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Seasonal Dynamics in the Phytoplankton Density of Mullaperiyar Reservoir in The Western Ghats Of Kerala

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Abstract

Periyar Lake, situated inside the Periyar Tiger Reserve (PTR) and Wildlife Sanctuary, a major international tourist centre in Kerala, was studied for a year (January to December 2005), in order to explore the nutrient status and associated phytoplankton growth. This oldest manmade freshwater reservoir/Lake in the Western Ghats of Kerala, is getting more attention now a day due to the dispute between Kerala State and Tamil Nadu (TN) State for the ownership of the Mullaperiyar Dam. Moreover, it is situated inside India's prime Tiger reserve in its quantity, area and quality. Total Nitrogen and inorganic Phosphorus of the waters were studied every month and the data were grouped into three different seasons and analyzed the seasonal fluctuation if any, moreover, water samples from different parts of the entire Lake were also analyzed to account any spatial variation due the increasing anthropogenic influence in and around the Lake related with tourism. From the study, it was revealed that Nitrogen and Phosphorus concentration of the Lake was at an alarming rate during premonsoon and northeast monsoon in stations-1 and 5 (2400 to 3000 µg/L), with maximum human influence and sewage entry. While the inlets zones (station-4) showed minimum N and P contents (1500 µg/L). The density of Phytoplankton showed a positive correlation with the nutrients in almost all seasons. The highest plankton density (490 no./L) was recorded during premonsoon at station-5 and the lowest was at station-4 (253 no./L) during northeast monsoon.From this study it was clear that the nutrient and phytoplankton of the Lake is dependent on the seasonal fluctuations in the environment as well influenced by the increased anthropogenic activities in and around the Lake. Strict measures should be taken to monitor the water quality of this pristine water body within the sanctuary because this is the source of drinking water for 4 Districts of TN.

Key words: Nutrients, Nitrogen, Phosphorus, tropical, high altitude, freshwater, Western Ghats

Introduction

The PTR is one of the most fascinating wildlife sanctuaries of the world, a major site of tourist attraction for the last fifty years. It is

designated by the Department of Environment as a major wetland site of the Country. Mullaperiyar Lake located in the Idukki District of Kerala is the largest (26km^{2}area) and oldest (built in 1986) reservoir/Lake constructed in the state to irrigate the plains of TN. Mullaperiyar Dam was constructed near the confluence of Mullayar and Periyar (the largest river in Kerala with a length of 244km). It lies between 09'16 and 09'40N latitude, and 76'55 and 77'26E longitude, and an altitude of 1525m above mean sea level (Govt. report, 1986). This study was designed to understand the nutrient status of the freshwater system, which was not explored and will give information about the general trend in nutrient load of the water bodies in the Western Ghats (one of the 25 biodiversity hotspots of the world) region of India, majority of them are under explored. This will help to understand the present nutrient condition of the water body on behalf of the fast-developing tourism based on the Lake/Sanctuary system.

Materials and Methods

Collection of water samples

Five stations were fixed in the Lake **(Fig-1)**, based on the maximum and minimum anthropogenic influence to different locations. They were PLS (Periyar Lake Station)-1(boat landing for tourists), PLS-2 (Mullaperiyar Dam site), PLS-3 (confluence zone of Mullayar to the Lake), PLS-4 (confluence zone of Periyar the Lake), PLS-5 (open water tunnel to TN from the Lake, where the sewage of Kumily township enters the Lake). Sampling was done between 15th and 20th of every month from January to December 2005.Samples for nutrient analysis were collected from surface water (1to2cm) of the Lake with 2 Litre (L) acid cleaned polythene bottle and were kept in dark ice boxes at 4^{0}C till it reached the laboratory for analysis.

Estimation of N and P in water

Total nitrogen was determined by kjeldal method, and inorganic phosphorus was measured using UV visible spectrophotometer. All the analysis was carried out following the standard methods of APHA (1995) and Trivedy and Goel (1986).

Grouping of data

In order to account all the major seasonal environmental fluctuations of the study area the monthly measurements done were grouped into averages of three seasons such as pre-monsoon (PM)

(January to April), southwest monsoon (SWM) (May to August) and the north-east monsoon (NEM) (September to December).

Statistical analysis

A correlation co-efficient were calculated to find out the significant correlations between parameters. All the quantitative data were analyzed by student's t-test and significance was assumed for P-values lower than 0.05.

Results

Total Kjeldal Nitrogen (N)

Comparatively high concentrations of total nitrogen was observed during PM and NEM, and the low values were obtained during SWM in almost all stations **(Fig-2)**. Total Nitrogen of the Lake varied between 1500µ/L to 3000µg/L. The highest value was obtained at PLS-5 (3000 µg/L) during PM and the lowest (1500µ/L) was obtained at PLS-4 during SWM and NEM.

Total Inorganic Phosphorus (P)

Comparatively high concentrations of total phosphorus were observed during PM and SWM and the low values were obtained during NEM in almost all stations. Total Phosphorus of the Lake varied between 10 to 80 µg/L **(Fig-3)**. The highest value was obtained at PLS-1 and 5 (80 µg/L) during PM and the lowest was obtained at PLS-4 (10µg/L) during NEM. PLS-5 showed high values during all the season.

Phytoplankton Density

Phytoplankton density also showed the same trend as that of the nutrients, during PM, PLS-5 showed the highest density (490 no./L), and the lowest values were observed at PLS-4 during all the seasons. The lowest density of all the seasons and stations was 253 no./L during NEM at PLS-4 (Fig-2&3). During NEM, PLS-1 and 3 dominated (430 and 400 no/L respectively), PLS-5 in phytoplankton density. The lowest density obtained during PM was 303 no./L.

Discussion

An increase in trophic status of a Lake is associated with an increase in nutrient status. N and P are the major nutrients for all phytoplankton growth and the limited availability of these nutrients in water usually limits phytoplankton growth in natural aquatic

system. On the contrary excess availability of both of them triggers eutrophication. Accumulation of N and P in natural waters is more closely related to external factors such as anthropogenic influences, fertilizers, and the rate of inflow (Hutchinson, 1938). The accumulation of N in reservoirs and natural water bodies has become a common phenomenon which alters ecological process in many parts of the world due to intensive human activity. Increased nutrients along with altered nutrient ratios cause multiple and complex changes in aquatic systems (Rabalais, 2002).

In the present investigation, the highest N content was noticed at PLS-5 during all the seasons coupled with an increased density of phytoplankton in that station. The highest value for N recorded in the Lake was 3000µgL^{-1} during PM, and that of phytoplankton density was 490 no./L. In natural waters N, 150 µg/L is a critical value and when the contents cross the limit algal blooms occur (Sawyer et al., 1945). The increased amount of N, in almost all stations during PM showed a significant positive correlation with phytoplankton density and significant P-values in t-test. The increased concentration during this season at all stations except PLS-4 (1900 µg/L) is undoubtedly related to the concentrated state of the Lake waters due to very less precipitation and dry climate. The high rate of N indicates that the lake at certain zones (PLS-1&5) exceeds the maximum level due to the high sewage disposal and human interaction. Other zones also showed a transitional stage between oligotrophy to eutrophy. Nitrogen fixation increases during summer in Lake Waco (summer N load is more), performed by certain Cyanobacteria which have become common. Some Cyanobacteria, can use dissolved gaseous N, periodic blooms are expected when mixing or flushing is low after pulsed inputs, especially with high temperatures (Joe Plotrowski et al., 2011).

Maximum lowest N value was recorded at PLS-4 (1500 µg/L) during SWM and NEM and plankton density 263 and 253 no./L, respectively during these seasons. A low level of N was reported by Abbasi (1997) in Kuttiyadi reservoir in southern Western Ghats. Comparatively low concentrations (1500-2100 µg/L) of N and plankton noticed during SWM may be due to the dilution of waters during heavy monsoon coupled with the overflow of dam and outflow towards TN water tunnel. Horizontal mixing of water due to high wind during this season also influenced the lowering of N concentration.

Then again, the concentration showed an increasing trend during NEM (1500-2400 µg/L) may be due to the inflow to the Lake. Due to the intensive agricultural activities around the reservoir during this season, might have increased the nutrient load of the Lake, through the inflow at PLS-5. Land runoff to the lake, comparatively lesser amount of rain than that of SWM also might have influenced the increased level of N during this season. Heavy thunder and lightning coupled with NEM also might have caused the large amount of Cyanophyceae in the bottom zone of the lake to fix the atmospheric nitrogen during the season. In deep lakes settling of suspended matter can lead to low nutrients in the epilimnion during summer. Hence internal loading depends upon the intensity of turbulence across seasonal pycnocline that transports nutrient rich hypolimnetic water to the photic zone in summer (Jellison et al., 1993 and Romero et al., 1998).

P occurs almost solely as soluble phosphates in natural waters. All forms of phosphates such as orthophosphates, condensed phosphates, and organically bound phosphates are found in waters. P is considered to be the critical limiting nutrient, causing eutrophications of fresh water systems and required by algae in small quantities. P limits the growth of the algal forms most often, but N limits the algal growth of certain species alone. This is because of the fact that certain species of algae which fix nitrogen themselves are not affected by scarcity of N in the water they grow. Hence, the P nutrient assessment of waters is crucial to the monitoring investigations of natural freshwater bodies. P additions to landscape enter water via wastewater effluents and soil erosions, and also from detergents. Therefore, P in large quantities in water is an indication of pollution through sewage and industrial waste. P is the primary limiting nutrient in most lakes and reservoirs. Just like N, higher P in bottom water may result from decomposition of organic matter and its release from sediments under the anoxic conditions. More P leads to more algae (Cyanobacteria), more algae lead to lower water clarity. Key transition range is between of P is between 10 and 100 µg/L. N: P ratio determines which algae are dominant. P concentration 5 to 50 µg/L is typical for an unpolluted water body (Joe Plotrowski et al., 2011).

In the present study, the P value ranged between10-80 µg/L. The highest P of all stations was PLS-1&5 (80 µg/L) and season was PM, and the lowest was at PLS-4 (10 µg/L) during NEM. Comparatively higher values were observed during PM coupled with positive

correlation of phytoplankton and significant P-values in t-test. Second highest P values were obtained during SWM and low amounts during NEM. The concentration of P is at an alarming rate during all seasons in the Lake. According to Welch (1980), a water body may be considered to be eutrophic if the total P value exceeds 30 µg/L. Romero et al., considered Lake Pamvotis with a P content of 110 µg/L as one of the intermediate nutrient status.

The N and P content of Periyar lake is increasing at an alarming rate at PLS-1 and 5 with maximum anthropogenic influence and at other stations a gradual increasing trend was observed during PM when water become concentrated. The sewage channel at PLS-5 had a significant role in the increased level at that station and its influence was noticed in other stations because of the horizontal mixing during monsoon season. PLS-4 at the core zone of the lake with minimum anthropogenic influence showed comparatively lesser nutrient levels, and plankton density, because this station is almost 35Kilometers away from PLS-1&5, and altitude of that station is also higher than that of PLS-1&5, so chance for horizontal mixing is also negligible. Nutrient enrichment at locations 1 and 5 enriched the growth of unwanted plankton of eutrophic nature. These trends indicate a transition of this pristine natural high altitude tropical freshwater system from oligotrophy to eutrophy. The management of this precious water resource is very urgent and important in the increasing tourism impacts.

Acknowledgements
Author wish to thank UGC for the fellowship availed during the study period.

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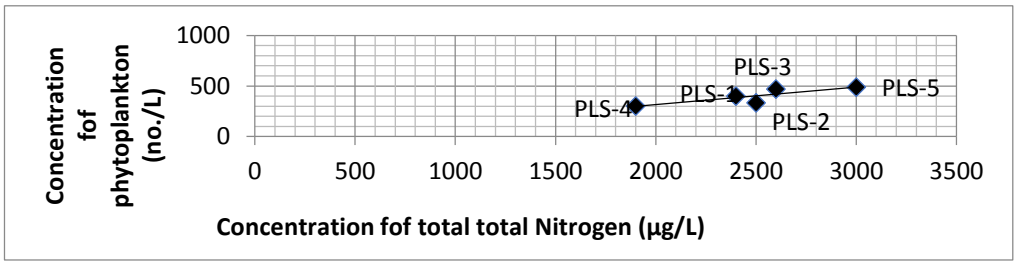
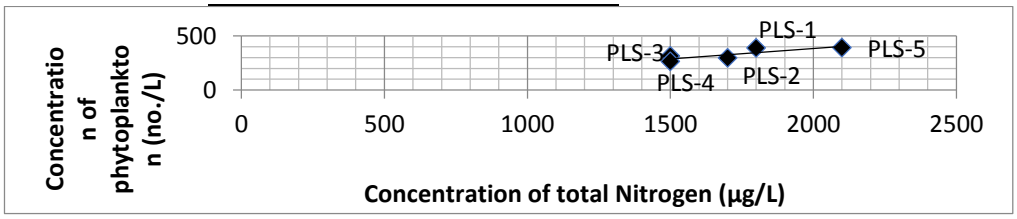
Fig-2: Total Nitrogen and concentration of Phytoplankton in different locations of the Lake during (1) PM (2) SWM and (3) NEM of 2005 (pp-10)
Fig-3: Total Inorganic Phosphorus and concentration of Phytoplankton in different locations of the Lake during (1) PM (2) SWM and (3) NEM of 2005 (pp-11)



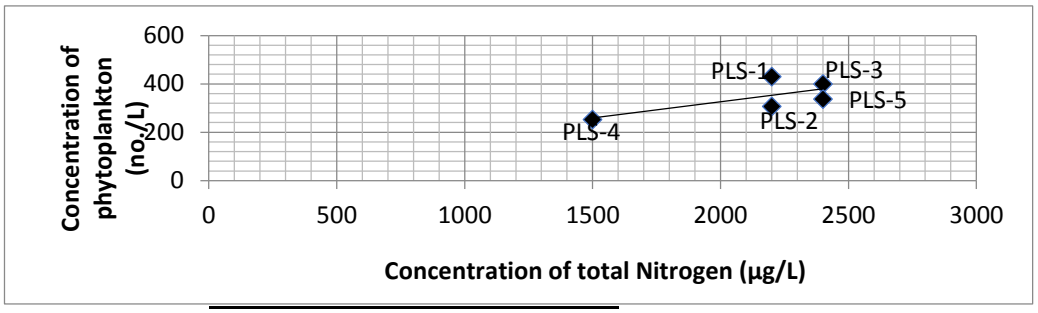
P-value critical= 1.4826E-06

		2600	470
	2600	1	
Correlation co-efficient	470	0.886991	1



P-value critical= 9.60272E-07

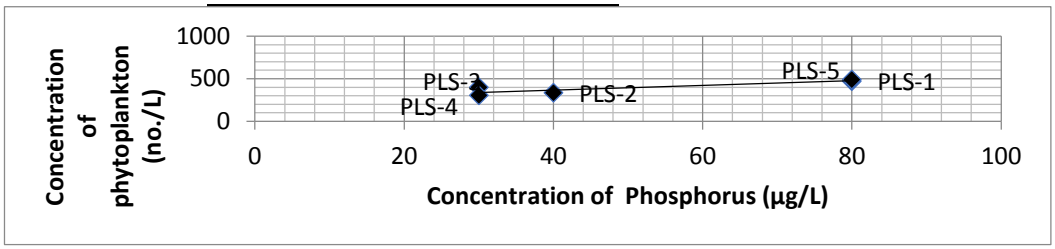
		1800	*387*
	1800	1	
Correlation co-efficient =	387	0.895215	1



P-value critical= 2.7238E-06

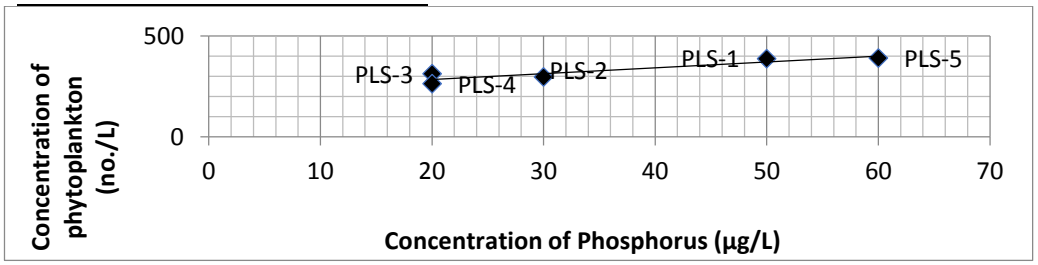
	2200	*430*
2200	1	
430	0.860083	1

Correlation co-efficient



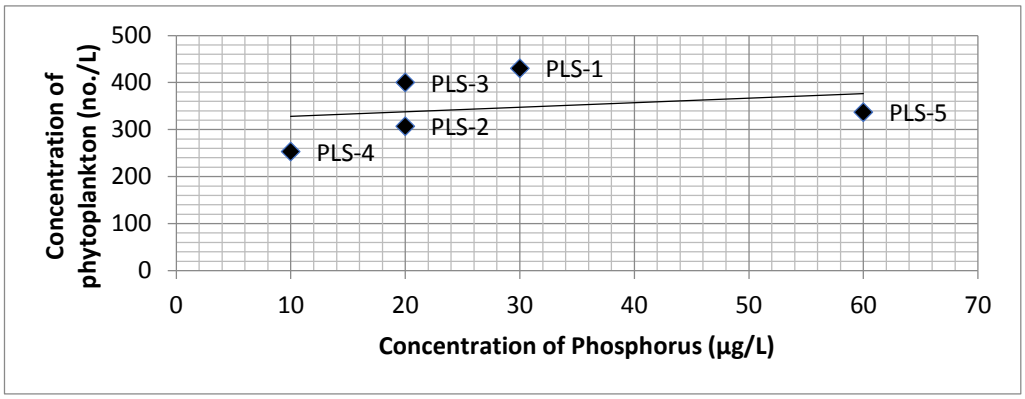
P-value critical= 9.04986E-06, correlation co-efficient

	80	*470*
80	1	
470	0.834187	1



P-value critical= 1.94008E-06, correlation co-efficient

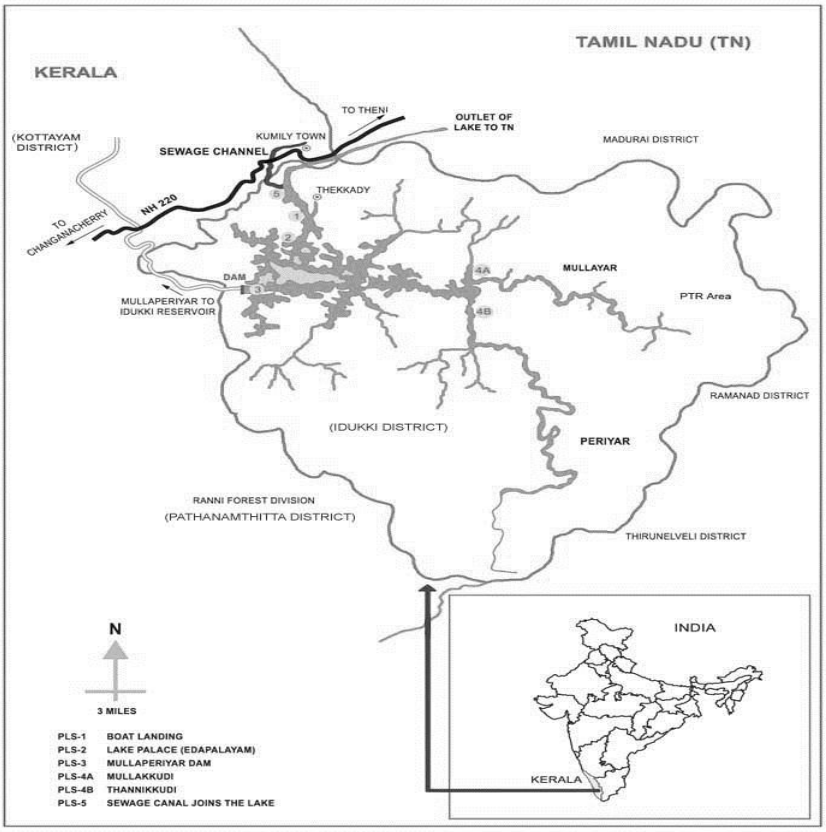
	50	*387*
50	1	
387	0.912229	1



P-value critical= 5.59543E-06, correlation co-efficient

	30	*430*
30	1	
430	0.299778	1

Figure-1: Different study stations in Periyar Lake



ICT In Education: The Indian Perspective

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Introduction

Education is the most effective instrument which can instill people with the knowledge, skill and capability to observe and analyze the sense of purpose and confidence for building a dynamic energetic, just and unified nation able to take care of its entire people. Education does not have accumulation of information as its terminus. It should engender wisdom, which comprises tolerance, understanding, compassion and large-heartedness in outlook. Perhaps, this is what Plato meant when he said that the purpose of education is "not to fill an empty vessel but to turn the eye of the soul towards light".

Information & Communication Technology

ICTs stand for information and communication technologies and are defined as a "diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. Information technology defines an industry that uses computers, networking, software programming, and other equipment and processes to store, process, retrieve, transmit, and protect information.

Growth of Higher Education in India

India's higher education system is the third largest in the world after China and the United States. Since independence the higher education in India has increased manifold in its institutional capacity as can be observed from the given table:

Table 1.
Institutional Capacity expansion in Higher Education

Institutional capacity indicator	1950	2008
Number of University Level Institutions (including 11 Private University)	25	431
Number of Colleges	700	20,677
Number of Teachers	15,000	5,05,000

Number of Students Enrolled	1,00,000	1,16,12,000

The Aim of Involvement of ICT In Education

For developing countries like India, ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy for developing countries. ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor.

One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and to open access to knowledge in ways unimaginable not long ago. However, the reality of the Digital Divide—the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities. The multifaceted aim of involvement of ICTs in education may be given as follows:

a) ICTs for expanding access to education.

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies—scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus.

b) Anytime, anywhere.

One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the

instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners.

c) Access to remote learning resources.

Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons— mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

d) ICTs for better Grooming of Students for the modern workplace.

One of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the current generation of students for a workplace where ICTs, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous. Technological literacy, or the ability to use ICTs effectively and efficiently, is thus seen as representing a competitive edge in an increasingly globalizing job market. Technological literacy, however, are not the only skill well-paying jobs in the new global economy will require.

e) ICTs to improve the quality of education.

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways as follows:

- **Motivating to learn**: ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real

world events.

- **Facilitating the acquisition of basic skills**. The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement.
- **Enhancing teacher training** ICTs have also been used to improve access to and the quality of teacher training. Institutions are taking advantage of the Internet to provide better teacher professional development opportunities to inservice teachers. At Indira Gandhi National Open University, satellite-based one-way video- and two-way audio-conferencing was held in 1996, supplemented by print-materials and recorded video, to train 910 primary school teachers and facilitators from 20 district training institutes in Karnataka State. The teachers interacted with remote lecturers by telephone and fax. In China, large-scale radio and television-based teacher education has for many years been conducted by the China Central Radio and TV University.
- **ICTs to transform the learning environment into one that is learner-centered**. Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift at the heart of education reform in the 21st century. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. When used appropriately, ICTs—especially computers and Internet technologies— enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. These new ways of teaching and learning are underpinned by constructivist theories of learning and constitute a shift from a teacher-centered pedagogy—in its worst form characterized by memorization and rote learning—to one that is learner-centered.

Forms of ICTs In Education

(1)Radio and TV Broadcasting.

Radio and television have been used widely as educational tools since the 1920s and the 1950s, respectively. There are three general approaches to the use of radio and TV broadcasting in education:

(a) **Direct Class Teaching**: Where broadcast programming substitutes

for teachers on a temporary basis.
(b) **School Broadcasting**: Where broadcast programming provides complementary teaching and learning resources not otherwise available.
(c) **General Educational Programming Over Community:** National and international stations which provide general and informal educational opportunities.

(2) Teleconferencing.

Teleconferencing refers to "interactive electronic communication among people located at two or more different places." There are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology:
(a) Audio conferencing involves the live (real-time) exchange of voice messages over a telephone network.
(b) Audio-graphic conferencing: When low-bandwidth text and still images such as graphs, diagrams or pictures can also be exchanged along with voice messages, then this type of conferencing is called audio graphic. Non-moving visuals are added using a computer keyboard or by drawing/writing on a graphics tablet or whiteboard.
(c) Videoconferencing allows the exchange not just of voice and graphics but also of moving images. Videoconferencing technology does not use telephone lines but either a satellite link or television network (broadcast/cable).
(d) Web-based conferencing, as the name implies, involves the transmission of text, and graphic, audio and visual media via the Internet; it requires the use of a computer with a browser and communication can be both synchronous and asynchronous.

Teleconferencing is used in both formal and non-formal learning contexts to facilitate teacher-learner and learner-learner discussions, as well as to access experts and other resource persons remotely. In open and distance learning, teleconferencing is a useful tool for providing direct instruction and learner support, minimizing learner isolation.

Computers and The Internet for Education.

There are three general approaches to the instructional use of computers and the Internet, which are as follows:
(a) **Learning about computers and the Internet**.
Learning about computers and the Internet focuses on developing

technological literacy. It typically includes:

- Fundamentals: basic terms, concepts and operations
- Use of the keyboard and mouse
- Use of productivity tools such as word processing, spreadsheets, and data base and graphics programs
- Use of research and collaboration tools such as search engines and email
- Basic skills in using programming and authoring applications such as Logo or Hyper Studio
- Developing an awareness of the social impact of technological change.

(b) **Learning with computers and the Internet**.

Learning with the technology means focusing on how the technology can be the means to learning ends across the curriculum. It includes:

- Presentation, demonstration, and the manipulation of data using productivity tools.
- Use of curriculum-specific applications types such as educational games, drill and practice, simulations, tutorials, virtual laboratories, visualizations and graphical representations of abstract concepts, musical composition, and expert systems.
- Use of information and resources on CD-ROM or online such as encyclopedia, interactive maps and atlases, electronic journals and other references. Technological literacy is required for learning with technologies to be possible, implying a two-step process in which students learn about the technologies before they can actually use them to learn. However, there have been attempts to integrate the two approaches.

(c) **Learning through computers and the Internet**.

Learning through computers and the Internet combines learning about them with learning with them. It involves learning the technological skills "just-in-time" or when the learner needs to learn them as he or she engages in a curriculum-related activity.

Role of Teachers in ICT Environment

Learning and Teaching has undergone a tremendous change due to the emerging technologies. Because of the advances in the technologies, the teaching profession is evolving from an emphasis on teacher-centered, lecture based instruction to student-centered, interactive learning environments. The responsibility of the teacher has changed from knowledge transmitter to that of learning facilitator, knowledge guide and co-learner with the students in ICT

environment. The modern teacher in the ICT age acts as a guide rather than a knowledge transmitter. In fact, with the introduction of ICTs in the classroom, we can say that the teaching and learning process has been modified from blackboard to keyboard……. from pen to pen drives……and from chalk to mouse……

Because of the rapid change and uncertainty, there is one thing of which we can be sure, that the teachers need to adapt to change if they are to survive and keep pace with new methods and technologies. The teachers should adapt current teaching skills and practice to accommodate the introduction of ICT in all their academic efforts. These efforts are in bringing changes in teaching methodology, assessment of learning, student tracking, communication and evaluation.

ICT In Education: The Indian Perspective

Though the potential and capability of open and distance learning was realized in early sixties across the globe however, it got national acceptance and recognition with the emergence of Indira Gandhi National Open University in 1985.

IGNOU and ISRO share a common vision of creating Educated India. And to achieve this, ISRO and IGNOU have been collaborating in the use of satellite communication to enrich learning processes and increase access to education through distance mode. Under ISRO-IGNOU collaboration, IGNOU has developed capability for four TV-channels and two interactive networks dedicated for education. In order to fulfill the requirements of education for all, the Indian Parliament took a major decision in the year 2001 whereby education was made compulsory for every Indian in the age group of 6 to 14 years. This task is to be accomplished by the year 2015 under the initiative Sarva Shiksha Abhiyan. The massive educational setup required to handle such large numbers requires development of effective satellite communication systems with extensive point-to-point reach covering the whole country. In this initiative, some successful joint interventions between ISRO and IGNOU and a few other educational institutions and organizations propelled the idea of designing and developing a dedicated satellite for education by ISRO. Within a short period of less than 2 years, ISRO successfully designed, developed and launched a dedicated geo-stationary satellite on September 20, 2004, EduSat, dedicated exclusively for Education. India is unique in the world in this respect and it is expected that this capability will immensely support the mission to provide seamless

education and to accomplish the target of education for all.

Overall, India is graduating at a steady pace towards implementation of various ICTs at all levels of education which will soon be taken as a standard by other countries desirous of achieving this goal.

Conclusion

The one fact that emerges in the relatively brief history of ICT use in education is that "It is not the technology but how we use it". Technology should not drive education; rather, educational goals and needs, and careful economics, must drive technology use. Only in this way can educational institutions in developing countries effectively and equitably address the key needs of the population, to help the population as a whole respond to new challenges and opportunities created by an increasingly global economy. Indian Education System has a bright future in terms of Information & Communication Technology, as that it will enhance the speed of providing education even to remote areas of the country. Let's wait for the dawn when education will become a familiar term to all the Indians….

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Teaching through media and technology

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Abstract

Teaching includes all the activities of providing education to others. Teaching is an art and science. It is a process of imparting knowledge and skills. To teach is to touch a life forever. A teacher takes a hand, opens a mind, and touches a heart. Teaching through media provides a useful platform for teaching. Media can be a component of active learning strategies, media could be a film clip, a song you hear on the radio, podcast of a lecture or newspaper. Teaching with technology can deepen student learning by supporting instructional objectives. In the classroom, technology can encompass all kinds of tools from low-tech pencil, paper, and chalkboard, to the use of presentation software, or high-tech tablets, online collaboration and conferencing tools. Online collaboration tools, such as those in Google Apps, Presentation software, Course management tools such as Canvas, Lecture-capture tools, such as Panopto etc are few examples of technology used in the class room.

Key words: Google Apps, Presentation software, Canvas ,Panopto.

Introduction

The person who provides education is called teacher. The teacher uses different method for giving best knowledge to his students. He tries his best to make understand students. **Teaching means interaction of teacher and students, they participate for their mutual benefits.** Many great teachers of world define teaching in different way and we can say that teaching is just to train the students so that they can stand on their own foot in society. Abbatt and McMahon say: 'Teaching is helping other people to learn and has four main functions. The teacher has to decide what students should learn, the teacher has to help the learners to learn, the teacher has to make sure that the students have learnt, and the teacher has to look after the welfare of her/ his students.

As we list out in order of importance the three most important abilities that teacher impart to students are **cultivate thinking skills, stimulate interest in the subject,** and **motivate students to learn**. Of

course, credentials, knowledge, critical thinking, and all other faculties of intelligence are important. However, a great teacher should be much more than credentials, experience and intelligence. S/he should be kind, compassionate empathetic, positive, a builder, bridges gaps and builds relationships, friendships with community. You inspire and uncover hidden treasures, possibilities, talents and magic right before everyone's eyes. In the era of knowledge explosion the two important tools that a teacher can make use in the class room activities are teaching through media and technology. According to Kothari commission (1964-66) "the destiny of India is being shaped in the four walls of her class room". The ICT integrated teaching learning can bring tremendous changes in the field of education.

Teaching through media

Media can be a component of active learning strategies in a group discussions or case studies. Media could be a film clip, a song you hear on the radio, podcast of a lecture or newspaper article. Students can also create their own media. For example, student video projects can be a powerful learning experience. Effective instruction builds bridges between students' knowledge and the learning objectives of the course. Using media **engages students, aids student retention of knowledge, motivates interest** in the subject matter, and **illustrates the relevance** of many concepts. Media – like all other teaching techniques – should be used judiciously in the learning process. The dramatic growth of social media creates new opportunities for engaging students. These include social networking sites such as Facebook, My Space, LinkedIn, and Twitter along with blogs and wikis. The term *media* was first used to describe newspapers more than two centuries ago. Today media has many different connotations. For instance, there are mass media, print media, visual media and social media. While media can take on many different forms, the purpose of all media is universally the same – media is a channel of communication.

Media can be used in direct instruction, active learning teaching strategies and student projects. Existing media resources can be used within lectures to stimulate interest in and develop knowledge of the material being taught. Given the tremendous rate of technological change, instructors face an ongoing challenge in choosing the most effective media platform to reach their students. Instructors can also create their own media to effectively and efficiently convey knowledge. Existing media resources can also be used to engage

students and facilitate active learning strategies which promote deeper learning. Media provides a useful platform for teaching, cooperative learning and problem solving and for giving more interactive mode of demonstrations. Student-created media involves a high degree of engagement, promotes individual learning, social interaction and immersion, and is highly customizable and collaborative (Yowell and Rhoten, 2009). Student-created media provide an alternative or a complement to traditional method, by doing a digital storytelling, project, personal reflection and communication by students, teaching can be promoted.

Media can be used in almost any discipline to enhance learning, both in class, and also for out-of-class assignments. Short film and television clips, written articles, and blog postings can be viewed to reinforce concepts and spark discussion. Research suggests that people learn abstract, new, and novel concepts more easily when they are presented in both verbal and visual form (Salomon, 1979). Other empirical research shows that visual media make concepts more accessible to a person than text media and help with later recall (Cowen, 1984). In Willingham's (2009) research he point out that students remember everything that's on television and forget the lectures – because visual media helps students retain concepts and ideas. Bransford, Browning and Cocking (1999) also note the crucial role that media plays for creating learning environment. Media, such as movies, documentaries, television shows and music brings interactive learning like visualizations and student-enriched activities.

Advantages of Using Media:

Many media sources (feature films, music videos, visualizations, news stories) have very high production quality capable of showcasing complex ideas in a short period of time. Media offers both cognitive and affective experiences. It can provoke discussion, an assessment of one's values, and an assessment of self if the scenes have strong emotional content. The uses of media sources help connect learners with events that are culturally relevant. News, stories can be used to connect theories taught in the classroom with real world events and policies. Popular media (films, music, YouTube) are a familiar medium to students that helps gain attention and maintain student interest in the theories and concepts under discussion. Students can hone their analytical skills by analyzing media using the theories and concepts they are studying. The use of media in the classroom enables students to see concepts and new examples.

Students can experience worlds beyond their own, especially if the media is sharply different from their local environment.

How to introduce media:

Before learning the concept. Showing media before the discussion gives students an image to which they can compare the topics under discussion. This approach allows quick reference to easily recalled examples. Schwartz and Bransford (1998) show that demonstrations focused on contrasting cases help students achieve expert-like differentiation. In addition, Schwartz and Martin (2004) found that carefully-prepared demonstrations "help students generate the types of knowledge that are likely to help them learn" from subsequent lectures. After a brief introduction but before learning the concept. This method provides students with a brief capsule of what the media is about and what to look for – helping to focus attention while watching the media. After learning the concept. Showing media after describing a theory or concept allows the instructor to use the scenes as a particular study. This approach helps students develop their analytical skills in applying what they are learning. Before and after. Repeating the media is especially helpful when trying to develop student understanding of complex topics.

Tips to use media:

Start small- Find one movie, song, or news source and incorporate it into your class. Provide a clear link between what you want your students to learn and the media. Care must be taken provide the proper learning context. It takes time to integrate media effectively into a course**.** Use the subtitles feature for visual media. This is especially useful in focusing student attention on the words being said. Be prepared- Technology does not work 100% of the time so have a backup plan. If the media equipment does not work, go to plan next and continue on with your class without missing a beat. Evaluate student understanding-you ask them to write a reaction in paper, take a quiz, or place questions on your exams that relate to the media content they will pay more attention and learn more in the process. Stay legal- View the copyright information on the cautions page.

In addition to numerous advantages, there are also a number of cautions that faculty should keep in mind in utilizing media. Using media requires a complete understanding of copyright law, an appreciation of the workload involved, and some skill in recognizing content that will enhance learning, instead of becoming a distraction.

The instructor takes on the role of a facilitator who helps students interpret what they are listening to, reading or seeing. Media can also be pupil created. This approach help the student to step into the role of the teacher and create content that will engage learners and help them to master concepts. Social media can also be used to enhance teaching and learning and it includes varied online technology tools that allow people to communicate easily via the internet to share information and resources.

Teaching with technology

Teaching with technology can deepen student learning by supporting instructional objectives. In the classroom, technology can encompass all kinds of tools from low-tech pencil, paper, and chalkboard, to the use of presentation software, or high-tech tablets, online collaboration and conferencing tools, and more. The newest technologies allow us to try things in physical and virtual classrooms that were not possible before. What you use depends fundamentally on what you are trying to accomplish.

Few examples of Technology: Online collaboration tools, such as those in Google Apps, allows students and instructors to share documents online, edit them in real time and project them on a screen. This gives students a collaborative platform in which to brainstorm ideas and document their work using text and images. Presentation software (such as PowerPoint) enables instructors to embed high-resolution photographs, diagrams, videos and sound files to augment text and verbal lecture content. Tablets can be linked to computers, projectors and the cloud so that students and instructors can communicate through text, drawings and diagrams. Course management tools such as Canvas allow instructors to organize all the resources students need for a class (e.g. syllabi, assignments, readings, online quizzes), provide valuable grading tools, and create spaces for discussion, document sharing, and video and audio commentary. Clickers and smartphones are a quick and easy way to survey students during class. This is great for instant polling, which can quickly assess students' understanding and help instructors adjust pace and content. Lecture-capture tools, such as Panopto, allow instructors to record lectures directly from their computer, without elaborate or additional classroom equipment, as educators we strive for students to engage with our subject beyond a superficial level. Technology places the world in the hands of every student inside the confines of your classroom. There are many ways in which technology can be used in

the classroom to engage students and facilitate exciting, engaging and interesting lessons. Allowing the use of technology in the classroom has freed from the lesson-plan shackles. However, allowing the freedom to search and discover the subject through technology has fostered a love for the subject. Filming a peer assessment or recording a group discussions and uploading to Audio Book is yet another way of engaging students.

Perfect Ed Tech Activities for Beginners: Do a PowerPoint, the templates are available online for teachers to download and revise, including their own content. Have students complete a written classroom activity as if it was online. They can create a perfect blog, blog sites (Blogger and WordPress are two of the most popular) and create a template for your students to fill in .Ask them to tweet a lesson which one they want to summarize information. Try a Webquest- A webquest guides students to search the Internet for specific information. There are tons of already-constructed webquests out there, a perfect way to teachers to begin integrating internet searches into their curriculum.

Use technology as a topic for a writing assignment: Create a class webpage: class webpage can be anything from a basic site where you post announcements (think "online bulletin board") to a much more elaborate one that includes class photos, a class blog, downloadable materials, and your own domain name. Enjoy Webs.com (http://www.webs.com/), which offers both free and premium service packages. Use an online grading system: Sites like MyGradebook.com (http://www.mygradebook.com) offer the opportunity to track grades, record attendance and seating charts, and compile reports on student progress, do an email exchange: Have your students exchange emails with students in another school, city, state, or country – especially valuable if both sets of students are studying the same material. Give multimedia presentations: Liven up a traditional lecture by using a PowerPoint presentation that incorporates photographs, diagrams, sound effects, music, or video clips. Supplement your lessons: When you've taught the same material for a while, you – and your students – may find it less-than-exciting. A quick Internet search may help you identify ways to supplement your lessons with interesting new material. Create a class blog or wiki, take appropriate precautions for Internet safety, but a class blog or wiki can be a great way to integrate technology in the classroom and develop student knowledge. A wiki is a website that

uses software which allows many different people to edit it (think Wikipedia). Have your students work together to create a wiki on a topic they are studying. They will need to correct each other's work and collaborate in order to make it a success. Create a Podcast. There are thousands of podcasts available on the Web. Search for ones that meet your students' needs Have students create their own podcasts to document their progress through the year or discuss their ideas on a variety of issues pertaining to the course. According to your skill level, integrating technology in the classroom offers the chance to increase student interest and teach valuable professional skills – and have some fun.

Conclusion:

Teaching with media and technology enhances the transfer of learning. Media can be used in direct instruction, active learning teaching strategies and student projects. Existing media resources can be used within lectures to stimulate interest in and develop knowledge of the material being taught. The phrase "teaching with technology" may conjure up a variety of different images depending on our own experiences as instructors, students, or even conference attendees. It might be using PowerPoint, podcasting lectures, web designing, Web-based interactive learning modules and simulations to teach skills and concepts. The tool itself is a starting point to make the teaching more likely to be effective and appropriate. If it is integrated into a careful planning process that make magic in teaching and learning.

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Phytochemical analysis showing normal and diseased Leaves of Psidium guajava

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Abstract

The ethanolic extracts of normal and diseased leaves of Psidium guajava Linn. (Myrtaceae) were used in the present. Phytochemical screening of the plants showed the presence of phenolic compounds, tannins, alkaloids, glycosides, steroids etc. While flavonoids are absent in diseased plants.

Key words: Psidium guajava, Phytochemical screening

Introduction

Disease is the manifestation of reaction between the plant and disease-causing agent or any impairment of normal physiological function affecting an organism. Infectious diseases are caused by living agents, the pathogen. The Common transmissible agents or pathogens that because infectious diseases may be fungi, viruses, mycoplasmas or even insects. Non-infectious disease cannot be transmitted from one diseased plant to another healthy plant. It is caused due to improper conditions of the soil, air or mechanical injury. It may also due to too high or low temperature, lack or excess of light, lack of oxygen, nutrient deficiencies, soil acidity or alkalinity, toxicity of pesticides etc. In Psidium the pathogen is Cephaleuros. The pathogen reproduce and survive in spots on leaves or stems and in fallen plant host debris. There are two main types of symptoms on Guava leaves: velvety spots and non-velvety spots. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Some of the well-known phytochemicals are lycoprene, isoflavones

Flavonoids etc. A large number of secondary metabolic compounds are also present in Psidium. They are alkaloids, flavonoids, terpenoids, saponins tannin, glycosides etc

Materials and Methods

Collection of materials

The plant selected for the study was healthy and diseased plants of Psidium guajava. Care was taken to select healthy and diseased plants. The fresh leaves are collected from its natural habitat and thoroughly washed to remove impurities. Leaves of both healthy and diseased plant were dried in shade, powdered separately using domestic grinder and stored air-tight containers. The powder was then

extracted with methanol. This was then used for phytochemical analysis.

Phytochemical analysis

Preliminary phytochemical tests were carried on extract of the specimen using the solvent, methanol to detect various constituents present in them. The preliminary phytochemical analysis was carried out according to the methodology of Harborne (1984).

Detection of carbohydrates:

Benedict 's test:

To 0.5 of filtrate, 0.5 of Benedict's reagent was added. The mixture was heated on a boiling water bath for 2 minutes. A characteristic coloured precipitate indicates the presence of carbohydrates.

Benedict 's reagent:

About 173 gm of sodium citrate and 100 gm of sodium carbonate was dissolved in 800ml of distilled water and boiled to make it clear. Then 17.3gm of copper sulphate was dissolved in 100ml of distilled water and was added to the above solution.

Detection of Saponins:

A little of the extract is shaken with distilled water, if there is froth formation which for a few minutes; this shows the presence of saponins.

Detection of Coumarins:

To the test solution add a few ml of alcoholic sodium hydroxide solution. The appearance of intense yellow colour on addition of concentrated hydrochloric acid indicates its presence.

Detection of Terpenoids

Stokowski test:

5ml of the extract were mixed with 2ml of chloroform and 3ml of concentrated sulphuric acid solution. A reddish – brown colour at the interphase shows the presence of terpenoids.

Detection of Alkaloids:

Mayer's test:

To a few ml of filtrate add one or two drops of Mayer's reagent along the sides of the test tube. A white or creamy precipitate indicates the presence.

Mayer's reagent:

About 1.36gm of mercuric chloride is dissolved in 60ml of distilled water and 5gm potassium iodide is also dissolved in 10ml of distilled water. The two solutions are mixed and made up to 100ml distilled water.

Detection of Tannins:

Ferric chloride test:

To a few ml of extract add 100% Ferric chloride solution. The appearance of blue or green colour indicates the presence of condensed tannins.

Detection of Phenol's:

Shino do test:

The methanol extract is treated with magnesium turnings followed by concentrated hydrochloric acid which is added in drops. The appearance of pink scarlet or intense red or green to blue colour indicate the presence.

To a few ml of aqueous extract, add dilute ammonia and concentrated sulphuric acid along the sides of the test tube. Yellow colouration indicated the presence of phenolic compounds.

Detection of Cardiac Glycosides (Keller-Killani test)

5ml of the extract is treated with 2ml of glacial acetic acid containing 2-3 drops of Ferric chloride solution and 1ml of concentrated sulphuric acid solution. A green ring initially appears which turns to violet and then brown and the interphase indicates the presence of cardiac glycosides.

Detection of Flavonoids (Alkaline reagent test)

To the test solution add a few drops of sodium hydroxide solution, an intense yellow colour is formed which later turns to colourless on adding a few drops of dilute acid indicates the presence of flavonoids.

Shinodo Test

The methanol extract is treated with magnesium turnings followed by concentrated hydrochloric acid which is added in drops. The appearance of pink colour indicate the presence.

To 2ml of aquous filtrate add 5ml of dilute ammonia and concentrated sulphuric acid along the sides of the test tube. Appearance of yellow colour indicates the presence of flavonoids.

Result

The phytochemical analysis shown above reveals the following:
In both healthy and disease affected plants, constituents like alkaloids, terpinoids, tannins, glycosides etc. are present while flavonoids are absent in disease affected plants. The result is tabulated in Table:1

Sl No	Constituents	Normal	Diseased
1	Alkaloids	+	+
2	Flavonoids	+	_
3	Tannins	+	+

4	Glycosides	+	+
5	Saponins	+	+
6	Terpenoids	+	+
7	Phenolic compounds	+	+

Table 2. Quanditative Estimation of Polyphenol Oxidase in *Psidium guajava*

LEAVES	AMOUNT
Healthy	0.8
Disease Affected	1.52

Discussion

The present study was done to compare the morphological and phytochemical differences seen in Guava plants affected by disease with the normal healthy. The morphological variations are the following:

Cephaleuros parasiticus spots on guava leaves appear initially as tiny, dark brown specks that enlarge into roughly circular lesions with ash coloured centres and dark brown to blackened margins. Spots on Guava leaves are intercellular necrotic, destroying both upper and lower epidermal cell layers and interveining tissues. The methanolic extract of both the healthy and diseased plant leaves showed the presence of phenolic compounds, tannins, alkaloids, glycosides, etc. while flavonoids are absent in diseased plants. These chemicals are responsible for anti-allergic, anti-inflamatory, anti-microbial, anti-cancer, anti-diarrheal activities etc. (5) The different chemical compounds detected in the plant could make the plant useful for treating different ailments and having a potential of providing useful drugs for human use.

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Diverse Learners in The Class Room

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Abstract:

*The teacher uses the homogeneous strategies to meet out the diverse needs of the learners. There are gifted, backward, retarded, talented, and handicapped children. The teacher has the responsibility. Gender acts a vital role. Grasping power must be observed. Multimedia supplements the traditional curriculum. The teaching approach towards **a**ppreciate and accommodate the similarities and differences among the students' cultures. Learning Styles in a Diverse Classroom may be framed. Inclusive schools are essential.*

Key Words: Diverse needs, Responsibility, Gender, grasping power, Multimedia, learning style, Teaching Strategies, Individual Differences.

Introduction:

Unity in the diversity is neither only in our India nor in our class room. There are various types of students from various Back ground various culture various economic status and various educational level also. The teacher has the responsibility to manage the diverse learners in their class room. The teacher use the homogeneous strategies to meet out the diverse needs of the learners. Teaching should fulfill the requirement of inclusiveness.

Individual Differences:

No two persons are exactly alike. There is individual difference. Pupils always differ in their level of intelligence, aptitudes, likes and dislikes and in other propensities and potentialities. Different minds are to be trained by the teacher. There are gifted, backward, retarded, talented, and handicapped children. All of them should not be trained in the same manner. Knowledge of educational psychology helps the teacher to cater to individual different of children.

Teacher responsibility:

A teacher has to play the following rules for dealing H.I.children:

1. Ease the child to the floor.

2. See that is not opposite to injure himself by striking furniture or sharp comers while convulsions.
3. Turning the child's head to one side and carefully placing but never facing a folded hand kerchief of a soft object between back teeth is sometimes advised.[1]

Influence of Gender:

Girls are superior to boys in verbal ability they read more and write more. Boys are superior to Girls in mathematical and mechanical ability. Girls are more skilful than boys in making movements that require independent finger control, but boys excel in movements requiring strength and speed.[2]

Grasping Power:

In recent years we have been learning more and more about the intellectual development of children. It is clear that we have wasted many years of learning time because of the fear that students were not ready or the subject was too difficult. With exception of the earliest stage of childhood. The truth is that almost nothing is too difficult. Jerome S. Bruner days. "The foundation of any subject may be taught to anybody at any age in some form.[3]

Multimedia:

Multimedia at its best, allows us to bring the real World to the learner through the use of sound and video. Such connections to the real World serve as a factor in providing them with additional connections to other knowledge structures. At the same time, multimedia allows students to experience information through multiple modes of presentation. Such need to model learning should help to build to connections with in the learner's brain of only because multiple modes of reception will engage different areas of the learner's brain.[4]

Role of Traditional Curriculum:

The traditional curriculum is to appropriate and inadequate to day to pull all types of children to developmental level. It is because the individual difference lies among the students.[5]Techniques and technologies have been developed to eradicate the inadequacy of boosting through traditional method. The teaching approaches can be applied for the development.

The teaching approaches:

Zeichner (1992) has summarized the extensive literature that describes successful teaching approaches for diverse populations. From his review, he distilled 12 key elements for effective teaching for ethnic- and language-minority students.

1. Teachers have a clear sense of their own ethnic and cultural identities.
2. Teachers communicate high expectations for the success of all students and a belief that all students can succeed.
3. Teachers are personally committed to achieving equity for all students and believe that they are capable of making a difference in their students' learning.
4. Teachers have developed a bond with their students and cease seeing their students as "the other."
5. Schools provide an academically challenging curriculum that includes attention to the development of higher-level cognitive skills.
6. Instruction focuses on students' creation of meaning about content in an interactive and collaborative learning environment.
7. Teachers help students see learning tasks as meaningful.
8. Curricula include the contributions and perspectives of the different ethno cultural groups that compose the society.
9. Teachers provide a "scaffolding" that links the academically challenging curriculum to the cultural resources that students bring to school.
10. Teachers explicitly teach students the culture of the school and seek to maintain students' sense of ethno cultural pride and identity.
11. Community members and parents or guardians are encouraged to become involved in students' education and are given a significant voice in making important school decisions related to programs (such as resources and staffing).
12. Teachers are involved in political struggles outside the classroom that are aimed at achieving a more just and humane society.[6]

Appreciate and accommodate the similarities and differences among the students' cultures:

Effective teachers of culturally diverse students acknowledge both individual and cultural differences enthusiastically and identify these differences in a positive manner. This positive identification creates a

basis for the development of effective communication and instructional strategies. Social skills such as respect and cross-cultural understanding can be modeled, taught, prompted, and reinforced by the teacher.[7]

Learning Styles in a Diverse Classroom:

Eddy (1999) describes a learning style as the way in which we prefer to organize, classify and assimilate information about the environment. That is, how do we like to learn? There is a great deal written on learning styles – and probably as many theories as there are writers on the subject. However, in their most basic form, there are three main learning styles (Eddy):

- Auditory learners prefer to receive ideas and information by hearing them. These students may struggle with reading and writing, but excel at memorizing spoken words such as song lyrics. They often benefit from discussion-based classes and the opportunity to give oral presentations.
- Visual learners prefer to receive information by seeing it. Typically these students pay much attention to detail. They are less likely to speak in class than their auditory peers, and generally use few words when they do. Outlines, graphs, maps and pictures are useful in helping these students learn.
- Kinesthetic-Tactile learners tend to learn best via movement and touch. These students are often labeled "hyperactive" because they tend to move around a great deal. Because they like movement, they may take many notes and learn best when allowed to explore and experience their environment.

It is important to note that the various styles are those preferred by learners. If we looked at complete descriptions of each style, we would probably see some of ourselves in each. But we could also probably identify our dominant style. The fact that we learn in many ways is further justification for utilizing variety of teaching approaches is so important. Understanding learning styles can help you create more inclusive classrooms where everyone has a chance to succeed. For instance, a student from a culture that teaches children to listen quietly in a classroom (or a visual learner who is uncomfortable with speaking) can be at a disadvantage when a portion of the grade is based on participation in class. Sensitive teachers can allow for group work during class to create smaller, safer environments for these students to speak and for their classroom performance to be evaluated.[8]

Inclusive school:

Inclusive practices are an integral characteristic of schools that achieve strong measures of academic success. Why? Because in inclusive schools, the following characteristics are in place:

1. Students are educated whenever appropriate in the general education classroom with teachers skilled in the content taught.
2. Access and opportunities to progress in the general education curriculum is greatly facilitated through inclusive practices.
3. High expectations for all students are the norm.
4. Instruction is differentiated to engage students on the basis of the skill sets, interests, and learning styles.
5. Teachers use flexible grouping that includes varied small group instruction, large group, and paired instruction.
6. Students are actively engaged in instruction and in their own learning.
7. Instructional accommodations and scaffolding are used to increase access to learning and academic success.[9]

Strategies for working with diverse learners:

A Research Review Educational research directed at working with diverse learners is replete with studies identifying best practices for closing the achievement gaps that persist by race/ethnicity, socio-economics, language, and disability. Fortunately for practitioners, there is considerable agreement on the practices that improve the academic performance of groups of students who have traditionally demonstrated lower levels of achievement than their white, Asian American, and more affluent peers. These best practices may be categorized into four broad bands of strategies that include: 1) demonstration of high expectations, 2) implementation of culturally relevant instruction, 3) establishment of caring relationships, and 4) effective parent and community involvement. None of these bands of strategies is new to the readers of this article and none are quick and easy "fixes." Each band is a complex construct that must be considered within the specific cultural and social context of the community and the particular issues that exist in relationship to the achievement disparities in the school. This article will review the four bands of strategies and provide specific observable and measurable indicators for each one. It is important to note that the indicators cited here are not all-inclusive, but merely a sampling of behaviors and practices that are pervasive in the research.[10]

Conclusions:

Teacher has the responsibility of teaching all the students. Teacher can apply various strategies. Technology can be applied to full fill the individual differences. Grasping power, understanding capacity may vary according to the individual differences. There are various types of students also. Inclusive education is essential. Learning style and Teaching strategies accomplish the need according to the class room diversity.

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Classroom Management

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Abstract

Classroom management is aim to achieve desired goals for teaching and learning in the classroom. In is more dependent on the progress and outcomes of the various activities of the class, which lead the group of pupils to develop excellence in their performance. Today, we know more about teaching than we ever have before. Research has shown us that teachers' actions in their classrooms have twice the impact on student achievement as do school policies regarding curriculum, assessment, staff collegiality, and community involvement. We also know that one of the classroom teacher's most important jobs is managing the classroom effectively. Classroom management is closely linked to issues of motivation, discipline and respect. Methodologies remain a matter of passionate debate amongst teachers; approaches vary depending on the beliefs a teacher holds regarding educational psychology. A large part of traditional classroom management involves behavior modification, although many teachers see using behavioral approaches alone as overly simplistic.

Introduction

Classroom management is the process by which teachers and schools create and maintain appropriate behavior of students in classroom settings. The purpose of implementing classroom management strategies is to enhance prosaically behavior and increase student academic engagement. Effective classroom management principles work across almost all subject areas and grade levels. When using a tiered model in which school-wide support is provided at the universal level, classroom behavior management programs have shown to be effective for 80-85 percent of all students. More intensive programs may be needed for some students.

Classroom management is a term used by teachers to describe the process of ensuring that classroom lessons run smoothly despite disruptive behavior by students. The term also implies the prevention of disruptive behavior. It is possibly the most difficult aspect of teaching for many teachers; indeed, experiencing problems in this area causes some to leave teaching altogether.

The Approaches of Class Room Management

Culturally Responsive Classroom Management

Culturally Responsive Classroom Management is an approach to running classrooms with all children, in a culturally responsive way. More than a set of strategies or practices, CRCM is a pedagogical approach that guides the management decisions that teachers make. It is a natural extension of culturally responsive teaching which uses students' backgrounds, rendering of social experiences, prior knowledge, and learning styles in daily lessons. Teachers, as culturally responsive classroom managers, recognize their biases and values and reflect on how these influence their expectations for behaviour and their interactions with students as well as what learning looks like.

The Good Behaviour Game

The Good Behaviour Game can be used to increase desired behaviours (e.g., question asking) or to decrease undesired behaviours (e.g., out of seat behaviour). The GBG has been used with pre-schoolers as well as adolescents; however, most applications have been used with typically developing students (i.e., those without developmental disabilities). In addition, the Game "is usually popular with and acceptable to students and teachers.

Don't leave relationships to chance

Teacher-student relationships provide an essential foundation for effective classroom management—and classroom management is a key to high student achievement. Teacher-student relationships should not be left to chance or dictated by the personalities of those involved. Instead, by using strategies supported by research, teachers can influence the dynamics of their classrooms and build strong teacher-student relationships that will support student learning.

Discipline with Dignity

Discipline with Dignity provides an in-depth flexible approach for effective school and classroom management. With a strong focus on developing responsibility, it is a comprehensive, practical program that leads to improved student behavior through establishing the shared values of a classroom/school then developing a clear set of expectations, and teaching responsible thinking, cooperation, mutual respect, and shared decision-making.

Discipline without Stress, Punishments or Rewards

The approach is designed to educate young people about the value of internal motivation. The intention is to prompt and develop within youth a desire to become responsible and self-disciplined and to put forth effort to learn. The most significant characteristics of DWS are

that it is totally no coercive and takes the opposite approach to Skinnerian behaviourism that relies on external sources for reinforcement.

Use Equitable and Positive Classroom Behaviors

Teachers should, for example,

- Make eye contact with each student. Teachers can make eye contact by scanning the entire room as they speak and by freely moving about all sections of the room.
- Deliberately move toward and stand close to each student during the class period. Make sure that the seating arrangement allows the teacher and students clear and easy ways to move around the room.
- Attribute the ownership of ideas to the students who initiated them. For instance, in a discussion a teacher might say, "Cecilia just added to Aida's idea by saying that . . .."
- Allow and encourage all students to participate in class discussions and interactions. Make sure to call on students who do not commonly participate, not just those who respond most frequently.
- Provide appropriate wait time for all students to respond to questions, regardless of their past performance or your perception of their abilities.

Take a Personal Interest in Students

Probably the most obvious way to communicate appropriate levels of cooperation is to take a personal interest in each student in the class. Although busy teachers—particularly those at the secondary level—do not have the time for extensive interaction with all students, some teacher actions can communicate personal interest and concern without taking up much time. Teachers can

- Talk informally with students before, during, and after class about their interests.
- Greet students outside of school—for instance, at extracurricular events or at the store.
- Single out a few students each day in the lunchroom and talk with them.
- Be aware of and comment on important events in students' lives, such as participation in sports, drama, or other extracurricular activities.
- Compliment students on important achievements in and outside of school.
- Meet students at the door as they come into class; greet each one by name.

Classroom management as a process

Teachers must

- Develop caring, supportive relationships with and among students;
- Organize and implement instruction in ways that optimize students' access to learning;
- Use group management methods that encourage students' engagement in academic tasks;
- Promote the development of students' social skills and self–regulation; and
- Use appropriate interventions to assist students with behavior problems.

Many of them describes classroom management as a process consisting of key tasks that teachers must attend to in order to develop an environment conducive to learning. These tasks include: organizing the physical environment, establishing rules and routines, developing caring relationships, implementing engaging instruction and preventing and responding to discipline problems.

The Teacher and the Classroom Management

This implies the creation of an environment in the class as it allows for the best display of the student's abilities in the teaching- learning process. There is the maximum involvement of the students in the classroom activities. The teacher and the students are full of enthusiasm. The classroom environment based on the mutual goodwill and faith. The teacher gives due regard to the individuality of the students and the students in turn show spontaneous respect for their teacher. Pupils with widely different backgrounds different abilities and interests attend school today. Broadly speaking an effective classroom management include:

- Curriculum Development and implementation
- Adjustment to individual differences and development
- Dynamic techniques of instruction
- Use of technology of teaching
- Maintaining class Discipline
- Evaluating and discussing pupils performance

Some characteristics of having good teacher-student relationships in the classroom involve the appropriate levels of dominance, cooperation, and awareness of high-needs students. Dominance is

defined as the teacher's ability to give clear purpose and guidance concerning student behavior and their academics.

By creating and giving clear expectations and consequences for student behavior, this builds effective relationships. Such expectations may cover classroom etiquette and behavior, group work, seating arrangements, the use of equipment and materials, and also classroom disruptions. Assertive teacher behavior also reassures that thoughts and messages are being passed on to the student in an effective way. Assertive behavior can be achieved by using erect posture, appropriate tone of voice depending on the current situation, and taking care not to ignore inappropriate behavior by taking action.

Conclusion

Finally, "ignoring and approving" is an effective classroom management strategy. This involves ignoring students when they behave undesirably and approving their behavior when it is desirable. When students are praised for their good behavior but ignored for their bad behavior, this may increase the frequency of good behavior and decrease bad behavior. Student behavior may be maintained by attention; if students have a history of getting attention after misbehavior, they may continue this behavior as long as it continues to get attention.

Effective teacher-student relationships have nothing to do with the teacher's personality or even with whether the students view the teacher as a friend. The most effective teacher-student relationships are characterized by specific teacher behaviors are exhibiting appropriate levels of dominance and exhibiting appropriate levels of cooperation. Effective classroom management involves clear communication of behavioral and academic expectations as well as a cooperative learning environment**.**

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Strategies for Effective Classroom Management

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Abstract

A good teacher must be good at classroom management the teacher should guide the students towards self-direction. Rhythm in the classroom is also important. Class culture makes the students feel secure. The teacher's smile, words of encouragement, praise and good attention affect students' behavior Soft reprimand is very effective. Self-learning and self-evaluation are useful for students. Kounin, one of the early writers on classroom management, identified several effective classroom management techniques. He emphasized cultivating withitness, coping with overlapping activities, maintaining the momentum of a lesson, keeping the whole class involved in a lesson, using a variety of instructional techniques enthusiastically, being aware that the ripple effect can be used to a teacher's advantage by focusing on the misbehavior of students rather than on their personalities, and suggesting alternative constructive behaviors. Further, needs of the students in the classroom, general techniques of classroom management are suggested for a classroom teacher at the end of this article.

Key words: Classroom management, Rhythm, withitness, reprimand, ripple effect, class culture, techniques

Introduction

A classroom is not merely a room where students attend classes or move from one room to another in order to attend classes as per the timetable. It can be considered as a sacred place of learning where a teacher teaches and students learn. In other words, a classroom is a teaching-learning interactive place where two personalities namely the teacher and the taught interact every day. A child is like a plant. A child's mind is more sensitive to treatment. Since the child's mind is a great source of potential, natural but controlled conditions can nurture magnificent growth. It all depends upon how the parents at home and teachers in the classroom manage the development of the potentialities of children. "Education must foster in students the essential leap from **I know** *to* ***I care***. Therefore, the classroom must be the place where the student can explore himself. The teacher must regard the child as an active, thinking, feeling human being, who needs to be stimulated, directed and guided towards the realization of

all his inherent potentialities thereby becoming a worthy member of a society.

Classroom Management

Classroom management is one of the two main functions of a teacher, the other being teaching and instruction. This approach is based on the human organization of modern theory of relationship centered. The basic assumption of this approach is that a teacher has the ability to take decisions and solve classroom problems. Though a difficult job, a teacher has to direct and control the classroom activities. The main focus of classroom management is to generate an atmosphere that is conductive for learning. In fact, the quality of teaching and learning depends upon the quality of classroom management. Classroom management is a very dynamic process and at the same time it is the most difficult job of a teacher.

Areas for which concern to be shown by the teacher in the classroom

***1.* Conduct Problems**

This included such responses as aggressive behavior, disruptive behavior, lacks self-control, uncooperative, foul mouthed, that is those responses referring to behaviors which reflect an outward going, acting out attitude.

2. Neurotic Problems

This included responses such as withdrawn, insecure and miserable and timid, that is, behaviors which reflect an inward looking, passive attitude.

***3.* Mixed conduct**

This included those responses which embodied elements of both the conduct and neurotic problem categories. It was included because other researchers have concluded that a substantial percentage of behavior disordered pupils show elements of both behavioral patterns, and a School Council Project, found that teachers in special classes and units for disturbed pupils rated 25 per cent of their pupils to be in this group.

***4.* Non-attendance**

This included those responses referring to any aspect of non-attendance and also included two responses which referred to extremely bad timekeeping.

5. Delinquent Behavior

This includes all of those responses which at an appropriate age, could constitute a criminal act, this is to say that children below the age of criminal responsibility could be, and were, included.

***6*. Learning Problems**

This included responses such as poor attainment in basic subjects, low ability, poor concentration, lazy and son on.

***7.* Home Problems**

This included responses referring to poor home situations, parental neglect, parental instability, parental imprisonment, absence, etc.

***8.* Physical Problems**

This included those responses referring to a directly physical problem and also to those in which a physical problem and also to those in which a physical problem and also to those in which a physical problem might be inferred.

***9.* Emotional Difficulties**

This category was found necessary if the quality of certain responses was not to be lost. It included references to odd, strange or bizarre behavior. For example, lives in a fantasy world, high evil resource, maladjusted, has attempted suicide, unstable, no sense of right or wrong, never laughs.

***10.* Attention Seeking**

This was included because a number of responses were expressed simply as attention seeking with no indication of how this was manifested.

***11.* Others**

This took in all those responses which could not reasonably fit into the other categories, for examples victim of a sexual assault, unsettled, unpopular and general welfare.

Needs, teaching structures and techniques of Motivation

The various needs, teaching structures and techniques of motivation to be used are summarized below:

Needs	Techniques of motivation
Lower Needs Physiological Safety Belonging	 Reward and punishment Praise and Proof Success and failure
Higher needs Esteem Self-actualization	 Competition and Cooperation Knowledge of result Self-motivation Novelty

In the daily classroom teaching, the teacher must be careful about monotony and boredom. He should always provide the students with activities. The teaching methods should capitalize on the students' needs for stimulation and their propensities to be curious and explore. The teacher should reward students' performance in such a way as to encourage further effect on the part of the learners. The disciplinary functions require the teacher to control undesirable behavior by the use of punishment but it should be rarely used. The teacher should use a combination of reward and punishment in controlling and regulation students' behavior.

Strategies for classroom management

The teacher as management expert of the class adopts different strategies to manage it. In addition to authority and leadership, he has a repertoire of approaches which he applies depending on the behavior patterns exhibited by the students and the situation on hand. The teacher is successful in classroom management if he brings ***rhythm*** in everything he works with, develops a ***class culture*** to make the members of the class feel secure. The ***teacher's attention*** is one of the most basic of all influences on student's behavior. The teacher's smile, words of encouragement, praise, evaluation and silence powerfully affect student behavior. ***Teacher's verbal control*** is the most common form of a teacher on a classroom. Verbal reprimand is quite understandable when teaching is viewed as giving direction and redirection.

The most effective classroom management techniques in Kounin, one of the early writer's perspective are as follows:

- The teacher must show his students that he is "with it". An expert at classroom management will nip trouble in the bud by commenting on potentially disruptive behavior before it gains momentum. Teachers who show they are "with it" head off discipline problems.
- The teacher should learn to cope with overlapping situations. Being able to handle overlapping activities helps to maintain classroom control.
- The teacher should be able to strive to maintain smoothness and momentum in class activities. When a teacher failed to take into account the degree of student's inattention and restlessness, commenting on an unrelated aspect of classroom functioning such as someone left a lunch bag while reading a lesson, wasting time dwelling on a trivial incident such as making a big fuss of a lost

pencil, all these types of teacher behavior tended to interfere with the flow of learning activities.

- The teacher must try to keep the whole class involved, even when he is dealing with individual students. Some teachers, for example, call on students by going around a circle, or going up and down rows or following alphabetical order. Other call on a student then ask a question. All of these techniques tend to spotlight one child in predictable order. If a teacher does so, the other students become bored and may be tempted to engage in trouble-making activities.
- The teacher need to introduce variety and be enthusiastic, particularly with younger students. Students will be less inclined to sleep, daydream or engage in disruptive activities if they are exposed to an enthusiastic teacher who varies the pace and type of classroom activities.
- The teacher must be aware of the ripple effect When criticizing student behavior , be clear and firm, focus on behavior rather than on personalities, and try to avoid angry outbursts. If a teacher follows this suggestion, the amount of misbehavior may be reduced.

Techniques of classroom management

In a well-managed classroom, students know what they are expected to do and do it successfully, are kept busy with teacher-assigned activities, and exhibit little confusion or disruptive behavior. Such classrooms are marked by a work-oriented yet relaxed and enjoy pleasant atmosphere. Classroom management can be made easier by using technology tools to carry out such tasks as test construction, record keeping, developing seating arrangements, analyzing space utilization, and monitoring student work. Some of the techniques of classroom management are as follows:

- The teacher must be confident and prepared for the first day of class
- The teacher must think ahead about how he plans to handle classroom routine, and explain basic procedures the first few minutes of the first day.
- The teacher is needed to establish class rules, call attention to them and explain why they are necessary.
- Instructional activity of the first day be clearly stated and be completed quickly and successfully by the efficient teacher.
- During the first few weeks with a new group of students, have them spend most of their time engaging in whole-class activities under teacher's direction.

- The teacher should give clear instructions, hold students accountable for carrying them out, and provide frequent feedback.
- The teacher need to demonstrate continually that he is competent, well prepared and in charge.
- The teacher must be professional best pleasant, and try to establish a business-like but supportive classroom atmosphere.

Conclusion

The mastery of classroom management skills should note regarded as an end in itself but these techniques are necessary tools. The mastery of techniques makes choices possible. The possession of classroom management skills allows the teacher to accomplish his teaching goals, whereas the absence of managerial skills acts as a barrier. It is needed for a teacher to develop managerial skills to understand the needs of the students in his classroom, identify the problems which his students face every day in the classroom and how can it be rectified using the techniques. If the teacher ENJOYED teaching, students would ENJOY learning; If the teacher ENDURED teaching, students would ENDURE learning. What is enjoyed ENDURES. What is endured does not ENDURE. The ENJOYED teacher can make a good classroom

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In Vitro Studies on Antioxidant Properties of Gallic Acid from Mangifera Indica

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Abstract

Polyphenolic compounds exert a variety of physiological effects in vitro and are able to act as antioxidants by virtue of their hydrogen-donating and metal-chelating capacities. Gallic acid from Mangifera indica kernel was isolated and identified. This article describes an approach to the study of the antioxidant activity of gallic acid. This activity is compared with a known antioxidant quercetin. The 1, 1-diphenyl-2-picryhydarzyl (DPPH), superoxide & hydroxyl radical scavenging activities and inhibition of ferrous sulphate induced lipid peroxidation of this compound was evaluated to determine its physiological usefulness as protective against oxidative injury. Gallic acid mainly exhibited a potent scavenging effect on superoxide and 1, 1-diphenyl-2-picryhydarzyl (DPPH) radicals and also acted as a moderate scavenger of hydroxyl radicals. The antioxidative protection of low-density lipoprotein (LDL) was also evaluated and compared with that of quercetin, because the generation of oxidized LDL is one of the most active and specific risk factors contributing to atherogenesis.

Keywords: Mangifera indica, hydroxyl radical, DPPH radical, antioxidant, Gallic acid, serum oxidation

Introduction

Flavonoids are polyphenolic components of higher plants known to be excellent antioxidants *in vitro*. Dietary flavonoids have been shown to prevent lipid peroxidation, to scavenge reactive oxygen species, to chelate iron ions, essential for the generation of hydroxyl radicals, and to inhibit NADPH-dependent oxidases and consequently superoxide anion production (1; 2; 3). Evidence for the potential role of oxidative stress in various diseases and pathophysiological processes suggests that the dietary intake and the therapeutic use of flavonoids may have positive health effects (4; 5; 6). Polyphenols are reducing agents, and together with other dietary reducing agents, such as vitamin C, vitamin E and carotenoids, referred to as antioxidants, protect the body's tissues against oxidative stress and associated pathologies such as cancers, coronary heart disease and inflammation (2; 7). The variable response to dietary flavonoids could have important physiological consequences since

individual flavonoids and their metabolites have differing biological effects (8). A significant body of literature has accumulated, primarily from *in vitro* investigations, regarding the antioxidant properties of flavonoids and other plant polyphenolics (9).

In recent years improved understanding of the pharmacological properties of individual flavonoid compounds has led to the developments of flavonoid drugs. Many fruits and vegetables have already been identified as good antioxidants due to the presence of good quality antioxidants like flavonoids and other polyphenolic compounds in addition to usual antioxidants like ascorbic acid, α-tocopherol, β- carotene etc. (10). However, supplementation of these antioxidants through diet does not always meet the requirements. Effective drugs developed from natural sources come to rescue under such situations. Since 'stress' as well as 'pollution' induces the generation of toxic radicals in the body and modern man is always under the purview of these risk factors, antioxidants from diet alone may not compensate the issue. Accumulation of toxic radicals over periods can cause life threatening diseases like cardiovascular diseases and cancer. Hence it is highly demanding to unmask the best antioxidant hidden in natural sources.

Materials and Methods

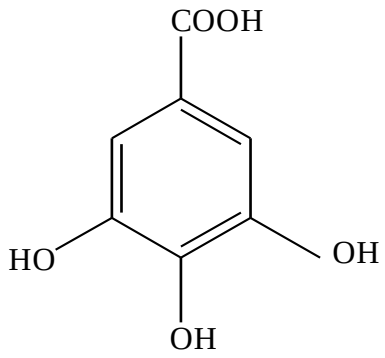
Part A: Isolation and characterization

The mango kernel was air dried and the ground dried material was extracted with hot 80% methanol thrice (Petra *et al*, 1999). The combined extract was evapor ated to dryness and the residue was dissolved in water and extracted successively with hexane, benzene, ethyl acetate and n-butanol. The respective extracts were evaporated in vacuum yielding residues from hexane, benzene, ethyl acetate, and n-butanol. Ethyl acetate residue was selected for column chromatography because of its high polyphenolic content. Ethyl acetate residue was used for successive column chromatography with eluents such as hexane, chloroform, ethyl acetate, and methanol mixtures in increasing polarity and repeated column chromatography of series ($CHCl_3$: ethyl acetate, 1: 9) afforded the compound, which was examined further. Yield of compound was 335.2 mg/Kg.

The compound that has been obtained by column chromatographic separation and subsequent crystallization from ethanol appears to be slightly yellow colored crystals, which is soluble in methanol, ethanol and other organic solvents. It was also soluble in dilute sodium

bicarbonate solution and gave indication of effervescence. This pointed to an acidic nature of the compound. For its structure identification, it was subjected to spectral analysis. Its UV-visible spectrum showed a λ max at 269 nm and another at λ 396 nm. In presence of sodium hydroxide its absorption spectrum underwent a drastic change thus indicating a phenolic nature for the compound. Its UV-visible spectrum showed a shift in the λ max in the presence of $AlCl_3$ (the shift observed was +44 nm) and $AlCl_3$ + HCl (the shift observed was + 12 nm), which is characteristics of the presence of ortho dihydroxy groups. These UV- visible spectral parameters points to the fact that the compound presently isolated could be a phenolic acid. Its IR spectrum in KBr disc showed a broad band in the region 2600- 3350 cm^{-1}. This seemingly indicates the presence of OH groups in the molecule. There was a strong peak at 1700 cm^{-1}, which is attributed to a carbonyl function. The ^{1}H NMR spectrum of the compound was taken in methanol, acetone and DMSO-d_6. These spectra showed the absence of any methoxy, alkyl or alkene functionalities. There were only aryl hydrogens seen in the spectra. The ^{13}C NMR spectrum also was in accordance with the above conclusion; peaks appeared only in the range 95- 167 ppm. These were at 95.73, 109.0, 120.74, 137.78, 145.18, and 167.76 ppm and are indicative of an aromatic ring bearing oxygen function. The ES- MS showed a peak at m/z 188. The ES- MS was run in presence of ammonium acetate in methanol and therefore the peak at m/z 188 is assigned to [M + NH_4] thereby giving 170 as the molecular mass of the compound under investigation. This is substantiated by the appearance of a peak at m/z 358 which is assignable to [2 M+ NH_4^+] peak. Such cluster peaks are the hallmark of electrospray mass spectrum. In addition, similar [n M + NH_4^+] clusters were seen at n values of 3, 4, 5, and 6 at m/z values of 528, 698, 868 and 1038, thus confirming that the molecular mass is 170.

Considering all the data above, it appears that the compound has a carbonyl, at least two hydroxyls and a benzene ring. This leads to a plausible structure of [2HO + C_6H_3 + COOH] with mass 154. If another oxygen is present as in $C_7H_6O_5$, then the molecule could be a trihydroxy aromatic carboxylic acid. The singlet nature of the ^{1}H NMR peak at 7.06 indicates that the compound could be 3, 4, 5- trihydroxy benzoic acid or gallic acid. The melting point reported for gallic acid is 251°C; the compound presently isolated melts at 251 °C. Thus, the compound isolated could be conclusively identified as gallic acid.



3, 4, 5- trihydroxy benzoic acid or gallic acid

PART B: In vitro studies on antioxidant activities of gallic acid from Mangifera indica kernel

Flavonoids and other polyphenolic compounds are the most potent antioxidants. Polyphenols can form complexes with reactive metals such as iron, zinc and copper- reducing their absorption. At first glance, this may seem to be a negative side effect (reducing nutrient absorption), but excess levels of such elements (metal cations) in the body can promote the generation of free radicals and contribute to the oxidative damage of cell membranes and cellular DNA (Sestili *et al*, 2002). In addition to their chelating effect on metal cations, polyphenols also function as potent free radicals before they can cause cellular damage (Bravo, 1998; Damianaki *et al*, 2000; Fuhrman *et al*, 1995; Goldbohm *et al*, 1996; Kuo, 1997). In general, flavonoids and other polyphenolic compounds are thought to deliver health benefits by several mechanisms, including: (1) direct free radical quenching, (2) protection and regeneration of other dietary antioxidants (like vitamin E), (3) chelation of metal ions. Both metal chelating and free radical scavenging activities have been recognized as the antioxidant mechanism for flavonoids in a biological system (Afanas'ev *et al*, 1989; Belinky *et al*, 1998). Flavonoids can act as chain breaking antioxidants by scavenging chain propagating peroxyl radicals because they possess phenolic hydrogens responsible for the peroxyl scavenging activity. Bors *et al* (1990) have proposed that three structural groups are important determinants for free radical scavenging; (a) the o-hydroxyl (catechol) structure in the B ring, which is obvious radical target site for all flavonoids, (b) the 2, 3- double bond in conjunction with 4- oxo function, which is responsible for electron delocalization (c) the additional presence of both 3- and 5- hydroxyl groups for maximal radical scavenging potentials and strongest radical absorption. Numerous in-vitro studies have shown that polyphenolic

compounds are powerful antioxidants that can protect cell membranes and cellular DNA from the damaging effects of free radical induced oxidative damage (Sestili et al, 2002; Rice- Evans et al, 1997). Here we have used the purified gallic acid from Mangifera indica for in vitro studies including $FeSO_4$ induced lipid peroxidation (Tripathi and Pandey, 1999), inhibition of superoxide production (Rowley and Halliwell, 1983), antiradical efficiency (Joyeux et al, 1995), effect on serum oxidation (Hodgson et al, 1999) and inhibition on hydroxyl radical formation (Jeffery et al, 1989). The effects of the compound were compared with quercetin, a known antioxidant flavonoid purchased from Sigma Chemical Company, USA.

Statistical analysis

The data given in tables and figures are the mean of the values from the number of animals specified in the respective tables and figures ± SEM. Statistical significance was determined by One-way Analysis of Variance (ANOVA) in SPSS 10.0 package. Paired comparison between groups was made by Duncan's multiple range test. 'p' value of 0.05 or less was considered as significant. Values expressed as mean ± SEM, for n = 6.

Results

- Effect of gallic acid from *Mangifera indica* on $FeSO_4$ induced lipid peroxidation (fig 1):

The lipid peroxidation was inhibited of by gallic acid from *Mangifera indica* in concentration dependent manner. Similarly, quercetin also inhibited in concentration dependent manner. Concentration required to produce 50% inhibition on lipid peroxidation (IC_{50}) was 42.5 ± 1.275 μg/ 3ml in the case of gallic acid where as it was 44.63 ± 1.78 μg/ 3ml for quercetin.

- Inhibition of superoxide production (fig 2):

The superoxide production was inhibited by gallic acid from *Mangifera indica* in a concentration dependent manner. Concentration of flavonoid required to induce 50 % (IC_{50}) inhibition is 4.35 ± 0.18 μg/ 3ml for gallic acid where as 34 ± 1.36 μg/ 3ml for quercetin.

- Effect of gallic acid on antiradical activity (fig 3):

Antiradical efficiency also increased with concentration. Concentration of flavonoid required to induce 50 % inhibition (IC_{50}) is 3.83 ± 0.167 μg/ 2ml for gallic acid from *Mangifera indica* whereas 26.13 ± 1.12 μg/ 2ml for quercetin.

- Effect of gallic acid on hydroxyl radical scavenging (fig 4):

Gallic acid from *Mangifera indica* and quercetin showed 50 % inhibition on hydroxyl radical production at 6.375 ± 0.22 μg/ 2ml, 9.5 ± 0.4 μg/ 2ml and 11.063 ± 0.47 μg/ 2ml respectively.

- Effect of gallic acid on serum oxidation (Fig 5):

The lag time to lipoprotein formation was measured from the plot of absorbance against time. The lag time was defined as the intercept between the tangent of the absorbance curve during the propagation phase and baseline. The lag time of compounds to lipoprotein diene formation in serum oxidation are given in table 1. .

Discussion

In vitro studies on inhibition of production of superoxides, and hydroxyl radicals, antiradical efficiency, and serum oxidation showed that gallic acid from *Mangifera indica* was highly effective antioxidant. Gallic acid from *Mangifera indica* exerted 50% inhibition (IC_{50}) of superoxide production at a concentration of 4.35 ± 0.18μg whereas quercetin showed a higher value 34 ± 1.36μg. This compound also acted as efficient radical scavenger and inhibition was found to be 50 % at a concentration of 3.83 ± 0.167μg for gallic acid in spite of the fairly high concentration 26.13 ± 1.12μg for quercetin. This is in accordance with several other reports demonstrating the property of inhibiting autoxidation reactions and scavenging of free radicals by flavonoids (Galati *et al*, 2002). Flavonoids possess multiple properties for scavenging reactive oxygen and nitrogen species (van Acker *et al*, 1995; Rice- Evans, 1999). Flavonoids inhibit platelet activation by interfering simultaneously with several biochemical pathways, as platelets are likely to be exposed *in vivo* to stimulation by several agents acting through different mechanisms (Beretz and Cazenave, 1988). Flavonoids can react with superoxide anions (Afanas'ev *et al*, 1989), hydroxyl radicals (Husain *et al*, 1987), and lipid peroxy radicals (Torel *et al*, 1986). These compounds may also act by chelating iron (Afanas'ev *et al*, 1989; Morel *et al*, 1998) which is thought to catalyze processes leading to the appearance of free radicals. Kim (2001) explained the antioxidant potential of biflavones of *Ginkgo biloba* on the basis of structure-related activity and hydroxy- and methyl-substitutions on the basic structure of these flavonoids. Flavonoid rich extract from rose hip (*Rosa canina*) inhibited superoxide anions, hypochlorous acid (HOCl) and hydrogen peroxide (H_2O_2) generated by *in vitro* inflammatory conditions induced on isolated PMN (Daels-Rakotoarison *et al*, 2002). It has recently been suggested that

phenolic/flavonoid antioxidants from apple extracts inhibited proliferation of tumor cells *in vitro* (Lapidot *et al*, 2002). Plant polyphenols, such as gallic acid, have been reported to have a range of biological activities including antimutagenic effects (Stupans *et al*, 2002).

Gallic acid is a naturally occurring plant phenol (found in green tea & grape seed extract). In screening anti-cancer agents, gallic acid was found to show cytotoxicity against all cancer cells that were examined. Additionally, the study found that gallic acid did not harm healthy cells, but was able to distinguish between normal cells and cancer cells (Inoue *et al*, 1995). A number of antioxidant phenols, pyridines, and gallic acid esters are believed to be effective by virtue of their antioxidant action. A direct relation between radical inhibitory action and radiation protection has been observed (Burlakova *et al,* 1965). The protective effect of gallic acid esters are attributed to inhibition of chain oxidation processes induced by radiation (Hasan *et al,* 1981). Activity-guided fractionation of the ethyl acetate soluble fraction from *Chrysophyllum cainito* L. (Sapotaceae), known commonly as star apple or caimito, was performed to identify the antioxidant constituents, which contained gallic acid as one of nine polyphenolic antioxidants (Luo *et al*, 2002). Bisignano *et al*, (2000) reported the antibacterial activity of gallic acid isolated from *Mitracarpus scaber*, a species used in folk medicine by West African native people and the minimum inhibitory concentration of gallic acid was found as 3.90 µg /ml for the inhibition of the growth of *Staphylococcus aureus*. A water extract of *Limonium wrightii* showed a strong scavenging action for the 1, 1-diphenyl-2-picrylhydrazyl, or superoxide anion and moderate for hydroxyl radical. Gallic acid was identified as the active component of *Limonium wrightii* with a strong free radical scavenging action (Aniya *et al*, 2002). However, growth retardation and toxicity symptoms were assigned to gallic acid when fed to rats at dietary levels of 2-10% (Joslyn and Glick, 1969).

In our highly industrial and technological society, the pharmaceutical industry had been disrupting the ancient relationship between man and plants. However there is already a decided swing back to the old ways. People are beginning to take a greater interest in herbs and their uses, and grandmother's remedies are coming into their own again. Rediscovery of old truths and integration of the traditional medical system with new technology can generate wonderful drugs without any side effects.

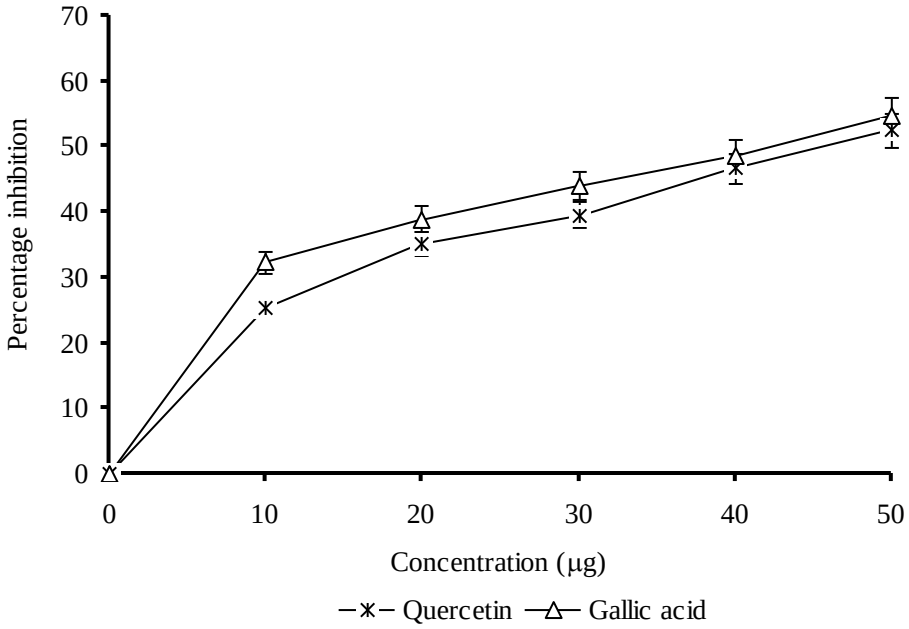


Fig 1. Effect of gallic acid on $FeSO_4$ induced lipid peroxidation

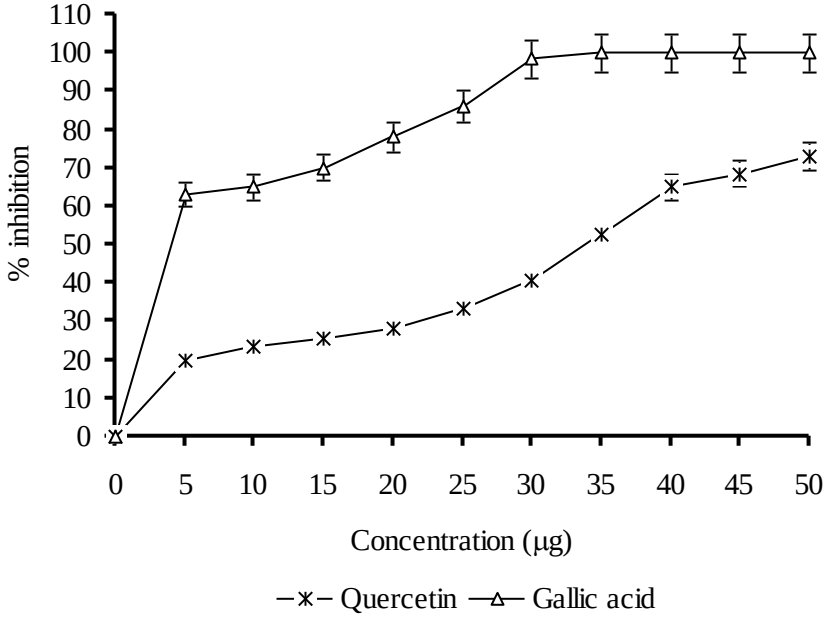


Fig 2. Percentage inhibition of superoxide production. Values expressed as mean ± SEM, for n = 6.

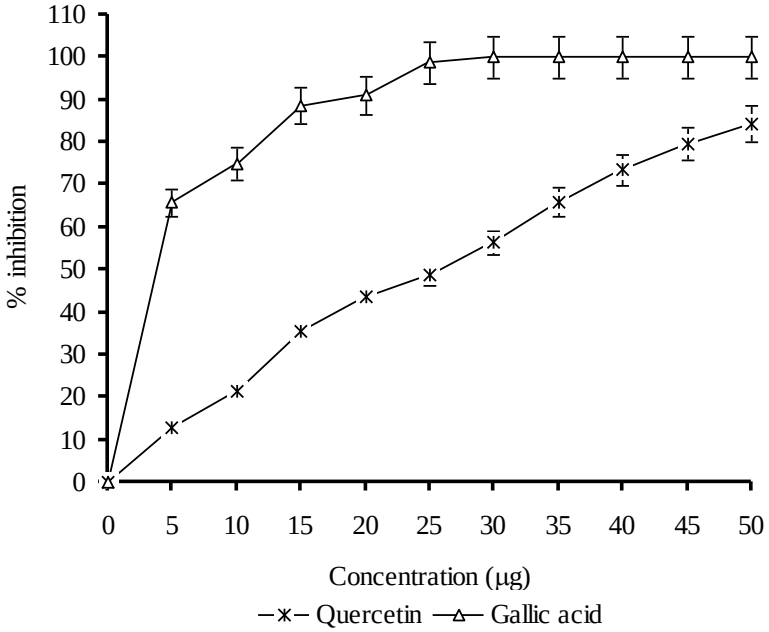


Fig 3. Antiradical efficiency

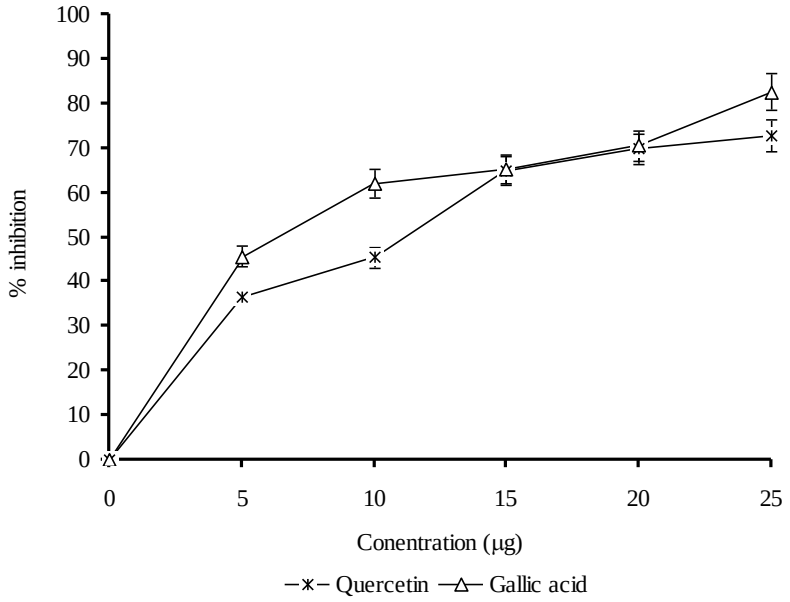


Fig 4. Effect of gallic acid on hydroxyl radical scavenging

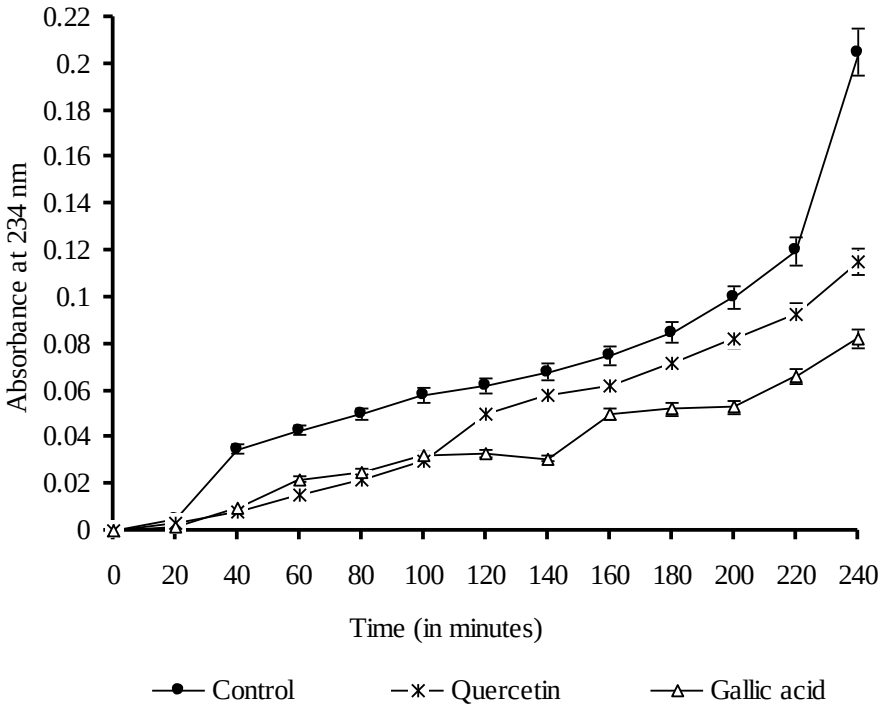


Fig 5. Effect of gallic acid on serum oxidation

Sample	Lag time (in minutes)
Control	17
Quercetin (50 μg)	71
Gallic acid (50 μg)	108

Table 1. Effect of gallic acid on lag time for lipoprotein diene formation

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Attitudes and Skills in Learning

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Abstract:

Hard work in learning will not produce fast progress. Instead use of skills in learning will be effective in getting results. Positive attitude helps in learning process. Learning occupies a very important place in our life. The 21st century learning skills are often called the 4 C's: critical thinking, creative thinking, communicating, and collaborating. These skills help students learn, and so they are vital to success in school and beyond.

Key words: critical thinking, creative thinking, communicating, and collaborating.

Introduction:

Hard work in learning will not produce fast progress. Instead use of skills in learning will be effective in getting results. Attitudes are evaluations people make about objects, ideas, events, or other people. Attitudes can be positive or negative. Explicit attitudes are conscious beliefs that can guide decisions and behavior. Implicit attitudes are unconscious beliefs that can still influence decisions and behavior. Positive attitude helps in learning process. Learning occupies a very important place in our life. Most of what we do or not do is influenced by what we learn and how we learn it. Learning therefore provides a key to the structure or our personality and behavior. The 21st century learning skills are often called the 4 C's: critical thinking, creative thinking, communicating, and collaborating. These skills help students learn, and so they are vital to success in school and beyond.

Critical thinking

Critical thinking is the process we use to reflect on assess and judge the assumption underlying our own and others ideas and efforts. It is focused, careful analysis of something to better understand it. It helps a person in stepping aside from his own personal beliefs, prejudices, and opinions to sort out the facts and discover the truth, even at the expense of his basic belief system. When people speak of "left brain"

activity, they are usually referring to critical thinking. Here are some of the main critical-thinking abilities:

- **Analyzing** is breaking something down into its parts, examining each part, and noting how the parts fit together.
- **Arguing** is using a series of statements connected logically together, backed by evidence, to reach a conclusion.
- **Classifying** is identifying the types or groups of something, showing how each category is distinct from the others.
- **Comparing and contrasting** is pointing out the similarities and differences between two or more subjects.
- **Defining** is explaining the meaning of a term using denotation, connotation, example, etymology, synonyms, and antonyms.
- **Describing** is explaining the traits of something, such as size, shape, weight, color, use, origin, value, condition, location, and so on.
- **Evaluating** is deciding on the worth of something by comparing it against an accepted standard of value.
- **Explaining** is telling what something is or how it works so that others can understand it.
- **Problem solving** is analyzing the causes and effects of a problem and finding a way to stop the causes or the effects.
- **Tracking cause and effect** is determining why something is happening and what results from it.

Creative Thinking

Creative thinking is the process we use to develop ideas that are unique, useful and worthy of further elaboration. It is expansive, open-ended invention and discovery of possibilities. When people speak of "right brain" activity, they most often mean creative thinking. Here are some of the more common creative thinking abilities:

- **Brainstorming** ideas involves asking a question and rapidly listing all answers, even those that are far-fetched, impractical, or impossible.
- **Creating** something requires forming it by combining materials, perhaps according to a plan or perhaps based on the impulse of the moment.
- **Designing** something means finding the conjunction between form and function and shaping materials for a specific purpose.
- **Entertaining** others involves telling stories, making jokes, singing songs, playing games, acting out parts, and making conversation.

- **Imagining** ideas involves reaching into the unknown and impossible, perhaps idly or with great focus, as Einstein did with his thought experiments.
- **Improvising** a solution involves using something in a novel way to solve a problem.
- **Innovating** is creating something that hasn't existed before, whether an object, a procedure, or an idea.
- **Overturning** something means flipping it to get a new perspective, perhaps by redefining given, reversing cause and effect, or looking at something in a brand-new way.
- **Problem solving** requires using many of the creative abilities listed here to figure out possible solutions and putting one or more of them into action.
- **Questioning** actively reaches into what is unknown to make it known, seeking information or a new way to do something.

Communicating

Communication (from Latin communicate, meaning "to share) is the purposeful activity of information exchange between two or more participants in order to convey or receive the intended meanings through a shared system of signs and semiotic rules. The basic steps of communication are the forming of communicative intent, message composition, message encoding, transmission of signal, reception of signal, message decoding and finally interpretation of the message by the recipient.

- **Analysing the situation** means thinking about the subject, purpose, sender, receiver, medium, and context of a message.
- **Choosing a medium** involves deciding the most appropriate way to deliver a message, ranging from a face-to-face chat to a 400-page report.
- **Evaluating messages** means deciding whether they are correct, complete, reliable, authoritative, and up-to-date.
- **Following conventions** means communicating using the expected norms for the medium chosen.
- **Listening actively** requires carefully paying attention, taking notes, asking questions, and otherwise engaging in the ideas being communicated.
- **Reading** is decoding written words and images in order to understand what their originator is trying to communicate.

- **Speaking** involves using spoken words, tone of voice, body language, gestures, facial expressions, and visual aids in order to convey ideas.
- **Turn taking** means effectively switching from receiving ideas to providing ideas, back and forth between those in the communication situation.
- **Using technology** requires understanding the abilities and limitations of any technological communication, from phone calls to e-mails to instant messages.
- **Writing** involves encoding messages into words, sentences, and paragraphs for the purpose of communicating to a person who is removed by distance, time, or both.

Collaborating

Collaborative learning is a method of teaching and learning in which student's team together to explore a significant question or create a meaningful project. A group of students discussing a lecture or students from different schools working together over the Internet on a shared assignment are both examples of collaborative learning.

- **Allocating resources** and responsibilities ensures that all members of a team can work optimally.
- **Brainstorming** ideas in a group involves rapidly suggesting and writing down ideas without pausing to critique them.
- **Decision-making** requires sorting through the many options provided to the group and arriving at a single option to move forward.
- **Delegating** means assigning duties to members of the group and expecting them to fulfil their parts of the task.
- **Evaluating** the products, processes, and members of the group provides a clear sense of what is working well and what improvements could be made.
- **Goal setting** requires the group to analyse the situation, decide what outcome is desired, and clearly state an achievable objective.
- **Leading** a group means creating an environment in which all members can contribute according to their abilities.
- **Managing time** involves matching up a list of tasks to a schedule and tracking the progress toward goals.
- **Resolving conflicts** occurs from using one of the following strategies: asserting, cooperating, compromising, competing, or deferring.

- **Team building** means cooperatively working overtime to achieve a common goal.

Conclusion:

Positive attitude and skills in learning bring good results among learners. Critical thinking, creative thinking, communicating, and collaborating are important skills in learning.

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Attitude Towards Individualization Is Behind the Success in Learning Science Through Computer Technology

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Abstract

Attitude is the dimension of the affective domain and also one aspect of an individual's personality. Attitude is reflected in reactions to events, other individuals, objects, or instruction. Technology has become an integral part of higher education instruction. Those who advocate technology integration in the learning process believe it will improve learning and better prepare students to effectively participate in the 21st century workplace (Sathish Keethinedi, 2012; Shih, et.al ,2012). Given its increased use, it is important to understand how instructional technology and the technologically rich environments are influencing student attitudes toward learning. An important aspect in successfully implementing instructional technology is user acceptance, which may be influenced in a great deal by users' attitude. Various studies have addressed the issue of student attitude toward instructional technology, attitude towards individualization and specifically toward computer technology and technologically enriched learning environments. (Mohanty, 2010).

It is important to note that the high correlation between attitude and the success rate in use of technology as an educational tool. "Positive attitudes toward technology can produce a widespread use of different technologies; but negative attitudes can have the opposite effect". Liuand Che- Hao, (2008); Mullins et.al, (2011), insists that attitude is an important construct and must be measured because of its usefulness in predicting behaviour. This line of inquiry about attitudes has brought most researchers to the conclusion that the use of Computer technology leads to more positive student attitudes than the use of conventional instruction. According to Kageni Njagi, et.al. (2003); both males and females had reasonably good attitudes to computer technology, but generally males were found to have a better attitude. The results of this study also agree with similar studies where gender was found, not only to be related to attitude towards computer technology, but more specifically, there was a difference in attitude between males and females.

Key Words: Attitude towards Individualization, Technologically rich environments, Computer technology, Positive attitudes.

Introduction

Computer technologies in education have had a profound effect on the system of education worldwide. Technology allows student to become much more engaged in constructing their own knowledge. Cognitive studies show that attitude and ability are the key factors for successful learning. Technology caters the need of millions of people around the world. It improves the ways of learning and improvised the dissemination of knowledge. It enables learners to sit in a comfort zone and learn when they are mentally ready to learn. This individualization in learning makes individuals, lifelong learners and prepares them for the 21st century.

Importance of learning Science through Technology

It allows student to learn at any time any place, any path and any pace. This flexibility is often found to be most successful in independent, motivated learners. Science is a subject in which; sequential content builds upon previously acquired information. So science learning must motivate interest, be meaningful as well as possess purpose (Ediger & Roa, 2012). Interest too is a powerful factor in learning, which might wane if content becomes senseless. Gaps in achievement hinder possibilities of continuous grow in academic discipline of science. As seamlessly as possible pupils must perceive order in learning science. Though the computer learning platform loses the social component; learners gain considerable flexibility in how to meet their learning goals individually and/or collaborately. Learners need to be involved in ongoing activities and experience successful due to interest factor. Many research studies proved that the computer technology is the only remedy which has to be emphasized for in depth learning.

Need for the study

The implementation of technology seems to be very significant for the developmental process in the educational sector. Though ICTs are potentially powerful tool for extending educational opportunities, meeting learners esteem needs is the salient and a quality reward system is poignant. In this system of learning, learners need to learn upon themselves and trust their own thinking in a collaborative setting. It has to promote quality feelings, attitudes as well as facilitate the acquisition of basic skills. Hence it is very much necessary to measure the attitude of students towards such individualized system of learning through computer technology.

In this study; the researcher has used a tool called Attitude towards Individualization in a classroom, where the entire pupil in the classroom has access to the computer for learning science through online.

Attitude towards Individualization - Description of the Tool

The prejudices against the use of computers for education need to be identified among learners; because the internal environment of the learner may influence, when opportunity to use computers for learning science was provided to them. An inventory was specially prepared to know about the preference of the learner to have individualization of instruction in varying learning situations. The behaviour comprises of co-operative learning, peer tutorial behaviour, social adjustability and concern for other classmates while learning through computer mediated packages. The inventory developed identifies whether the learner is positive or negative in their attitude towards individualized learning. This tool has two dimensions as;

- positive attitude towards Individualized Instruction
- negative attitude towards Individualized Instruction

This tool consisted of 27 statements, out of which 21 statements are positive and the rest of the statements are negative, for identifying the student's Attitude towards Individualized Instruction.

Table 1. Distribution of Items under Individualized Instruction

No.	Category	Item Numbers	Total
1	Positive attitude towards Individualized Instruction	1,2,3,4,5,6,7,9,10,11,12,14,15,16,18,19,20,21,25,26,27	21
2	Negative attitude towards Individualized Instruction	8,13,17,22,23,24	6

Scoring

The scoring for the tool was evolved after discussions with the educational experts. A three-point measurement scale was developed and the respondent had to select and put a tick mark in any one of the

column from 1 to 3 (agree, neutral & disagree) as per his Attitude towards Individualized Instruction. For example, if the student selected first column for a positive item, one mark would be awarded, if he chooses column no.2, two marks would be given for the same item. If column no.3 was selected, 3 marks would be awarded. For the negative statements, the marks were provided in the reverse order as 3, 2 and 1 for the column no. 1, 2 and 3 respectively. The maximum score possible for the tool Attitude towards Individualized Instruction is 81.

Hypothesis

When the learners are tested for their Attitude towards individualization, there is no significant difference between the external independent variables with respect to their mean attitude scores.

The External variables selected:

Level of education, Gender, Computer knowledge, Locality of the institution, Educational Environment.

To find out whether there is any significant difference between mean scores of different categories of learners in terms of Attitude Towards Individualization, the 't' / F- test is applied and results are presented in the Table: 2

Table: 2. Significance of difference between Mean scores of different categories of learners in terms of Attitude towards Individualization (AT I)

Variables		ATI score			Test	'p'	Significance
		Range	Mean	SD			
Level of education	**School**	45-79	64.0	10.0	t-value 1.917	0.0598	NS
	College	51-79	69.1	08.0			
Locality of the institution	**Rural**	45-78	64.5	10.2	t-value 0.896	0.3735	NS
	Urban	51-79	66.6	09.0			
Gender	**Male**	51-79	72.8	05.5	t-value 10.598	0.0001	S
	Female	45-70	57.3	06.2			
Computer knowledge	**Nil**	45-78	62.7	09.7	F-value 2.090	0.1323	NS
	Basic	51-79	66.0	09.5			
	Done a course	51-79	69.2	09.4			

Educational Environment	**State Board**	45-78	63.5	09.6	F-value 3.475	0.0371	S
	Matric	51-79	63.8	10.3			
	CBSE	54-79	70.8	07.3			

Table 3: ANOVA

Variables	ATI score	Sum of Squares	Df	Mean Square	F-value	Significance
Computer knowledge and ATI score	Between Groups	381.289	2	190.645	2.090	0.132 (NS)
	Within Groups	5654.311	62	901.199		
	Total	6035.600	64			
Educational environment and ATI score	Between Groups	608.398	2	304.199	3.475	0.037 (NS)
	Within Groups	5427.202	62	087.536		
	Total	6035.600	64			

The above table shows that the differences between mean individualized scores of different categories of learners in terms of Attitude towards Individualization do not attain the level of significance in the categories such as Level of education, Locality of the institution and Computer knowledge. In Gender category, the mean scores for male and female differ significantly at 1% level. The mean individualized scores of students based from different school environment differ significantly at 5% level of significance.

Findings

When the learners are tested for their Attitude towards individualization, the mean individualized scores will not be significantly different, for the following external independent variables such as, Level of education of the learner, Locality of the institution and computer knowledge and there is significant difference in the cases like Educational environment and Gender of the learner. The performance of students who use computer technology for learning mostly depends on the internal factors like Aptitude and Attitude as proved by the earlier research (Liuand Che-Hao, 2008; Seery, Michael. 2009). Aptitude is the cognitive factor for readiness in learning and for integration of knowledge. In this study, most of the learners' attitude towards the internal factor individualization is positive, and they prefer individualization and hence, there exists no

significance among the various group of learners' in terms of their mean score.

It is inferred that the male and female learners are significantly different in their Attitude towards individualization, The learners from different school environment also differ in their Attitude towards Individualization

Conclusion

The implementation of technology seems to be very significant for the developmental process in the educational sector. In this system of learning, learners need to learn upon themselves and trust their own thinking in a collaborative setting. The study also proves that; this system of learning has promoted quality feelings, attitudes as well as facilitate the acquisition of basic skills in learning science. Hence it is concluded that, those who advocate technology integration in the learning process believe it will improve learning and better prepare students to effectively participate in the 21st century workplace

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Open book test: A tool to analyze diverse learners in a class room

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Abstract

This paper aims to analyze open book examinations as a tool to understand the learning behavior, attitude and motivation level of students in achieving academic integrity. Open book test was conducted in different levels to bring maximum score and the results indicated a better performance with each trial but complete success was not obtained. This indicates lack of motivation among students and the attitude of hard work diminishing among the student community. Comparison of open book test with traditional test showed better results because it required less memorization and left more room for logical thinking. Implementation of open book test in colleges can change students' learning attitudes and make the learning process more active.

Key words: Open book test, Traditional test, Learning attitude, Motivation

Introduction

Teaching is a profession where the faculties are given a group of learners and it becomes necessary to know the skills and potentials within them. Each learner develops the fundamental cognitive skills like memory, attention, processing and sequencing which when developed together improves learning and reading. An overachiever learner has the ability to memorize and get good grades. A sound learner is motivated to go an extra mile and get solid grades where as an unmotivated learner feels uninterested and unchallenged by the learning process. Concerns over the role of faculty in effective communication with students, motivation and assuring learning outcomes are growing (Yang and Cornelius, 2005). A variety of performance assessments including examinations are employed to assure quality in education. According to Olt (2002), one way to ensure academic integrity is through the use of open book test. Open book testing promotes realistic learning opportunities that emphasize higher order thinking skills. Feller (1994) believed that closed book

exam test only what student can memorize while open book have the potential to measure higher level thinking skills. He believed that open book exam was one method of incorporating realistic, open ended task into higher education. Research findings demonstrate that students perform better on open book test than traditional testing (Liu, 2005). Francis (1982) investigated open book test in a University English literature course observed that students who took open book test earned higher scores than peers who took traditional test. Pauker (1974) found that over all scores were not different between two groups, but the below average student scores were lower on open book exam. Thus, open book test helps us to understand the reading and logical reasoning of a student, their motivation to achieve higher and the role of the faculty in making the classroom environment stimulating and interactive. Hence the present study aims to analyze the student performance, based on open book test and further to understand the cognitive skills and level of motivation to reach academic success.

Methodology

The study compares the effect of open book testing with that of traditional test on student learning based on their performance in multiple choice questions. The students assessed were enrolled in the II UG program of Zoology course and were handled by two instructors for the subject they took the test. The participants completed the test within the stipulated time limit. The first open book test was conducted using a power point where the student was expected to answer the MCQ of 50 questions where each question was given a time limit. Based on their performance the students were asked to prepare on the same questions and once again assessed using a printed question paper. A score of 100 % was expected, so the students were provided opportunity to take the test four times to achieve the required score. The results obtained were compared with the traditional testing like written quiz test and online quiz.

Results

The data obtained was analyzed and the results reveal that in trial one of open book testing the score was maximum between 0 -10 marks with 75% students falling in this range. In trial 2, 3 and 4 after thorough preparation the students scored between 10 to 20 marks but 25 out of 38 students were not able to achieve 100% even in the 4th trial.

In traditional test and online test the range of marks scored was higher between 5 and 15 marks (Table-1).

Table: 1

Performance of students in a MCQ test assessed through open book and traditional test

Marks	Success rate of students (%)					
	Open book test				Online test	Traditional test
	Trial 1	Trial 2	Trial 3	Trial 4		
0-5	51	0	0	0	11	13
5-10	29	3	0	0	58	39
10-15	15	37	26	23	28	37
15-20	5	60	74	77	3	11

Discussion

An open book examination is one in which the students are allowed to use their book or reference material for answering their questions. In the current scenario teaching is just thought as dissemination of knowledge and teacher's role is viewed as facilitating the transfer of information from text book to student's mind (Mohanan, 1997). Most conventional examinations test the memorizing ability of the student and to cope with this demand the students memorize the test books and transfer it to answer books. In this type of examination, success depends on the quantity of information and the efficiency with which it is reproduced. In the present study as most of the students were from rural background with poor efficiency in understanding the subject in English and were not capable of memorizing the concepts and reproducing, the traditional testing showed poor results when compared to open book testing of trial 2,3 and 4. On the other hand the open book test results were very poor in the first trial and this shows traditional testing to be better. Repeated preparation of students to achieve better score and helping them to understand the mechanism behind open book test helped them to achieve better in further tests. The reason behind the low achievement could be attributed to the lack of understanding between the two tests, motivation to achieve higher score and the organizational and logical reasoning of the student. One key factor behind low success rate is lack of motivation. Motivation is of two types –intrinsic motivation which arises from a desire to learn a topic due to inherent interest, self-fulfilment and to achieve a mastery over the subject while extrinsic

motivation performs for the sake of accomplishing a specific outcome. When students take up a test for the sake of just passing out they are least motivated and the learning outcome is not achieved. Studies have demonstrated that a lack of preparation for open book test exists on the part of some students (Brightwell *et al*., 2004). It is related to the fact that anxiety is reduced when taking open book test and students believe no preparation is required to perform well (Theophilides and Dionysius, 1996). Open book examination, if properly implemented, promotes the ability to think rather than to memorize, reduce stress for the examinees and encourage students to self-monitor their own learning (Theophilides *et al.,* 1996). Together with appropriate changes to teaching methods, it could well be the most effective way to improve our education system and make it one for the 21st century (Feller, 1994).

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