधिकांश लड़कियां उन दिनों स्कूल नहीं आती यह एक ऐसा विषय है जिसने महिलाओं बालिकाओं की बेहतरीन उनके स्वाथ्य और स्वच्छता को प्रभावित किया है।

वर्तमान समय में पर्यावरण मैं हुए परिवर्तन या खानपान के कारण बच्चियों को कम उम्र में ही माहवारी शुरू हो जा रहा हैं। हमारे मिडिल स्कूल में 11 से 14 वर्ष की बच्चियाँ पढ़ती हैं । इतनी कम उम्र में ही इन्हें माहवारी शुरू हो जाना और फिर इन्हें कोई वैज्ञानिक जानकारी नहीं होती । हमारे क्षेत्र में समाज मे माहवारी को लेकर कई तरह के अंधविश्वास व्याप्त है। माहवारी को लेकर हमारे ये बच्चे अंधविश्वास से घिरे होंगे तो शिक्षा के लक्ष्य को भला कैसे प्राप्त कर पायेंगें, इसीलिए हमारे विध्यालय में माहवारी को लेकर अंधविश्वास मिटाने व मालिकाओं की उपस्थिति बढाने के लिए एक अभियान चलाया "माहवारी स्वछता प्रबंधन – जागो सखियां"।

ST4/015

Need of Innovative and Technological Learning in Science. [ITLS]

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Abstract

Educators who are committed to high levels of learning for all students and who understand the link between student and educator learning will find guidance and inspiration. Innovative teaching methods in science can substitute the teaching techniques to achieve the goal. We live in a scientific world and the advanced teaching strategies are helping students to discover and explore science every day. If students do not have enough information about the subject, then many answers to questions will be missed. So, do not get learning outcomes. If give enough information, innovative ideas, technologies to the students about the subject, the curiosity of the students increased and the answer to the question increased. The ability of these students has developed. Students found learning outcomes. Effective communication, if done by teachers, Sustainable development will be possible.

Keywords: Science communication, Sustainable development, Technological learning, innovative ideas.

ST1/108

A venture into the scientific world through new and emerging media

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Abstract

In today's competitive global economy where every field of education is increasingly driven by data, digital technologies and innovation, students must explore and comprehend the reason behind their learning. Researching science is to investigate the unknown and explain natural phenomena in terms of the evidences examined by methods of scientific inquiry. Effective communication in scientific terms has helped to increase connectivity amongst various segments of society improving research, mental and physical ability to name a few. Smart class environments utilizing different evolving media like cloud computing, tablet method, online quizzing, video presentations have helped to improve efficient science learning skills, increase creative thinking ability and promote team commitments in learners. Easy to use portable Tablets are gaining importance in school sectors as effective teaching pedagogy. These help to foster communication, interaction and promote multifarious schooling applications for STEM education [1]. Easy-to-create, manage, review and deal live student sessions through designed software has alleviated teaching aptitude. Potential tablets have the prospective to inspire and inculcate innovative learning skills amid pupils and broaden their intelligence domain. Promising responses have been acquired after launching of this technology in upper primary level. Focus remains further to enhance learners' reasoning ability by arranging for more modified application-based technical assessments.

Keywords: Science, media, STEM, Tablet technology, Student creativity.

ST5/068

Learning life science through EDUSAT

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Abstract

Education plays an important role in building of the Nation and is instrumental in bringing about a change in the society as a whole. For quality improvement in education of mass, every citizen has to be covered, without any disparity between the haves and the have-nots, the rural and the urban, the linguistic & geographical regions and more importantly between the genders. Due to advancement of Science and Technology in Education curriculum it needs to update teaching standard and knowledge. To meet the challenges of growing no. of High schools and student population with limited trained and skilled teacher population, the concept of Tele-education comes in the mind of State Govt. It is planned to set up high capacity satellite based interactive network to meet the requirement of various users in education sector, across the country and run it as an application project on Edusat. In Odisha most of the Secondary School are running without science laboratory, equipment and chemicals. Lack of trained science teachers is another big problem throughout the state for which science teaching is affected adversely. In this critical situation learning through Edusat is a boon to the students of Edusat connected School. The purpose of this study is to compare whether Edusat connected teaching or general teaching is more effective in improving student achievement and interest. Both classes participated in two-week Edusat connected teaching and two-week general teaching method unit. It is explored that both the groups were equal regarding their achievement scores in teaching life science before the experiment but after experiment both were different in their achievement. Results revealed higher students' scores, Interest and participation in Edusat teaching unit than the general teaching unit.

Key words: ISRO, ORSAC, Satellite Interactive Terminal, Tele-education, Power point Presentation, Edusat Hub, GSLV.

ST3/050

Poetic Form- A Tool for Improving Teaching-Learning Experience of Physiology Topics for Higher Secondary Students

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Abstract

Plant physiology is study of wide range of processes and functions that plants use to live and survive e.g. respiration, photosynthesis, transpiration, plant hormones, and environmental response & transport processes. These topics are taught to higher secondary students in their Biology syllabus. Students find difficulty in learning these topics due to their complexity. Systematic application of tool of 'Poetic forms' for these topics is significant, as it will bring focused learning, understanding and provide a hook for recall of biochemical reactions. The present paper aims at putting forward tool of 'Poetic form' for learning Kreb's cycle (plant physiology – aerobic respiration topic). As a Biology teacher advantage of employing this technique is, it acts as learning tool for students which facilitate memorization of complex biochemical reactions. The same tool is also used for teaching learning of Calvin cycle, HSK path way, Glycolysis, Life cycles of - Fern, Cycus, China rose, Jowar, Cockroach circulatory system and Human heart and its working.

Key words: Poetic form, Tool of memorization, Kreb's cycle

ST5/049

Quality improvement of science learning by enhancing skills among students through group activities

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Abstract

Collaborative work in small groups is useful to develop skills among students. It is seen that students often turn to rote learning. This is due to several factors including lack of student centred learning. Group work permits students to enhance various skills like planning, presentation, problem solving, communication, observation, analysing, predicting, problem solving etc. This paper presents group work activities are effective for quality improvement of science learning by enhancing the skills among students. Researcher planned group activities for 8th class students for chapter Force and Pressure. Researcher teaches these students last two years. Lack of various skills observed in these students. So as to improve skills planned group activities and guided groups for running activities. Researcher recorded previous and after activity grading of skills of every student in all groups. Calculate average grading of each group for each skill. Last calculate average grading of all groups for each skill. It clearly seen that given teaching model is effective for enhancing skills among students and improving quality learning of science. This teaching model is also used for other subjects. Researcher gave feedback form to all group members. From that it clears that according to all students' group activities essential for improving skills among them and effective learning of scientific concepts. Planning and presentation skills improved up to 100%. Other skills up to 75%. Teacher's role is only as facilitator and student's face to face communication increases. Students discuss in groups share their ideas and find more 2 activities related to their scientific concept from internet and reference books. Active learning of students takes place by this method.

Keywords: Group activities, planning, presentation, observation, problem solving, skills, teaching model, collaborative learning.

ST5/082

Integrated teaching methods prioritizing student's interest: A novel approach

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Abstract

Traditional methods of teaching have been remained to pour truckloads of facts and formulae in the tender minds of children. In the beginning of session 35 class 9th students were assessed, and I found around 35% of the students were even lacking skills like basic mathematical operations and basic science up to 6th standard. So, I tried integrated teaching approach involving basic mathematical skills and basic scientific phenomena linking these with periphery and local arena including day to day activities. The second approach tested here was peer-to-peer learning, and results obtained from these approaches work encouraging and foremost created interest and inclination of the students towards science and mathematics. Geographical aspects also were covered with basic science. Learning level of students was improved substantially, and gradually students transited form one level to the next.

ST4/052

Mossatic Khuss- Replacing Plastic Bottles with Eco-Friendly Bottles

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Abstract

Living in 21 centuries, still using plastic bottle! Plastic bottles are omnipresent- in schools, colleges, offices. Even after knowing the fact that plastic bottle is a hazard for humans. Vices are many- short term memory loss in school students, increase in rate of cancer patients, early maturity period in children. Heavy usage of plastic bottles causes Parkinson, BPA which in turn causes hormonal imbalance and dioxins which are carcinogens. So, to counter the ill-effects of plastic, we prepared a BPA testing kit and replaced the plastic bottles with eco-friendly bottle. In our research, we came across the fact that in olden days there were no plastic bottles. Then the next task was to find out the material used for carrying water, for that we interacted with our grandparents. They told us that they were using natural materials like bamboo stem, moss, khuss (vetiver) and tulsi for storing water, keeping it fresh and for maintaining its temperature. We brainstormed and carried experiments to conclude that we can prepare a bottle in which the outer layer will be of coir as it is water resistant, between two layers of coir there will be moss which would maintain the temperature of water and in inner layer there will be khuss which will keep water fresh. To prepare that bottle we combined all the materials with a natural adhesive prepared by us and the final outcome is this amazing ECO-FRIENDLY water bottle.

ST2/064

Building blocks of STEM education

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Abstract

In line with emerging trend, STEM education was introduced in Navrachana Vidyani Vidyalaya School around two years back. The purpose being to create more interest for science among students, enable them to co-relate with applications i.e. technology, engineering. Further they were required to know - how to calculate, evaluate to reach certain value and perform specific task. The fact was that all (including teachers) were new to STEM. The main challenges were to set up proper LAB, prepare curriculum as per level of students and lastly forming easy instruction steps which students could understand. The STEM classes, topics were done in stages. The initial stage was familiarization with kit, handling kit with large inventory, making simple building blocks. The second stage involved model making of simple machines, powered models, operate these models with computer programme. The third stage had renewables, robotics, 3D printing, Internet of things etc. All throughout this process, focus was kept that students understand the application part. After two years, we could see interest for science had grown manifold among students. With model making their creativity, desire to explore could be noted. Advent of STEM has given a new dimension to science education, made it much more interesting.

ST1/086

Effective science learning and teaching for sr. Secondary students by adapting the medium of scientific journals.

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Abstract

Question-asking is a rudimentary skill, mandatory for the progress of scientific thinking and effective learning. However, our teaching methods does not stimulate and develop this skill. To kindle this quality among students we taught the topic of malaria based on a research paper from a reputed scientific journal which was brought down to the student's level. Since a scientific paper puts forth a research question, reveals the procedures that leads to the answer, and introduces new questions, we endeavoured to inspect

the consequence of studying through research papers on student's capability to pose questions. Students were asked after instruction what they found interesting to know about malaria. In addition, other batch of students were taught the same topic without research papers by traditional method. We scrutinised students' questions, which were asked verbally during the classes. Questions were recorded according to levels of Bloom's taxonomy Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. We found that when the topic was taught with traditional method using text book students tend to ask questions of the Knowledge and Comprehension group only. But when taught using research papers students asked questions that were of higher level of thinking and exclusivity. We recommend that learning with research papers may be one mode to offer an incentive for question-asking by high-school students and eventually leads to higher thinking levels. As a commencement to this practise I would like to propose to the Central Board of Secondary Education to introduce scientific papers as the open book material or project for class 11 Biology.

Keywords: Senior secondary, malaria, Blooms taxonomy, scientific competence, effective learning, inquiry-based learning.

ST5/104

To investigate the effect of innovative teaching methods on the performance of students of XII science B group (biology) at M.G. Jr. College, Ashta, Maharashta

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Abstract

The purpose of this experiment was to investigate the effects of innovative teaching methods on the performance of students of XII Science B group (Biology). The experiment was done on the teaching of Biology subject to the students of XII Sci. A sample of 50 students (boys and girls) was selected randomly out of the population of 80 students in XII Sci B group (Biology) from Mahatma Gandhi Junior College, Ashta, Tal walwa, Dist-Sangli (Maharashtra). Two groups of 25 students each were made. Pre-test of Biology was given to both the groups and the results were recorded. One group was taken as a control group which was taught Biology by the researcher who used conventional method of teaching while the other the experimental group was taught by the researcher who used innovative teaching method. After one months' time of teaching a post-test was conducted.

Keywords: Innovative Teaching Methods, Biology, Mahatma Gandhi Junior College, Ashta.

ST2/067

Can research based pedagogy tools (RBPT) help in building research competence in undergraduate students?

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Abstract

Higher education in India is currently challenged by expansion of the system to cater to the needs of her large youth population. In this process of rapid expansion, she is battling equity of educational opportunities and maintenance of quality of teaching and research. The current study was conducted on a batch of biological science undergraduate students for a period of one semester. Research projects were conducted as a part of the curriculum. A six-step pedagogy was drawn up which comprises of Inspire, Recognise, Require, Refine, Report and Reward. 165 students participated in this program. Research skill development, Research supervision, Infrastructure and funding, Self-learning capacity, time management and presence of research environment were assessed. Questionnaire was framed to collect both quantitative as well as qualitative data from the participants. Research based learning helped

the students to sharpen their analytical skills and improved their confidence to take up higher studies. A significant number of students reported an improvement in communication skills and their capacity to work as a team. The grounds of dissatisfaction were placed on lack of availability of time, supervisor competence, technical support and funding. Our study will enable academicians to plan and organise research-based learning at undergraduate level.

Key words: Research based pedagogy tools (RBPT), biological sciences, Undergraduate.

ST1/027

Impact of Digital Media on Science Learning at Upper Primary Level in Government Schools

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Abstract

Towards Effective Science Learning, a lot of emerging technologies like ICT @ Schools, Smart cum Interactive Boards, Mobile Apps, etc., are playing a vital role. Scientific concepts are now easy to interpret among children to understand & response. So here I can use New and Emerging Digital Media as a tool for effective learning of Science at Upper Primary Level. Most often we handled the class using TLM, doing some experiments from Science Kits, field trips, etc., In this project, effective usage of New Digital Media like Smart cum Interactive Board, DIKSHA App, etc. are taken as a tool for Pedagogy to learn Scientific concepts easily & quickly with complete understanding.

ST3/017

To Develop No Cost Teaching Devices for Science Teaching in Senior Classes

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Abstract

The project aims at simplifying chemistry at senior level (class XII CBSE Curriculum) by helping learners to visualize abstract concepts. Models which are low cost and gives hands on experience were used to teach optical activity to few sections of class XII. Stereochemistry being a difficult topic needs to visualized and hence to make learning joyful and holistic, BALL AND STIUCK model gives a concrete and hands on experience. Usage of such a model helps in visualization, gives concrete idea, enhance understanding, and makes learning joyful since the models are coloured. The learning outcomes were analysed by administering same test to all the sections of class XII, and the results of different sections were compared. The results were compared on the basis of graph and average score of a class. The findings resulting in improved performance. The project further aims at advising usage of zero cost models for rural/remote area using potatoes and coloured threads.

ST5/056

Germination of Seeds: Study of Leaves and Roots

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Abstract

Students cannot visualize what's inside a seed and how a new plant develops from it. By rote learning they know the definition and diagram of – Germination of Seeds but in-depth and holistic understanding of the concept is lacking. There is a topic in NCERT Environmental Science book wherein students have to study the steps involved in preparing the soil before sowing the seeds, the method of sowing the seeds, watching the sprouts appear, comparing the roots and leaves and so on. To provide a hands-on experience and to nurture the spirit of inquiry a practical and creative resolution was adopted which had the elements of Design Thinking Process. Different seeds were sown in the school ground after digging the soil. These were covered with soil. Also, to compare on one part of the soil, some moong seeds were left open. The day wise growth of the seeds, pattern of leaves and roots (reticulate venation and tap root, parallel venation and fibrous roots) was observed and generalizations was drawn. Monocotyledon and dicotyledon seeds- this was the incidental learning that took place. Also, a practical evaluation was done using a working model. Co-operative learning was also done wherein student groups explained the sub-topics assigned to them. The methodology adopted was Experimental and Controlled Group Method. The results and finding were tabulated and analysed to draw conclusions.

Keywords: Germination of seeds, hands-on experience, growth of seeds, pattern of roots and leaves, monocotyledon and dicotyledon.

ST1/051

Cinema in the Classroom: The Pedagogy of Learning Science with Moving Images

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Abstract

Many students do not like science because they find it too cold and objective, devoid of emotion. The teacher can easily get such students interested by bringing cinema into the classroom, that is, by using appropriate film clippings to teach the principles of science and their applications in real life. While the teacher is likely to find ample educational films on different topics on the YouTube, it is a greater challenge and more exciting to use unconventional audio-visual material to teach dry and difficult subjects. These unconventional materials may be clippings of popular films and documentaries, videos circulated on WhatsApp or videos captured by the teacher on her mobile phone. The teacher has to contextualize this unconventional TLM to the curriculum and syllabus through an exciting teaching learning design. The efforts made by the teacher are expected to be rewarded by unexpected learning outcomes. The author of this paper has outlined a pedagogy for creating these teaching learning designs and fine-tuned the pedagogy in a series of workshops titled "Cinema in the Classroom: Learning science through films" conducted jointly by Bichitra Pathshala and Vigyan Prasar. In these workshops 200 teachers have been trained till date. About 25% of these teachers have applied this pedagogy in their respective classes and have got encouraging results. The testimonials of these teachers are shared in this paper. Applying this pedagogy, learning is participatory, interdisciplinary and life centric. The child's creative expression and analytical abilities can be satisfied through activities springing from "cinema in the classroom".

Keywords: Pedagogy of the moving image, unconventional audio visual TLM, popular films, life centric learning, inter disciplinary learning, Teaching learning designs using film clippings, learning outcome, Vigyan Prasar, Bichitra Pathshala.

ST1/095

Imparting Classless Knowledge

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Abstract

For more than a decade, reports from expert panels have called for improvements in science education. There is general agreement that science courses consisting of traditional lectures and cookbook laboratory exercises need to be changed. What is required instead is "scientific teaching," teaching that mirrors science at its best-experimental, rigorous, and based on evidence. To commemorate this NCSM, Govt. of India, has come up with numerous Innovation Hubs of which Innovation Hub, BITM is the 1st prototype. The hub is designed to support and channelize the creativity of the students, by providing raw materials and mentorships. They are exposed to the research and development infrastructure, so that they can make informed choices about their careers. They are encouraged to come up with new ideas related to the problems that ail the society and how to solve them.

Keywords: Innovation Hub, STEM, Grass root Innovation, Class – less environment, Science Stations.

ST4/097

A Model of Nature Diary for Learning Some of the Basic Concepts of Environmental Science at Upper Primary Level

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Abstract

The paper deals on the diary approach in learning and teaching science. The investigator selected the class VII to conduct the study. The sample consisted of 40 number of students among whom half who were exposed to the “Diary approach” Learning of science. The students were supplied with the format of a diary to fill up the blank columns using the clues followed by observation and recording. The school garden was taken as the spot for observation. The filled columns were presented in the class followed by discussion and correction by the students and teachers’. Then question answer sessions were held and the presenter showed pictures and diagrams at the time of demonstration. After two to three weeks of the spot visit, observation recording and discussion in the class room, a post-test was held. As it was a double control and experimental group pre-test, post-test design. The post-test mean scores were compared with the pre-test. It was found that the post-test mean score was more than pre-test mean score, thus the “Diary approach” proved beneficial for the students in learning science. The teacher (the Investigator) acted as a facilitator and mentor to conclude the experiment.

Keywords: ‘Diary approach ’environmental science, field visit, observation and recordings.

ST3/032

Science Communication for Society through Scientific Awareness by Students

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Abstract

In many schools Science educators are working in their schools and communicate the students as well as peoples in their own way. In this paper Author has use many ways to reach up to the society. Students and parents and other peoples have much creativity, curiosity, observation, problem solving capacity, they are working in groups, finding out various solutions & results in their own way. They didn’t get

opportunity to show the skills, these skills are never going to be develop. Whole community suffers from that action. If teacher and school take part with scientific programmes then there will be best results in heath & economic development. It takes more time to convince people than pupils. It will be possible when teachers were trained in their network and they know there are many different ways by which they communicate with help of students. Educator will communicate if he will know importance of scientific literacy. In this paper researcher had put the ideas of science communication he had arranged many such projects since year 2000 continuously in and around nearby villages to develop scientific awareness in students as well as community. Awareness of natural resource conservation and blind belief removal programmes are arranged by researcher in school and in community he gets much support by former students' participation. Researcher thinks that Science Communication for all is everyone's constitutional right. This communication of science will be purely based on increasing scientific attitude among people. Objectives were: To find out problems in society related with unscientific information. Researcher has arranged programmes for science communication for all. The various methods increase the participation & communication with the community. There is no fix unique programme find out in research which is effective science communication way with people for people at local level.

ST4/096

The Effective Activities carried out by Khodad Rural Science Centre (KRSC) to Overcome Addiction Problems at High School Level

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Abstract

Evaluation of human, well-developed or a scientifically improved human, addiction problems, issue of tobacco, statistics of tobacco user, first level substance of addiction, seriousness of tobacco use, activities to de-addictions, activities carried out by KRSC, highschool level activities, questionnaire regarding tobacco use, credit-debit of tobacco addiction, oath concept in sendoff ceremony, sustainable development by de-addiction; Keywords: tobacco addiction issues/problems/statistics, de-addiction activities, KRSC.

ST4/028

Fun making in science-An open education resource through self-learning and collaboration at elementary level

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Abstract

The National Curriculum Framework 2005 presents a changed perception of learner, learning process, learning strategies, curriculum, teacher and evaluation. It has also strongly recommended for substantial improvement in Quality elementary education. However spectacular changes made during the last five to eight years. Quality initiative has its own potentialities in many fields like science and technology due to the multifarious and dynamic nature. UNESCO in 1990-91 sponsored an action research by a team and it is stated that ***Collaboration*** encourages teachers to use resources around them (including colleagues and children) to support them as they reflect upon difficulties that arise in their class room. Hence ***open education resources*** make the learners more autonomous, creative and self-reliant. Open learning system also enhances the achievement levels of the children. The teacher educators and teachers have introduced five sets of approaches for different strategies on reflection and collaboration. These

are Active learning, Negotiation of objectives, Demonstration, Continuous evaluation and Support. Science and Technology both are two sides of the same coin i.e. ***Quality***. **Technology Enhanced Collaboration for improving quality education is the essential parameter in the present scenario**. Science and Technology are closely associated in all levels and in each and every spheres of our life and has brought tremendous changes. Not only class room teaching but also teaching strategies give a shape to collaboration for open education resources, through which the children are more able to understand and acquire knowledge in science and technology. Serious efforts are made at the National and State levels to bring about qualitative changes in science education Subject: with the aim of making citizens scientifically and technologically literates as well as inculcating scientific temperament. National Policy of Education, 1986, the National Curriculum Guidelines of Syllabi (1988) identified seven dimensions-(1) Nature of scientific knowledge, (2) Concepts of science, (3) Process of science, (4) Values underlying science and technology, (5) Scientific interest, (6) Scientific attitude and (7) Manipulation of skills for the development of science Competencies among learners. **"Fun making in Science"** –an open resource has been taken for the children an intellectual space where teachers, children and members of the community can expect collaboratively the common goal to find the means to deepen their knowledge and imagination. The main objectives of the present study is to make children self-reliant, provide SLMs to children, create scientific temperament among children, facilitate Multigame and Multilevel teaching, use SLMs and technology consistently in the class room, make learning more vibrant and updated, build confidence among children for making science experiments, provide learning by doing strategies, bring inquisitiveness of the children, supplement clues for diversified thinking develop team spirit and collaboration among the children. Lastly, this study brings, capacity building of teachers, effective classroom transaction, collaborative learning and sustainability of children and ultimately meet ***"the challenge for ensuring permanent learning of the children.***

ST1/080

Impact of YouTube technology on students' achievement level while teaching science at secondary level

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Abstract

Increased implementation of technology will increase students' comprehension of content and development of skills in such areas as analytical reasoning, problem solving, information evaluation, and creative thinking. The comprehensive use of technology would create a good environment facilitative of learning. This approach would shift education from the classical approach toward the deep-meaning approaches that would help students seek a true understanding of the central principles, themes, and applications of any given area of study. The present study was conducted to investigate the possible relationship between students' use of technology and their achievements in learning science. Out of a variety of technological resources the author has used YouTube as the tool for teaching some of the science concepts to the class-x students. This study observed a significant relationship between students' use of YouTube technology and their achievement level at the secondary level.

Keywords: YouTube, achievement level, technology.

ST4/016

Tools with technique (T2) method for student academic performance and professional development

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Abstract

विज्ञान शिक्षण को अधिक स्थायी, प्रभावी रोचक तथा दीर्घकालिक बनाने के लिए शिक्षा में उपकरणो का प्रयोग करना बहुत आव यक होता है। उत्तराखण्ड के पर्वतीय क्षेत्रो मे ंविद्यालयों की वित्तीय स्थिति अच्छी न होने के कारण विद्यालयो ंके द्वारा उपकरणो को खरीदना सम्भव नही होता साथ ही ये उपकरण महगे तथा नाजुक होते है तथा इनके टूटने का भय हमे ा बना रहता है। बाजार से खरीदे गये उपकरणो से बच्चे प्रयोग तो करते है लेकिन उनका यह ज्ञान स्थायी नही होता। अतः छात्राओ ंमे ंउपकरणो के विकास निपूणता के द्वारा व्यवसायिक कौ ालता विकास के अध्ययन हेतु इस परियोजना को चुना गया। इस कार्य हेतु कक्षा 6 मे ंविज्ञान विशय का चयन किया गया । परियोजना कार्य अध्यापन कार्य के साथ किया गया । इसके लिए विज्ञान के कोर्स को माहवार बॉट दिया गया तथा प्रत्येक पाठ के साथ साथ उपकरण सह तकनीक विधि हेतु अलग अलग प्रकार के क्रियाकलाप तैयार किये गये। क्रियाकलापो के अन्तर्गत जैस ेमॉडल, चार्ट, हरबेरियम, गमले आदि पाठ्यवस्तु के हिसाब से तैयार किये गये । मॉडल के रुप मे ंये उपकरण पहले खुद तैयार किये गये तथा छात्रो को इसके बारे मे ंपूरी जानकारी दी गयी । इसके बाद समूह के रुप मे ंबच्चो से क्रियाकलाप करवाये गये तथा उसका निरीक्षण एव ंपरीक्षण किया गया। परीक्षण से यह निश्कर्श निकला कि बच्चे जब किसी कार्य को स्वयं करते है तो इससे उनके भौक्षिक विकास के साथ साथ व्यवासायिक कौ ाल का विकास होता है तथा टीम भावना से कार्य करते हुए बच्चो में प्रतिस्पर्धा का विकास होता है।

Keyword: उपकरण, तकनीकी, कौशल, व्यवासायिक कौशल, भौक्षिक विकास

ST3/014

Impact of hands-on, heads-on activities on students' achievement in physics

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Abstract

In this paper we shall discuss the method 'hands-on, heads-on' that I took as Action Research to teach physics using low cost hands-on activities in my class. In order to generate interest of the students and ensure the deep understanding of the physics concepts, I create the low-cost unique HANDS-ON exhibits and use them to explain the various concepts in physics to students to further add fun to their learning. In this article I present some of the activities that I used successfully to build capacity of physics students. Initially two sections of a particular grade (let say grade XII) were divided into two groups. One section was named as 'Experimental Group' and the other section was named as 'Control Group'. Firstly, a pre-concept achievement test (CAT) was conducted for students of both the groups based on the previous knowledge and the content shared with them as pre-reading material. During the treatment period, students in both the groups were exposed to the same content for the same length of time. The students in the Control group were taught with the note taking strategy. I explained the concepts via lecture. The students wrote down the explanations and asked questions about unclear points during the instruction. The instruction via lecture was not accompanied with demonstrations, lab-based experiments or any activities. In the experimental group, each student was given related activity sheet and necessary materials. Students followed the procedure and answered the questions given in the activity sheets. Some of the activities were demonstrated while explaining the concepts and some of the activities were performed by the students. After completing each activity, they discussed their results with each other and me. Therefore, the students were actively engaged in hands-on/minds-on activities and discovered both facts and concepts. Finally, the Concept Achievement Test (CAT) was administered to the Control and experimental groups again. All the data gathered were analysed. Results of the study indicated that students who experienced hands-on activities frequently had significantly higher scores of science achievement than those students who did not experienced hands-on activities.

Keywords: Hands-on, Heads-on activities, low-cost unique hands-on exhibits, Concept Achievement Test (CAT), Control Group, Experimental Group.

ST3/039

Action research in Biology teaching through electronic gadgets using social media.

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Abstract

The science related topics are to be communicated from experts to non-experts, for it effective communicative skills are needed. In the present era of information boom there is more need of transfer of correct and result oriented approach between teacher and taught. Scientific literacy includes the transfer of information from science professionals like engineers, doctors, scientists and trained science teachers to government and society i.e. from more skilled to non –skilled or less skilled. It is the responsibility of the knowers of the science to transfer it to those in need of it that's the effective science communication. Gathering information, understanding will be gauged by the positive outcome of science and technology and rejecting superstitions. The knowledge has expanded from text to web. In the class room teaching of senior school students the knowledge may be effectively communicated through the various means of social media, including the modern gadgets like mobiles. Communication should avoid misconception. It should promote clear, interesting and innovative communication. It leads to interest but if ineffective it leads to disinterest. An action research was performed in a group of 17 students separately to communicate the concept of population interaction. The various plants and animal interactions are named but without any photograph. The Google on line, Wikipedia may be used to develop interest among pupil. A questionnaire was given prior and after showing the photographs. The students have shown great interest and enthusiasm in transfer of information.

Keywords: scientific literacy, emerging challenges, action research, effective communication, trust between teacher and taught, social media.

ST5/015

Enriching science education through creative expression of poetry

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Abstract

Everybody is more or less aware of the phobia, compact in the minds of children for science, the reason being the incapacity of the children to understand the meanings and efficacy of scientific terms. Unless this psychosis is neutralized or simplified, no interest can be brought about for the children. Creative expression of scientific observations and principles through poetry can create impulse in the hearts and minds of the children which will pave the way for their inquisitive interest. This will in turn directly or indirectly educate them on different aspects of science. Poetry hones unrealisable taste of science in the minds and unfolds acceptable truth and pleasure with ease. In this context due importance and significance can be attributed to images, symbols, similes, metaphors, satires and even the latest inventions and discoveries, normally available to the children. All of these are commonly useful in understanding, problem solving and decoding scientific mysteries. Moreover, the hard terminologies can be memorized by various poetic devices such as rhyming schemes, alliterations and deliberations. Considering the scientific observations and principles as compared to the object, an appreciable prognosis in the imaginative and creative power can be expected and even achieved. The art of composing poetry in scientific manners can reflect a perfect exposure and resolution to benefit the society. While speaking of the above opinions and suggestions, I feel that these are precisely the eye-catching factors to diffuse the problems for solutions.

Keywords: Inquisitive interest 2- Acceptable truth and pleasure 3- Decoding scientific mysteries 4- Imaginative and creative power 5- The art of composing poetry in scientific manner.

ST3/056

A comparative study of science classroom learning environments of the middle level in selected J & K Board and CBSE Affiliated Schools of Jammu City

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Abstract

The study will compare the science classroom learning environments of selected CBSE and STATE Board Schools of Jammu city at Middle stage in terms of their learning environments and their attitudes towards science. Data will be collected from 225 students studying science at Middle stage in three CBSE and two state Board co-educational schools. To assess the science classroom learning environments Actual and Preferred versions of the Questionnaire *What Is Happening In This Class?* (WIHIC) along with Attitude towards Science will be administered. The WIHIC was developed by Fraser, Mc Robbie and Fisher (1996) to bring parsimony to the field of learning environments by combining the most salient scales from existing questionnaires with new dimensions of contemporary relevance. WIHIC consists of seven scales and 56 items with eight items in each scale (Fraser, Mc Robbie & Fisher, 1996). The seven scales are Student Cohesiveness, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation and Equity. Directed by the research objectives, numerous statistical analyses will be performed such as Cronbach alpha reliability, mean correlation, ANOVA and Mean, Standard Deviations, t-Test, Simple, multiple correlation and regression coefficients etc.

Keywords: WIHIC, ANOVA, LEARNING, SCIENCE, ATTITUDE etc.

ST5/080

A novel process for determination of LCM and HCF through 3D mathematics table

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Abstract

Pupils enter in the confusing stage when they try to calculate Least Common Multiple and Highest Common Factor in mathematics classes. It is an approach to calculate L.C.M. and H.C.F. with the help of a 3D mathematics table with different coloured box. The said table was introduced to VI standard students. Students from different schools were taken as sample for the experiment. At first a pre/test was performed then the 3D table was introduced. Pupil observed the table and they identified the colour used in it. According to colour used in the table, they were asked to say similar colour and find a relation between colour used. It was seen that with the help of the table they were able to identify the L.C.M. and H.C.F. of given two or more numbers easily. The table is found less time consuming and accurate in result, having activity base character. Pupil enjoy the mathematics as one of the favorite game. This child centered, activity /base table provides joyful learning situation.

Keywords: 3D, L.C.M., activity base, colored box.

ST1/071

Innovative Methods of teaching Physics through simple computer programming

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Abstract

In general, it is thought that programming is very difficult and cannot be used in teaching Physics. However, it is extremely simple and can be used to draw graphics and make the students understand the concepts of a topic visually. In this paper, we have shown the animation of three programs namely Projectile motion, SHM and simple pendulum. 1) PROJECTILE MOTION: - While teaching projectile motion, we derive the formula of the path of the projectile and tell the students that the path of the projectile is a parabola. We also prove theoretically that the horizontal range is maximum for angle of projection 45 degrees and that horizontal range is same for angles of projection Ɵ and 90 – Ɵ. Students will enjoy the topic if we can show them all the concepts graphical. 2) SHM: - The basic understanding of SHM as motion of projection of uniformly rotating particle on diameter of the reference circle is visualized very easily by students. SIMPLE PENDULUM: - The vibrations of the simple pendulum with different length and amplitude have been shown graphically for better understanding. We have used PC-Basic (an open Source Software) as simplest programming language to show how various results of different phenomenon can be shown graphically to the students.

Keywords: PC BASIC, PROJECTILE, SHM, PENDULUM.

ST5/106

Clash of Integers

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Abstract

Integers is a new introduction in class 6th Mathematics syllabus which is a foundation concept for many other Mathematical topics. I have observed that students face challenges in deep understanding of the concept. Addition and subtraction of integers is a further burdensome for them which eventually de-motivates their learning process. Through this paper/ concept, they will develop a positive approach for the subject which will help them to have permanent understanding of the concept in an interesting way by using the steps of Bloom's Taxonomy.

Keywords: Clash of integers: A role play resembling clash of clans, Posi-blue: an army of positive integers wearing blue colored dress, Nega-red: an army of negative integers wearing red colored dress

ST4/031

Effective Joyful Learning with Self-Collected Material

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Abstract

In the process of science learning, low cost and no cost materials are used for effective teaching along with experiments. But I observed that if these low costs and no cost materials are collected by the students and perform experiments on their own, they will learn science more joyfully. Especially in the case of below average students who are unable to understand the concrete concepts of science, will learn science simply by doing experiments with their self-collected material. I have selected ix class 54 students for my project and conducted pre-test for all of them. Based on their performances I divided them into 6 groups. Three groups performed experiments with supplied material and other three groups with self-collected material. Then I observed that the 3 groups who have done experiments with self-collected material have performed better than other 3 groups. They also improved their creativity,

enthusiasm and active participation in regular classes. Students mingle freely with other students and maintain coordination and cooperation with others. So, in my opinion this effective joyful learning with self-collected material is more useful for science learning for sustainable development.

Keywords: Joyful learning, Self-collected material, Experiments, Better performance.

ST1/063

To Develop Scientific Skills in Newly Enrolled Students in Our School from Rural Area

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Abstract

In many Zilha Parishad and Munciapal Schools Science educators are working in their own way. Many of those school teaches no science lab is available. Science educator / teaches student orally or by using chart. There is no science equipment available in those school. But the science study is not only orally but it involves the development of important skills. The following skills are included in this. Such as dawing skill, collective and preserving skills, Manipulative skills, dissertational skills etc. It's most important to encourage student to describe what they see in detail, this help them identify properties & make more knowledgeable hypothesis. In this research paper author tried to developed some scientific skills in newly enrolled student in our school of 8th Class. That Student see first the science laboratory in our school. Author arranged **science apparatus exhibition** for that student and arranged some lectures and workshop for the student. Objective were to find out problems in the student to handling science equipment. To develop skill in handling the apparatus of science lab and to inform them about the uses of those apparatus. Author tried various method to encourage those students. Made some practical videos and showed the student. After that author talk a post test and compare between achieved some skills in science laboratory.

ST3/071

Optimizing students' scientific communication skills through higher order thinking virtual laboratory

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Abstract

Communication skill is one skill that is very needed in this 21st century. Preparing and teaching this skill in teaching physical science is relatively important. The focus of this research is to optimizing of students' scientific communication skills after the applied higher order thinking virtual laboratory (HOTVL) on topic electric circuit. This research then employed experimental study particularly posttest-only control group design. The subject in this research involved thirty high school students which were taken using purposive sampling. A sample of seventy students participated in the research. An equivalent number of thirty-five students were assigned to the control and experimental group. The results of this study found that students using higher order thinking virtual laboratory (HOTVL) in laboratory activities had higher scientific communication skills than students who used the verification virtual lab.

ST3/054

Visits to science centres & Museums effect on Science attitude of Students

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Abstract

Outdoor learning is always fun and exciting for students as well as the educators. Inside the classroom the teaching - learning process sometimes become monotonous and boring. So, it is essential to visit the institutions of science communication for public, like science centres, parks and museums to give shape and wings to the imagination of the young and inquisitive minds. The purpose of the present research is to study the impact of visits to the science centres and museums on the science attitude of secondary class students. The sample consists of 50 class 10 students of Kendriya Vidyalaya, Ernakulam, Kerala. The main findings of the study are; there is significant difference in the attitude of students before and after the science exposure visits towards science. Students' positive attitude towards science increased after the science exposure visits. The gender does not differ significantly on attitude towards science before and after the visits. In this paper the significance of the students' visits to science centres and science museums has been highlighted. Visits to science centres and science museums must be encouraged for the young students as well as the general public to explore, experience, and learn science for greater benefit of the society.

Keywords: Science Centres, Museums, Scientific Attitude, Communication.

ST2/035

The Effectiveness of 5E Learning Cycle Model and Simulations on High School Students' Understanding of Static Electricity Concepts

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Abstract

The main purpose of this study was to study the effectiveness of instruction based on 5E learning cycle model and simulations over traditionally designed physics instruction on 8th class students' understanding of static electricity concepts. Thirty-eight, 8th class students of a physical science course taught by the teacher in Zilla Parishad High School, Kambalapally 2017-2018 academic year were enrolled in the study. Students in the group were taught by the instruction based on 5E learning cycle model and simulations. Simulations have potentials to improve students' comprehension of abstract concepts and have opportunities to vary initial values in experiments. Phet simulations which were constructed by Colorado University was used in explanation and elaboration phases of learning cycle. The research instruments were the lesson plan of 5E learning cycle model and simulations of static electricity, the concept achievement test, and attitudes toward physics test. The research was carried out by the one group pre-test-post-test design. The data were analyzed using mean, standard deviation, percentage and t-test for dependent. The results of this study indicate that the application of 5E learning cycle models is effective in improving students' Static electricity conceptual understanding and students' attitudes toward physics.

Keywords: 5e Learning Cycle, Simulations, Static Electricity, Attitudes toward Physics.

ST5/078

Science learning through field visits and specific laboratory experiments in Telangana State Model School, Elaganadal, Telangana

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Abstract

Field trips play a significant role in science learning. They provide an opportunity for students to encounter and explore novel things in a natural environment. The role of field trips in science learning is supported by various studies. Generally, students are restricted to class room environment without any exposure to the real world. This will act as a barrier for their learning of science and as a matter of fact what they learn in the class room cannot be verified by the practical knowledge. In the present study the students of Telangana State Model School, Elagandal are taken to the Lower Manair Dam, Karimnaga for a field trip and from there water samples are collected which are used to test the quality of water in the laboratory. Water could be chemically, physically or microbiologically contaminated. The concept of indices to represent gradation in water quality. It is basically a mathematical means of calculating a single value from multiple test results. The present study aimed at the measuring the WQI of the waters of Lower Manair Dam located across the river Manair at Karimnagar.

Keywords: Drinking water, WQI, parameters, public health.

ST1/081

Use of QR code in teaching learning process.

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Abstract

I heard about QR code but no any idea for how to create QR code. In 2016-17 6th std. Marathi textbook there is given four QR codes. When I scan that QR code video clip play and got details about content. At that time, I understand that from QR code information appears on the phone screen or computer. At that time, I decide to make QR code. After preparing videos on various topics QR codes are developed for the entire class, stickers of those codes are posted on hard copies of textbooks, so that students can refer to scan through textbooks and procure additional information on each topic. Now I get success in this work. All the students said that they understood the concept better than the traditional method. It is a 21st century treasure hunt.

Keywords: QR codes, Scan, Google Play store, YouTube, Website, and Computer.

ST1/082

Digi maths: Impact of technology on mathematics teaching in classroom

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Abstract

Mathematics teaching has been facing the challenge of reducing the fear of mathematics among students at school level from a very long time. An effective teaching and learning of mathematics at this level has been a challenge for school teachers. Technology can be a very effective way of addressing the above problems and improve the teaching learning of mathematics in classrooms. Although effectiveness of technology in classroom depends on various factors but an in-depth study of its implications can help us in improving our pedagogies. In this Action Research study, we tried to find

out the difference in technology enhanced mathematics classrooms and traditional classrooms with respect to students' academic achievement and student motivation. We also hoped to find that how teachers and students can use technology effectively in classrooms and what type of use can be done. In order to do the above study, we took two experimental groups of students studying in Class VI, and taught them the same concept separately in technology enhanced classroom and in traditional classroom. We analysed the performance of the students in both the classrooms by taking written tests and classroom observations. Our analysis showed that technology can enhance student academic achievement and can motivate students to a large extent. A well-planned integration of technology in school curriculum can result in achieving much higher goals of mathematics teaching.

Keywords: Technology enhanced classroom, Traditional classroom, Mathematical Exploration, Pedagogy, Tab Lab, Curriculum, Teaching, Khan Academy, FUNTOOT, CUPA.

ST1/098

Effectiveness of use of 'WhatsApp' in science learning

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Abstract

Nowadays students are attracted and habitual towards the mass media like T.V., mobile, I-pod, computer, websites, Facebook, twitter, WhatsApp, games etc. students are distracted from reading books & study. This leads into unawareness about science books reading and learning. This results in misinterpret/ misunderstand the basic concept of science. Misunderstanding or ignorance of science concept leads into disgusting of science. So, there is poor science communication in society. It is very important to attract the students towards science study and make them interested through their habit of using mobile phone. Students are drowning into use of mobile phone for using 'WhatsApp' for science study instead of gaming, Facebook, chatting, watching YouTube, twitter etc. By grouping the student under 'Educational Science - WhatsApp group' give the opportunity to study, discuss, interact with friends, teachers and experts' parents. By sending information, meaning of new and unfamiliar words, charts, photos, videos, links etc. make them interested for science study. This mode of learning results in awareness, interests about science.

Keywords: Educational science WhatsApp group.

ST5/001

Raise of House Sparrow (*Passer domesticus*) Population by Artificial Habitats

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Abstract

House Sparrow (*Passer domesticus*) belongs to Passeridae Family. It is symbiotic bird associated with human beings. For the past four decades, the House Sparrow population has been declined rapidly. One of the many reasons is Habitat loss. The latest sophisticated houses unable to provide shelter to the house sparrow. As a result, they lost their breeding grounds. As per our observations, habitat loss is the major threat, that not allowing the outcome of new generations. To fulfil the habitat loss, we installed artificial nest boxes experimentally in a colony of the town Jangareddigudem. They adapted to utilize the nest boxes for breeding. The population in the experimental area has been raised from three couples to 80+ in the span of three years.

Keywords: House Sparrow, Symbiotic species, Habitat Loss, Breeding grounds.

ST4/095

A study on effect of activity-based teaching method in general science at secondary level

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Abstract

This research paper is based on the study conducted to find out the effectiveness of activity-based teaching method on the learning of science students. The purpose of this research was also to explore the linkage between teaching technique and student learning. In this study, a measuring instrument was used i.e., achievement test (post-test). The test was based on two chapters of the text book. Students were divided into two groups, that is experimental and control groups. Each group was consisted of 26 students, these groups were equated on the basis of marks achieved by the students in a test of VII class science. The control group was taught by Traditional method and the experimental group was taught by activity-based method. The duration of the teaching for both groups was 30 minutes per day for two weeks. At the end of the treatment, the post test was conducted. The data of the study comprised up of scores of experimental as well as control group obtained on the post-test. The study revealed that the performance of experimental group was better than the performance of the controlled group of the students. Overall, the findings of the study revealed that the activity-based teaching was more effective than the Traditional method teaching of science at Secondary level.

Keywords: Activity based teaching method. Traditional method, Experimental group, control group

ST4/140

Umariya Jille ke Sharhi V Gramin Khetra ke U.Ma. Vidyalayin Vidharthio ki Bhautiki Uplabdhiyo ka Tulnatmak Adhyanan

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Abstract

भविष्यगामी चुनौतियों और संभावनाओं में शिक्षा को विचारसंपन्न दर्शन, कर्मसम्पन्न क्रिया और उप्लब्धि संपन्न आदर्श बनाने में विध्यालय और परिवेश का छात्र जीवन पर गहरा असर पड़ता है । उच्चतर माध्यमिक विध्यालय स्तर पीआर ही छात्र पृथक विषय के रूप में भौतिकी से रूबरू होता है । परिवर्तनशील समाज की निरंतर बदलती आवश्यकताओं हेतु भौतिकी के विध्यार्थियों एवं शिक्षको हेतु विविधतापूर्ण गहन अधिगम प्रणाली आपनाना अनिवार्यता बनती जा रही है । भौतिकी से संबन्धित अवधारणाओं के विकास व अधिगम का संबंध प्रत्यक्षत: भौतिकी विषय शिक्षण के साथ भौतिकी विषयांश शिक्षण (निम्न कक्षा का विज्ञान) के परिवेश के संयोग से होता है। अत: उच्चतर माध्यमिक के विध्यार्थियों के भौतिकी उपलब्धि स्तर का तुलनात्मक आकलन प्रस्तुत शोध का विचारणीय बिन्दु है।

न्यादर्श स्वरूप उमरिया जिले के शहरी व ग्रामीण क्षेत्र के उ मा वि सतर के कुल 200 विध्यार्थियों, जिनमे से 100 शहरी क्षेत्र व 100 ग्रामीण क्षेत्र से सम्मिलित किए गए है । विध्यार्थियों की भौतिकी विषय की उपलब्धि मापन हेतु श्री एस एन एल भार्गव द्वारा निर्मित एक प्रमाणीकृत परीक्षण "भौतिकी उपलब्धि परिक्षण" का प्रयोग किया गया एवं निष्कर्षस्वरूप पाया गया की शहरी क्षेत्र के बालकों और बालिकाओं की भौतिकी उपलब्धियों में कोई सार्थक अंतर नहीं पाया गया जबकि ग्रामीण क्षेत्र हेयु यह अंतर सार्थक है। शहरी और ग्रामीण क्षेत्र के बालकों की उपलब्धियों में भी कोई सार्थक अंतर नहीं पाया गया किन्तु बालिकाओं की भौतिकी उपलब्धियों में सार्थक अंतर पाया गया। शहरी क्षेत्र की बालिकाओं की भौतिकी विषय की उपलब्धियाँ ग्रामीण क्षेत्र की बालिकाओं की भौतिकी विषय की उपलब्धियों से अधिक पाई गयी जो परिवेश के प्रभाव को स्पष्ट करता है।

ST5/036

Kinesthetic learning in physics

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Abstract

Students learn best when learning is active, when they are involved in what they are learning. When Children use all their senses it helps the brain create pathways that makes it easier and quicker to retain information. Students learn and understand best from what they see, touch, feel and manipulate. Learning by doing is a concept within economic theory by which productivity is achieved through practice, self-perfection and minor Innovations. Hands on Science Activities and Investigations are essential components of any early childhood setting, and they help lay the foundation for lifelong learning, enhancing child's ability to think critically and healthy development. Hand's on is important in the classroom as it involves the students in Kinesthetic learning which involves understanding of concepts with learner's body movement to gain new or extend existing knowledge. "Hands-On is Mind's-On" Is the best way to engage child's brains by having them move their hands as when you combine activities that require movement, talking and listening it activates multiple areas of the brain and more the part of brain we use, more will be information that will be retained. It is rightly said Busy Hands, Busy Brains. "Children acquire scientific knowledge by construction and not by instruction". When a student works with his own hands, he gains confidence and insight into fundamentals that stay with him for the entire life.

Keywords: Kinaesthetic, Retained, Innovations, Activate, Manipulate, Enhancing.

ST5/119

Innovations in science communication

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Abstract

Science and technology are embedded in virtually every aspect of modern life. For this reason, it is important for the students to integrate information from science with their personal values and other considerations as they make important life decisions, such as those about medical care, the safety of foods, a changing climate, etc. Science education is one of the most important subjects in school due to its relevance to students' lives and the universally applicable problem-solving and critical thinking skills it uses and develops. These are lifelong skills that allow students to generate ideas, weigh decisions intelligently and even understand the evidence behind public policy-making. Teaching technological literacy, critical thinking and problem-solving through science education gives students the skills and knowledge they need to succeed in school and beyond. Science communication is part of a science teacher`s everyday life. To be effective teachers must learn how to communicate effectively. Science communication is any activity that involves one person transmitting science-related information to another. A science teacher helps answer questions; they inspire their students to seek out the answers for themselves. Our paper includes a research aiming to find the difference in the learning outcome of the students by the use of innovative ways of communication. The result showed the differential in the performance of the student before and after the use of innovative ways.

Keywords: Respiration, Anatomy, Multimedia, Critical investigation, Scientific temper, Sonification.

ST4/117

To Study the effectiveness of use of mobile & mobile supported activities in learning of the topic - health for std. 8th students

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Abstract

The new upgraded science syllabus as per CBSE norms for std. 8th in Maharashtra was being implemented from 2018- 19. This syllabus is based on knowledge constructivism. Hence it is student centric & activity based. The researcher is working in Govt. Ashram School since last 12 years. The researcher in tribal ashram school was facing many difficulties & problems in teaching & learning of topic health & diseases in the syllabus. The researcher realized that there was an urgent need of new method/ way of teaching & learning for the topic. The use of mobile & mobile supported activities was done for the topic health & diseases. The effectiveness of method was tested by a test as a quantitative tool. The effectiveness was verified by statistical tools such as mean, standard deviation & t value. Also, qualitative tools like observations of researcher & feedback & opinions from the students clearly suggested the usefulness of the method. The method is simple, easy, no cost & local need based. Therefore, can be used for other topics in science & for other subjects also.

Keywords: Health & diseases, mobile, supported activities, local need based.

ST2/052

STEM – The gateway between science & real world

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Abstract

Starting science class with Hands-on activity puts students with different learning abilities in receptive state of mind. A STEM lesson; that connects different science concepts to Real World, helps students develop deeper conceptual understanding. In this STEM lesson, we described the activity to explain “Voltage Current Relationship and Verification of OHM’s LAW” included in 9th Grade Syllabus. This activity includes the concepts like 1] Chemistry Atomic Structure of Metals/Non Metals 2] Physics Voltage Current Relationship 3] Maths Calculation of Current and Resistance value 4] Electronics Introduction to Electronics Components, Circuit Assembly, Concept of Series/Parallel Connection 5] Electrical A.C./ D.C. voltage , Power Consumption and Electricity Bill Calculation 6] Software Developing Software Program to calculate Resistor Value using JavaScript Block Editor The tools used in the activity are developed by our own organization “KNOWHOW LEARNING” with brand name “ROBOTECH” which are Safe, Easy, Durable and Low Cost. We hope the tools and lesson will provide opportunity and learning environment to nurture our Young Indian Talent as Creative Thinkers who will contribute in Nation Building. Here we mention our inspiration, our experiences with students; photographs and statistical analysis; reflection on the effectiveness of the lessons; and recommendations for future work.

Keywords: STEM, Multidisciplinary, Real World, Learning by Doing, Hands-on.

ST1/110

Find out the Reasons for the Mathematical Subjects to be Difficult during the Study of Class IX and to apply it

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Abstract

In this research, the students of Class IX studied the reasons for the difficulties of mathematics to find and apply it. The students of Class IX took pre-test and post-test. From this, I used to remember the use of knowledge, constructivism and practice in nature, in memory of the mathematical symbols Activity, tables and Formula rule properties.

Keywords: Process, add, table.

ST5/059

Enhancing Achievement through the Social and Emotional Learning (SEL) in Mathematics Instruction.

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Abstract

To cater to the needs and challenges of 21st century, the disciplinary and cross-disciplinary knowledge of mathematics along with the social and emotional skills are needed for the students. Numerous programmes have been developed to increase the math achievement by providing different instructional strategies. But few programmes have developed by taking care of developing the social and emotional skills as an inseparable part of their mathematics instruction. "The Social and Emotional Learning (SEL) in Elementary Mathematics Instruction" is such kind of programme that can be effective by building SEL competencies to drive student learning and engagement. This study was designed to evaluate whether the adapted version of the aforesaid SEL programme enhances the students' Attitude and their achievement in Mathematics. For that, a quasi-experimental study was designed with a pre- & post-test over the course of nine months in one academic year. The students of Class V (Fifth Grade) of a Bengali medium Government sponsored co-educational school in West Bengal were selected as the participant of the study. The data were analyzed through Product Moment Correlation and t-test. The results reveal that the students who were provided SEL in their Mathematics Instruction were shown significance improvement in the achievement and their attitude towards Mathematics.

Keywords: Social and Emotional Learning (SEL), Mathematics Instruction, Emotional Intelligence, SEL Competencies, CASEL.

ST5/060

Impact of low cost apparatus from locally available material for teaching science-A study

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Abstract

Quantitative and qualitative methods were used to examine the relationship between teachers' attitudes, beliefs, and their perceptions of student's attitudes in teaching science, gender differences in student's

patterns of science learning, and teacher's perceptions of scientific knowledge, about scientists and Science and Technology. A sample of 80 teachers who are handling secondary level selected randomly in Warangal Urban and Jangaon Districts. The quantitative results suggested that teachers that perceive their student's attitudes as positive and hold no prejudices about scientists or negative opinions about Science and Technology tend to perceive no gender differences in student's attitudes. The qualitative analyses concerning teacher's beliefs about scientists and Science and Technology principally confirmed all quantitative findings. The further exploration of the relationships between teacher's attitudes and their beliefs concerning scientists and Science and Technology, however indicated that the results are two-edged.

Keyword: Science, Science and Technology, Science Equipment in Laboratory, Teaching Material.

ST4/109

Science Learning for Sustainable Development

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Abstract

Sustainable Development is the development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs. Science learning plays an important role in sustainable development for future. Proper learning was suggested for making future better able to understand the integrated nature of the ecological and societal changes involved. It would teach them how to actively participate in shaping society for a sustainable future. The goal of this paper is to describe an activity about organic farming and to know how to affected students' perceptions concerning sustainability. The participated students are from 8th class. We collected and analyzed students written records and focus group discussion after questionnaire activity is over. Data analysis was inductive. This study shows importance of bridging science and sustainable education. The questionnaire activity made the theme relevant for the students and they were engaged with searching relevant information, thinking about it and way to present.

Keywords: Science learning, Sustainable Development, Organic Farming.

ST4/078

Learning Physical Science Is More Effective Through Experiential Approach

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Abstract

The purpose of the study was to provide clear knowledge to students of class IX with experience of conducting experiments. To conduct activities by themselves by using low cost & no cost teaching learning materials. The students of class-IX were divided into small groups and each group allowed for conducting activities. They were also provided with clear instruction sheet. The lesson selected by the students was planned according to 5E model (Engagement, Exploration, Explanation, Elaboration and Evaluation). Classroom observation schedule, interview schedule and achievement test schedule were used as tools. The investigator followed the single group Pre-test & Post-Test design to see the effect of the method on the achievement of the students in physical science. The students' participated in the class were carried out activities, examine the question raised by the teacher, generate their own questions, interact with each other & record their observations. Data were collected from student and subject teachers. The investigator found that this method enhanced the achievement level of the students. Almost all the observers opined that the process of activities done & students' participation, classroom management use of TLMs was highly effective.

Keywords: Experiential learning, Low Cost & No Cost TLMs, Experimentation, Activities, 5E, model.

ST3/081

To Assess and Develop Physical Environmental Awareness among Primary School Students

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Abstract

The need of environment awareness in primary schools is recognized by all but there are little practical efforts at ground level. The objective of such efforts is to make students aware, acquire knowledge, and develop attitude, skills and abilities and to make them able to overcome real life environmental problems. In the backdrop of this, present project work was carried out as the children are foundation of our society and it is necessary to develop awareness of environment primary school students. In order to carry out project work the four government primary schools of Amritsar district from rural, urban and birder area were selected. Whole procedure was divided into 6 phases for smooth completion of the project. A questionnaire was developed to check the environmental level of the students. This questionnaire was given to sample students at start of and at end of this project work. The results were compared taking percentage of marks obtained by the sample in test. On reviewing the results, the P value was found statistically significant. The two tailed P value was less than 0.0001. By conventional criteria this difference was considered extremely significant. The daily improvements in the improvements in the behaviour of students regarding environmental issues were observed. It was found that at the initial phase of the project students were having a little knowledge about environment as at the final phase of project.

Keywords: Acquire knowledge, develop attitude, conventional, questionnaire, statistically significant

ST4/040

Enhancing Research Skills Development in Secondary school

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Abstract

Development of research skills in science communication is well acknowledged gap in school training but the constraints that accompany research make it challenging. This paper reports the experience of school students in learning research skills, awareness, problem solving approach and challenge acceptance, for the solutions of basic problems faced by females during menstruation and finding Innovative solutions for community welfare and sustainable development through project work. This was a cross sectional and research-based study done on 45 schools' girls and 25 females of rural areas. A predesigned pretested and structured questionnaire was given to 45 girls of class X (Amity International School) to check their knowledge and awareness about menstrual health and hygiene. The data was collected and analysed and given complete deep-rooted knowledge and awareness on menstrual health and hygiene including impact of material to be used, cot, remedial action, and thus solving a social and environmental issues. After 30 days a post-test questionnaire was given to the same set of girls. The data was collected and analysed which showed that in pre-test only 42.27% of schools' girls were aware while in post-test 87% girls had developed greater knowledge, awareness, critical thinking development of problem solving skill, working on solutions and acceptance of challenges etc. Out of all, 25% girls have taken the initiative to start a project on sanitary pads and done research work and testing for 10months under the guidance of a teacher and scientist to replace these high, cost plastics based, non-biodegradable and chemically treated sanitary pad with their low cost, herbal treated, biodegradable, cotton sanitary pads which every female can afford. For spreading awareness and testing of herbal sanitary pad, students have done many surveys in the rural areas. A pretested and structured questionnaire was given to 25 rural females to check their knowledge and awareness about menstrual health and hygiene. Data was collected and analysed. School girls understood their problem and gave information, why menstrual health and hygiene is important and build a communication bond with unknown and under privileged rural people to break societal taboos. 25 females were given herbal

sanitary pads to use, made by students. After 30 days a post test was given to the same set of rural females. Date was collected and analysed. According to pre-test data only 25% of females knew about menstrual health and hygiene and in a post-test, we found a major difference of 85% in their knowledge, awareness and importance of health and hygiene and their confidence level. They were very satisfied after using our herbal cotton sanitary pads which is very low cost and environment friendly. I found that a better way to cultivate research skill is to take problems from their life and surroundings, aware them, guide them, develop interest in them to solve the problem and accept the challenge. By doing so we hope students will create a new culture of science communication by research at school level. Through this study and research project students had not only solved female problems with their innovative ideas but also developed research skills, awareness, critical thinking, analytical skills, confidence, problem solving approach, challenge acceptance, social skills, concern towards environment and understanding the importance of health and hygiene in every female's life and save our mother earth. This is a small effort of students to make a big difference in their as well as life of all females and make a happy and healthy India.

Keywords: Awareness Research Skill, Adolescents, Menstrual Health and hygiene, rural females, Herbal Sanitary pad, Sustainable Development.

ST4/017

Design of a new index to measure the basic science knowledge of a high school student

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Abstract

Science Education in the government schools in Assam is quite deteriorating in the recent times. In this research, attempt has been made to develop a scale or standardized index to check the basic knowledge of science among the students in high schools. A science-based set of sixty questions is given to selected students, and are allowed definite time duration to answer the questions. The questions are out-of-text, having one-word answers and are based on basic observations of events taking around the society in which they grow. The question ranges from easy to conceptual, based on memory, thinking and cognitive types. The test can apply to any high school students and the scale can reveal the normal scientific knowledge of the student. Results in the pre-test and post-test for most of the students show a remarkable difference. In the past test, the students showed improvement with respect to the factors considered in conducting the test.

Keywords: Science IQ, standard test, science knowledge.

ST4/016

Innovative practices in teaching-learning process of science at secondary level

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Abstract

When, how and why do computers come to be used in classrooms? What are the factors involved in the processes of innovative scientific technology integration in schools? How and under what conditions can these practices generate processes of scientific innovation? Attempts to answer these questions have resulted in a number of studies that have identified the uses of technology and its role in the educational innovation processes in relation to science. The convergence of computers, microelectronics and communications constitute the information and communication technology for the purpose of acquisition, processing, storage and dissemination of information. ICT can be an effective and innovative tool to practice in teaching-learning process at secondary level by deconstructing Digital Infrastructure, Computing and Education Technology. The purpose of this study is to analyze what is

happening at schools regarding the integration and use of ICT in science and to examine teacher's perceptions about what teaching and learning processes can be improved through the use of ICT. The use of digital technology at secondary level can enhance motivation and academic ability in students. In particular, it shows that the contribution of ICT to the improvement of science learning is higher in the schools that have integrated ICT as an innovation factor.

Keywords: Information and communication technology, ICT, Digital Infrastructure, Computing and Education Technology, digital technology.

ST1/093

Friending my learning: Facebook as a learning tool

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Abstract
This qualitative research explores how social media used by higher secondary school students of science stream for educational science communication contributes to learning in the setting of Mumbai city. The findings show how students and teachers can use social media as educational scaffolding tools in formal education context. Data collection included focus group discussions and individual interviews along with analysis of a specific Facebook group. The analysis revealed how the explicit educational (e-) content when embedded in Facebook leads to engagement of student members. The research also indicates the engagement with (e-) content on such groups leads to learning.

Keywords: Digital natives, Connected learning, Social media, Facebook.

ST5/089

Evaluation of subject knowledge of student by new innovative method.

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Abstract
"Science education has been considered as the crucial investment all over the world because of advancement of science and technology in all walks of life". Learning of science is an intellectual for truth in nature. From so many years, human was finding out so many innovations by science for living life and enjoy. Science innovation is very important part of our journey of human life. Day by day human suffering many new problems in their surrounding so science knowledge is helpful for solving that problems. That's why science learning process is very important. In science, several small or big concepts, principles. Science has to correlative with other sciences subjects and with other aspects to make a better impact on the students learning. So, it is duty of teacher to give proper knowledge to students of science communication. The process of teaching learning is to be more effective when the teacher performs well. Today all parts of the world can connect via internet and communication technology we have use of theses modern technologies for effective teaching and enhance the students' learning. The knowledge explosion creative and innovative method of evaluation and learning. For collaborative learning, we have use Google Docs as Google form for evaluation of student and teaching learning process. Though Google Forms are designed to be used as a survey software, but we have found that it works for quiz reviews very well. Google Forms gathers responses to form fields and sends that data to a Google Sheet. It's not complicated, but the beauty is that if you are working with multiple collaborators, all the data goes into the same place and in the same format. In which we create quizzes on topic and activities, this is an exciting time for collaborative learning education. For checking the effectiveness of this method, we compare this innovative method with traditional evaluation method. Then we got positive result for this new design innovative method for evaluation. By this new innovative

method, the give exam at their home at any time. Students really enjoyed it. They don't take any tension of exam. We made different types of quiz. Also, we got data or result of quiz easily. For study learning goals such as attention, reading skill, motivation, thinking, exploring, evaluating of student. These learning activities can be so easily for me. By this new innovative method increase curiosity in student, automatically make them hardworking, self-learning and work oriented. Google form is continuous and comprehensive evaluation.

Keywords: Google form, science, evaluation, innovative method

ST2/050

Hands on learning mathematics through origami

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Abstract

Why we study mathematics and why the students fear in Mathematics is the most important things to the Mathematics teacher to understand the learners that why the emerging students sometimes shut down in the face of fragile content knowledge and frustrated with questions and not sure how to proceed. There are many ways to overcome frustration and encourage learning mathematics and one of the best methods what I have succeeded in my teaching is learning mathematics through Origami. How Origami "the art of paper folding" can be utilized in teaching of mathematics is my main motto. The objectives are 1) to develop the curiosity among students by learning mathematics through Origami. 2) It gives the child hands- on experience of shapes, angles, lines and geometric. 3) It teaches the child the art and craft of mathematics modeling. 4) It teaches precision in a gentle and beautiful way. 4) Paper is accessible and cheap. Through paper the child can make healthy mathematics where they make their own models, problems and conjectures. I have adopted the experiment on teaching mathematics through Origami for the students of Class VIII and Class X. I selected the students having low standard into two groups A & B of each class. In each group I took 30 nos. of students. I taught group A of each class through problem solving and another group B of each class through Origami for the same topic for Class VIII, the lesson carried by me was Algebraic Identities and for Class X was the Circumference and Area of a Circle. After teaching I evaluated both groups of each class. The average score of Group A of Class VIII= 12.6. The average score of Group B of Class VIII= 17.3. The average score of Group A of Class X= 9.8. The average score of Group B of Class X= 14.2. It was found that teaching through Origami, the students are developing curiosity on learning mathematics and scoring better as compared to general teaching. What Origami says I mean that to convert a paper into a recognizable shape is a challenge to the intellect and it can condense into a candid lesson in mathematics, so that we all the teachers should apply the Origami in our teaching to develop eagerness in child and make learning permanent?

ST4/062

Sustainability and science learning: Perceptions from high school students involved with a role of playing activities

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Abstract

The purpose of the study was to explore relationship between Science Learning and Sustainable Development among High School students. The methodology of this research was descriptive and correlational. Development UN high school 200 students (100 Males and 100 Females) from Ayodhya and Sultanpur city of Uttar Pradesh were randomly selected to participation in the study. Administered to all participants for data collection. Both (Males and Females) have shown strong science learning.

Female students who have shown strong science learning, scored higher on various dimensions of science learning for sustainable development as compared to their male counterpart. Results of the study showed that high school students scored over average on science learning. Positive correlation was found between science learning and sustainable development.

Keywords: Science Learning, Education for Sustainable Development, Instrumental Strategies, Science Students, Classroom Management.

ST4/082

Shiksha ke Liye Prabhavi Digital Shikshan & Vigyan Sanchar Shikshan

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Abstract

अब ग्राम पचांयत स्तर पर एक सीनियर स्कूल करने व उस पंचायत की अन्य स्कूलों की देख रेख का जिम्मा सीनियर विद्यालय के प्रधानाचार्य को दे दी की अब इनका स्तर सुधरगेा और वास्तविकता भी है कि प्राथमिक कक्षाओं में विषय के निष्णात् अध्यापक महानुभावो ंको एक दिन छोटी कक्षाओ ंमें भेजें जो छोटे बालकों को लर्निंग बाइ डुईंग LEARNING BY DOING सिद्धांत पर शिक्षण दे, बालक उसे सीखे व स्वंय करके देख अपने कॉन्सेप्ट को क्लीयर कर सके। मैने भी कक्षा 5 – 8 तक की कक्षाओ ंमे ंजा कर गणित व विज्ञान विषयों की कमजोरी दूर करने व बालको के दिल व दिमाग से इन विषयों के डर को भगाने का प्रयास किया है। एक दिन कक्षा 5 मे ंगया व विज्ञान की पुस्तक से उनके द्वारा पढ़ा गया पाठ दिन रात कैसे बनते है, सर्यू के चारों ओर पृथ्वी घूमती है इसी से दिन रात बनते है? इस पर बालको से प्रश्न पूछे सभी निरूत्तर थे। सोचा अध्यापक जी ने भी मेहनत कर पाठ पढ़ाया है लेकिन बालक पूर्ण रूप से समझ नही पाये है। अतः सोचा कैसे बालकों को समझाया जाये की पाठ का पर्ण सार समझ आ जाये। हमे ंकक्षा में नवाचार का प्रयोग करना चाहिये, मैंने बालकों को कक्षा मे ंउनकी सहभागिता से प्रायोगिक ज्ञान कराया। प्रायोगिक कार्य :– एक बालक को जलता हुआ बल्ब लेकर बिठा दिया गया तथा कमरे में अन्धेरा कर दिया गया, अब एक दूसरे बालक को बल्ब वाले बालक के चारों ओर स्वयं घूर्णन गति करते हुए वृताकार पथ में घूमना है। बाकी सभी बालक इस क्रिया को देखेंगें। परिक्रमा पूरी होने तक बालक प्रत्येक क्रिया को देख रहे है। अब इस प्रायोगिक क्रिया से बालकों को प्रष्न पूछे गये – 01. बीच में बल्ब वाला बालक कौन है ? – सर्यू, 02. वृताकार पथ में घूमता बालक किसका रूप है? – पृथ्वी, 03. स्वयं भी घूमता बालक किसे बताता है? – पृथ्वी का अपनी धुरी पर घुमना, 04. रात दिन कैसे बनते है? – जब बालक का बल्ब के सामने है वहाँ दिन व दूसरी तरफ रात होगी। इस प्रकार पाया की पहले बालक इन्ही प्रश्नो ंके उत्तर को समझ ही नहीं पाये जबकी अब स्वयं ही देख कर उत्तर तुरन्त दे रहे है तथा एक नहीं लगभग सभी बालको ंका प्रयास था। इस प्रकार पाया कि पाठ का पुनः सारांष बताने पर 85 – 98 प्रतिशत तक छात्रों को पाठ समझ आ गया। अब तुरन्त प्रश्नों के उत्तर लिखाये गये 80 प्रतिशत छात्रों ने उत्तर सही लिखे। अतः स्पष्ट था कि पाठ को नवाचार के माध्यम से प्रायोगिक विधि से समझाया तो पाया कि बालक सीख भी रहे है, पाठ में रूची भी ले रहे है तथा उत्तर भी सही दे रहे है जबकि पर्वू मे ंसभी निरूत्तर थे। खेल – खेल में सभी अपना कॉन्सेप्ट क्लियर कर रहे है।

ST1/009

Teaching Physics through Broom Ends

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Abstract

When do we teach physics? I don't think physics is taught in schools and colleges? What we teach is only the grammar of physics, year in and year out. We teach only formulas & units of several topics. Then the students solve problems to make sure that the grammar is understood properly. To understand the fundamentals of physics is very difficult for all students. It is a big problem for the students of my nation. So, cause of this problem I make some very innovative apparatuses from broom ends. They are very beautiful in look & very cheap. These are constructed under phenomena of "Easy to make & easy to understand. The cause of selection of broom ends, its outer surface is very hard, smooth & natural. It is found in so many varieties like diameter & thickness of the wall. It's very easy to cut & to join. Durability & shining is also a cause of use for teaching learning material. Some Genera of Broom—

PHOOL JHADU—Festuca aristida SARCANDA—Saccharum bengalense MUNJA -- Saccharum Munj PHUL-JHADU [Nepal] --Thysanolaena maxima. So, I make approximate 14 working & static models of physics from broom ends like – 1) Double pan micro balance, 2) Weight in air, 3) Single pan micro balance, 4) Circular motion of a circle is always double to its linear motion, 5) Comparison of density of liquids. Rectilinear propagation of light, laws of reflection of light, motion of transverse waves etc. I thought these instruments will be beneficial to understand the logics of physics. They can make them from easily available brooms.

Keywords: Broom, Microbalance, Lever, Ends.

ST1/006

New and Emerging Media for Effective Science Learning

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Abstract

The empirical study was conducted to observe the impact of new and emerging media on science learning. Science Learning is the fame for school going students as well as teachers or trainees. This research paper succeeds to estimate the effect of new technology in learning area. This research paper depicts the role of cloud computing, MOOCs, interactive webpages, blogs, podcast and twitter. The satisfaction is also indicated in this study. The suggestions and further studies and their scope also evolved in this paper.

ST1/028

Let's Find a 4th Idiot in My Class

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Abstract

Through this project my basic intention is to identify the super talented students of mine who not only excel in studies but also utilises different aspects of the modern technology in developing a complete module of different topics of my subject. The modern technology used here are flash animation, Java based interactive Simulation, Animation, Mobile camera, Movie maker, Power point presentation and html test. Here the students are given a free hand to bloom their own creativity along with fun filled learning. At the end the students are judged by their peer group through interactive self-evaluating MCQ based questionnaires. Here the role of a teacher is only a facilitator and the main work is completed by the students each one of whom are given a specific duty and a team of three are assigned with a lesson. The best outcome here is development of a quality resource of topic wise study cum evaluation material at the end of the session.

ST4/010

Pollution Caused in Deoghar: Remedial, Measures and Consequences

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Abstract

Natural resources represent all the materials present in nature, most of which are used since the dawn of the human civilization. These resources, extracted from terrestrial and aquatic systems can be biotic or abiotic. The abiotic components are rocks, mineral and soil and biotic components which includes the flora and fauna. Geo-environmental, socio-cultural and economic condition plays an important role in their availability, stock use or misuse. Today our demands for development put pressure on natural resources beyond the nature's capacity to restore and replenish. Development is required and needed for our economic and social well-being, and hence extraction of resources is inevitable. However, we must aim for a planned development and sustainable use of our resources so that we have enough of these for generations to come. As far as human being is concerned, sources or our food are from plants and animals. In true sense, agriculture comprised of crop and animal husbandry led to development and invention of not only different agro- technologies for production, like fertilizer, pesticides, hybrid seeds, irrigation technologies to name a few but also of different technologies for post-harvest processing and preservation. Despite all such technological inventions, production per unit of cultivated area failed to provide quality food for all. Conversely, some of these technologies led to degradation of environment, land, soil, surface to degradation groundwater that led to health and environment hazards. The sub-theme will cover studies on different aspects of natural resource extraction, processing, value addition, or any other activity that leads to optimization of natural resource uses for various purposes. It shall also cover activities related to deferent identification of natural resource for better uses of already available natural resources for betterment of environment and human welfare.

Keywords: Natural Resources, Geo-Environmental, Agro-Technology, Cultivated Area, Human Welfare.

ST2/018

Math Lab

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Abstract

For our sustainable growth and development science along with technology engineering & mathematics (stem) important elements. STEM education encourage student to understand and embrace science and technology that affects them in their daily life and to attempt problems that may even extend to their larger arena of the community. We sometimes view learning as something separate from living. But children often learn the most from simple by model making of mathematics. The critical formulae can be remembered easily. The main objective is to clear some basic concept of mathematics through learning by doing. Which help the students to learn with joy? Using simple material like ply wood, steel wire, plastic colour ball sticker student can make STEM literate. The algebraic formulae cannot be visible. They can saw the formulae by geometric model. For the formulae of arithmetic progression, the required materials are ply wood, steel wire, colour round plastic wire colour tap. 1) I took rectangular ply wood frame and the plastic ball was arrange in 10 line and proof t_n, s_n of AP. The sum of natural number is also found out. 2) In another rectangular frame steel wire and plastic ball are arrange to make the formula of sum of odd number. 3) By taking cube and cuboid we can found out s_n of square and cube of natural numbers. Learning of STEM education in math lab help the students to learn with joy. It is also sowing the seed of interest that could grow in to an existing& rewarding STEM carrier. Using math lab, the student can be made STEP literate. Sharing their success stories would go to a long way in making STEM literacy for tomorrow. It will spread the mathematical temper in the society.

ST2/033

Ideation, Making and Using Science Project- An Innovative Approach to Teaching Learning Process

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Abstract

Science education aims at making children capable of becoming responsible productive and useful members of the society. By creating opportunities for learners to develop knowledge, skill and attitudes through ideation, execution of idea in science project, experimentation, observation and application a better scientific temper can be inculcated among learners. Before going to making science project we have to find out problem areas which we are facing in our day to day life as necessity is the mother of invention. Now a days in hazardous environment health problem is common to all. Modern men are going to gymnasium for physical exercise. But it is not easy for women, person having disability and people of low income group to get gym facility. During adverse weather people are unable to reach the gym. People are so busy that they don't find adequate time to go to the gym. To solve problems, I have prepared a modified innovative multipurpose, energy yielding exercise unit called "Green Gym". Taking into mind to make an exercise unit, I have visited so many gymnasiums and rehabilitation center and designed my required gymnasium unit. Then I collected low cost & non cost materials like 6*4*3 wooden bar(4nos), 5*4*3 wooden bar (2nos), 1.5 wooden roller (12 nos), 3*4*1 wooden plate (9nos), unused scooter bearing (24 nos), rickshaw bar with bearing and hop, 3 tin with cement for weight, one collar made from sponge and resin, one big bearing, one foot plate 1*2*1 with acupressure points, two small dynamo, one cycle dynamo, 2 handle with acupressure point. One large spring and two circular wooden plate of diameter of 9 cm to solve the common problems like blood pressure, paralysis, spondylitis, obesity, Back pain, abdominal pain etc. The units like treadmill, abdominal, exercise unit, muscle fitness device, neck traction device, parallel bones with swing, waist fitness device, hand and finger exerciser, paralysis exercise device are united in a single gym. People of all region, all age, and every family member can use it. It needs no specific technical training. AT the time of exercise, it helps in producing electricity which is a green energy and can be stored. This project is an application of science, Mathematics, and technology and warmly accepted by all. It is very much beneficial to the teacher-Students on tinkering and teaching of rolling friction, elastic property, conservation of energy, principle of exercise, laws of gravitation etc. It is a model of great social and educational implication.

Key Word: Ideation, Scientific temper, Hazardous environment, Acupressure point, Tinkering.

ST2/037

Transition to STEM education

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Abstract

Being a teacher, I always used to find different way to make my class more interesting and enable students to learn easily. I also take care that students are able to apply the learning things in day to day life. During my classes I always feel that regular classes with bookish knowledge unable to design literacy for science communication. In our school students learn science in a way as learning as history. They know but are unable to apply in day to day life. I first heard about STEM in a program of TEDx talks. So, I thought to apply in my classes. So, I tried with my class X students, starting with small experiments. First students felt difficult because they were habituated with regular teaching style. Steps which I have taken in the class are…1) Giving general information about the topic, 3) Demonstration, 4) Giving some simple problem or task to do with different devices (like resistence , magnent etc), 5) Analysis the data got by students, 6) Generalization of the results by students, 7) Finding the common theory/Postulate/Any law/ Mathematical expresion

behind the spacific task, 8) Comparison with the books, 9) Application of that theory/Postulate/Any law/ Mathematical expresion in day to day life. After that minimum 3-5 worksheet were given to each group of students. The results are in the 1st one month was bad but slowly after the developing the interset of students in science, results also showed improvement.

ST4/055

Embracing Design Thinking Facilitates Better Science Learning for Sustainable Development

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Abstract

This paper explores the potential of design thinking methodology for effective science learning. Design Thinking process was conducted with the help of VII Class students of AP Model School, Patipalli, using the steps- Empathy, Define, Ideate, Prototype and Test, to find solution to a potential problem and found that design thinking process when implemented properly through a collaborative solution-oriented approach using abductive reasoning empowers students with extra skills set that are needed for sustainable development. Design process can help our students to enhance the knowledge and skills that will make a difference to society with the ability to innovate and add value to society.

Keywords: Design Thinking, Sustainable Development, Collaborative Solution Oriented Approach, Abductive Reasoning

ST4/023

Science Learning for Sustainable Development

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Abstract

"Health is Wealth". Health is one of the most important fact need for all human beings. Raising awareness about sustainability is an urgent need and as such education for sustainability has gained relevancy for the last decades. It is acknowledged that science education can work as an important context for education for sustainability. The goal of the present paper is to describe a role-play activity about the good health and well-being and to know how it affected students' perception concerning sustainability their degree of involvement and the type of competencies manifested while involved in the activity. This is qualitative study, adopting an interpretative orientation. Participants were 35 students in 8th elementary education (average age 13 years old). We collected and analysed students' written documents and focus group interview after the activity was over. Data analysis was inductive. This study shows the importance of bridging science and sustainable education. The role-playing activity made the theme relevant for the students, and they were engaged with searching relevant information, thinning about it, and ways to present and to support their position. By proceeding this way, students became implicated with the theme under discussion and learnt about the curricular topic energy. The results of this research provide important about students towards science and could be used by science and educators to development of science curricular and science books.

Keywords: Role Playing, Zero Hunger, Good Health and Well Being, Clean Water and Sanitation.

ST5/016

Science Communication through Hands-on Activities by Innovative Math Kit

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Abstract

Science Communication is an important segment of Education in any society. The present information and knowledge-based society is the outcome of the science communication imparted in schools and colleges. For affective science communication it is very important to develop creativity, curiosity, critical thinking, logical reasoning, problem solving ability and scientific outlook among the students. These qualities can be well developed among the students through innovative methodology of science communication by the use of Hands-on Activities (Improvised and Innovative Teaching Aids). To inculcate scientific temper among student's emphasis should be given on "Teaching and Learning by Doing", because science /Mathematics can be properly understood and communicated only when we "Do" science. The proposed paper attempts to provide a scope to the students to explore, analyse and to communicate scientific and mathematical skill, aptitude and literacy with the help of innovative Teaching Aids. Students at school are generally taught Geometrical Theorems (Mathematics) without any visual Teaching Aid. The different theorems on circle, triangle, quadrilateral, arc, chord, and tangent lines etc. are orally explained and communicated by the teachers. The students have no way to understand visually the geometrical theorem and verify the result/ conclusion established by it. It is also very clearly described by a Chinese proverb which says, "I READ I FORGET, I SEE I REMEMBER, I DO I UNDERSTAND." In the light of this proverb I have invented a Mathematics kit which includes 14 devices to communicate visual understanding of Geometrical Theorems to make the students understand the theorems practically, easily and effectively, which also reduces the rote memorization and undue stress among the students. I have conducted a survey by using the Math. Kit (Teaching Aids) on 50 students of 10th class to note the effectiveness of Hands-on Activities (Teaching Aids.) Students were divided into two groups of 25 each. First group (A) of 25 students was taught for one month with the help of Math. Kit (Teaching Aids) and the 2nd group (B) of 25 students was taught for the same time and for the same syllabus of geometrical theorems orally. A written test of 50 marks was conducted after one month for both the groups. It was noted that the students of group (A) got greater marks as compared to marks got by students of group (B). So, it is concluded that the understanding and retention of the geometrical theorems by the students based on oral teaching is comparatively lower as compared to the teaching of theorems based on visual Teaching Aids. So, this Math. Kit is very much useful for the teachers and students of 6th to 10th class to make them understand and communicate Geometrical Theorems practically, easily, effectively and also to improve the class results. The detail of 5 out of 14 Teaching Aids is given in the paper.

Keywords: Science Communication, Geometrical Theorems, Creativity, Scientific Temper.

ST1/048

Role of Media in the Science Teaching Learning Process in Kendriya Vidyalaya of Bikaner Dist. With Special Reference to Kendriya Vidyalaya No. 3, Nal Bikaner

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Abstract

In today's scenario, people are spending their time in internet and surprisingly, students have consumed a lot of time of using social media sites. Not only students but also educators, and they belief that media with internet will helpful for the future of Indian education system. With the usage of social media, students no longer continue to remain passive absorbers of knowledge but become co-producers and contributors. For example, blog or you tube; they are the resources in science education which are linked to other sources. I observed implication of media to the science education process and found about numerous ways, positive or negative. The results of the research showed that both students as well as educators assessing the internet with media. On the basis of positive result showed by the research, I proposed the use of media with internet in schools whole heartily, so that we engage and run our education system with emerging technologies in ways not previously possible.

Keywords: Blog, internet, education, you tube.

ST4/060

Study on Students Perspective on In-Depth Learning of Technology and Science Education

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Abstract

Students find science relevant to society but they often do not find school science absorbing enough. Earlier studies have indicated that a student's interest in the subject matter leads to deep learning, so the student is able to apply what he/she has learned, to a new situation (Krapp; 2002). This paper is a result of the study based on a survey done on approx. 1050 students of IX and X grade. This study was aimed to understand student's perspective to enhance understanding and create interest to enable them to have an in-depth learning of the subject. The survey involved 1050 science students of Amity International School, grade IX and X. In the questionnaire, pupils were asked to state various questions for which they answered by ticking the appropriate box on a four-point scale, the extreme categories being 'Not interested' and 'Very interested'. Information collected from data will prove to be beneficial for the teachers to make remedial changes in their current pedagogy. This dynamic approach will create individual and situational interest for science as a subject, in the students.

Keywords: Pedagogy, Survey, Science Study, Deep Learning.

ST5/099

(1) Sommerfeld Atom Model (Rosette Model)
(2) Images Formation by Convex Lenses

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Abstract

Sommerfeld Atom Model (Rosette Model)

According to Bohr electrons revolves around the nucleus not in all possible orbits. So, Bohr model could not explain the fine structure of Hydrogen. But Sommerfeld gave another model that the electron can evolving elliptical orbit. This is demonstrated by this innovation. By this way Sommerfeld was explain fine spectrum successfully.

Images Formation by Convex Lenses

We go to study about lenses and its properties, we must across the difficulty to learn Image formation of lenses. For example, in convex lenses the students difficult to understand the position of the object, position of the image, size of the image and nature of the image. But I explain this easily by play way method using a stick only.

ST1/008

Augmenting Students' Involvement in Learning through Storytelling: A Case Study

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Abstract

A good number of students are taking admission in post-graduate level technical programs with having commerce backgrounds. It is difficult to understand technical courses easily for them. It ultimately causes in increasing dropout ratio for the institutions. If students complete the program somehow then

also there is poor employability of the students. Currently around 20-30 percent pass out students are only employable and placed. A systematic case study is carried out to comprehend the problem and to propose the solution for the same. Novel practice of storytelling is adopted during the teaching of technical courses in the classroom to augment the students' involvement in learning since last two years. Four courses are completed in the two years. Every week one or two stories were told to the students on various topics. Performance of more than 240 students are observed till now. Students' performance is measured by academic and placement results. Extracurricular activity involvement and social activity participation are also considered and monitored. Oral survey is also carried out to understand the outcomes of the practice. The result of the adopted practice is promising. The practice has been found to significantly improve student performance, employability, and social activities participation.

Key words: Storytelling, student learning, case study, student involvement.

ST1/003

Gnomon Sundial: A Tool for Effective Learning and Science Communication

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Abstract

Gnomon Sundials are a type of horizontal sundials, which when in true north direction gives time of that moment accurately by observing Gnomon's shadow caused by sun. Its two types- Fixed and Movable Gnomon Sundial were constructed and demonstrated to students. The longitude correction and addition of an analemma to Movable/Human Sundial to rectify time variation (due to eccentricity of the Earth's orbit and obliquity of the ecliptic) aroused deeper of interest among students as it gives time in resonance with watch. The time correction due to the factors caused by motion of Earth and Sun varies from) to ±16 minutes. This Human Sundial is a unique and rarest Sundial of India. Both the Sundial's are highly accurate and quite effective as an aid for science communication to layman. These are also acting as tool for effective learning of science as students learnt several basic concepts of motion of Earth and Sun, cause for day and night, solar time and standard time, theory of sundials and equation of time. They acted as researchers and studied concepts with great interest and motivation. The observation skill, solving ability and spirit of co-operation was greatly amplified with this activity.

Keywords: Gnomon Sundial, Analemma, Equation of Time.

ST3/061

Science communication for all through board games

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Abstract

Education should always be not just about knowledge imparted in classroom in any given subject but should also trigger interest and curiosity in the subject being taught so that the learner gets motivated to learn more. In the 21st century, the skills that need to be imparted beyond the subjects are the 4Cs – Communication, Collaboration, Critical Thinking and Creativity. Play has been found to be the natural form of learning according to many eminent child educators and psychiatrists. Learning facilitated through board games offers such a platform where learners have a fun environment interacting with fellow learners where they get to learn in a fun filled way. Play2Learn leveraged these and conducts workshops for middle school children where games from different subjects are facilitated by instructors and the young learners get to learn. Humans are social beings and we learn best from each other rather than books. Interactive games enable the healthy needed conversation between learners promoting this

learning beyond what the game content itself has to offer. The games enable critical thinking by posing questions and making the learner think critically. Creativity is encouraged by making the children build games on their own.

Keywords: Board Games, Interactive Learning, Fail-Safe Learning, Play, Fun.

ST2/008

Mythological story of MAHABHARAT based on stem education

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Abstract

It continued the crusade of the Mahabharat. Taking the opportunity, the absence of Arjuna in war Drona arranged the chakrabhyuha which was impossible for the Pandaavas to understand expect Arjuna. The consequence in that day would be the last day Pandavaas. At once a 14yr, old boy released the sorrowful & pitiful though form the mind. He declared that he ahd learnt the way ow to enter into the Chakrabhyuha when he was in the embryo stage. N the end he accepted the death among the seven villains in impious war. I have coloured the hidden theory of the Chakrabhyuha in co-ordinate Geometry in my project. There are lot of question arise in my mind. 1) Was Drona good at in Geometry so that he created a circle like Chakrabhyuha for the enemies? 2) Had Abhimanyu learnt co-ordinate Geometry in the embryo stage which dared him to enter in to army? 3) If it is true how old he application of the Co-ordinate Geometry in Mathematics, Now the question is what type of Geometrical application was applied by Drona against the enemy in the Mahabharat was and what knowledge helped Abhimanyu to protest and enter the Chakrabhyuha. I have clarified bit all the questions and place the answers in my project. My project will be helpful for the safety in the crowded festival or the temples and will provide the protection along with the hidden knowledge to the students/people about the Geometrical theory. The objectives were 1) To bring creativity of the interest to learn Co-ordinate Geometry among the student, 2) To bring out the application of Co-ordinate Geometry in Mahabharat war. 3) Keep away with the misfortune from crowded temples & festivals. Having acquired the knowledge of the Chakrabhyuaha, you must get the idea where was the fault of Abhimanyu. Why could seven strong warriors kill a strong hero like Abhimanyu in this impious was? Think a little, what did Abhimanyu do, he could have hoisted the winning flag after coming outside the Chakrabhyuha that I have noted down by some straight lines. Which is so easy that a small child can understand? It would be very light to enter in to the children questions in the Chakrabhyuha.

Questions:

- In which knowledge could Drona arrange the Chakrabhyuha
- What knowledge of Co-ordinate Geometry is expressed
- Did Abhinanyu learn Co-ordinate Geometry
- What had Abhimanyu done, he could have come out of Chakrabhyuha
- What Geometry theory unknown to Abhimanyu
- Why didn't Abhimanyu return to the central point

What was the problem here?

ST4/020

Science Learning for Sustainable Development

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Abstract

The objective of science education is nation building through scientific knowledge and technology. All educational domains at all levels, including primary and secondary science education, have been working to enable younger generations to become responsible citizens and promote sustainable development in our world. The teaching technique based on the research approach and the corresponding evaluation case studies shows that thoroughly combining the ESD framework with science teaching has great potential for helping students develop many general educational skills. The students of class VIII were able to teach a group of villagers, the importance of the effective use of solar cooking devices and the way to attain sustainable development through scientific knowledge. The students of class IX have successfully completed their project in eradicating the mosquito borne diseases from a colony in our neighbourhood. The socio-scientific issue-based approach helps the child to develop many other life skills. It also opened a path to a more balanced view of science in its social and professional context. This allows career orientation both in and beyond science and engineering. This paper gives an insight that when an ordinary science classroom changes into a mini-research place, it ultimately leads to social transformation and sustainable development. Through this paper I have tried to blend the scientific temper of the children and the life skills in teaching learning activities to reach the goals of science education.

Keywords: Sustainable development, social reform, educational skills workplace for social reforms Socio-scientific issue, life skill.

ST2/026

Students' Attitude towards Physics Lessons and Physics Laboratory Experiments and bring about Positive Changes in their Attitude and Enhancing practical Skills in Physics through STEM Education

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Abstract

In order that students can develop researching, questioning, critical thinking, problem solving and decision-making skills, so that they become lifelong learning individuals, they should be improved regarding their knowledge, understanding and attitude towards Physics. Attitudes towards Physics lessons and physics experiments of students Of Class XI & XII have been examined for this purpose. The research has been designed as a study from class XIA & XIIB of Kendirya Vidyalay, Bhandup. A sample consists of 10 students from Class XIA and 10 students from Class XIIB. A questionnaire including 12 items regarding students' attitude towards physics lessons and 8 items regarding physics experiments were used in the study. Some of the students are indecision about physics lessons and physics experiments, and also, there are as many students of negative opinion as those with a positive opinion. Furthermore, it was examined whether general attitude towards physics lessons and physical experiments of the students varied with respect to gender, class and age variables, and no significant variation with respect to gender was found. It was determined that students' class and age differences effect on students' attitudes. I developed lesson on electric circuits and its uses based on STEM concept and implemented in class XII to study. The lesson has developed based on Science, Technology, Engineering and Mathematics. By involving four disciplines i.e. inter disciplinary approach to understand better and to do extended learning.

Keywords: Physics Education, Physics Experiments, Attitude, Technology, Engineering, Mathematics, Inter Disciplinary.

ST1/033

Simulations in Science Learning is Connecting Theory and Practical Knowledge

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Abstract

My Paper is about how simulations and Virtual Science labs are bridging the gap between theory and practical Knowledge of students in the schools in learning science. Virtual science labs are the way of the future, as more and more technology is brought into the classroom. They can be incredibly supportive of the current teaching methodology if combined with proper preparation and structure.

ST4/030

Learning of Science makes Sustainable Development in the Society

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Abstract

डॉ॰ सरपल्ली राधाकृष्णन ने कहा था की ज्ञान से बढ़कर कुछ नहीं होता। हम जो भी पढ़े उनके मूल में जाना चाहिए और उसमें प्रवेश करना चाहिए । इनके अनुसार विवेक के बिना ज्ञान कुछ नहीं है। मैं यहाँ येश बातें इसलिए कह रहा हूँ क्योंकि वर्तमान समय में शिक्षा प्रणाली में दोनों ही बातों की कमी हें । इसमें मैंने कुछ शिक्षण बिन्दुओं को अपनाने का प्रयास किया है **,** जो कि व्यवहारिक तथा मनोविज्ञानिक तथ्यों पर आधारित हैं। हम कक्षा में प्रवेश करते ही अपने ज्ञान का भंडार बच्चों पर उढेलना चाहते हे यह जाने बिना कि बच्चे कि इसके लिए तैयार हें भी या नहीं **?** हम चाहते हें कि बच्चे एक ही दिन में विज्ञान के सभी नियमों को सीख जायें जो कि हमारी सबसे बड़ी भूल हें । विज्ञान के द्वारा ही समाज में सतत विकास हो सकता हें क्योंकि विज्ञान के नियमो को समझने के के पश्चात हमारी तार्किक शक्ति का विकास होता है जिससे कि हम अंधविश्वास तथा भ्रमक कुरुतियों से बच सकते हैं। इसी प्रकार हम छोटे बच्चों को विज्ञान तथा गणित की ज्ञानवर्धक शिक्षा देकर समाज में जागृति ला सकते है।

ST4/051

Use of Science Learning by Eco-friendly Method for Making Compost from Garbage from School Garden and Farms

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Abstract

For sustainable development composting of organic waste is one of the best methods. It increases crop yield. It also Increases the fertility of the soil. Plant leaves from the garden and other dead parts of the plant are used for composting. On large scale production of compost, we can use sugarcane plant leaves which are remained in the field after harvesting. Also, we can use leaves, stem and roots of other plant for composting. Bacterial solution, cow dung slurry, water, soil is used for making compost.

ST1/077

Study the teaching and learning science with interactive boards in class rooms of Govt, Aarohi model School-Geong (Haryana)

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Abstract

Technology is an integral element in the world today. Technology plays significance roles in workplaces, education, entertainment and the way of life surviving. This paper Investigates teachers' and students' perceptions concerning the impact of using Interactive boards for teaching and learning purposes. An explorative focus group study was conducted with teachers (n=20) and students (n=40) in a senior secondary school that has implemented interactive board for science learning since April 2018.The general finding of this study shows that the use of interactive board in the classroom setting has an impact on both teaching and learning practices. The results suggest that teachers can be divided into two categories: the innovative teachers and the instrumental teachers. Innovative teachers attempt to shift from a teacher centred to a learning-centred approach. They have changed their teaching style by transforming lessons in accordance with the advantages interactive board can offer. Instrumental teachers seem to use the device as a book behind glasses. The distinction between the two groups has consequences for both the way courses are given and how students experience them. In general, the introduction of interactive board entails a shift in the way students learn, as the devices provide interactive, media -rich, and exciting new environments. The results of this study indicate that policy Makers should consider introducing technical and pedagogical support in order to Facilitate both teachers' and students' understanding of the full potential of this kind of Technology in education.

Keywords: Smart classes, pedagogical, Book behind glass, instrumental teacher &innovative teacher.

ST1/007

Communicating on Climate Change: A Hands-on Approach

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Abstract

Climate change is the most important global environmental issue that humanity faces in recent times. For developing countries like India, the concern with climate change is extremely serious. The impact of climate change can be arrested and mitigated effectively by education people and increasing public awareness. Improved understanding of public perceptions about global warming can contribute to informing scientific of and policy discussions on climate change. As the science of climate change is complex in nature, science communicators are often confronted with difficulties in communicating the concepts of climate change to the common man. However, the science of global warming and climate change can be communicated to the general public and students using some hand-on activates. In this paper, an attempt has been made to develop some activities/experiments with a view to communicating the science of global warming and climate change. The paper also suggests introduction of such activities in the school curriculum and conducting such activities in the classroom situation. These activities are low cost, learner friendly, interesting and easier. Such hands-on activities would be an essential tool in communicating and education and communication of climate change science interesting and effective but also motivate the common man and students in developing scientific temper.

Keywords: Climate change, Science communication, Common Man, Hands on Activities, Educating people, Scientific Temper.

ST4/146

Beat Plastic Pollution

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Abstract

Plastic has become a major threat to the world. Present work is an attempt to reduce the use of plastic in the school and thereby reduce the use at home. Through this project teachers and students tried to refuse certain things, reuse things and also recycle. They also started rethinking about the common practices and reframe it. Through determined actions we have brought out the following changes. 1) Plastic folders have been replaced with cloth folders, 2) Plastic lunch boxes and water bottles with steel, 3) Plastic Lunch bag with jute bag, 4) Collection of plastic and give it to K plastic for converting it in to a useable material in tarring the road, 5) Various awareness programmes. Key aim of the project was bringing in some change in the attitude of young minds. Teachers, students and management worked together for bringing this change and to change the school premises as a plastic free zone. Students are now bringing steel boxes, bottles and cloth bags. Apart from these students collect old uniform and convert it in to shopping bags and lunch bags. The school was divided in to four levels and action plan was made for each level some of the activities are: 1) Cyclathon and walkathon for giving awareness, 2) Poster making, 3) Skit, 4) collection of plastics from all students, 5) Changing water bottle, lunch boxes etc. to steel bottles and boxes. 50% of the school has changed their attitude towards environment through this activity. It is an ongoing project. Hope to see a plastic free zone in the near future.

ST1/113

Computer Interfaced Active Learning about Standing Wave using Low Cost Materials

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Abstract

Computer Interfaced Active learning is an innovative approach to teaching and learning, in particular activity-based methods that engage students in the learning process. In order to communicate the excitement and joy of discoveries in Physics, this approach foster the use of expEYES (detailed in Annexure) and android mobile in order to replace expensive physics experimental instruments. In this method teacher get an opportunity to learn about innovative modes of content delivery and also the chance to improve their conceptual understanding of Physics. The project focuses on experiments in Physics. The activities use simple and inexpensive materials and materials that can be fabricated locally, whenever possible. In this project, the researcher prepared a kit in Physics especially for the topic standing wave. Try out of the Computer Interfaced Active learning was conducted among 60 students of Government Higher Secondary School Pattambi. Through Active learning they completed whole theory topics as well as prescribed practical simultaneously in the class room itself, recorded their observation in the Activity log book and in the Laboratory log book. It is found that Computer Interfaced Active Learning was effective for teaching and learning of standing wave at Higher Secondary level.

Keywords: Standing wave, closed pipe, pen Pipe, Stretched String, Harmonics, Resonance, expEYES.

ST2/025

Effect of STEM Education Method in Science

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Abstract

This paper is based on the study conducted to find out the effectiveness of STEM Education method on the learning of Science students. The purpose of this research was also to explore the linkage between teaching technique and student learning. In this study, the measuring instrument used was a post-test which was based on two chapters of Physics text book. Students were divided in two groups that are group A & B. Each group was consisted of ten students. The group A was taught by Lecture Method and group B was taught by STEM Education Method which was based on activity. The duration of teaching for both the groups was 1 hour per day for 15 days. At the end, the post test was administered. The study revealed that the performance of experimental Group B was better than the performance of the students of Group A. Furthermore, there was significant difference in the performances of the two groups with reference to knowledge, comprehension & application skill. Overall the findings of the study show that the STEM Education method was much more effective than the lecture method the teaching of science.

Keywords: Stem education method

ST5/018

Science: With Household Materials

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Abstract

Science one of the subjects which creates innovative, creative, self-reliance, and self-assessment and motivate to facing challenges from all subjects. It may not close inside class room. One can do different activities facing challenges with all creativities out-side the class room. In open environment (out-side the class room) with natural elements and some low cost and no cost objects with household materials done different experiments in their own hands. The students gain a lot other than in-side the class-room activities. The activities belong heading of Weather, Sound, Light, Heat, Astronomy, Fluid Pressure, Food, Plants, Density, Surface Tension, Solubility, Human body, Vision, Law of motion, Forces, Simple machines, Magnetism-Electricity, Centre of gravity, Candle, Eggs, Pendulums, Ice, Energy and other miscellaneous. Students do the activities their own hand with the help of teachers. Using household material with low cost and no cost objects are create interest, easy to handle and better understanding the difficult scientific maters. After doing the activities, the students prepare report on activities their own note book for future reference with their own language. This activity report was helpful to others for betterment in science. In time-table specific provision on CLUB activity are used for scientific activity beyond the class room. There no extra provision needed for both students and teachers in their school activities. Last three years, it is 92% to 95% successful on solving scientific problems in the class from VI to VIII. It is most successful in upper primary level students. The knowledge of science on out-sides learning is more than classroom learning.

Keywords: Weather, Sound, Light, Heat, Astronomy.

ST5/120

Rejuvenation of Science Communication at Root Level in Govt. Schools through Hand-on Activities

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Abstract

The digital world has boomed up the teaching methodology in education, especially in science. But being a Govt. teacher, lack of resources restricts us to use the multimedia on a regular basis in Govt. schools. To compensate for this disability, a very initiative and productive project has been started by Punjab education department, named as 'Parho Punjab Parhao Punjab', since the mid of last academic session. Teacher as well as students are guided to perform each and every activity given in the lesson as per curriculum by themselves. Students are involved in arranging of the materials, performing the activities and answering the questions related to these activities, so that they can conceptualize the topic to their best. This has proven to be a revolutionary step in Science communication as student's acquaintance to the scientific apparatus has increased, their way of handling them has improved and last but not the least their understanding of various topic related to activities has grown. The understanding for the activities is assessed through baseline and end line tests, which are analysed afterwards. At the root level, students were assessed through simple questions and this initiative has motivated the child's kinaesthetic learning ability by using synthesis, application and knowledge as a learning objective.

Keyword: resources, multimedia, activities, conceptualize, acquaintance

ST3/082

Experimental Chemistry Education for Inclusive Classrooms: Case Studies

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Abstract

Inclusive classrooms engage students of varied abilities, irrespective of their physical, intellectual, social, or emotional conditions. Due to high diversity in learning abilities, such classrooms require inclusive pedagogy suitable for learning of all students. Experimental science is an important aspect of science learning. Students with special needs often do not get to experience experiential learning in chemistry due to constrains with chemical safety. This paper illustrates case studies of conducting five high school science experiments in an inquiry-based manner for inclusive classrooms. The experiments were designed involving day-to-day chemicals found in kitchen, and avoided the use of unsafe chemicals and glassware to make it safer for students with special needs. These modified instructional methods to fully include students with physical disabilities did not compromise on the chemical principles being taught. We observed that inquiry-based experiments are most suitable for these classrooms as students can progress with a pace suitable to their abilities. Students exhibited collaborative learning, helping each other to conduct the experiments. Experiments typically took longer time to complete than in regular classrooms, as each student preferred performing the experiment at their pace. Based on the feedback, students loved to perform these experiments. These low cost- low risk experiments are suitable to be carried out in regular classrooms as well.

Keywords: Inclusive science education, Inquiry-based science education.

ST1/012

Chemistry-With "Creativity" and "Technology"

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Abstract

The more I see, better I learn, more I work for myself, longer I retain, more I Interact, better I understand for effective teaching and efficient learning this is the "Mantra". Modern is the age of technology. In present scenario, no area is left untouched by it: may it be teaching or learning. Undoubtedly, technology can never replace a teacher. But it certainly can help both educator and learner to meet their purposes. The project undertaken focuses of above mentioned areas. As a child reaches 11, he studies fundamentals of chemistry: Structure of atom, chemical bonding to name a few. These topics lay the foundation of the subject. They should have a very thorough understanding of these concepts. The topic involves visualization of 3-D structures, understanding and application. The project undertaken targets some topics from "Chemical Bonding" and devises methods for better explanation. Learners are active throughout the chapter. They are involved in planning as well as execution. Chapter will be introduced with **a role play**. To make them understand importance of the topic few questions will be asked. They will be given time for **"brain storming**" and come to a solution to given questions. As chapter progresses, level and nature of activity changes. They are involved in group activities, presentation of their work, working as a team. Their level of understanding is assessed simultaneously and gradually interest in subject grows tremendously. **"Ball and Stick model"** is used for 3-D shapes which they make on their own. They are given "urls" of video related to topic for their reference which they watch and analyse before the class. An element of "flipped class room" is used. The knowledge gained is shared with others while the teacher explains it thoroughly. Since the plan involved active engagement of learners throughout, output is extremely fruitful. Along with content, it added to confidence level, helped understand their peers better, eliminate the fear of subject. It facilitated the teacher to bond better with class, explain more effectively, understand potential of each student, plan better assessment strategies. Role of education is not only imparting subject knowledge and make the learners qualified professionals only. Rather it aims at a holistic development targeting certain elements of their personality as well. The project is successful in achieving this aim.

ST3/001

Making the Environment Clean and Green

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Abstract

Neatness and cleanliness is next to Godliness. Safe sanitation and clean water make the population healthier. Health and sanitation are complementing to each other. That is why it is called "Health is Wealth". It is as necessary to a single individual in the same way as it is necessary to a society. If we take the example of a village, there is a saying that "The cleanliness of a village is known from the washing Ghats of a washer man". Thus, from the first part of a village to the last part of village it must be clean, free from dirt with proper drainage system. The popular "Swachh Bharat Mission" has gained wide popularity now a days and everyone has a view in this aspect starting from home, school and the society at large. Open defecation which has not been totally banned is a matter that makes us think. The schools should take care of the matter and it should be a principle of each and every school to see it with fervent care. The present study deals on the environment pollution pertaining to land, water and air. The young learners who are of the future citizens of India need to be aware of the ways and move for a

healthy and conducive environment. After administering a questionnaire containing the main reasons of environment degradation and its ill effects the problems were identified and measures for solution were formulated. The main objective of the study was to generate awareness about making the environment clean and green. The sample consisted of 25 students of Class-VII. 50% of the students of Class-VII were from rural belt and rest 50% constituted urban and semi urban background. At first a questionnaire was administered to know the degree of awareness regarding areas of environmental degradation and the reasons of air pollution and water pollution. Basing on the identified needs of the students, strategies were formulated. Suitable class room intervention methods and approaches were evolved. Field observations, pair work, group work and individual work were assigned to them. Print materials and ICT based materials were used concerning environment and environmental degradation were used. Field study to a nearby industrial area and nearby forest developed under social forestry were selected for spot visit. Observation schedules were supplied to each student to record their observations according to the format. After field visit, the observations schedules were presented group wise. Clarification of doubts was done then and there. At the end of the intervention a post feedback was taken to know the degree of awareness and knowledge they have been inculcating as a result of the intervention. It was revealed that they were motivated to take care of the environment to make it clean and green.

Keywords: Degraded, environment, clean and green, pair work, group work, field visit, observation schedule

ST1/004

Effective Science Learning with First e School

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Abstract

Many research studies on Indian Education and performance of the children in schools present days clearly indicated that children learning levels are not good that means according to their age and class they are not having proper knowledge levels. In school they are not having teaching learning materials, lack of laboratories especially in science subject. They are very poor in science learning even the school administration and management and teachers are also not providing such environment of science learning classroom for that reason recently government has decided to improve learning levels of the children with introducing digital class room with ICT technology in class room. First object technologies LTD, is a software company provided first e school is an education initiative and it approached the topics with an optimum mix of technology, quality content, pedagogy, educational psychology, mnemonics and guide for better performance in examinations. The content is prepared under the guidance of eminent academicians. It covers pre-primary to higher secondary education under CBSE/ICSE and state boards in English and all leading languages under the banner of "First e school". In our school nearly 600 students are studying in that nearly 350 students are residing in government BC, SC, ST hostels. Government supplied first e school software to the hostels and provided CPU and Digital screen. The children will see daily digital content of science subject of class 6^{th} to 10^{th} as tutor for the hostels I am showing digital content to all the students they are understanding subject very well. Experiments and activities are provided with animations compare to non-hostel students their performance is increased rapidly. I am also learning very well in subject and explaining in school as well. So, first e school software is giving very good subject and skills for our students. In this paper I am clearly indicating the difference of hostel students and non-hostel students in their examinations performance.

ST3/074

'Badianala': An Elixir for Life

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Abstract

From the ancient times man is using different parts of the body or whole small plant to cure many diseases. Even now-a-days rural and urban people of Boudh district are using Badianala for various diseases like liver, kidney, skin diseases etc. To explore science behind traditional knowledge, to compare traditional medicinal practices with modern scientific word I took this project. Badianla is a popular medicinal herb found in Boudh district and all over ODISHA. It is used in various medicinal purposes. Badianala is abundant in rural and urban area of Boudh district. First, we heard about the use of this plant in jaundice. From data collection we came to know that it is used in skin disease, diabetes, Leaf juice is used to cure earache. It is a tonic for hair also. Whole plant is grinded with seven black peppers to cure jaundice of children. Twenty-one black peppers are grinded with whole plant is used to cure jaundice of adults. Scientific name of Badianala is Phyllanths niruri by Linnaeus and Phyllanthus fraternus by Webster. It belongs to family Phyllanthaceae. It is abundant in rainy season. Highest levels of glutathione are found in P. niruri group. It is an antioxidant. It is capable of preventing damage to important cellular components caused by reactive oxygen species such as free radicals, peroxides, lipid peroxides and heave metals. It is used to cure diseases of liver, kidney. Leaf juice is used for skin disease, ear ache, tooth ache, hair tonic etc. 86% of the people we have interviewed identified that plant. It is used as medicine by 46% of the people,28% of the people have used it in jaundice ,14% in diabetes,4% in gynic problem ,4% in toothache,2% in earache,4% in stone in kidney,4% in blood pressure and 8% in skin diseases. Students were very happy to visit Boudh market. More research on this plant is essential. I also enjoyed this project work by sharing the knowledge about this plant with community. Those who are ignorant about its medicinal value appreciated this project work.

Keyword: Phyllanths niruri, Phyllanthus fraternus, Phyllanthaceae, Glutathione.

ST4/139

To Study of Reducing the Air Pollution by Absorbing the Carbon dioxide from Atmosphere

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Abstract

In the light of increasing fears about climate change, greenhouse gas mitigation technology has assumed growing importance. Carbon capture and sequestration is one of the options that can enable the utilization of fossil fuels with lower CO_2 emission of the different technology for CO_2 capture. Capture CO_2 by chemical absorption is the technology that closest to commercialization. While a number of different solvents for use in chemical absorption of CO_2 have been proposed, a systematic comparison of performance of different solvents has been performed and claims on the performance of different solvents very widely. Yet condition air pollution is big problem in whole world. Now a dye the most increasing type of pollution is air pollution. These pollution controls are most important to our health. More of smoke in throughout in more vehicles, those smocking contents co_2 increases air pollution. This Apparatus use to control of carbon dioxide in atmosphere. Not hundred percentage but some quantity. The use of sodium hydroxide and calcium hydroxide as a solvent for CO_2 capture was evaluated for use in a project. Conclusion a framework for the comparison of the performance of

different solvents for CO_2, capture has been developed and the performance of carbonates. These are used to other purposes.

Keywords: Air pollution, Carbon dioxide, smoke**,** Sodium hydroxide, Calcium carbonate, Exhausting fan, Tank.

ST4/100

Low Cost Experiments on Teaching Air Pressure at Secondary Level

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Abstract

Students of Standard IX, of this school have been selected to participate in the project works, as the topic is in their curriculum. Here I have taken sixteen experiments on air pressure for experimental works; the apparatus required bears no cost. Students can collect these apparatuses from their own surrounding very easily. Here experiments are done in very simple ways, so that there will be an interest among the students to have scientific attitude. This will be making them easy to understand science. In many of the secondary schools of India, Science teaching is done without teaching aids because of its high cost. Some of these schools have apparatus to do the task. This apparatus used there is very high cost & the experimental process is very complex. If we can collect some apparatus from our surrounds such as used and empty ball pen refills, Saline pipe; wooden piece; newspapers; thread, balloon, fuse electric bulb; cello tape; unused plastic & glass bottles, cold drinks pipes; empty fruit box, all these bear no cost. The experiments done by using the above locally known as materials children can easily understood the subject. They can do this experiment again in their home by collecting these materials easily.

ST3/069

Olfactory Indicators: A Laboratory Technique for the Visually Impaired Students for Acid Base Titration

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Abstract

Onion extract, clove and vanilla essence can be used as olfactory indicators to identify acids and bases. They maintain their odour in acids and they lose their odour in bases. Today synthetic dyes are the choice of acid – base titrimetric analysis, but due to environmental pollution, availability, allergic skin reactions and cost, the search for natural compounds as acid – base indicator started. Onion skin extract, clove & vanilla essence are the compounds being investigated in this study. The aqueous skin extract of red onion bulb was used as indicator in titrating 1M HCl and 1M and 0.5M NaOH solutions respectively. The result of the mean equivalent point obtained was compared with that of Phenolphthalein indicator. The mean equivalent point of titration of 1M HCl and 1M NaOH using ten drops of red onion skin extract indicator agreed significantly with that of Phenolphthalein indicator with a standard deviation difference of 0.09cm3. It was also observed that the mean equivalent point of titration of 1M HCl and 0.5M NaOH using ten drops of aqueous skin extract of red onion bulbs indicator and two drops of Phenolphthalein coincided to a great extent with a standard deviation difference of 0.18cm3. Thus, from the results obtained, aqueous skin extract of red onion bulb can be conveniently employed as indicator in teaching and learning acid – base titrimetric analysis. Aqueous extract of onion gives characteristic odours changes in acid and alkali. The mean equivalent point of titration of 1M HCl and 1M NaOH using ten drops of clove oil indicator agreed significantly with that of Phenolphthalein

indicator with a standard deviation difference of 0.03cm3. It was also observed that the mean equivalent point of titration of 1M HCl and 0.5M NaOH using ten drops of clove oil indicator and two drops of Phenolphthalein coincided to a great extent with a standard deviation difference of 0.02cm3. The mean equivalent point of titration of 1M HCl and 1M NaOH using ten drops of vanilla indicator agreed significantly with that of Phenolphthalein indicator with a standard deviation difference of 0.06cm3. It was also observed that the mean equivalent point of titration of 1M HCl and 0.5M NaOH using ten drops of vanilla indicator and two drops of Phenolphthalein coincided to a great extent with a standard deviation difference of 0.07 cm3.

Keywords: Acid base titration, olfactory indicator, visually impaired.

ST1/031

Use of QR Codes to Enhance Learning in Science

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Abstract
This research is on using QR Codes (Quick Response Codes) to bring the online digital world and offline paper-based world together in an educational setting to make learning more fun, interactive and dynamic. Modern Information and communication technologies, such as mobile technologies and quick response codes, have great potential to improve teaching and learning because mobile technologies enable learning across multiple contexts, through content interactions. In other words, learners can learn can learn anytime and anywhere and learning can be personalized, customized and authentic. The experimental study was conducted on 32 students of class 4. First lesson was taught in the classroom and after that QR codes were given to the students to paste in their notebooks. The students were given the task to scan the codes using Smartphone and view the linked videos of that topic. Following which QR codes of online tests (MCQ) were given to solve. The Data Collection: The research data was collected using questionnaire based on the core aspects of mobile learning and measured the perspectives, opinions of the smart phone usage and QR code-based assignments. This project was a real time success as it created a lot of interest and enthusiasm among students to learn new things using mobile technology. Since the students have access to smartphones at their homes the use of QR technology can offer the most cost effective and easy to access tools for knowledge and skill acquisition.

Keywords: Quick Response, QR Codes, Mobile Learning.

ST2/059

STEM Education for Innovation

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Abstract

The innovation Index of India in world was 66 in 2016 and 60 in 2017. But being a small country Switzerland secured 1st position in both the consecutive year 2016 and 2017. Question arises, “Being the second highest populated country in the world, why the position of India is so behind in the field of innovation?” Why our glorious cottage industries are running in miserable condition? Is the answer lack of interest of students for innovation and cottage industries or anything else? In order to find out the answer of above mentioned question, this research works on the topic. “STEM EDUCATION FOR INNOVATION” has been conducted. Because according to eminent educationist like Roder W. Bybee

and nation maker like Barak Obama STEM education has potential to inculcate the spirit the innovation in students. In the present research work a study has been conducted upon the students and teachers reading in under Board of Secondary Education, Odisha in the schools with Atal Tinkering Laboratories and Without Atal Tinkering Laboratories. The findings of the study reveal that students of both the type of schools are interested to learn STEM education, make innovations and work for our glorious cottage industries with modern technique. The teachers are also interested to teach STEM education if they will be provided with proper training and study materials.

Key words- STEM, Innovation index, Atal Tinkering Laboratory.

ST1/115

Virtual and remote classrooms, a study impact on learning outcomes

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Abstract
The Govt. of Andhra Pradesh has recently implemented the ICT initiatives in the department of School Education with the help of Andhra Pradesh State Fiber Net Limited (APSFL). It is a fully owned entity of the Government of Andhra Pradesh. In the year 2018, about 4000 schools will be equipped with the installation of virtual classrooms in AP during I phase. A district level studio for the purpose of VCRs is planned in all 13 districts of the state. Any VCR school can be connected with any of the studio in the state based on the need of the subject and class. All the users/ teachers should be activated /motivated by explaining the benefits of this technology for the learners, teachers and to the system. There is no implementation of VCR in the district earlier. The survey results revealed that many teachers are not proficient in using the VCRs as they are using this for the first time. VCR classes are good enough with overall impression. So, it is observed that VCR is very much helpful in enhancing the learning outcomes of the learners and showing much impact on the minds of learners. It is not only useful& effective to the learners, but also for the teachers. It is absolutely not correct in all cases. As far as our study is concerned, it was observed that proper technical support/training is to be provided for the users to get 100% results. Further it is recommended that a 5-day orientation is needed for the users. At the same time interactive mode of content is required in case of languages. More advanced tools like clickers are to be provided for evaluation purpose.

Keywords:
VCR (Virtual Class Room); **ICT** (Information and Communication Technology); **APSFL** (Andhra Pradesh State Fibre Net Limited); **LMS** (Learning Management System); LCMS (Learning Content Management System), **IML** (Interactive Mode of Learning), **GBL** (Game Based Learning); **Apekx** (Andhra Pradesh e knowledge Exchange Portal); CSEAP (Commissioner of School Education Andhra Pradesh)

ST3/013

Science Teaching through Play Things and Toys

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Abstract

Children are fond of play things and toys. In upper primary and secondary levels, the same attitude still survives. If the science classroom teaching includes the use of toys and other play things, it brings lively atmosphere. If more than two sense organs are used in the teaching - learning process, the retention of

the knowledge is more. Using the play things like top, balloon, straws, marbles and etc. as teaching aid, it brings a freshness and friendly atmosphere to the early science learners. 'Top' is the beautiful scientific toy. More than 25 concepts of science can be teaching through the toy top. Two sample groups are taken for the experiment. Balloons are also fascinating toys for the children. By using top, balloons, straws and etc. are used for the experiments. About 25 experiments are framed for the test. One group without the play things and toys, another with actual chalk and talk method. I made the pre-test and post-test. The data collected and analysed. In the post test we got the good result. To know the importance of the play things the results are helpful.

Keywords: Play things, more sense organs, retention, knowledge.

ST3/077

Capillarity made Simple

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Abstract

The Topic Capillarity is taught to the students of standard XII of Maharashtra state Board. Initially the students were taught by the simple lecturer method of black board chalk method. A Self-administered questionnaire method was used to assess the Knowledge of the XII standard students from Hislop College, Nagpur. On analysing the responses given by the students it was found that they had no knowledge or very little knowledge of capillarity. So, another method of observation and performance was taken. Capillary is a tube with a very small bore and capillarity means rise or fall of liquid in a capillary.

ST1/092

3D Printing: A New Approach towards STEM Learning

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Abstract

STEM education is a curriculum approach that uses science, technology, engineering, the arts, and mathematics to guide students' critical thinking, dialogue, and inquiry. Student engagement and understanding of material is given more emphasis in today's education over spoon feeding the facts. Various new and emerging media and methods for effective science learning are quickly making headway in classroom across the country. 3D printing is one among them gaining popularity and accessibility in schools now-a-days. Regardless of any specific discipline, a 3D printer will find its worth in any topic that one is looking to teach. The applications are diverse and the impacts are far reaching. 3D printers let educators illustrate difficult concepts and enhance engagement through interactive learning. 3D printing involves using computer aided design CAD software to develop a model, or obtaining a 3D print file from a database or other sources, and using a 3D printer to produce a physical object. The object 3D printers produce is created by adding many different layers until the intended object is formed. The computer aided design CAD is used to create a virtual replication of the object on the computer and this design is then sent to the printer to be produced in real life. Making 3D models allows for creative thoughts and problem-solving in assignments where students develop new tools or products and can be a collaborative activity that builds students' teamwork skill. 3D printing can be easily integrated into active learning, group work and case-based learning.

Keywords: STEAM, 3D Printing, CAD, PLA, ATL.

ST4/165

Reuse paper by measuring the paper used by students

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Abstract

Each tree gives oxygen, stops soil erosion, forest sustain biodiversity and conserve the environment. Therefore, every tree is precious. But slaughter of millions or trees to prepare paper is done. For this by selecting the subject of 'Paper Reuse and Recycling', and what can we do for the environment through our direct action? This project was chosen to be aware of this. The objectives were 1) Training of paper and trees co-relation with students. 3) Avoiding misuse of paper. 4) Make various materials from paper pulp. 4) Improve the importance of Trius of Reduce, Reuse and Recycle. Project method: Students has collected scraps of waste in all classes of school. It found more of the dry, partially used, broken pieces. Methodology: A training for students to make paper pulp. Training to create educational tools and other items without using gum or fevicol. Finally, Students made their own educational tools without any glue or fevicol. The quantity of papers deposited in the boxes decreased under the project. Creativity and scientific perspective increase in students. "Save paper-Save Trees" enlightened the students about their responsibility towards ecology. Student understood the correlation of paper and trees. Reused the paper by making different educational stuff and other materials by student. Students understood the importance of Trius for Reduce, Reuse and Recycle.

ST1/094

Let's See Mathematics

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Abstract

The purpose of the study is to help the students to overcome fear for mathematics. Mathematics is a subject of abstract ideas. It deals with operations of numbers. Most of the learners in schools try to keep a distance from mathematics due to its non-realistic, theoretical operations. Visual representations could help in this context to all students. The sample of this study consists of student of the class-VI and provided with a mathematical worksheet. The investigator helped the students to learn multiplication through visual representation. They were also provided with a clear instruction sheet. Interview schedule and achievement tests were used as tools. The investigator followed the single group pre-test post-test design to see the effect of the applied method on the achievement of the students in Mathematics. The collected data were analysed and the investigator found that this method enhanced the achievement level of the students in mathematics.

Keywords: Visual Representation, Class room instruction, Achievement in Mathematics

ST1/049

The Impact of PowerPoint Digital Mind Maps on Science Achievement among Fourth Grade Students

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Abstract

The purpose of this study was to examine the impact of technology assisted i.e. digital power point mind maps on science achievement among fourth grade students in Chembur Education Society's primary School, Chembur Mumbai, and Maharashtra. A total of 40 students were randomly assigned to 2 experimental groups to receive different treatments. The first group utilized PowerPoint digital mind maps during their learning process, while the other group utilized paper mind maps. The results revealed that using PowerPoint digital mind maps had a significant effect on students Science achievement. Based on the obtained results, it was concluded that the utilization of PowerPoint digital mind maps for fourth grade students could be helpful in improving their achievement.

Keywords: PowerPoint mind map, paper mind map, Science achievement, fourth grade students.

ST2/048

Computing Thinking for students and educators

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Abstract

Computational Thinking (CT) will be an essential skill with implication in every field of human interest in the 21st century. It is an approach to problem solving derived from concepts of computing mainly abstraction and automation with applications across disciplines. With the exponential growth in science and technology, in this paper, even though computational thinking is not a new concept, the importance of computational thinking is revisited. A questionnaire survey was performed online for about 165 students at National Institute of Science and Technology (NISER) and questions about knowledge and need of CT were asked. The question seeks to assess the potential as well as the need of CT among the Indian academia as well as the current state of CT in Indian schooling system. In effort to address the concern raised by the students, it is imperative that the computational thinking should be given an important priority in the future both by students as well as educators as India starts competing for its place in the world.

Keywords: computational thinking, educators, computer science, algorithms, students

ST4/090

Integrated Approach Design to Develop Sustainable Learning

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Abstract

To develop universal students and make learning interesting leaving a long-term undeniable impact on students mind we have taken an integrated approach. Our case study involves class VIII students wherein we have taken topic Energy integrating sub topics Coal and Petroleum in science and Resources in Social Science. A series of activities were designed and conducted with students. Students performed activities at their pace and in the process were able to understand the relevance of energy in context to Coal and Petroleum chapter along with Resources chapter. The generation has become more conscious towards environment, understand their responsibility in conserving energy so it's available later and hence develop sustainable learning.

ST2/063

A Scientists Quest of Simplified Version for Integration in STEM Education

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Abstract

"STEM" is an acronym for Science, Technology, Engineering, and Mathematics. Every Science Educator knows this acronym but do they really know what it means? If we just remove 'S' From it, we would be left bewildered baffled and confused. We tend to talk about STEM in Vague terms. While we can integrate Technology and Engineering when beneficial and necessary; how do you integrate Science? In this paper, I am presenting various methods that I tried when I turned myself from Scientist to Science Communicator'. The pros and cons of the methods discussed. Ultimately, the quest was to find a method that works, that is simple, yet allows the integration of Sciences. What I learnt in the process was: It's not about teachers, educators, not even scientists. It's about children/ students. It is about giving 'STEM' directly in the hands of each and every child of age 6-16. This alone will open up a realm of exploration, and we - educators would be bemused. It will remove our unpreparedness once and for all. Students will feel empowered to choose a career of their liking, with new real STEM vision for innovation in any field.

ST2/027

Transition to STEM education

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Abstract

STEM is an acronym of science, technology, engineering and mathematics. In the education field, most of the educators are aware of what the meaning of STEM education is but how many of them really know what it means? STEM education is interdisciplinary approach to learning where academic concepts are integrated with science, technology, engineering and mathematics in context that make connections between school community work and the global enterprise enabling the development of STEM literacy (Tsupros 2009). The present study is designed to investigate how stem education the interest of student in learning and improving the student engagement I formal leaning process. STEM activities can foster another arm to word STEM as ART leading to creativity. That combines to form STEMA. All young people should be prepared to think deeply so that they have the chance to become the innovators, educators, researchers and leaders who can solve the world challenges easily. In this paper I have done the comparative study between the two sections of class vii (both with same strength of the students). some of the activities were performed in one of the sections and other section was taught in a regular way using chalk and lecture method, using text books (control class). It was found that class taught using STEM activities added another element to it i.e. art. Student from STEM activated section came up with more creative and innovative solutions to the problems. Thus, transition to STEM activities leads to addition of new element called ART (creativity), which is a result of more exposure to the outside world. It leads to the development of more successful nation.

ST2/039

Mathematical Model for set operation

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Abstract

STEM Education known for its focus on science, technology, Engineering and Mathematics is relatively a new and good term in the education system. Enhancing STEM Education during school transition, bridges the gap in Mathematics manipulative skills. STEM education encourages students to understand and embrace science and technology that affects them in their daily life. Set theory is seen as the foundation from which virtually all of mathematics can be derived. The lack of exposure practical work in primary schools leads to incompetency in manipulative skills in Mathematics and students may carry this problem with them to secondary school. The objective is to clear some basic concepts of set theory and set operation by using simple, innovative teaching learning materials which helps the students to learn with joy. This is a very simple and innovative model to solve the basic problems regarding set theory and set operation. This model also ensure that children are more inclined as well as interested in the "do it yourself" method. Transition of set and set operation by using this new model helps the students to learn with joy. So, it can remove the students from rote learning. Using this model, the student can solve many other problems in Mathematics which will make the STEM literacy a reality for tomorrow. It will spread scientific temper.

ST4/061

Science Teaching for Sustainable Development

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Abstract

Science and amp; technology helps people for a better and smart life. So younger generations need effective science communication in an advanced way for their sustainable development. Sustainability science indicate to capitalize on research as a tool to solve problem on sustainability. Different way by which science help for sustainable development are: -1) Conserving Biodiversity, 2) Awareness for green policy, 3) Preparing for Disaster, 4) Poverty Eradication, 5) Saving ocean, underground & fresh water, 6) Tackling climate change etc. Local firms and enterprises have to access technological knowhow to provide essential products and services to improve living standards. Steady investment required for increase science education and to improve science, technology & innovation. Teachers must be trained, skilled and efficient with advanced knowledge acquired through technology information. Steps for effective development of science teaching are a) Science education should be included from primary & high school to university level encouraging research pole. b) Co-operation with university research institutes with industries improvement of overall eco-system. c) Broadening the culture of science, technology and innovation. d) Making science & technology accessible to all levels of learners, students, teachers and public. e) Sharing of knowledge through ICT labs and broad band networks. So effective science teaching will help children for their knowledge of sustainable development & restoration of a clean, green & healthy earth with smart living.

Keywords: Science & technology on 21st Century, challenges of science, science, teaching and learning for sustainable development, stress on advanced technology, encourage to research pole, e-learning.

ST4/110

Microscale chemistry a green chemistry-an approach to sustainable development

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Abstract

In this research work green procedures in the form of Microscale Chemistry to save the environment are being reported. The students of secondary and senior secondary level were taught Experimental Chemistry by using micro quantities of chemicals and accordingly the apparatus used were also micro in size. The newly designed greener procedures were carried out to perform the chemistry practical in laboratory and the advantage over the conventional one evaluated through a comparative study. The Microscale Chemistry is a step in the direction of minimization of the use of chemicals and their harmful effect on the environment. This improvised technique represents facile, environment friendly and with high atomic effectivity in chemistry practical education. Our objectives are to conceptualize Green Chemistry and sustainability in education, to change our Chemistry practice to be greener, to reassure the importance of green Chemistry and sustainability, and to design Greener and sustainable Chemistry practice instead of the conventional one. The Microscale experimentation obviously demonstrated the superiority over the conventional ones. This improvised process of experiments represents less hazardous, high atom efficiency and environmentally benign benefits in chemistry education. This is an important step to support the conservation of environment and building healthier practices for the sustainable development of humanity.

Keywords: Green Chemistry, Microscale Chemistry, Conventional method, Sustainability, High atom efficiency.