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ENHANCING THE QUALITY OF HIGHER EDUCATION THROUGH THE USE OF ICT

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INTRODUCTION

Information and communication technologies (ICT) have become commonplace entities in all aspects of life. Due to incredible progress in information and communication technology, the scenario of contemporary teaching techniques is entirely changed. The teacher of 21st century should shed traditional perceptions and techniques of classroom teaching and should implement the recent and novel teaching techniques. English language teachers must be innovative, imaginative, and resourceful and have thorough knowledge of the subject and adopt new techniques to change socio, economic status of the country. According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education. Hence a teacher has to advance and update knowledge of modern techniques to meet the demands of changing world as ICT has the potential to innovate, accelerate, enrich, and deepen skills, to motivate and engage students and create economic viability for tomorrow's workers. Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems (Bottino, 2003; Bhattacharya and Sharma, 2007; Mason, 2000; Lim and Hang, 2003). It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy (Kozma, 2005).

ICT – enhance the quality of teaching and Learning

In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Contemporary ICTs are able to provide strong support for the learners as ICTs by their very nature are tools that encourage and support independent learning. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). The integration of ICT in classroom teaching has brought education into one step higher from the traditional technique. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves & Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase. In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission

(Duffy & Cunningham, 1996). In what is a contender for a methodology that is central to the world of technology and language learning is that of blended learning (Motteram and Spivey, 2009). With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. In developing countries, India, effective use of ICT for the purpose of education has the potential to bridge the digital divide.

Types of Technology- presently used in the Classroom

- Classroom Blog
- Internet
- PowerPoint
- Word Documents
- Video Conferencing
- Podcasting
- Mobile Phones
- Movie Making
- SMART board/Interactive Whiteboard

Blog

Blogging has become increasingly popular, especially in the realm of education as they are a great way to share information and generate discussion. Instead of text books and traditional methods, many educators prefer using these new techniques to help teach students and gain experience with various forms of social media.

Possible ways to use blogs

- Posting homework
- follow up discussion on a book or lesson
- Building on new vocabulary
- sharing ideas
- asking classmates questions or for help on a lesson/homework
- classroom announcements

The following are some of the free blog sites that the students can use for learning:

- www.blogger.com
- www.wordpress.com
- www.21classes.com

Blogs in ICT classroom allows the teacher to assess students in a different ways as it provides an opportunity for the students who hesitate to speak in class and encourage them to write without any fear of making mistakes.

Internet

The Internet can be a rich source of authentic oral models via recorded songs, talking electronic books, podcasts and video clips that help learners with pronunciation as well as acquisition of

strengthening of new vocabulary. These tools can also help to support teachers who don't feel as confident with their own language skills. Technology also affords children the opportunity to record themselves for playback at a later time. Learners report that the ability to listen and play back recordings helps identification of grammatical errors and inaccuracy in pronunciation, encouraging self-improvement. Learning resources, such as songs and poems, can be downloaded from the internet and practised as a whole class via an interactive whiteboard.

Video Conferencing

Videoconferencing describes a system whereby "two or more participants, based in different physical locations, can see and hear each other in real time using special equipment" (NCTE, 2003). It connects with experts and it is a resource of learning. The previous studies particularly focus on the capability of videoconferencing for synchronous voice communication and the educational benefits in promoting oral language skills. Hampel (2003) views videoconferencing as a paramount tool for language learning which addresses the need for interaction and the negotiation of meaning in a real communicative situation. Unlike asynchronous CMC, videoconferencing shares many characteristics of the face-to-face communication, such as time constraints, paralinguistic cues (gestures, facial expressions, tones, and intonations), turn-taking rules, immediate responses, clarification, and recast. Hence, videoconferencing can promote student communicative skills in a real sense (Hampel & Hauck, 2004). Thus Video conferencing is a promising learning tool for the learners to develop their oral skills.

Power Point

Power point presentation meets the needs of visual learners and the learners can understand and learn the application easily specially learning new terms and vocabularies. It is the easiest teaching and learning tool to get the attention of all the students in the classroom.

Word Documents

The learners can use their own computer and type their class work instead of writing and document the important points of a lecture as the students listens. It enables the students to be engaged and focus on learning.

Mobile Phones

The use of mobile phones as a learning tool has a wide variety of applications. Internet can be connected to a mobile phone. Students can surf the net for getting notes, pictures, Power Point presentations, extra reading materials etc.. Mobile dictionary is a mobile application allows having English and two additional languages on the device at the same time. While reading, students may come across many new words. By using the mobile dictionary they can find out the meaning of the words. Beautiful pictures, natural sceneries and scenes that captivate the mind when the students are taken to the field trip or educational tour can be captured by using camera. The teacher can ask the students to make a photo documentary using the camera function on their mobile phones. The teacher can assign a theme for the documentary to the students. Teacher can record or download audio clippings from internet or movies and play it inside the classroom. The effective and judicious use of the mobile phone in the language classroom can make the classroom lively.

Podcasting

A podcast is essentially the modern version of tape recording. Podcasting allows the learners to record information and turn it into an MP3 file. These MP3 files can be listened to right on the computer or uploaded to an iPod or class blog/website.

The following are some of the advantages of Podcasting;

- Very user-friendly; students can record their own podcasts with a few quick clicks on the buttons allowing the majority of this activity to be student-centered.
- Addresses the needs of auditory and kinesthetic learners
- Synthesizes information
- Assesses student knowledge orally
- Allows students to teach one another
- Great for heterogeneous groups
- Can be used to record accountable talk
- Provides opportunities for ELL students or students with Speech and Language Impairments to practice speaking
- Book discussions

Movie Making

The learners can make movies using software such as Windows Movie Maker or iMovie to create digital movie projects and/or slideshows. It can be as simple as putting in pictures and captions in a slide show, or as difficult as full movies using video cameras, editing, etc. The advantages of making movies are;

- It addresses the needs of visual, kinesthetic, and auditory learners;
- Synthesizes information;
- Allows students to share with, present to, and teach one another;
- Can be used to challenge higher level students.

Interactive Boards or Smart Boards

An Interactive White Board is a touch-sensitive screen that works in conjunction with a computer and a projector. Interactive whiteboards are good replacements for traditional whiteboards or flipcharts as they provide ways to show students everything which can be presented on a computer's desktop. It is an effective way to interact with digital content and multimedia in a multi-person learning environment and a student-centered approach to teach language. The teacher can use smart board to enhance students' language skills in play way method. Learning activities with an interactive whiteboard may include the following:

- Manipulating text and images
- Making notes in digital ink
- Saving notes for later review by using e-mail, the Web or print
- Viewing websites as a group
- Demonstrating the lessons

Creating digital lesson activities with templates, images and multimedia and the teacher can also display paragraphs with errors and ask the students to edit the paragraphs or proofread them. To teach writing skills the teacher can also use a story starter and ask the students to write a story. Thus, Interactive White Board is a very innovative and powerful support for language acquisition.

Factors affecting adoption of ICT in education

There is a worldwide need felt for integrating ICT into education in order to improve the pedagogy

to reflect the societal change (Plomp et al, 2007). The main goals of ICT adoption in the education field are reducing costs per student, making education more affordable and accessible, increasing enrollments, improving course quality, and meeting the needs of local employers (Ozdemir and Abrevaya, 2007). The main factors that affect the adoption of ICT in education are the mission or goal of a particular system, programs and curricula, teaching/learning strategies and techniques, learning material and resources, communication and interaction, support and delivery systems, students, tutors, staff and other experts, management, housing and equipment, and evaluation (UNESCO, 2002). Teachers need support in using and integrating ICT into the curriculum and teaching methods (Lai & Pratt, 2004; Amutabi and Oketch, 2003; McGorry, 2002). Teachers, who perceive greater ICT-related support being available to them, use technologies in their teaching much better (Tondeur et al, 2007).

Other Techniques – Authentic Materials

The need of the day is to equip people with proficiency in the English language and this is possible only with a proper blend of edification and modern technologies. These are used to make learning more interesting, motivating, stimulating and meaningful to the students. Along with modern technologies, using authentic materials like paper cuttings, magazine ads, movie reviews, movie clippings, dramatics, advertisements, sports commentaries, word games, English songs, television shows, conversations, train schedules, nutrition labels and many more from real life can make the class room very interesting, enthusiastic and learner friendly.

CONCLUSION

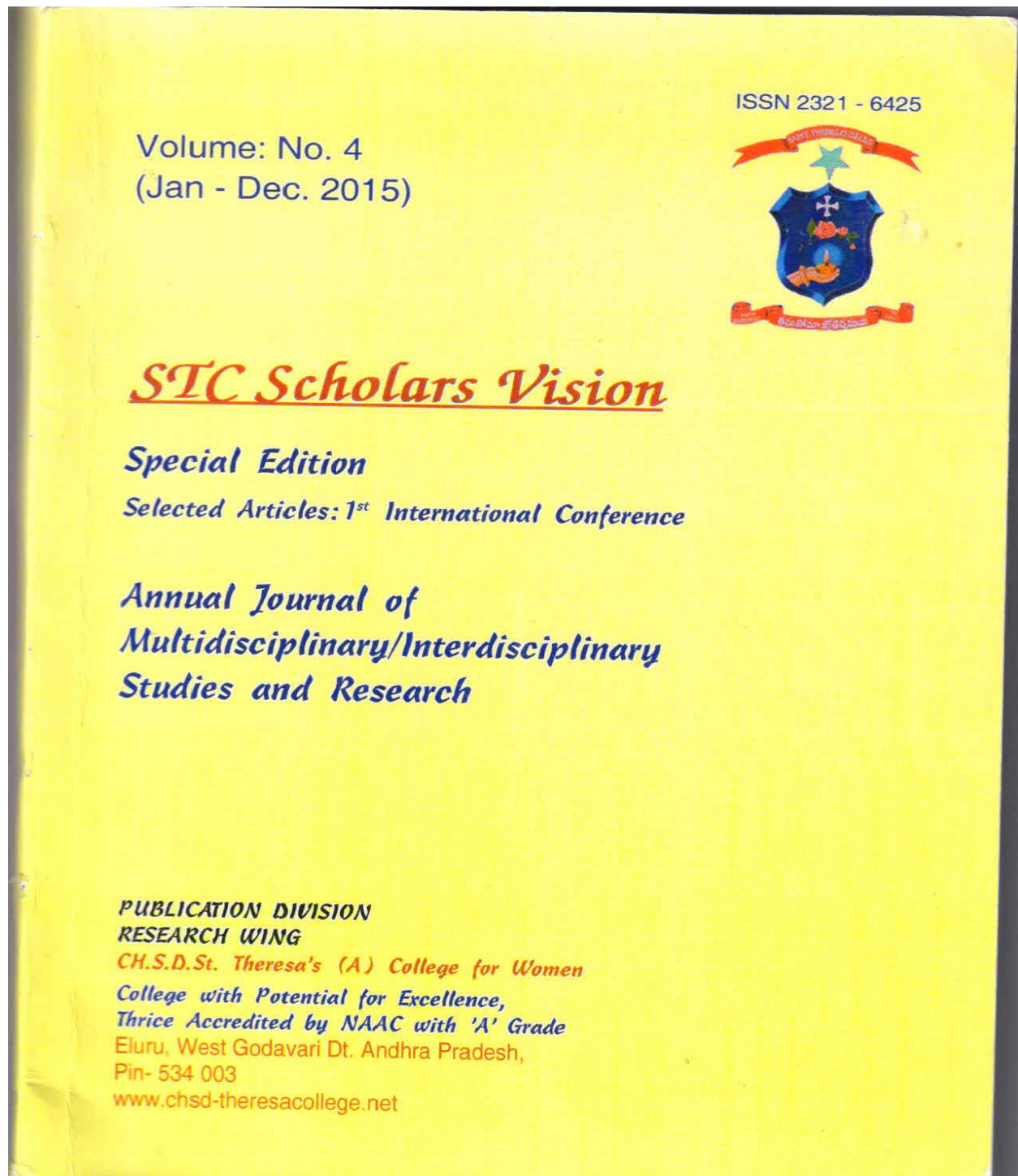
The adoption and use of ICT in education have a positive impact on teaching, learning, and research. ICT can affect the delivery of teaching and enable wider access to learning. It has greater flexibility of learning that learners can access the education regardless of time and geographical barriers. It would provide the rich environment and motivation for teaching learning process which seems to have a profound impact on the process of learning in education by offering new possibilities for learners and teachers. These possibilities can have an impact on student performance and achievement. Changes in the curriculum do support fundamental economic and social transformation in the society. Such transformations require new kinds of skills, capabilities and attitudes, which can be developed by integrating ICT in education. Thus, ICT can foster better teaching and enhance the quality of teaching and learning. And integrating ICT in the classroom could stimulate learners, enable better understanding and enhance communication skills.

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Abstract

Dalit women are one of the largest socially segregated groups anywhere in the world. They are discriminated as Dalits, as poor, and as women. In India, Dalit women are often met with violence when attempting to assert their rights in areas such as access to housing, drinking water, the public distribution system and education. Police personnel often neglect or deny Dalit women of their right to seek legal and judicial aid. In many cases, the judiciary fails to enforce the laws that protect Dalit women from discrimination. Often they face the triple burden of caste, class, and gender. Dalit women face verbal, physical and sexual violence in the public and private domain. In the private domain Dalit women are assaulted for not being dutiful wives, not bearing children or male children specifically or not bringing enough dowries into the marriage. They also face violence from community members, complicit police personnel, their in-laws and their families. This paper highlights how Dalit women become instruments in the hands of caste based social system that deny them opportunities, choices and freedom at multiple levels, undermining not only Dalit Women's dignity and self respect but also their right to development. The main objective of the paper is to analyze the status of Dalit women and promote awareness to empower and lead them forward.

41. Dalit Women and Human Rights

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Key words: Dalit Women, violence, discrimination, rights, dignity, empower, forward.

Introduction

Dalit women experience endemic gender and caste discrimination and violence as the outcome of severely imbalanced social, economic and political power equations. Discrimination is the denial of agency and dignity to an individual or group of individuals based on a perceived accident of birth, occupation, language, religious affiliation or any other primordial identity is visualized to the full extent in the analysis of situation of Dalit women. Often denied entry into places of worship, sources of water and livelihood, governance and education, Dalit women are the worst sufferers of injustice and oppression in Indian society.

Human rights of Dalits and women in general are normally violated by dominant castes and powerful communities to practice and exhibit it patriarchy and caste based discrimination. Dalit women are oppressed by the broader Indian society, men from their own community and also their own husbands and male members in the family. Thus, Dalit women face multiple disadvantages and vulnerabilities. But human rights of Dalit women are violated in peculiar and extreme forms. Stripping, naked parading, caste abuses, pulling out nails and hair, sexual slavery & bondage are few forms peculiar to Dalit women.

Dalit women lit women are in worst position than Dalits in general, in terms of sex ratio, wages, employment, occupation, assets, education, health, social mobility and political participation. Without economic assets including land and other resources, Dalit women have to go out to the fields and constructions sites, necessitated by economic deprivation, and an urgent need to earn for livelihood. Thus, their subjugation is more acute – being Dalit they are treated with great contempt by upper caste men and women alike, and their own men folk.

Further Dalit women have been subjected to rape, molestation, kidnapping, abduction, homicide, physical and mental torture, immoral trafficking and sexual abuse. The National Crime Records Bureau data records reveal that more than four Dalit women are raped every day in India. The recent years has also seen a rising violence against Dalit human rights defenders, and Dalit women activists are at greater risk. They have been silenced using various forms of pressure and violence including threats, intimidation, kidnapping and sexual violence.

Status of Dalit Women and Challenges

The word Dalit usually stands for oppression and untouchability and occupies the extreme and the lowest position in the hierarchical division

of Indian society. One of the most oppressive aspects of the caste system has been the practice of untouchability. They were forced to live outside the village, to live a life in an inhumane condition. Government of India abolished untouchability and introduced a new secular constitution, and under the law, untouchability was made an offence. The caste based quota system in education and government employment has helped them to look beyond the village. However, despite the radical legislation and other changes, caste system has continued to be an important fact of life for individuals and communities in India.

Dr. Vijendra Kumar in his book **Rise of Dalit Power in India** stated that "Dalits women's place in family is secondary even if she earns and they are subjected to inhuman rights violation in the world today, and especially when the women are from the Dalit community then she is looked down in all levels. Dalit Women constitute 16.3 percent of Indian female population, experience the brutality of casteism, other than the socio-economic discrimination; they also are subjected to sexual exploitation. Upper caste violence against the Dalits is increasing in its magnitude and in more cruel and vulgar than the past. Meeena Anand in her book **Dalit Women-Fear and Discrimination** quotes that Atrocity on Dalit women are an increasing trend. They are victims of Landlords, police and goondaism. In all instances of caste system, Dalit women are victimized. Many of the women who stood against the local landlords are punished by being paraded naked. It was reported that on an average three Dalit women get raped every day.

The annual report of the National Crime Records Bureau reported 1172 cases of rape of Dalit women during 2005. In 2002 only one among 25, upper caste occupies 78% of the judicial post. According to the 2001-2002 Annual Report on the Prevention of Atrocities Act 2002, only 2.31% of cases brought under the prevention of Atrocities Act led to convictions. The situation of Dalit women is more precarious and what is worse is that they have to face social, economical, educational health and political difficulties. Dalit women faces triple burden of caste, class and gender issues. Multiple forms of discrimination confront her, from Dalit and non-dalit community. Being in the bottom of the societal hierarchies, the means of asserting her constitutional and legal rights are minimal. And this is taken advantage by upper-caste men through sexual abuse to reinforce the caste divisions. Any action that comes on the way of undermines the caste division can lead to sexual violence. Upper caste men consider them available for their benefits. It is also found that whenever a Dalit women attempts to assert their constitutional rights, as access to land property and Panchayats, which is a clash of interest with upper caste member, then Dalit women are always targeted in the form of sexual exploitation. Dalit women in particular have to fight both socially economically and also politically. Political parties in India speak about equality of women but have totally ignored the Dalit women.

Challenges

- Incidents of all kinds of violence against women are increasing, including rape, sexual assault and domestic violence.
- Police often do not respond to rape cases or murder cases of women with any interest at all (this is a particular challenge in Kheda).
- Dalit men sometimes refuse to accept women in leadership positions and spread rumours and lies about women who speak out for their rights.
- Many women hide behind their veils, and are not ready to speak out.
- There are certain sub-castes within the Dalits that are not ready to have their girls educated.
- In villages that are close to towns, upper caste students get private education in the towns, so the teachers do no care to teach anymore, since most of the students left at school are Dalits or other poor people.
- Migrant laborers often do not keep their children in school.

Action To Take The Dalit Women Forward

Dalit women's movements across the world are growing stronger and are connecting to each other and reaching out to decision-makers and the global public. They are asking the international community and people of the world to come together and stand beside them, and to speak up to end the global silence that is allowing this gruesome form of discrimination to persist. The Indian Constitution banned the practice of untouchability under Article 17 and the Schedule Caste/Schedule Tribes (Prevention of Atrocities Act), 1989 was introduced to combat persecution and discrimination against Dalits and Adivasi (tribal) People. Despite the existence of these strong legal provisions, Dalit and Adivasi populations found it virtually impossible to access their rights through the legal system. In this context, the Dalit and Adivasi Rights Initiative should provide legal aid and rights-awareness to members of Dalit and Adivasi rights are addressed through the legal system. The Indian Government has an obligation under international human rights law to act with due diligence to prevent, investigate and punish acts of violence against Dalit women in both the general community and in the family, at the hands of state or non-state actors. Any case of violence against a Dalit woman has to pass through the hands of the local police and the judiciary in order for the women to receive justice under the law.

Conclusion

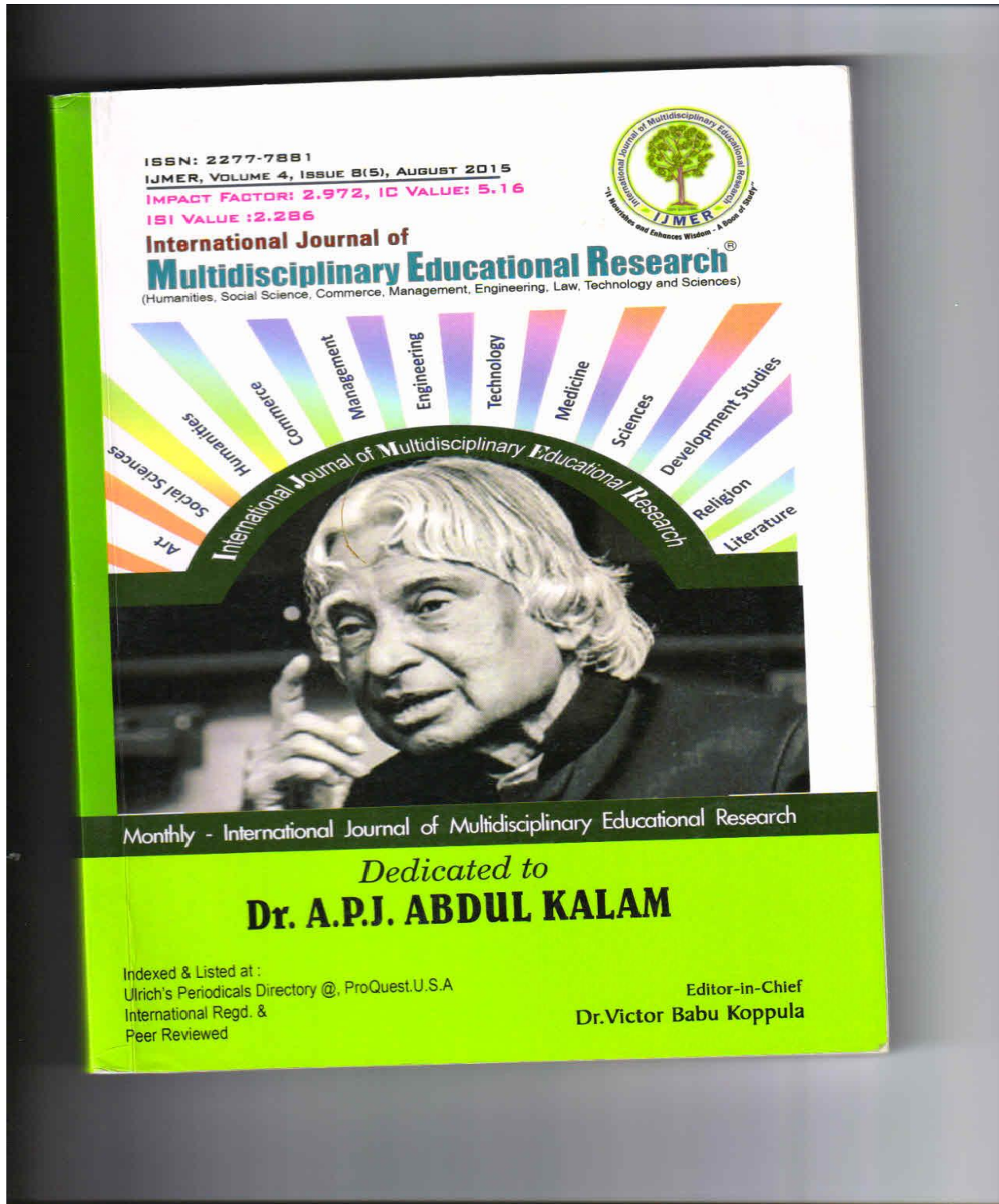
Caste plays a powerful role in shaping the patterns of society. Indian constitution abolished untouchability but the fact remains that the situation of Dalit is worse as before. The struggle for the liberation of Dalits right, ought to be treated as equal to the struggle for the independence of the Nation. National independence cannot be complete unless all the segments of the society are free. The society has to change its attitude towards Dalit community. The Indian Constitution abolished untouchability and has made it punishable offence, but the Indian religious ideologies and philosophies are so deep rooted in the minds of Indian society, especially in rural India, that all these legislation and protection of human rights of the Dalits are futile when the society is not willing to accept these laws. As the National Federation of Dalit Women has stated in its **Declaration of Dalit Women's Rights 2002**, Dalit women have the rights to life and to freedom from oppression and violence, the right to expression, conscience and autonomy. It is only when support is extended to Dalit women across the country that these women will become empowered and enjoys these fundamental rights on par with the rest of the Indian citizen.

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USE OF MOTHER TONGUE IN SECOND LANGUAGE TEACHING AND LEARNING

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Introduction

The role of L1 in L2 acquisition is a much researched aspect. Regional medium learners, in particular those coming from poor socio-economic background may not have much exposure to the second language outside the classroom. Therefore, the teachers and students in the regional medium classes, rely to a large extent on the mother tongue for the teaching and learning of English. L1 is used to modify and make the input comprehensible to the learners, thereby giving scope for interaction that result in language learning. The teacher performs a variety of language functions using L1 systematically in the class which provides rich language input to the learners. There has been enough evidence in L2 research to ascertain the importance of L1 in language teaching.

Mother tongue has both constructive and unconstructive consequences: it may serve social and cognitive functions (Carless, 2008:331). It is argued that students working in groups do not have to speak English all the time. The constructive impact of using Mother tongue in the classroom is that it relates to learner identity. And the unconstructive impact of Mother tongue use is that too much reliance on the L1 may weaken the communication in English.

Confirmation from research into the central issue of the L1 use in classrooms around the world has been analyzed by G.Mattioli (2004). For example, L1 use in the Chinese classrooms offers evidence that L1



is an important tool for socio-cognitive processes in language learning. Another reason for L1 use in the classroom relates to the promoting of a positive environment. C.W. Schweers (1999:6) supports teachers to insert the Mother tongue into lessons to influence the classroom energetic, provide a sense of security and validate the learners' experiences. Many studies indicated that both unconstructive and constructive transfer between the L1 and L2 was important for development of the language, the complex system of the learners' L2. Many teachers recognize that the L1 in the classroom is a positive representation of the inter language. The data on the inter language and language transfer illustrate that it is highly possible that L2 learners will think most often in their L1, even at the advanced level. Furthermore, translation in the second language classroom offers a way to emphasize similarities and differences between L1 and L2 forms. The translation is useful for L2 learning because, firstly it uses real materials, secondly, it is interactive, thirdly, it is learner - centered, and finally it promotes learner autonomy (Mahmoud, 2006:29-30). Ferrer, V (2000) states that a good number of teachers feel and based on their experiences as learners of a second language, that the mother tongue has an active and a beneficial role to play in instructed second language acquisition/learning. Among the first advocates of mother tongue use is David Atkinson (1987). He pointed out from his experience that mother tongue can be used mainly in accuracy-oriented tasks. Auerbach (1993) states that L1 provides a sense of security and validates the learners' lived experiences, allowing them to express themselves. The learner is then willing to experiment and take risks with English.

Deller & Rinvoluceri (2002) emphasizes the idea that the foreign language teacher should use the students' mother tongue only in certain situations, for example:

- ❖ Comparing English grammar with the mother tongue's grammar can be very positive for some learners



- ❖ Beginners will probably progress at a quicker pace if the use of the mother tongue is allowed in the classroom
- ❖ Translation exercises may also be the perfect practice when there is a grammar point that is causing trouble to students.

Mother tongue as a resource

Studies in bilingualism have proved that the use of two languages by a person can mean there is a common underlying proficiency (Cummins, 1976) and that the various languages known by an individual are merely channels that feed into this underlying proficiency common to all these languages. It is not uncommon to view languages as mediums of instruction or for the incidental apply of the Mother tongue of students in the second language classroom. The Mother tongue is also used as a compensatory strategy occasionally to explain to students the meaning of a particularly tough concept or word's meaning. However, it needs to be studied if learners think and talk about language mostly in their mother tongues and if they do, if the teacher can initiate the deliberate use of the students' mother tongues to bring to focus their knowledge of the world and their metalinguistical knowledge to help them learn another language better. Hence there is a possibility of the knowledge of one language being exploited as a scaffold or resource to learn another better.

Mother tongue as a hindrance

The use of Mother tongue in the classroom might direct to the development of an extreme dependency on the students' Mother tongue by both teachers and students (Harbord, 1992). As a result, students lose confidence in their ability to communicate in English. This can considerably decrease students' opportunities to practice English, and students fail to realize that using English in classroom activities is vital to improve their language skills.



Harbord also thinks that translation regularly creates the problem of oversimplification because many cultural and linguistic nuances cannot be directly translated (Harbord, 1992). For example, the sentence, "That's so cool!" in English means that something is marvelous or unbelievable. This phrase is the product of the continual development of the English language that was affected by the specific culture at a certain time. A direct translation of this sentence into another language may not make sense at all.

However, using the Mother tongue sensibly in the English-language classroom will help the students to acquire the target language with greater use and interest.

Professional use of mother tongue in second language teaching

When learning another language, translation is a natural phenomenon. Recent research has shown that switching between languages and translation happens automatically to all language learners and the L1 is actually an important resource in second language (L2) learning (Cook, 2001; Woodall, 2002). For these reasons, teachers should try to work *with* this natural tendency rather than *against* it. From the teacher's viewpoint, communicating with students in their Mother tongue seems to open up students' readiness to feel one with the teacher. Moreover, being able to use the L1 with learners can be more proficient and make time for more useful activities. For example, if complicated instructions are better translated and that would create more time for the activity and avoid a lot of distress for both teachers and learners.

Methods of teaching English

With theories of learning forming the base, different methods of teaching English have evolved throughout history. The following are some of the important methods of ELT followed in different parts of the world.



Grammar -Translation method vs Translation - Grammar method

Historically accustomed to teach Greek and Latin, Grammar Translation method is one of the oldest and traditional approaches in language teaching and learning. As the name indicates, the thrust is on teaching grammar and translating the target language into learners' mother tongue. Lessons are taught in the learners' Mother tongue, with a few active use of the target language. And the vocabulary is taught as isolated words, and grammar is taught as rules. Texts in target language are read and translated into mother tongue.

The principles of the Grammar-Translation method are:

- a) Academic language is superior to spoken language
- b) Chief skills to be improved are reading and writing
- c) Focus is on accuracy rather fluency
- d) Prescriptive teaching of grammar is followed
- e) The teacher holds the power in the classroom

As an extension of and as an alternative to Grammar - Translation Method Prakasam (2010) proposes Translation - Grammar Method.

In this extended method, the translation is from Mother tongue to Second language as a teaching device. The children come to school with their own configuration of concepts and their structures. The students now need to know how to express those ideas in a new language. So the teacher by introducing the ideas in L1 is facilitating their ideation. What now they will be excited about is learning words and structures of a new language. Once, the meaning is clear it is the expression that is coming into being. The teacher now uses only L2 expressions to strengthen the motivation and the resolve of the children to acquire the command of the new language. When a sentence in L1 is presented



along with its equivalent in L2, the teacher presents the differences in the organization of the sentences. For example, when in Indian languages an indefinite article is not used before countable nouns but it is used in English that child's attention is drawn to it. The teacher uses this attention as a resource to introduce, explain and reinforce the use of an indefinite article. Either on the blackboard or on paper mother tongue sentences will be presented in target language script which in a sense reflects the bond between spelling and sounds and the students get used to the new script.

Prakasam (2010) explains how some teachers and students questioned the grammaticality of

“Would it be alright if I **came tomorrow** at 5 p.m.?”

When he gave a similar sentence in Telugu the audience was completely convinced about its grammaticality. The Telugu sentence is:

“repu sayantram aidu gantalaku vachananukondi pharvaleda?”
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
tomorrow evening five o'clock came assume okay

The problem is the colligation of **tomorrow** and **came** in English and in Telugu **repu** and **vachanu**. The solution lies in the fact that **came** and **vachanu** should be understood as “completion of action” but not as “completion in past time” (Shiny 2008).

The main principles of Translation - Grammar Method are the following:

- L1 acquisition is simultaneous with socialization and maturation
- L2 learning is post socialization and maturation; it may involve sometimes re-socialization and re-maturation.
- L1 acquisition involves basic manifestation of Human Language Faculty (HLF)



- d) L2 learning is enrichment of HLF
- e) L1 competence paves the way for L2 learning
- f) Both lexical competence and grammatical competence of L2 can be effectively built by using judiciously L1 competence as a triggering device.

The Direct Method vs The Structural - Oral- Situational Approach

The Direct Method was developed primarily as a reaction to the Grammar-Translation approach. The Direct Method attempts to amalgamate more use of the target language in teaching. All teaching is done in the target language, grammar is taught inductively, the focus is on speaking and listening, and only useful, conversational language is taught. It refrains from using the learners' native language or mother tongue. It functions on the idea that L2 learning must be an imitation of L1 learning, as this is the common way individuals learn any language. This method puts great pressure on accurate pronunciation and the use of the target language.

The principles of the Direct Approach are:

- a) Learning is about forming associations
- b) Repetition is essential to form and reinforce associations
- c) No prescriptive teaching of grammar is done
- d) Learner motivation is given importance, and learners are given active roles in the classroom
- e) Restricted use of the target language in the classroom, Mother Tongue to be avoided

(L. Sauveur, Maximilian Berlitz, Henry Sweet)



Whereas, the Structural- oral – Situational approach came as an alternative to the Direct Method in 1920s and 1930s. The S-O-S approach is basically about presenting and practicing cautiously chosen and graded grammatical structures of English in effective and meaningful situations. The theoretical bases of this approach are Structuralism and Behaviourism.

The principles of the S-O-S method are:

- a) The Target Language is the language of the classroom
- b) Language teaching begins with the spoken form
- c) New language points are introduced and practiced situationally
- d) Items are graded according to their usefulness, frequency and teachability
- e) Reading and writing are introduced after a sufficient basis for lexicon and grammar is established.

(Harold Palmer, A.S. Hornby, George Pittman)

The Audio Lingual Method (ALM) vs Communicative Language Teaching (CLT)

The ALM method was initially called the Oral Method, the Aural –Oral Method or the Structural Approach. The Audio- Lingual method began to take form at the end of the 1950s. Its emergence was a result of increased attention given to foreign language teaching in the US in this period. Under this method, learners listen to or observe recordings of language models acting out circumstances. They then practise with a variety of drills, and the instructor stresses the use of the target language at all times.

The features of the Audio Lingual Method are:

- a) Teach the language, not about the language



- b) The focus is on listening and speaking, though writing and reading are also practised
- c) Dialogues are the main tool used for both presenting and reinforcing language.
- d) Language lab is introduced as an important teaching aid
- e) Use Target Language and avoid Mother Tongue in classrooms.

The Communicative Language Teaching put emphasis on interaction as both the means and the ultimate goal of learning a language. As an extension of the notional-functional syllabus, CLT places great importance on helping learners to use the target language in a variety of contexts and gives great stress on learning language functions. Its primary focal point is on helping learners create meaning rather than helping them develop perfectly grammatical structures or obtain native-like pronunciation. This means that successful learning is evaluated in terms of how well the learners have improved their communicative competence, or their ability to apply knowledge of both formal and sociolinguistic aspects of a language with satisfactory ability to speak.

CLT is generally distinguished as a broad approach to teaching, rather than as a teaching method with a clearly defined set of classroom practices. Any teaching practice that aids learners develop their communicative competence in an authentic context is deemed an acceptable and advantageous form of instruction. In the classroom CLT often takes the form of pair and group work requiring negotiation and cooperation between learners, fluency-based activities that persuade learners to increase their confidence, role-plays in which learners practice and develop language functions, as well as careful use of grammar and pronunciation focused activities. Thus learner becomes the active participant in the CLT classroom and the teacher takes on the role of a facilitator.



The main features of CLT are:

- a) Primary focus is on interaction in the Target Language
- b) Active learner involvement is endorsed
- c) Language is meant for expression, for communication
- d) Communicative competence is the target
- e) Fluency, accuracy and appropriateness are given equal importance
- f) Use of authentic materials as teaching/learning aids

(David Nunan, J.Yalden, A.P.R. Howatt, Dell Hymes)

Total Physical Response (TPR)

This language learning technique was developed by Dr. James Asher, a professor of psychology at San Jose State University, California. It is based on the harmonization of speech and action. It is associated to the **Trace Theory of Memory**, which holds that the more often or intensively a memory connection is traced, the stronger the memory will be.

The main principles of TPR are:

- a) Listening comprehension forms the base of language learning
- b) Learners learn best by doing things
- c) Meaning in TL is conveyed through actions

Suggestopaedia

This method has been formed by the Bulgarian psychotherapist George Lozanov. This method applies positive suggestion in teaching. The name is derived from 'suggestion' and 'pedagogy'. It is based on suggestology, a psychological theory that says human beings respond to subtle clues of which they are not consciously aware of.



The main principles of suggestopaedia are:

- a) Joy and psycho relaxation-learners will use their hidden potential only when they feel relaxed and happy.
- b) Harmonious collaboration of the conscious and the unconscious

The very noticeable characteristics of suggestopaedia are the decoration, furniture and arrangement of the classroom, the use of music, and the authoritative conduct of the teacher.

The Silent Way

This method is designed to enable the learners to become autonomous, independent and accountable learners. The Silent Way Method of teaching and learning was formed by Caleb Gattegno. It is constructivist in nature, guiding learners to develop their own conceptual models of all the features of the language. The teacher remains silent in the classroom, using actions to facilitate the learning process. The learners do all the talking. This method believes that teaching is subordinate to learning. It considers learning as a problem-solving, innovative, discovering activity, in which the learner is a main actor rather than a listener.

The main principles of the Silent Way are:

- a) Learning is facilitated when the student discovers or creates what is to be learned.
- b) The teacher is a silent 'engineer' creating a non-threatening atmosphere for language learning.
- c) Learner errors are dealt through self-monitoring and peer correction. Teacher never indicates disapproval.

Community Language learning (CLL)

CLL also known as Counseling language learning is an approach in which learners work together to develop what characteristics of a



language they would like to learn. The teacher acts as a counselor and a paraphrase, while the learner acts as a collaborator. This method was developed by Charles A. Curran, a specialist in counseling and psychology. It was produced especially for **Adult Learners** who might fear to appear foolish; so the teacher becomes a Language Counselor, understands them and directs them to overcome their fears. Its base is Krashen's Monitor Theory (Affective Filter Hypothesis) and the Cognitive Theory where the human mind is active, as opposed to Behaviorism where learning is merely a response to a stimulus.

Some features of CLL are:

- a) Teacher remains outside the circle of learners
- b) Mother tongue is used to instruct or translate to make the learners comfortable
- c) Community feeling is fostered to build up trust, and to reduce the level of stress for the learners
- d) Learning initiative must be with the learners
- e) Use of authentic materials for learning

The Reading Method

This method gives primary importance to reading for teaching English. This was developed by Michael West, a colonial educator in Bengal. West argued that the ability to read fluently should be given more importance than speaking skills. The objective of the reading method is comprehension rather than reproduction

Some of the features of the Reading Method are:

- a) Creation of graded readers in a systematic way
- b) Vocabulary grading
- c) Concept of extensive or rapid reading



The Natural Method

The natural method expanded by Tracy Terrell was supported by Stephen Krashen. It is a language teaching approach which asserts that language learning is a reproduction of the way individuals naturally acquire their Mother tongue. The approach adheres to a communicative approach to language teaching and refuses earlier methods, such as the Audio-Lingual Method and the Situational Language Teaching Approach. This approach analyze communication as the prime function of language, and stick to a communicative approach to language teaching, focusing on teaching communicative abilities rather than unproductive language structures. The main point that distinguishes the Natural approach from other methods and approaches are its premises concerning the use of language and the importance of vocabulary:

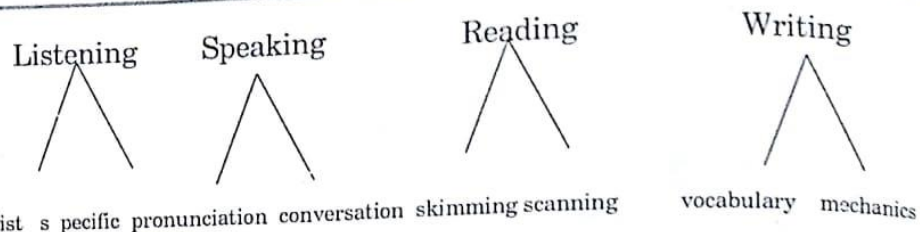
- + Language is looked upon as a means for communicating meaning and messages
- + Vocabulary is of supreme importance as language is essentially its lexicon

The Natural Approach belongs to a tradition of language acquisition where the naturalistic features of First Language acquisition are utilized in Second Language acquisition. It is an approach that describes on a variety of techniques from other methods and approaches and this is one of its improvements.

Skills-based teaching

Skills can be divided into language skills, learning skills, study skills, etc.

The four communication skills are identified as listening, speaking, reading and writing (LSRW). All these skills are further divided into sub skills.



The sub - skills of listening are gist listening (listening for over all information) and listening for particular information. The sub skills of reading are skimming (speed reading to get an overall impression), scanning (looking for specific information in a text) and intensive reading (for detailed understanding of the text).

Cognitive skills or learning skills are any rañional skills that are used in the progression of acquiring knowledge. The above skills comprise - reasoning, perception and intuition.

Study Skills and Study Strategies are aptitudes and approaches applied to learning. They are normally crucial to succeed in learning. They include removing distractions, self-motivation, time management, note taking, note-making and so on.

Conclusion

Most of the second language learners depend on their mother tongue to learn the second language. The language teachers need to provide ample opportunities for the learners to learn English using different methods like Grammar -Translation method vs Translation - Grammar method, The Direct Method vs The Structural - Oral- Situational Approach, The Audio Lingual Method (ALM) vs Communicative Language Teaching (CLT), The Reading Method, Skills-based teaching etc. And the mother tongue represents a powerful resource that can be used in a number of ways to enhance learning but that it must always be used in a principled way. This article provides a lot of awareness to use mother tongue to facilitate English language learning more effectively in the second language classroom.



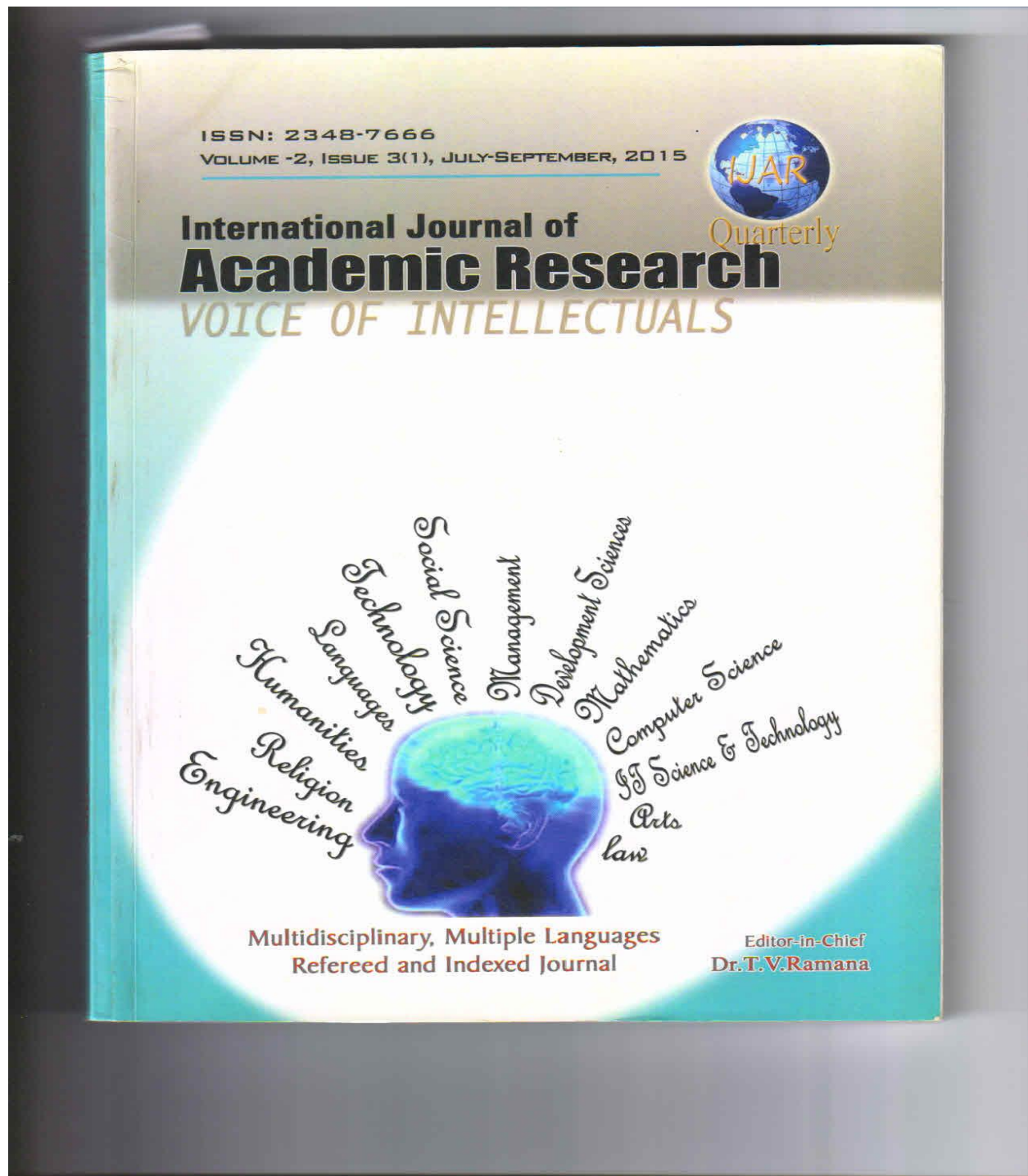
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Strategies for Teaching Vocabulary in the Language Classroom

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Abstract

Learning vocabulary is a very important part of learning a language because it is the words that help the learners to communicate successfully with people within and outside his/her circle. Vocabulary not only supports the four language skills Listening, Speaking, Reading, and Writing, but also mediates between second language learners and content-area classes to understand the text. Therefore, vocabulary is a core component of language proficiency and provides the basis for understanding a text or a talk. This article enlightens the readers and the language teachers and learners to focus on different strategies to teach and learn vocabulary interestingly in the classroom.

Key Words: *Vocabulary learning, Teaching strategies, Language proficiency, academic success*

Introduction

Vocabulary plays a major role in developing the language skills. Research on vocabulary in recent years has focused on the levels of vocabulary learning which learners need to achieve in order to communicate orally and written without any difficulty in their second language. Learning words in any language other than one's mother tongue is a not a day work but lifelong learning and practicing to master the focused language. A number of researchers in second language acquisition are of the opinion that words are gradually learned over a period of time from numerous sources of exposure. This suggests that there are different

aspects and degrees of knowing a word. Nation (1990) proposes a list of different kinds of word knowledge that a person needs to acquire in order to master a word such as the meaning of the word, the written form of the word, the spoken form of the word, the grammatical behaviour of the word, the collocations of the word, the register of the word, the associations of the word, and the frequency of the word. All these aspects of word knowledge are related and essential for a person to communicate with others accurately, fluently and confidently.

Considerable research has recently been conducted into the effectiveness of vocabulary teaching and learning through various activities or tasks.



Lee and Muncie (2006) showed that a post-reading composition task helped the learners to improve the productive use of vocabulary. In order to learn unknown words while reading a text, students can access a dictionary with various look-up options such as pictorial and verbal cues (Laufer & Hill, 2000). With regard to vocabulary retention, Hulstijn (1992) demonstrated that target vocabulary items were retained significantly longer when their meanings were correctly inferred than when explained by their synonyms. Joe (1995) argued that the retention of unfamiliar words was significantly facilitated when students engaged in a text-based task that demanded a higher level of generativity. Newton (1995) pointed out that students made more vocabulary gains when engaging in communicative tasks that demanded interactions than when negotiating word meanings explicitly. Wesche and Paribakht (2000) demonstrated that students learned vocabulary more effectively when they engaged in text-based vocabulary exercises in addition to reading a text than when they read multiple texts without exercises, because in the latter case, they could learn not only target words, but also their lexical features.

The following are some of the vocabulary teaching strategies which can be used by the teachers and learners to acquire vocabulary to enhance the effectiveness of communication.

Vocabulary through Reading

Reading is used as a strategy to promote vocabulary learning. For this purpose, the learners can be given reading materials like stories or a paragraph or news in the News paper and the learners can underline the difficult words and the teacher can help the learners to get the meaning of the words and enable them to use it in real context.

Vocabulary through Classroom Interaction

The language teacher while teaching can interact with the learners posing some questions or asking for the meaning of a particular word. The teacher also can divide the class into groups and interact with one another regarding what they have learned in that particular class. Besides these the teacher can encourage the learners to peak about their interest, likes and dislikes etc. This would help them to increase their vocabulary.

Vocabulary through Authentic Materials and Classroom Tasks

Authentic materials such as advertisement, train time schedule, information on movies, news paper cuttings on weather forecast, paper cuttings based on general knowledge and so on can be used in the classroom to teach vocabulary. Some of the tasks that teachers could exercise in the classroom are;

- ❖ Spelling tasks
- ❖ Word dictation
- ❖ Word completion tasks
- ❖ Word recognition tasks



- ❖ Word quiz
- ❖ Word association tasks
- ❖ Writing five sentences about oneself
- ❖ Narrating a small story or an incident

Apart from these, the language teachers can teach in detail and enable the learner to acquire collocations, idioms, synonyms and antonyms, Word Building processes, Word Association processes, Connotations, Polysemy and Homonymy and developing their skills of Reading, Contextual Guess Work, Drawing Pictures and using Dictionaries.

Collocations

The lexical approach, proposed by Michael Lewis (1993), has emerged as an alternative to grammar based approaches to second language teaching. Its focus is on developing learners' proficiency. This approach gives a special attention to collocations which helps the individual's communicative needs in a particular context.

Learning and acquisition of collocations does not happen to the second language learners without explicit instruction. In the Indian education set up, even at the higher education, little attention is paid to teaching and learning collocations. Hence, teachers should make learners aware of the phenomenon that collocations are an integral part of learning a language. It should be kept in mind that most of the collocations

must be taught or learnt explicitly on the basis of natural and informal conversations. And as it is not impossible to teach all the collocations in a classroom, criteria have to be set up to determine which collocations should be included in the syllabus (for example, acceptable, frequent and useful collocations to the learners). It is suggested that collocations which are non-congruent (which are not similar in meaning or form) should be given particular attention in language teaching. It is also said that less restricted collocations are problematic for the learners.

Classroom procedures should comprise activities that draw learners' concentration to lexical collocations and seek to increase their retention and use of collocations. According to Nadja (2003), it is not enough merely to teach the lexical elements that go together, but it is better to teach entire combinations including prepositions, articles, etc.

In the opinion of Hill (2000), the following procedures are important:

- a) Teaching individual collocations,
- b) Making students aware of collocations,
- c) Extending what students already know by adding knowledge of collocation restrictions to known vocabulary,
- d) And storing collocations through encouraging students to keep a lexical notebook.



Some of the activities to expand learners' acquaintance of collocations include the following:

↓ Intensive and extensive listening and reading in the second language.

↓ First and second language comparisons and translation carried out chunk-for chunk rather than word-for-word aimed at raising language awareness.

↓ Repetition and recycling of activities, such as summarizing a text orally one day and again a few days later to keep words and collocations that have been learned in the classroom.

↓ Guessing the meanings of vocabulary from the context.

↓ Noticing and recording language patterns and collocations.

↓ Working with dictionaries and other reference tools.

Idioms

A set expression of two or more words that means something other than the literal meanings of its constituent words is called idiom. For example, in

a. She is pulling my leg.

There is an idiom: *to pull someone's leg* means to tease them by telling them something fictitious.

Similarly, in

b. He took me to the cleaners.

the idiom is *to take someone to the cleaners* which means to cause them to lose a lot of money.

In

c. When will you drop them a line?

the idiom *to drop someone a line* means to send a letter.

In

d. You should keep an eye out for that.

to keep an eye out for something means to watch for it.

In

a. I can't keep my head above water.

to keep one's head above water means to manage a situation.

People use idioms to express subtle shades of meaning or intention. Idioms are used often to replace a literal word or expression. Idioms and idiomatic expressions can be more precise than the literal words, often using less word but saying more. For example, the expression it runs in the family is shorter and more concise than saying that a physical or personality trait is fairly common throughout one's extended family and over a number of generations. (Brenner Gail, 2003).

The study of fixed phrases has a fairly long practice but they are usually seen as outside the normal organizing code of language. Sinclair extends the notion of phraseology to cover a great deal more of language than it is commonly considered to encompass. One might say that all senses of all words exist in and are identified by the sequences of words in which they



typically occur. (Hunston Susan and Francis Gill, 2000)

Idioms are an important cultural element of the language for effective communication and flow of language. Hence, idioms should be taught to the learners to acquire fluency and proficiency in English language. Today a few of the ESL teachers merely go over a list of English idioms and their definitions and explanations. However, to make sure that learners not only understand them, but also learn to use them effectively, the idioms should be presented in simple conversations where their meanings are clear. The teacher can show the learners how some of the idioms are used in the authentic materials like Media, Newspaper and Magazine articles, and in Songs, Cartoons, videos, Advertisements and so on. To develop idioms one can follow some of the activities as given below;

- Select five to eight idioms which may be easily grouped, for example, idioms with time
- Introduce idioms in context, never in isolation
- Students create conversations using idioms
- Practice with games and activities

➤ Use real life, authentic material

Synonyms and antonyms

Learning synonyms and antonyms helps build vocabulary. Synonym is a word having the same or almost the same meaning as another word in the language. For example, joyful - glad.

Antonym is a word opposite in meaning to another word in the language. For example, fast - slow.

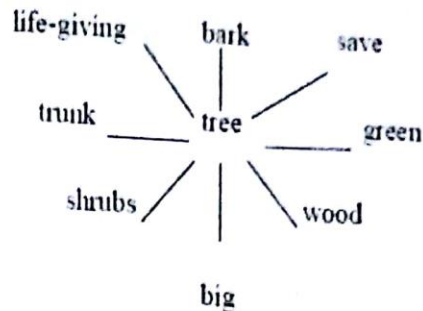
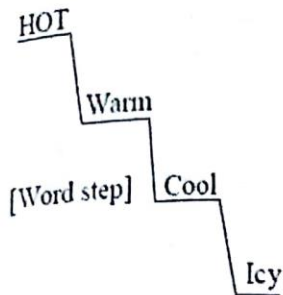
Even beginners learn antonyms when they study adjectives like fast, slow, big, and small at which point they will also probably learn that small and little are similar. One of the important techniques of enhancing vocabulary is to learn synonyms and antonyms together. Synonyms and antonyms could be learned in groups such as Adjectives, Adverbs, and Verbs. The best tools are dictionaries and thesaurus and learning is ensured when natural context is used to teach an item.

Word building

Some of the word building activities are word caterpillar, word webs, word steps, word spikes and so on which can be used in the class. These can be used as warming-up sessions or even winding up sessions of particular lessons.



APPLENTEROTUNDOENGLISHAPPY...[Word Caterpillar]



[Word-Spike]

Word association

Word association means "stimulation of an associative pattern by a word" or "the connection and production of other words in answer to a given word. One acquires one's language through word associations. That is, getting mental pictures of concrete and abstract words through senses which are connected with new words. For example, when one hears and see the word "sweet," the words that comes to one's mind is that badam halwa, dudh peda, candy, cake, ice cream and jilabi entirely getting the understanding of the meaning of the word "sweet." Word association is a language game used to learn / expand the students' vocabulary.

The following methods can be followed;

- ❖ The teacher initiates by reading out a key word and selects a student to begin the word association by responding to the word with another key word from the topic which is associated to it.

- ❖ Encouraging the learners to get ready a list of twenty key words/terms relating to the subject being studied.

Connotations: A connotation is a subjective cultural or emotional connection that some word or phrase carries, in accumulation to the word's or phrase's explicit or literal meaning, which is its denotation. The minimal unit of denotational meaning is called *sememe* and the minimal unit of connotational meaning is called *pragmeme* and the cover term for these two is *seme* (Prakasam 2004). Pragmeme thus subsumes connotation. A possible connotation of home is a place of warmth, comfort, and affection. A connotation is often illustrated as either positive or negative, with regards to its pleasant or unpleasant emotional association. Teaching and learning vocabulary also involves teaching the connotations of a word and its appropriate usage in a real context.

Polysemy and Homonymy



While teaching vocabulary, the teacher has to bring in the concepts of polysemy and homonymy. Polysemy relates to the multiple meanings of a lexeme. Homographs are commonly spelt different words (lead -Noun, lead -Verb) and Homophones are words that sound alike (see, sea) and Homonyms are words characterized by homographs and homophones (Bill = beak of a bird, bill = statement of charges).

Teaching polysemy facilitates the learners to differentiate between the different meanings of a word with closely related meanings; teaching homonymy make a distinction between the different meanings of a word with dissimilar meanings.

A few more examples for homonyms are given below:

- *bat* (an animal), *bat* (baseball equipment)

- *bank* (river bank), *bank* (financial institutions)

A *polyseme* is a word or phrase with multiple meanings.

For example, *man* has four uses while referring to humans

1. The human species (i.e., *man* vs. *animal*)
2. Males of the human species (i.e., *man* vs. *woman*)
3. Adult males of the human species (i.e., *man* vs. *boy*)
4. (Verb) Provide the workers (*manning a factory*)

This example shows the specific polysemy where the same word is used at different levels of a taxonomy. Better examples of polysemy are; eye of a needle, eye of animals; hand of an animal, hand of a clock

It is important to note that many dictionaries find it difficult to set apart homonyms and polysemes and so give them all as separate entries because the cline of related and unrelated meanings is always hazy.

Drawing Pictures

This is an effective method to build vocabulary. The teacher can divide the class into groups and give each one a list of words. The teacher asks one group to draw the picture on the blackboard with the help of the given words so that the learners in the other groups can guess the words or expressions they are trying to present. This type of method can make the learning interesting.

Picture Description: The picture description is an ideal way of practicing English vocabulary in all sorts of fields. And there's also a benefit for everyday life as they are authentic materials taken from real life. The learners can easily learn many new words through describing pictures. For example, looking at a picture of a person, the learner can describe like he is skinny, underweight, slim, fat, plumb, bonny etc... If the learners are finding it difficult to describe the pictures the teachers can help.



Conclusion : This article presents various strategies for vocabulary teaching that can be used in the second language classroom according to the learners' proficiency levels. The use of visual representations such as Drawing pictures and Picture descriptions can promote vocabulary retention. Thus, different strategies like Vocabulary through reading, Vocabulary through classroom interaction, Vocabulary through authentic materials and classroom tasks, Collocations, Idioms, Synonyms and antonyms, Word building, Polysemy and homonymy, Connotations and many other authentic materials promote vocabulary learning and make the classroom lively and interesting.

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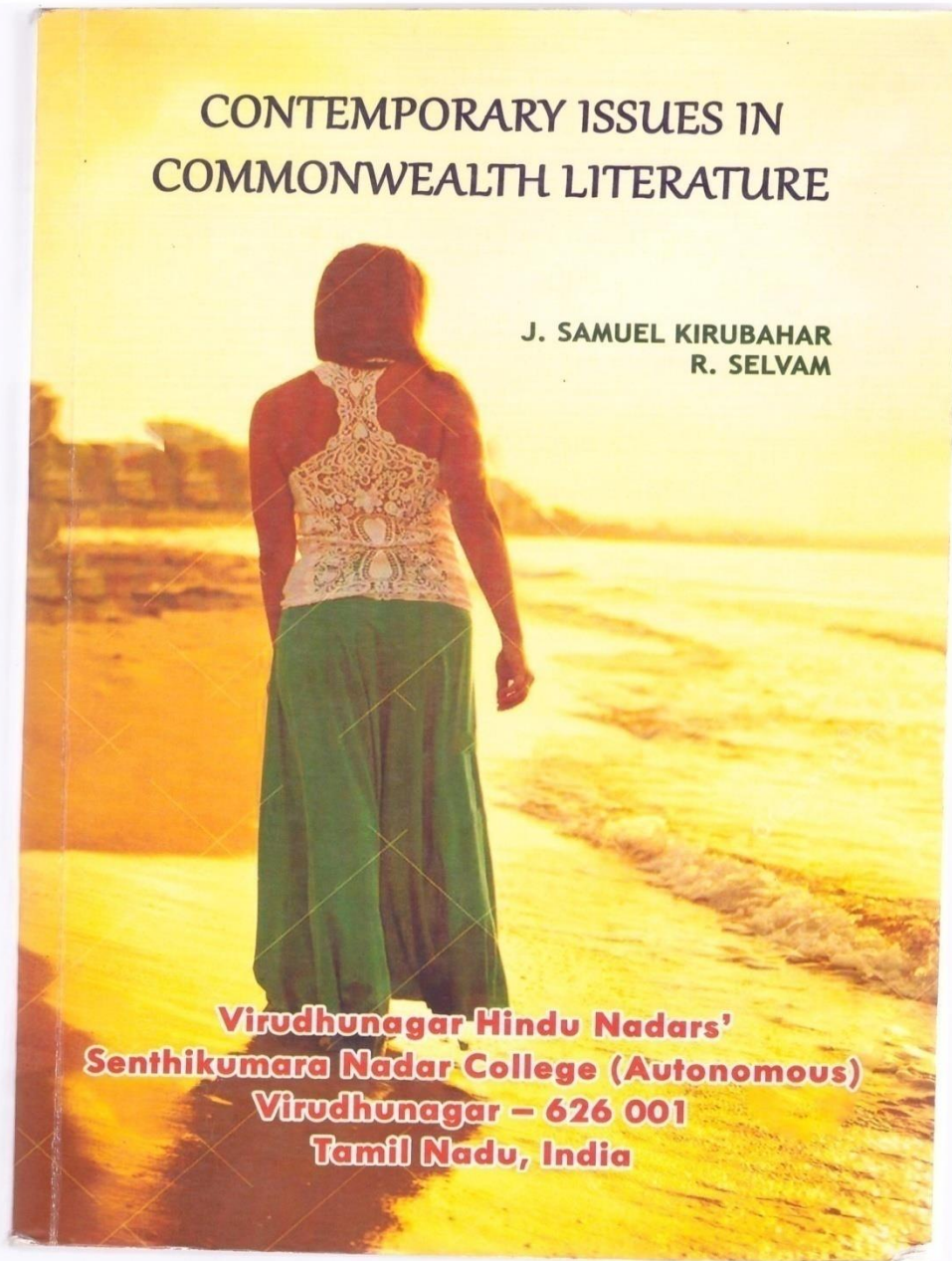
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THE VOICE OF THE VOICELESS: A HISTORICAL PERSPECTIVE IN ANDHRA PRADESH

N. VIMALA DEVI

The objective of this paper is to discuss the historical context of the emergence of a literary genre which reflected the growing identity, awareness and consciousness of the dalits during the colonial period. Although there was no literary genre distinctively known as 'dalit literature' during the pre independence period in Andhra, an examination of the literary works, i.e., poems, novels, plays, etc. of certain dalit intellectuals indicates that the oppression, agony and anger of the dalit masses is reflected in their writings. An attempt is made in this paper to analyse the nature of literary representation of dalit problems and the emerging consciousness in the writings of selected dalit scholars. It focuses on the treatment of caste oppression, untouchability and dalit sensibility in the writings of dalit intellectuals.

Broadly speaking, since the 1970s an increasing number of poets and writers drawn from the dalit communities of the states of Maharashtra, Karnataka, Andhra Pradesh, etc. have been producing literary works such as poems, short stories, novels and dramas representing the themes of caste oppression, untouchability, poverty, repression and revolution. The writings of dalit scholars also contain powerful denunciations of and fierce attacks on the caste system and on brahmanical Hinduism.

As far as Andhra Pradesh is concerned, it can be said that both the radical left movement and the Dalit Maha Sabhas have thrown up a new generation of dalit scholars, intellectuals and philosophers whose writings sharply reflect the changing perceptions and consciousness of dalit masses. In their writings the dalit question is posed in terms of the annihilation of the caste system and the building up of a casteless egalitarian society.

In Telugu literature the problems of untouchability and the poverty and misery of dalits were represented by nationalist and liberal scholars drawn from the upper castes. In particular, the literature which was generated during the time of social reform movements contained various problems confronted by different segments of society. Social reformers such as Gurajada Appa Rao and Veereshalingam broadened the base and scope of literature as well as transformed the traditional character of Telugu literature "into a modern tool of communication". Though Gurajada and Veereshalingam are acclaimed, as the "founders of new epoch in modern Telugu literature", their writings focussed

mainly on themes and problems such as bride price, widow remarriage, etc, related to women of upper castes, mainly brahmins. Neither Kanyasulkam (Bride Price) nor Raja Sekhara Charitam, written by Appa Rao and Veereshalingam respectively, addressed the basic, fundamental problem of caste oppression and alienation of dalit masses from the mainstream society.

The Gandhian movement inspired a number of scholars who argued that national liberation will herald a new epoch in which discrimination and oppression of all sorts will be abolished. In order to build a united and coherent anticolonial movement, they exhorted the people through their writings to eradicate social evils and unite. In this context novels such as Unnava Laxminarayana's Malapalli 1922, 'Harijan Hamlet') and Ranga's Harijana Nayakudu (1933) are socially significant literary works. Both of them depicted the problem of untouchability and the misery of dalits, but they suggested that with certain changes and modifications, the existing caste system could be maintained. The solution to the dalit problem is offered within the existing framework of the caste system. In a sense, it was not truly a realistic representation of the dalit question. Therefore, in the writings of non-dalit scholars the problems of untouchability and caste discrimination was reflected not as a serious and fundamental one. They advocated minor reforms and adjustments.

Though they were inspired by the ideology of nationalism, they were insensitive to the socio-cultural and economic oppression of the dalit communities. The aspiration and emotional feelings of the dalit masses were not adequately taken cognisance of by predominantly drawn from the upper castes. It was precisely for this reason that the Gandhian programme of 'Harijan upliftment' was a failure. A dalit poet ridiculed the commitment of pseudo-Gandhian upper caste activities towards the upliftment of untouchables. He wrote:

You prove that you are the descendants of sages

Outwardly you call us brothers

You boast to have listened to the teachings of Gandhi

Nobody follows (him), is not it injustice

You forget the words of Mahatma Gandhi

You born with anger at the untouchables⁷

The constructive programme (Harijan upliftment, temple entry, etc) of Gandhi was popularized in Andhra with a view to integrate the dalit masses into the fold of the mainstream nationalist movement. The

Who is this Fifth Caste person!

Savithri! (Mother)

The Dalit writers also traced the common ancestry of dalit communities. They claimed that they are the children of 'Matangi Kanya' and the descendants of Arundhati.

Jala Ranga Swamy, in a long poem entitled "who are the untouchables", criticized the upper caste Hindus for caste discrimination and asserted the rights of dalits to social equality.

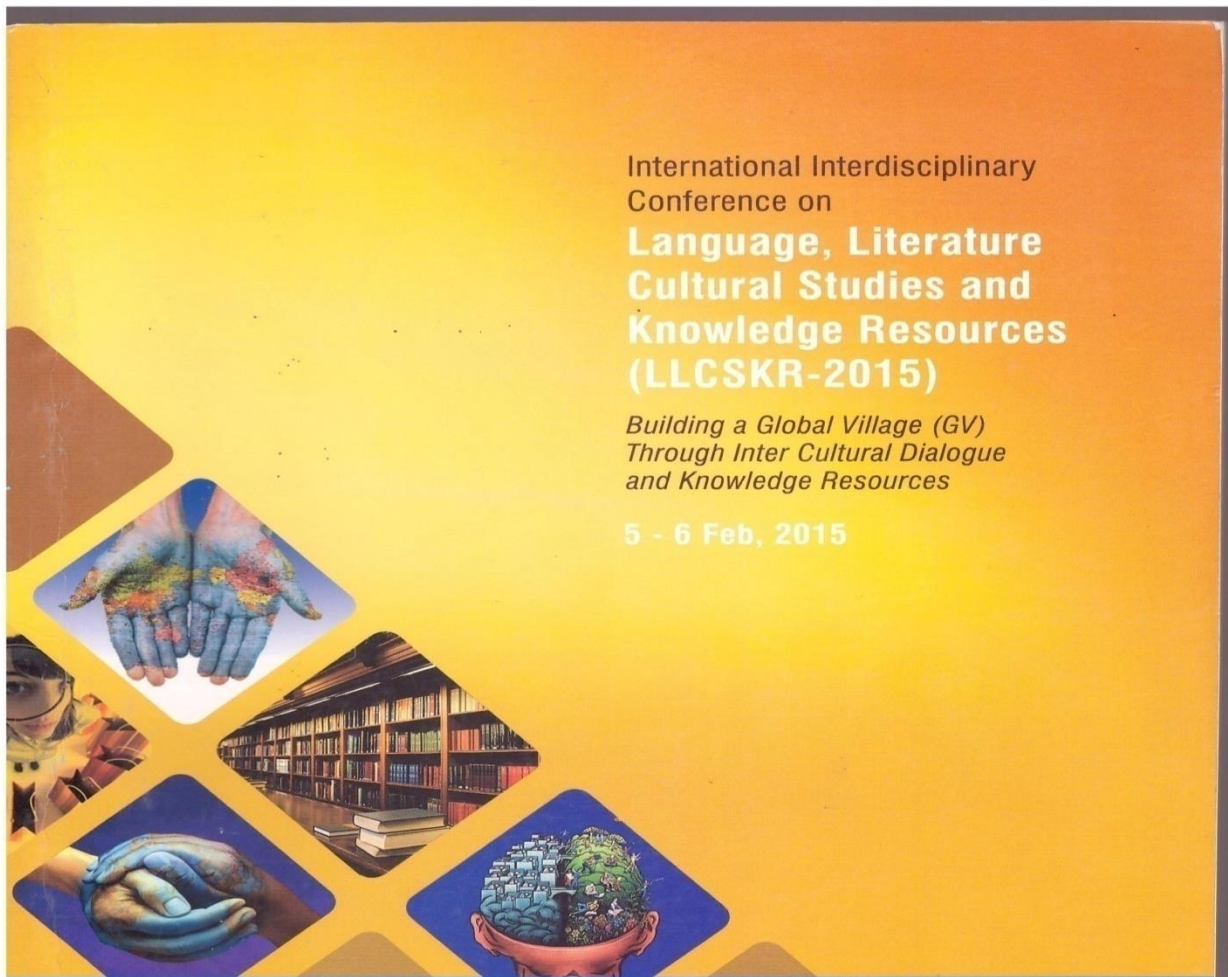
While denouncing the Aryan conquest, which led to the enslavement of the dalits, the poet (Ranga Swamy) proclaimed the glory of their (anaryas) past by claiming the great sages and pious/chaste women of the ancient times. The poem is as follows:

The great Warriors of Puranas were our people
Ashvitha, Valmiki etc. belonged to our dynasty
Vedavyasa, Parasara were our people
Hanuman, Sugreeva were our brothers...
Did not the great mothers of Heros born amongst us
Did not they observe chastity
Did not Arundhathi, the daughter of our caste
Savithri, Matangi were our women...
A caste in which such great people were born being alienated
We were made lowly people, excommunicated
Bhim Bheemanna pleaded for social equality. He wrote:
Around the neck of the powerful Indian Nation
Caste, religion are the hangman's ropes...
Destroy the guile of caste and religion
Indicate the human inequalities

Kusuma Dharmanna was a bitter critic of brahmanical Hinduism. In his long poem, 'we do not want the rule of black landlords'. He portrayed the miserable and pathetic living conditions of the dalit masses. He wrote:

(We have) only small huts outside the village
We do not have big houses

6. Published a paper titled "Language is the Medium of Communication" in the International Interdisciplinary Conference




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Language is a Medium of Communication

G. Jyothi Olivia, Lecturer in English, J.M.J. College for Women, Tenali

In India English occupies a prestigious position. It is an official language of republic of India. It is primarily taught as a foreign or a second language. Therefore, more than one billion people in the world speak or understand this language. It has become lingua-franca in India and is used by Indians as a link language to communicate with people from India all over the world. The primary aim of learning English language is to acquire communicative competence. Recent researches have considerably changed our understanding of the processes of second language acquisition and necessitated a change in the teaching. The present paper undertakes to explore the origins, evolution and theoretical foundations of an approach to teaching of language known as communicative language teaching. It examines the theories of language and learning that provide this model with its basic assumptions and techniques. Grammatical competence involves the mastery of rules related to tense, phrases, clauses, rules of sentence formation which account for our ability to form sentences. However, it is increasingly being realized that knowledge of rules of grammar does not necessarily lead to the fluent use of language in real life situations. It aims at developing techniques and strategies for the teaching of the four skills i.e. listening, speaking, and reading, writing, that acknowledge the interdependence of language and communication. It aims to make learners become communicatively competent. Communicative competence requires being able to use the language appropriately in a different real-life situations. This requires the knowledge of the linguistic forms, their meanings and functional use.

Keywords: *Linguistic forms, interdependence of language, language testing, communicative competence.*

Learners Culture & Target Language: Language Transition from Literature

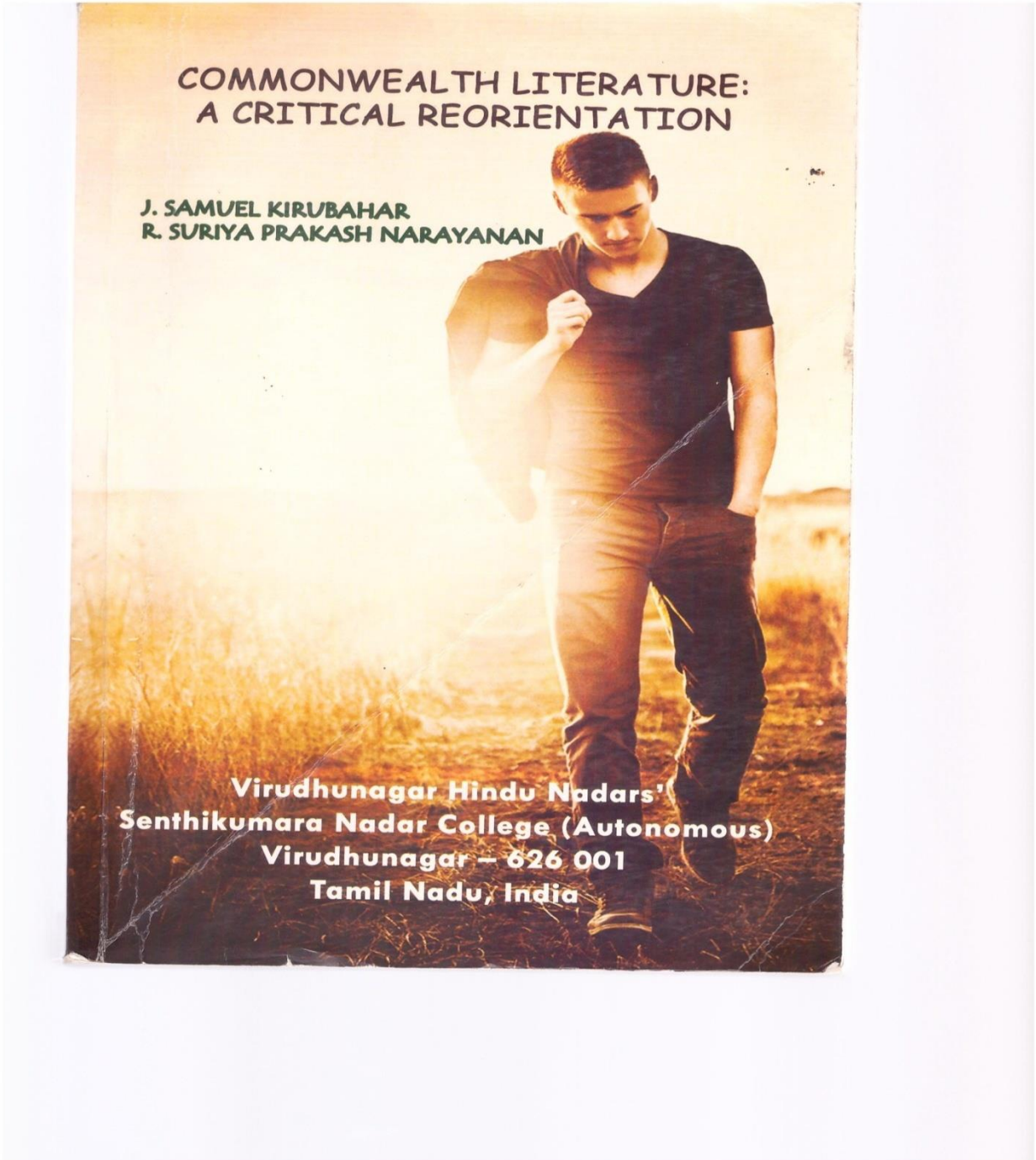
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The issue of language acquisition at early age has been the concern of ELT experts and researchers. In the Government Schools of Kashmir complex texts books are introduced for the teaching of English language at Upper Primary Level. This becomes an obstacle to the children who are already struggling to learn the English Foreign language. In order to overcome this problem a new approach-Culture specific approach is proposed in this paper. This approach will help learners to overcome the problem.

Keywords: *Language acquisition, ELT, Culture specific approach, Language Transition*

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GENDER DISCRIMINATION

G. JYOTHI OLIVIA

India and in many South Asian countries, it is the patriarchy that dominates. It signifies a social system where power is invested with the male member. It operates with a hierarchical power structure where males are considered superior to all females and elder males are considered younger. Universally found all around the globe, this system has created a set of social relations between men, a material culture that establishes or creates independence and solidarity among men and enables them to dominate women.

Recent studies have revealed the prominence of the goddess in many parts of the country that existed before the advent of Islam. Much folk lore of pahadi myths declare Shakti (the goddess of supreme power) to be the supreme deity, the foundation of all existences in the universe. She has equally shared the status of divinity with her male consort 'Shiva'. Reference to God as 'Shiva and Shakti' consolidates the belief that women in the universe received equal status. IS Even in the Ramayana, we find Rama showing preference to his duties to his mother Kausalya over his father Dasarath.

According to the biological ideology of patriarchy, the true vocation of woman whereby she has to produce a child is the source of happiness of a woman, according to patriarchal culture. The fulfillment of her family role. It works to keep women tied to the home through customs like wearing mangal sutras and sindoor, keeping women indoors, curtailing the physical mobility of women have led to a loss of self-esteem. Further, dowry deaths, female infanticide, and sati have emerged as the dominant patriarchal practices.

Sexual and legal oppression is also no less. Women are still discriminated especially in the unorganized sector. Their wages are lower than men. Sexual harassment compounded by the dowry deaths has always been the bane of women in the lower

...allow her less freedom to move in fresh air, deny her education; deny her... and then you have inevitably women who are... in imagination and so on. Save all this man's... through marriage and her fertility controlled for

propagating the lineage with no right to bear children with respect to a woman producing a male heir.

Gayle Rubin defines gender as 'a socially imposed division of sexes' -i.e gender is the product of social relations of sexuality. It transforms males and females into men and women and the way ascribed to a woman at different stages of her life remains the same non-entity.

Biology is destiny-says Freud. In India religion plays a great trick on woman. At one place woman is hailed as mother goddess shakti, the procreator of life. Obeisance is paid to her whereas on other hand she is looked down upon as an apostle of 'Maya' the illusion the seductress from the transient material world that needs to be renounced to achieve salvation. Further the biological line is distinguished by the fact that she has an impure body as is evidenced by the flow of menstrual blood each month. Their bodies are considered to be the locus of violence and sexual desire. It's a great surprise that the profounder of these validations too were born out of this very menstrual blood, this being a sheer challenge to the process of creation.

Women also face ample discrimination at work place. They face discrimination in entrepreneurship. Gender concerns are at the front for pursuing career. And jobs like-tailoring, boutique, a small beauty parlor are the most prevalent forms of employment i.e industrial ventures are constantly being avoided due to a stereotypical mindset that women are unfit for heavy work. This work ensures that women face discrimination at work place. Most of the strenuous jobs on construction sites or in the agricultural fields are done by women.

MODERN INDIAN WOMAN:

The Post Independent improvements in the position of women have to a great extent improved their status in the society. There are certain positive features. India has the world's highest number of professionally qualified women with more trained doctors and professors than UK. There is also a strong social structure. This has led to fewer cases of post natal depression. Sexuality is now openly discussed these days. As Mary EJohn in her essay says:

There is now an increased sensitization to gender issues. With the earlier introspections on women's status in the society, it has become a bumpy ride from 'Women's problems' to 'Women's perspectives'. With the advent of technology and media boom as instruments

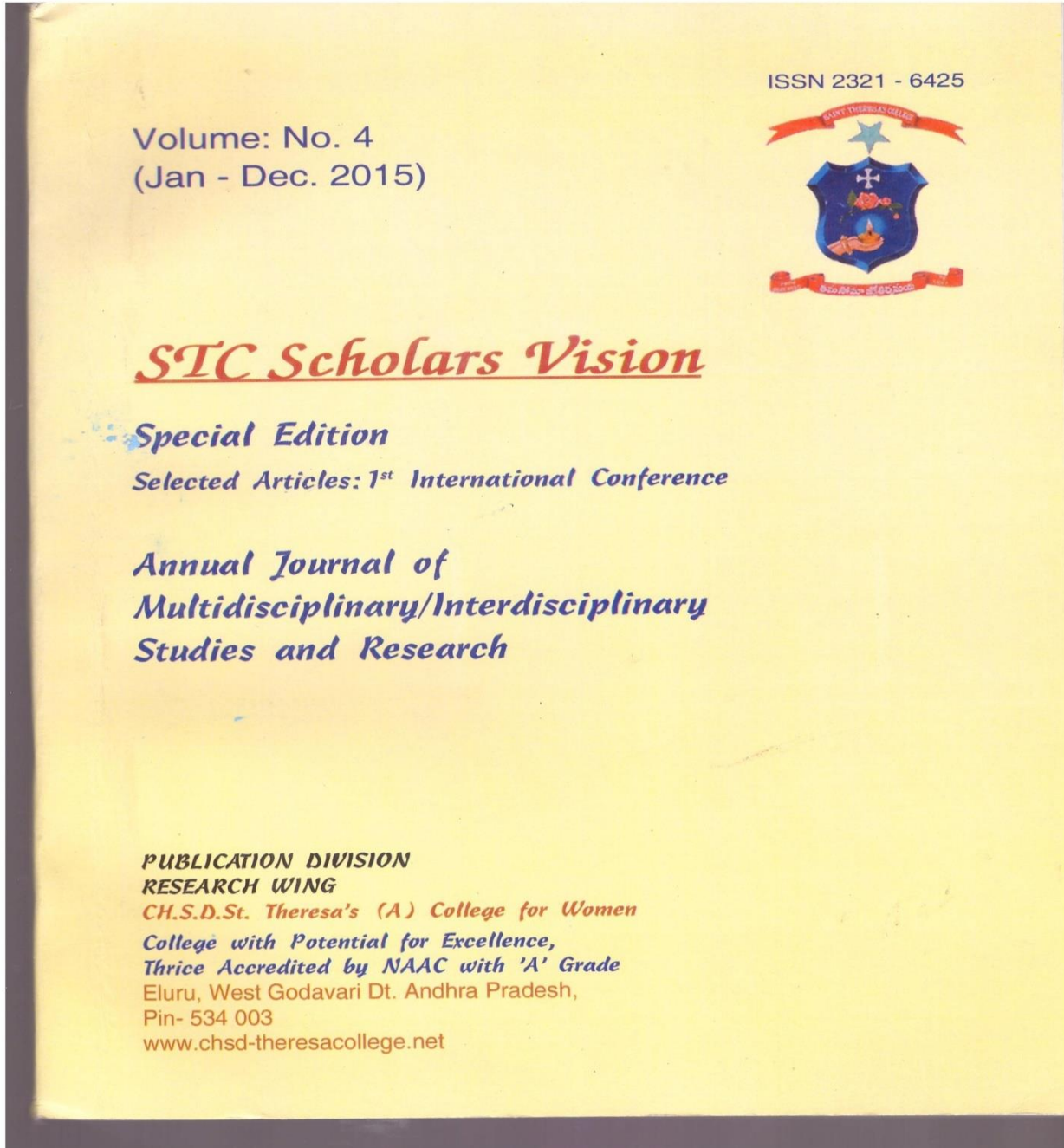
As women the trends of the West, the boundaries between the public and private spheres are blurred, thus projecting scenes of private life to a wider audience transporting images of the world at large to within the domestic sphere. Gendering processes are redefined as women who were once confined to the domestic sphere have started realizing their autonomy. They have now realized that they are more than objects at the disposal of the men in their homes. According to the World Bank report, the major axis of gender discrimination arises from the traditional dichotomy. The culture over definition of the woman's association with inside the home. But now these norms are changing. The conflicts between traditions and modernity are increasing with modern developments in women's lives. She is no longer just a 'gendered female'.

The image of the new Indian woman is of course derived from the educated, middle class career woman. Apart from this there are other hierarchies that are developing: the healthy versus the sick, rural versus the urban, the younger versus the older women. The teenager may enact actual sexual desire, whereas the older woman, once married, exercises her autonomy- her education, her career, her contribution to the family's well being. The development of an individual line of chauvinistic regional markers is one of the major questions of the Indian state. In this context, the Indian woman is increasingly and transcendently wife, mother and homemaker. The process of modernization. Without westernization "Good woman" as Tejaswini Niranjana calls it; must only be skin deep. The female subject has to achieve a balance between deep and surface (modernity). The gender norms for women in modern times are in a process of remoulding. The new woman model Sushmita Sen expressed it after receiving the Crown in 1991, that a modern India woman is one who is a 'perfect housewife' and 'still go out and get what she

'The Production' has briefly viewed the changing positions and processes and problems in the making of the modern Indian woman. It is this reality that the Indian English women novelists have reflected in their fictional narratives. The themes are related to the changing times within the family and society. The novelists are aware of patriarchy and gender discrimination, institution of the family and the role of women in the care of their writings.

The brief review of the genesis, predicament, upbringing of the Indian Woman and her journey from the Vedic to the post independent nation in the 'Introduction' attempts to set the scene for the analysis of the fictional world of Manju Kapur taken up in the next chapters. The present study aims to study the novels of Manju Kapur in order to see how she as a popular writer attempts to engage with the reality of women's lives in her work from a feminist perspective. The study aims to tease out the strands of popular and feminist engagements as represented in the characters and narrative strategies in Kapur's fictional narratives. All her women characters are seen contesting with institutionalised female subjugation in Indian society.

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33. Issues before the Dalit Movement in Andhra Pradesh.

G.Jyothi Olivia .M.A.M.Phil.,(Ph.D)

Key words: substantial, democratization, categorization of reservations, patriarchy, Wielding power.

Introduction

There are two important issues before the Dalit movement in Andhra Pradesh for bringing substantial meaning to internal democratization and unity of the community. One is the issue of Dalit women and the other is the categorization of reservations. Dalit women are on the Dalit periphery and are still hampered by a democratic deficit in terms of social, economic and political power. In spite of significant women's movements in Andhra Pradesh, Dalit women were in habited, in fact the untouchable women in Indian women's movement was a meek weapon, while denying equal status for Dalit women on par with the other higher caste women. Unfortunately, the literature on women's movement is mostly confined to the participation of higher caste women. As argued by a Dalit women activist, in spite of their common reality, as women, they are only given secondary rolls. She poses the question of how many Dalit women are there in leadership positions in the Indian women's movement at the local, regional, national and international levels. How many Dalit women have participated in the Fourth World women's Conference, held in Beijing in 1995? Higher cast women engage in gender struggles to reclaim and expand space. While Dalit women's struggle is not only against patriarchy but also against cast and class. However, unlike the previous mobilizations which did little to overturn the gender bias within the Dalit life, the Karamchedu incident in 1985 is symbolized as the critical event for Dalit women around which the Dalit movement mobilized, and there emerged a proliferation of critical mobilization of Dalit women on the question of caste and patriarchy within and without . The age of Dalit women is surely to dawn. It was the Dalit women, Suvarta, whose simple refusal to obey the dominant caste brought a storm of retaliation on the Dalits by the dominant caste . When the state officials including the then Chief Minister came and offered help, it was the majority of Dalit women who refusal outright to accept the government largesse. Dalit women's response and their participation were remarkable. Thousands of Dalit women went to Hyderabad and staged a protest in front of the Chief Ministers house, demanding immediate release of the arrested movement leaders, and punishment of the accused.

Dalit women who participated in the Karamchedu movement mustered her participation successive Dalit struggles and played an important role by carrying out a number of struggles over the land, livelihood, patriarchy and cast oppression and atrocities. The famous anti-liquor movement of 1992 in Andhra Pradesh , which has been otherwise championed by the dominant caste educated women, was actually initiated by the starved, cursed, and desolated rural Dalit women.

"It was the untouchable women of rural Andhra Pradesh who formed the backbone of the movement and it all began with one Dalit woman, learning, Alphabet, non formal educating, by the government of Andhra Pradesh enlightened Dalit women to the evils of liquor that men she realized her sufferings of physical ,economic, and psychological, insults and Humiliation and lack of nutritious food, self-respect, and inability bear the burden of the family." Having identified the root cause of her oppression and suffering, the Dalit women revolted and she fought head on with the police and other government officials, leading the movement in all parts of rural and urban Andhra Pradesh. Dalit women fought, struggled, demanding the ban of Arrack or liquor by the government, walking on roads braving the hot sun, destroying the liquor shops and burning in anger the government buildings. They bravely bore all the sufferings, arrests and beatings by the police, often at the cost of their lives.

Dalit women organized a movement for land and land rights. A huge mass rally in the street bhooporata mahayatra was organized for the land under the banner of Andhra Pradesh Dalit Sangham, started by Katti Padma Rao. It was reported that more thirty thousand women gathered and demanded, that every Dalit women should get one acre of land, proper housing, a small business, industry, a ban on arrack(liquor) a monthly pension, and free bus and rail passes for all Dalit women. Dalit Women Literary Parishat was started in 1989 under the leadership of B.M Leela Katti Padma Rao, a profession and activist to bring about awareness to the naked realities of Dalit women. Some of the most progressive Dalit women activists during the karamchedu and chundur movement. Dalit Women's Literary Movement started by G.Jhansi, a Dalit woman activist. Dalit women's literary creativity remained on the fringe of the mainstream literary world. But some of the Dalit women writers took the initiative to explore their own creativity. Gogu Shyamala brought out an outstanding creativity collection of anthology of Dalit women and activists in the name of Nallapadu. Some of the Dalit women writers like B.Vijay Bharani, Jupaka Subadra, and Chandra Stree, established themselves as the most popular Dalit women writers and activists.

The issues of Dalit women are of a crucial importance in the context of Dalit movement. The Dalit women's movement narrowing space in democracy. In spite of strong women's movements since the 1970s, Dalit women were invisible. Dalit women are on the Dalit periphery, 'Dalit among Dalit, worst of the worst. Remarkably, movement leaders such as K.G. Sathya murthy, Bojja Tarakam, Katti Padma Rao, Masterji have elevated the question of Dalit women to the level of primacy within their movement. They emphasized that the struggle for Dalit emancipation is inseparable from the issues of Dalit women's equality and commitment to their rights and freedom. They enthusiastically moved Dalit women from the kitchen into the factory modern mainstream world. The active participation of Dalit women in the Dalit movement was on a mass scale, and occupied a central place in agitation rallies and processions.

The Dalit movement, as the movement against this distortion, invoked the democratic principle. It is not only an correction mechanism but also brought about fundamental changes in the political system. It includes the way the Dalits think of their rightful position in relation to the democratic state. The Dalit movement in Andhra Pradesh as a social movement made an important contribution in shaping democratic relationships. The fundamental importance of the Dalit movement in Andhra Pradesh for uniting the Dalit community has been gathered through the fact that Dalit movement in Andhra Pradesh has become the bearer of the hopes, and aspirations of the Dalits.

The Dalits's political mobilization and their legitimate demand for equal opportunities and welfare state to respond the Dalits fair demands for material uplift in some measure. The Dalit movement with the welfare state thus elements contradiction and has raised many questions about the nature of the state processes in caste-class ridden Indian society. This contradiction itself became an instrument for the growth of Dalit consciousness. The agents of these contradictions were, primarily, the ruling upper caste.

...the Kammas, Reddys, Velamas, and Brahmins. Wielding power in the state for decades their... to stabilize and to consolidate their position. This endeavour took two forms. The... were forced to remain confined to the occupations traditionally enforced on them, like... and bonded labour. Even a mild protest from the alienated Dalit met with indelible... of the upper castes. Secondly, the educated Dalits who had been incorporated and... through reservations, and who could have led their Dalit brethren to autonomy, ... and discriminated against, in keeping with the Hindu social order which has an inherent... The result was that both the Dalits working inside the state apparatus and those who were... of the civil society developed an antagonistic relationship with the welfare state. This... Dalits towards a state that was unsympathetic to their plight and aspirations, and which in... their struggle for emancipation, brought about the Dalits collective resistance. ... mobilization of a new form of struggle by the Dalits that challenged the traditional order.

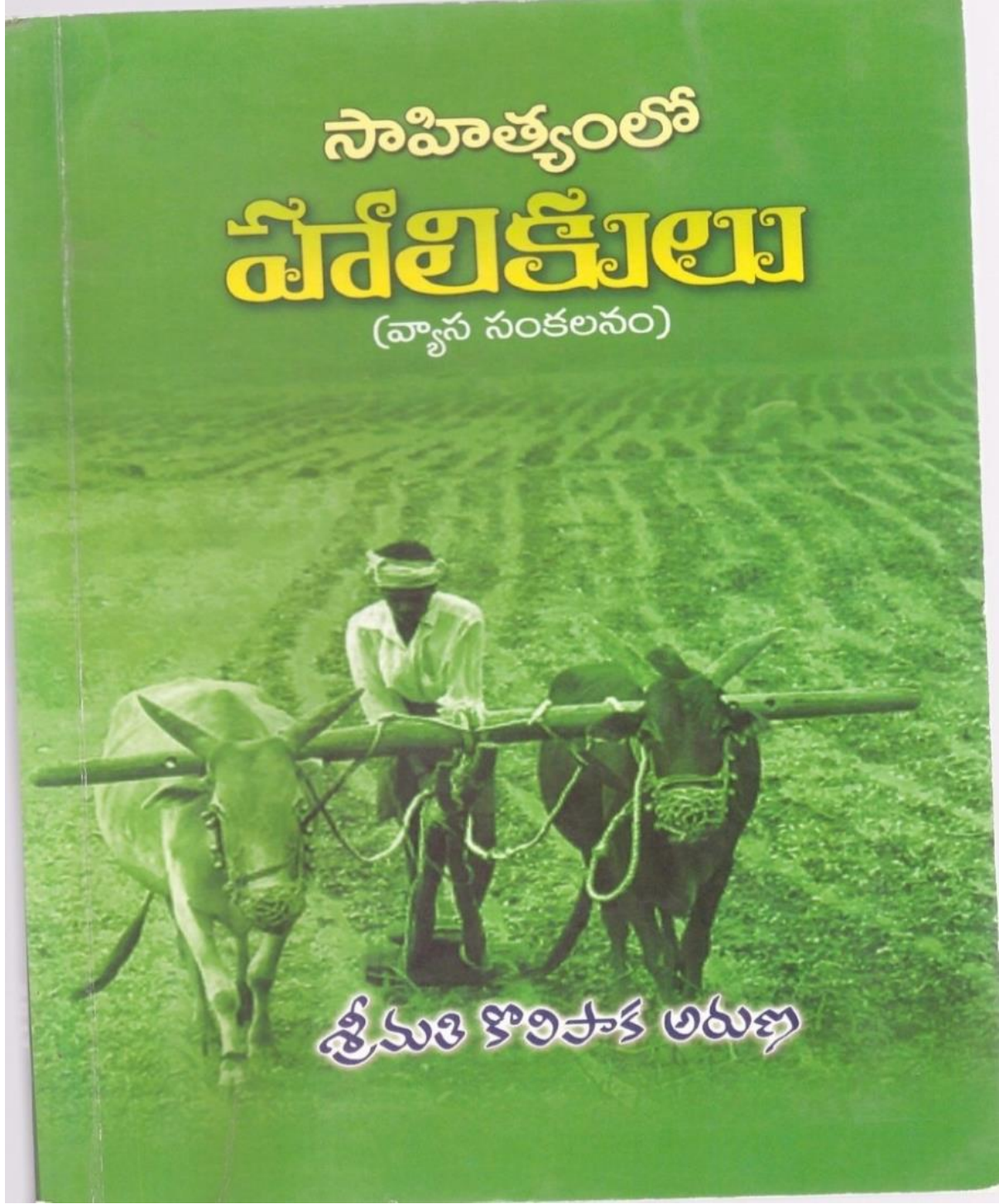
... political context of Andhra Pradesh was also molded by the political culture in which... the traditional rational authority, whereas the dominant castes upheld the tradition. The... and racial also played a notable role in the enhancement of Dalit consciousness. ... Marxist-Leninists created a significant impact on the Dalits in endowing them with... confidence in Andhra Pradesh. Thus, the Dalit movement has affected the agenda setting... parties. The increased mobilization of Dalit activism and proliferation of Dalit organizations, ... analysis of civil society suggesting the growing evidence of democratic consolidation... among the oppressed. And it played an active role in formulating public policy and instrumental... to be implemented. Even more important than these external political processes in bringing... was the Dalits study and absorption of Ambedkar's thought.

... of political violence on the Dalits whenever they assert and exercise their democratic... against the will of the dominant castes exposes the tension between the traditional power... who are aspiring for the access to the democratic state institutions, thus, the democracy becomes... ground in which Dalits are standing to weaken the traditions of caste and its hierarchical power... to create equality and social justice.

... The Dalits have always been ostracized and opportunities to cultivate their human faculties were... account of caste hierarchy. To uproot that institutionalized caste prejudice and social discrimination... of democracy Dalits led multifarious struggles. The Dandora movement initiated debate that... has ended up by creating not only a class division among the Dalits but also the deep... among the Dalits. Mala elitist kind of commitment to democracy might impede the... of the democratization process. Mala Mahanadu recognizes the existence of exploitation but tends... role and fail to provide an explanation of democratization in historical perspective. The... inevitably recognizes the primary role of agents of democratization included subaltern... location in civil society is the least of the least.

- ... Our struggle for Emancipation.
- ... Kusuma Dharmanna.
- ... Evaluating Dalits Leadership.
- ... Dalits Bahujana Parivarthana.
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సరహిత్యంలలో షరలకలల

సంపాదకులు
కాలపాక అరుణ

ప్రచురణ
సుచరిత పబ్లికేషన్స్, విశాఖపట్నం

ఐష్యోయోగసూచిక

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జె.యం.జె.కళాశాల,

తెనాలి

శ్రమ లేకయె ఫలములు దుముకబోవు
పిండి కొలదియె రొట్టె; యోపిన విధాన
కష్టపడుము కృషీవలా; కలుగు సుఖము
ఉత్తయాసల కన్న మేలుద్యమంబు.

అని కర్నకుని గురించి చెప్పినవాడు దువ్వూరి. ఆధునికాంధ్ర సాహిత్యములో కృషీవల కవిత్వానికి పాదులు తీసిన కవిగా, ప్రసిద్ధి కెక్కిన ఉత్తమశ్రేణి కవీంద్రులు దువ్వూరి రామిరెడ్డి అంగ్ల సాహిత్యంలోని పాస్టరల్ పొయిత్రీ ప్రభావము ఈయన మీద ఉన్నది. గ్రామీణ సౌభాగ్యాన్ని, కర్నకుని దైనందిన జీవితాన్ని వర్ణిస్తూ కృషీ వలదు కావ్యాన్ని రచించాడు.

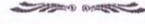
ఓ రైతన్నా! నీ జీవితాన్ని వర్ణించాలి అని నేను అనుకున్న వెంటనే సెలయేడు ప్రవాహములాగా వాక్కులు అనెడి ప్రవాహము పరుగెత్తుతుంది. అది చూసిన కొంతమంది ఈర్వాపరులు నన్ను కర్నక పక్షపాతి అంటున్నారు అని వాపోయాడు. దీనినిబట్టి ఆయనకు రైతు జీవితము మీద, అతని దినచర్య మీద ఎంత పట్టుఉన్నదో మనము అర్థం చేసుకోవచ్చు. పంజరములోని చిలుక ఎలా స్వాతంత్ర్యాన్ని కోరుకుంటుందో నేను కూడ ఆధునిక కవిత్వము పట్ల స్వాతంత్ర్యాన్ని కోరుకుంటున్నానని ధైర్యంగా చెప్పినవాడు దువ్వూరి. ఎవరు ఏమనుకున్నా ఈ కాలంలో మార్పు గలగటం సహజం. ఈ మార్పుతో మన ఆలోచనలను వెల్లడించటానికి భయపడవలసిన పనిలేదు అని అంటాడు.

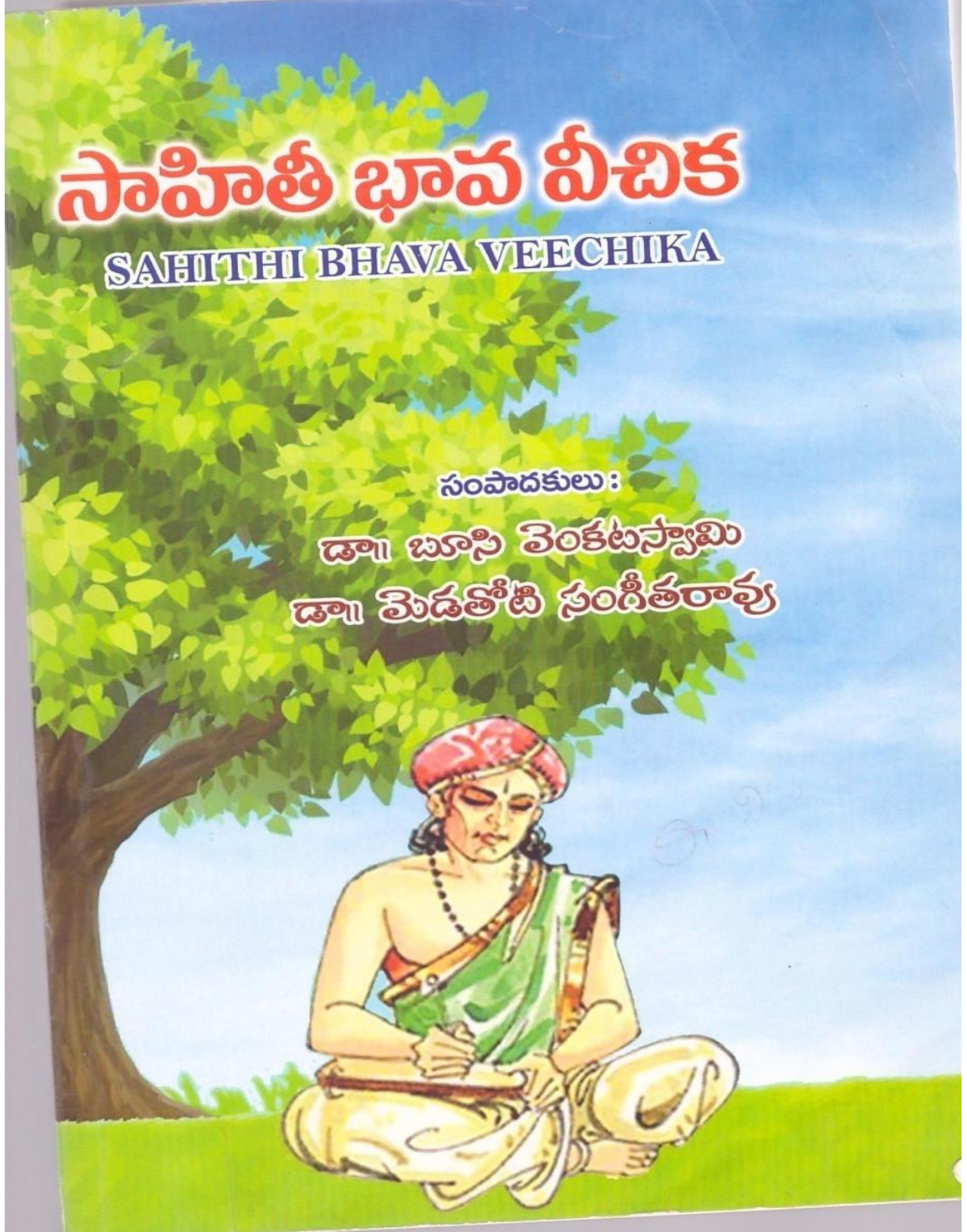
కృషీవలా! నువ్వు భారత భూమండలంలోని వీరులలో శ్రేష్టుడవు రాజు పాలనా దండము కూడ నీ హలము కన్నా గొప్పది కాదు, నీ కోర్కెలు నిత్యావసరాలకు మించి ఉండవు. నీ ఆలోచన ఊహ, నైపుణ్యం పచ్చని పైరు పొలాల మధ్యనే ఉంటుంది. సూర్యోదయం మంచి సూర్యాస్తమయం దాకా పొలములో కష్టపడి పనిచేస్తావే కానీ ఇరుగు పొరుగు వారి సంపద చూచి అసూయ చెందవు “నీ హృదయం అనే మొగ్గ ఎంత స్వచ్ఛమైనది అని కర్నకుని పొగడటం చూస్తే దువ్వూరి గారిని కర్నక పక్షపాతి అని అనటం నిజమనిపిస్తుంది. ఎందుకంటే ఇక్కడ ప్రత్యక్షంగా కర్నకుని స్వచ్ఛమైన మనసును గురించి తెలియజేస్తున్నాడు. ఈనాడు ప్రపంచీకరణ అని మనము

అంటున్నాము. కాని కవి ముందే గుర్తించి పల్లె పొలిమేరలే నీ సర్వ ప్రపంచం అంటున్నాడు. నీ భార్యయే నీకు రమణీయ విగ్రహం, బంగారం పండించే పంట పొలాలే నీ భాగ్య నిధులు, ప్రతిరోజు శ్రమించటమే నీ మతము, నీ సంపారంలోని పోట్లు పాట్లును మూడవ కంటికి తెలియనియ్యవు, పరిమితమైన కోర్కెలతో జీవితాన్ని పోగొస్తావు. నీకు తినటానికి తిండి ఉన్నా లేకపోయినా పరుల సొమ్ముకు ఆశపడవు అని అతని మంచి మనస్తత్వాన్ని వివరిస్తున్నాడు. ఆకలితో ఇంటి ముందుకు వచ్చిన అతిథిని నీకు ఉన్నా లేకపోయినా ఆతిథ్యమివ్వక పంపవు. అంతటి సంస్కారమున్న వ్యక్తివి నీవు అని కర్షకుని గొప్పగా చిత్రీకరిస్తున్నాడు.

వ్యవసాయమే సకల పరిశ్రమలకు మూలం. సమాజంలోని అధిక పౌఠాగ్యాలకు, సౌఖ్యా కారణం నీవు. సంవత్సరాంతం నీవు కష్టపడి పనిచేస్తే నీ వల్ల వంచ భక్ష్టపరమాన్నాలను తింటున్నవారు నీ గురించి ఆలోచించరు. నీవు ప్రపంచానికీ లోజనము పెద్దావు కాని నీకు తినటానికి తిండి కట్టుకోవటానికి బట్ట దొరకటం కష్టంగానే ఉంటుంది. ఫలాలు పండిస్తావు. దాన్ని అనుభవిస్తు ఆనందానుభూతి పొందుతూ పండులోని మాధుర్యాన్ని చవిచూస్తు ఉంటారు. కాని ఏనాడైనా ఆ చెట్టును పెంచి పోషించిన రైతు గురించి అతని జీవన విధానం గురించి, ఆర్థిక పరిస్థితులను గురించి ఆలోచించరు. అలా గుర్తించక పోయిన రైతు మాత్రము నిస్వార్థముగ వారికి మంచి ఫలాలు అందించాలని సదుద్దేశ్యముతో ఉంటాడు. ఇలా ఆలోచించే రైతుకు మాత్రము ఎప్పుడు తిండి, బట్టకు కొరవగానే ఉంటుంది. కర్షకుడు వ్యవసాయము సాగించే సమయంలో తన శరీరం ఎముకల గూడు అయినా, అతివృష్టి కురిసినా, కరువు వచ్చినా శారీరక బలమే ఆధారంగా చేసుకొని జీవనం కొనసాగిస్తాడు. ఇట్లా కష్టపడుతున్న కర్షకుని సేవలు ఎవరు గుర్తించరు. వెలుగుకు ముందు, చీకటి వర్షానికి ముందు మేఘాలు ఆడంబరాన్ని ప్రదర్శిస్తాయి. ఇది ప్రకృతి సహజం చక్రానికున్న ఆకులు క్రిందవి పైకి లేచినట్లే జీవితం కూడా ఎగుడుదిగుడుగానే ఉంటుందన్న సత్యాన్ని గుర్తిస్తాడు రైతు. నిరంతరం శ్రమిస్తూ కష్టాలలో కొట్టు మిట్టాడుతున్న రైతుమీద పెత్తనం సాగించేవారు ఎవ్వరూ లేరు. అందుకే కవి, రైతును ఆత్మ జ్ఞానంతో నిండిన వ్యక్తిగా ఆభివర్ణించాడు. ఆత్మజ్ఞానం లభించటం కవి పూర్వజన్మ సుకృతం. దారిద్ర్యము అనే పెద్ద ఓడను దాటటానికి రైతుకు స్వేచ్ఛ అనే తెడ్డు అవసరమంటాడు కవి. ఈ తెడ్డు ద్వారా తన జీవితంలోని లోటుపాట్లను సరిచేసుకోవచ్చు. స్వేచ్ఛా జీవులు ఎన్ని కష్టాలు ఎదురైనా వారు ఆత్మ విశ్వాసంతో ముందుకు సాగుతారని చెప్తాడు. ఒత్తిడికి లొంగకుండా కోరికల్ని తొలగించుకొని కష్టాల్ని సహించి ముందుకు సాగాలి. కర్షకునితో ఏది ఏమైనా పనిని ప్రారంభించడాన్ని మానుకోవద్దని, ధైర్యాన్ని వదలవద్దని హితం

చెప్పాడు. ధైర్యంతో కార్యం ప్రారంభిస్తే సత్యలితం దానంతట అదే వస్తుందని అంటాడు. రైతుల కష్టాన్ని వివరిస్తూ వారికి హితబోధ చేశాడు. వారు చేసే వ్యవసాయం దేశ భవిష్యత్తు ఆధారపడి ఉందని స్పష్టం చేశాడు. రైతు జీవిత వర్ణనతోపాటు తమ మనస్సు స్వాతంత్ర్యంవైపు పయనిస్తుందని చెప్పటం ద్వారా దుష్టాన్ని స్వాతంత్ర్యాభిలాషను కోరుకున్నట్లు తెలుస్తుంది. ఈవిధంగా కృషీవలుడు కావ్యానికి సాహిత్య ప్రపంచంలో ఒక ఉన్నత స్థానం దక్కింది.





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దాసరి విజయలక్ష్మి

తెలుగు ఉపన్యాసకులు,

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ఇది అస్థిత్య ఉద్యమాల కాలం. ప్రతీ తెగ ప్రతీ జాతి తమ తమ హక్కులకై ఉద్యమిస్తున్న సమయం. ఇటువంటి అత్యాధునిక కాలంలో ఈ దేశ మూలవాసులైన, దళితుల, ఆదివాసుల, గిరిజనులతో పాటు సమస్థాయిలో అభివృద్ధి చెందాల్సిన మొండి బండ జాతి ప్రజలు, నేటికీ అభివృద్ధి అనే మాటకి ఆమడ దూరంలోనే వున్నారు. ఇక్కడ 'ఉన్నారు' అనేదానికంటే, అనాడు ఆర్యులపాలనా వ్యవస్థాగత సంస్కృతి నుండి, నేటి ప్రజాపాలనా వ్యవస్థ వరకూ నిర్లక్ష్యంచే ఊరికి దూరంగా, సంచార జాతిగా, అడుక్కుతిని బ్రతకడం, సొంతగూడు, సొంతఆస్తి, విద్య, వైద్యం తదితరాలైన సౌకర్యాలన్నిటికీ దూరంగా నెట్టబడ్డారనడం సమంజసమేమో. స్థావరజంగమ స్థితినుండి, నేడు ఊరవతలి బ్రతుకులుగా స్థిరనివాసమేర్పరచుకున్నప్పటికీ తమ ఉనికేమిటో, తమ గతకాలపు సంస్కృతి, ఆచార వ్యవహారాలతోపాటు వారి పతన, పతాకావస్థల స్థితిగతులేమిటో నామమాత్రంగానైనా తెలియని ఒక అయోమయ వైఖరిలో నేడు ఈ మొండి బండ జాతి ప్రజలున్నారు.

ఈ జాతులకు సంబంధించి ఆశ్చర్యకరమైన విషయమేమిటంటే ఈ సమూహాలలో కొన్నిటికి గొప్ప సంస్కృతుంది. సంగీత, నృత్య గాన సంప్రదాయాలున్నాయి. వైద్యశాస్త్రం అంతగా అభివృద్ధి చెందని రోజుల్లోనే వీరు శ్రీకాకుళం నల్లమల మొదలైన అనేక అడవులనుండి తెచ్చిన మూలికలతో, ఆకు పసర్లతో రకరకాల జబ్బులకు వైద్యం చేసేవారు. పురుడు పోయటం దగ్గరనుండి, కోరింత దగ్గుకు, ఉబ్బసానికి, ఆయాసానికి, అజీర్తికి, కీళ్ళవాతాములకు, తేలు పాము ల్లాంటి విషకీటకాల విషం విరుగుడుకి మందు, ఆకుపసర్లు, తదితరమైన జబ్బులకు కొంత తెలివితో, మరికొంత యుక్తితో నయం చేసే గొప్ప సంస్కృతి ఈ మొండి బండ ప్రజలకుంది.

మనిషి జీవితంలో ప్రధానఘట్టమైన పుట్టుక మొదలుకొని, చావు వరకు ప్రతిఒక్కరూ తప్పనిసరిగా కొనసాగించే ఆచారసాంప్రదాయాలు వేడుకలు, వినోదాలు, కర్మకాండలు, తదితరాలైన భిన్న భిన్న సంస్కృతులు ప్రతి కులంలోనూ కనిపిస్తాయి.

ప్రతి ఆచార వ్యవహారాల విషయంలో ఒక్కొక్క కులానిది ఒక్కొక్క ప్రత్యేకత. భారతభూమి ఎన్నో వైవిధ్య సంస్కృతుల సమ్మేళనమైనప్పటికీ, భిన్నత్వంలో ఏకత్వం సాధించే జాతిగా ఒక ప్రత్యేకతను సంతరించుకుంది.

ప్రపంచ దేశాల ముందు ఒక శక్తివంతమైన సమిష్టి వ్యవస్థగా కొనసాగుతున్నప్పటికీ, ఇక్కడ జన సమూహాల్లోను, వారి వారి అంతర్గత భావాలోచనల్లోనూ వైరుద్యం, వైవిధ్యం స్పష్టంగా కనిపిస్తుంది. వర్ణ, వర్గ బేధాలతో ఎక్కువ కులం (స్పృశ్యకులం), తక్కువ కులం (అస్పృశ్యకులం) అంటూ, ఒక జాతి మరొక జాతిని అణచడమే కాకుండా, అలా అణగద్రొక్కబడిన వారి ఆర్థిక, సామాజిక, మానసిక, సాంస్కృతిక రంగాల పై కూడా అణచివేసిన కులం వారు తమ ఆధిక్యతను, బలవంతంగా అణచబడ్డ వారి చేత అంగీకరింపజేస్తారు. అలా అణచబడ్డ జాతులన్నీ నేడు ఒక పథకం ప్రకారం భానిసవ్యవస్థలుగా, బిక్షక గణాలుగా, సంచార జాతులుగా, రూపాంతరం చెంది నేటికీ అదే దురవస్థలో కొట్టుమిట్టాడుతున్నాయి.

భారతీయ సమాజాల్లో అగ్రవర్ణస్తులు తమకంటే క్రింది స్థాయి అన్యవర్ణస్తుల పట్ల వ్యవహరించే తీరు దాదాపుగా ఒక్కటే. ఈసడింపు, నిర్లక్ష్యం, అసహ్యం, తిరస్కారం, ఇటువంటి పదజాలాన్ని ఎదుటి వాళ్ళ పట్ల తీవ్రమైన వ్యతిరేకతను వ్యక్తీకరించే విషయంలో ఎంతగానైనా జోడిస్తూ పోవచ్చు. ఈ భారతభూమిపై మానవ సంఘాలు ఎక్కడున్నా, వారు స్థిర నివాసులైనా, లేక సంచారజాతులైనా వారిపట్ల మిగిలిన (ఉన్నత) వర్గాల వాళ్ళు పాటించే వ్యత్యాసాలు, భేదాలు, హెచ్చుతగ్గులు, అనివార్యమే. ఈ వ్యత్యాసాలు, తారతమ్యాలు భారతసమాజాల్లో మనకు గ్రామగ్రామానా దర్శన మిస్తాయి.

భారతజాతిలో మాత్రమే, ఒక మనిషి పుట్టిన కులాన్ని బట్టి అతని పుట్టుకా వంతర జీవన సర్వస్వం ఆధారపడి ఉంటుంది. ఆ మనిషి నీచకులజాడైతే ఆ వ్యక్తిని అటు ఇటు కదలనీయక, ఉన్నత వర్ణులచే, వేదాలు, శాస్త్రాలు, పురాణాలు, ఇతిహాసాల పేరిట అదుపాజ్ఞలతో కట్టడి చేస్తుంది. ఆ వ్యక్తి ప్రతి కదలికపైనా ఆహారం, వస్త్రం, నివాసం, వేషం, పెరుగుదల చదువు, అతను చేసే వృత్తి (పని), పెళ్ళి బ్రతుకు తెరువు (సంతానం, సమాజాల్లో అతడి నడవడిక ప్రవర్తన మొదలైన విషయాలు) లన్నిటిపైనా ఆంక్షలు. ఇలా ఒకటేమిటి, ఒక మనిషిని ఎన్ని రకాలుగా కట్టడి చెయ్యొచ్చో అన్నిరకాలకు సంబంధించిన శాసనాలను కేవలం అతని పుట్టుకనే ఆధారం చేసుకునే ఈ సమాజం నిర్ణయిస్తుంది.

ఏ మనిషికి తన పుట్టుక పై ఎటువంటి అధికారం ఉండదు. కానీ మన సమాజంలో మాత్రం, ఒక మనిషికి ఎటువంటి అధికారం లేని ఆ పుట్టుకను ఆధారం చేసుకునే, అతనికి ఒక కులం నిర్దేశితమై, ఆ కులచక్రంలో ఉన్న అదుపాజ్ఞలలో మాత్రమే అతని మనుగడును, మరణం వరకూ మిగిలిన సమాజం శాసిస్తుంది. ఈ పద్ధతుల్ని, సంప్రదాయపు నైజాల్ని అనాది కాలం నుండి, ఆధునిక కాలం దాకా ఎన్నో అస్పృశ్య కులాలు భారంతో, బాధతో అనుభవించాయి. నేటికీ ఈ వ్యవస్థ రూపాలు అక్కడక్కడా బలంగా సమాధానమే లేని ప్రశ్నలుగా మిగిలే ఉన్నాయి. ఎన్ని రాజ్యాంగ సవరణలు జరిగినా, ఎన్ని చట్టాలు చేసినా, ఈ భరతజాతిలో స్పృశ్యా స్పృశ్యతలకు (Touchable, untouchable) సంబంధించిన ఘటనలు చరిత్రలో పునరావృతమవుతూనే వున్నాయి.

భారతీయులంతా ఒకటే జాతి అంటుంటారు. ఈ మాట వాస్తవమే అయితే, కొన్నివందల వేలకులాల ద్వారా ఇలా ప్రజలంతా ఎందుకు విభజింపబడి ఉంటారు. ఒకే జాతి అనే మాటలోని సామాజిక, సాంస్కృతిక, ఆర్థిక మానసిక, భావాన్ని బట్టి చూస్తే ప్రజలంతా ఒకే జాతి కాదని ఎంత త్వరగా గుర్తిస్తే, అంత త్వరగా అస్పృశ్య జాతులకు మంచిది. అప్పుడైనా ఈ వర్ణకుల వ్యవస్థ అంతరించి, అన్ని రంగాలలోనూ ప్రజలంతా ఒకే జాతిగా మారాల్సిన అవసరాన్ని గుర్తించి తీవ్రంగా ఆలోచిస్తారు, ఆ లక్ష్య సాధనకు మార్గాలను, ప్రయత్నాలను శాస్త్రీయ మార్గంలో అన్వేషిస్తారు.

భారతీయ సమాజాల్లో ఈ అశాస్త్రీయ విధానం ఉన్నంత వరకూ బాదితులకు మూలమైన కుల వ్యవస్థ, ఆ కుల వ్యవస్థను అంటి పెట్టుకుని సాగే ఉపకులాలు, వారి వారి వృత్తులు, జీవన విధానం, ఆచారం, సంప్రదాయం, కళలు, మొదలైన జీవన సంస్కృతి యావత్తూ నిర్లక్ష్యానికి గురౌతూ క్రమక్రమంగా ఈ సమాజాల్లో కనుమరుగౌతుంటుంది. అలా క్రమక్రమంగా కనుమరుగయ్యే కులాలలో వెనుకబడిన తరగతుల్లో (బి.సి - ఎ) మొండివారు, మొండి బండ, బండ అని పిలువబడే 15 వ ఉపకులం వారు. నేడు తమ ప్రాభల్యాన్ని కోల్పోతూ ఈ సమాజం నుండి కనుమరుగయ్యే జాతిగా పరిణామం చెందుతున్న తరుణంలో వుంది.

గత చరిత్రలో మొండి బండ జాతుల వారిని ఈ సమాజాలు గుర్తించిన విధానాన్ని పరిశీలిస్తే, ఆ జాతులకు నిఘంటువులలో ఇచ్చిన నిర్వచనాల్ని బట్టి కొంతైనా గ్రహించగలం శ్రీ సూర్యరాయాంధ్ర నిఘంటువులో - మొండితనము కలవారు,

మూర్ఖులు, చుఱుకుదనము లేనివారు, ఘోరకృత్యములు చేసి బిచ్చమెత్తెడు నౌకజాతి వారు, బండపనులు చేస్తుండేవారు, ఆకతాయిగుంపు... అంటూ నిఘంటువులలో అనేక అర్థాలున్నాయి.

కానీ వాస్తవానికి చరిత్రలో వీరు సాహసవంతులుగా, గొప్ప గొప్ప ఆశ్చర్య కార్యాలు చేస్తూ మల్ల యోధుల వలే పెద్ద పెద్ద బండ రాళ్ళను సనాయాసంగా మరొక వ్యక్తి సహాయ సహకారాలు లేకుండా పైకి ఎత్తి కొన్ని క్షణాలు నిలిపి, ఇనిరి అవతలివైపుకు వేసే శక్తిని యుక్తితో (కిటుకుతో) ప్రదర్శించే యోధులు, పెద్ద పెద్ద బండ రాళ్ళను గుండెలపై పెట్టుకుని (సుత్తి) మరారాతో పగుల గొట్టించుకుని ఏ మాత్రం గాయం కాకుండా ఆరోగ్యంగా ఉండే క్రీడా నైపుణ్యాన్ని ప్రదర్శించే జాతులు గానూ, అలాగే వేగంగా దూసుకుపోయే పక్షిని సైతం గురిచూచి, ఆ వేగంలోనే లక్ష్య నిర్దేశం చేస్తూ ఒకే దెబ్బతో (ఉండేలు/క్యాడ్బాల్) నేలకూల్చగల సమర్థులు. వీరి సమస్త శరీర అవయవాలు త్రాళ్ళతో బలంగాబంధించబడి గుంజకుకట్టబడి ఉన్ననూ లేదా ఒక పెద్ద పెట్టె లో (బాక్స్) లో పెట్టి తాళం వేసి నీటిలో ముంచి వేసిన పిదప కూడా, వాళ్లు తాళ్ళనుండి బంధ విముక్తులయ్యి సునాయాసంగా బయటపడి అందరినీ ఆశ్చర్యచకితులను చేసేవారు. ఇలాంటి విద్యను మంత్ర తంత్రాలతో కాక కేవలం (బెక్కిక్తో) యుక్తితో ప్రదర్శించే నైపుణ్యవంతులుగా ఈ జాతులుయొక్క గతవైభవకీర్తి వర్ధిల్లింది. ఈ జాతులను నేటి ప్రభుత్వాలు, సమాజాలు సరైన రీతిలో ఆదరించి అవకాశాలు కల్పిస్తే ప్రపంచ వెయిట్ లిఫ్టింగ్, పవర్లిఫ్టింగ్, ఆర్చరీలాంటి విద్యల్లో తమనైపుణ్యాన్ని ప్రదర్శించి బంగారు పతకాలను తెచ్చి భారతజాతికే గర్వ కారణమయ్యేంతటి అర్హులుగా నిలిచేవారేమో..! ఎందుకంటే మొండిబండవారు ప్రదర్శించే విద్యలు సనాయాస విద్యలు. నేటి ప్రభుత్వాలు వేలకు వేలకోట్లు ఖర్చుపెట్టి సాధన చేయించి అధునాతన శిక్షణలు ఇప్పించినా ఆ స్థాయికి తగ్గ పథకాలను తేలేక కుదేలవుతున్నారు. అనాగరిక జాతులుగా నిరాదరణకు గురైన మొడి బండ జాతులకు తగిన ఆదరణ లభించి వాళ్ళ యుక్తికి సరైన శిక్షణ తోడైతే మరిన్ని పసిడి పతకాలతో ఈ దేశఖ్యాతిని దశదిశలా వ్యాపింపజేయగల సమర్థులు ఈ మొండి, బండజాతులవారు.

ద్రోణుని శిక్షణలో అర్జునుడు మంచి విలువిద్యాకారుడై పొండవ వర్గానికి వెన్నెముకైనాడు. ఈ రోజు భారతజాతి క్రీడాస్ఫూర్తిగా, ద్రోణాచార్య, అర్జున అవార్డుల పేరిట ఖ్యాతిని పొందుతున్నారు. అదే భరతజాతిలో ఏకలవ్యుని గొప్ప విద్య,

నిరాదరణకేకాక అపహాస్యానికి, దక్షిణ పేరిట శిక్షణకు పాత్రమైంది. అదొక గిరిజన తెగకు మాత్రమే జరిగిన అన్యాయంగా కాక యావత్ నిమ్న జాతీయులకు జరిగిన అన్యాయంగా పరిగణించాల్సిన అవసరాన్ని ఈనాటి మేధోవర్గ సమాజం గుర్తించాలి. ఒక అంటరాని గిరిజనతెగవారు ప్రదర్శించిన ప్రవీణ్యత నీరుగారిపోయింది. దానికి ప్రధాన కారణం స్పృశ్య, అస్పృశ్యతలే, వాటిని కొనసాగించే కుల వ్యవస్థ ఆ కుల వ్యవస్థ చట్రంలో కొనసాగే ఈ సమాజాల్లో ఎన్నో గొప్ప గొప్ప, నైపుణ్యాలు, సాంస్కృతిక వారసత్వాలు, ఆచారాలు, కళలు, వెలుగులోకి రాకుండానే చీకటి దశలోనే చిద్రమై పోతున్నాయి. అలా ఈ సమాజాల్లో అనాదిగా నిరాదరణకు గురైన కొన్ని వెనుకబడిన జాతుల్లో మొండి బండ జాతి వారున్నారు.

భాగోళికంగా రెండు తెలుగు రాష్ట్రాలలోనూ వీరు అక్కడక్కడా సంచార జాతులుగానూ, ఎక్కువగా స్థిరనివాసులుగానూ, జీవిస్తూ, వారి వృత్తి సంబంధిత కార్యక్రమాలను కొనసాగిస్తూ జీవనోపాధిని పొందుతున్నారు. వీరు ఎక్కడైతే స్థిర నివాసాన్ని యేర్పాటు చేసుకున్నారో ఆ ప్రాంతంలోనే, అంటే ఎవరికి చెందిన ఏరియాలో వారే జీవనాన్ని కొనసాగిస్తారు తప్ప ఇతరుల ఏరియాలలోనికి వెళ్ళరు. ఒకవేళ కరువు కాటకాలు సంభవించినప్పుడు ప్రకృతి వైపరీత్యాల బారినండి తమను తాము రక్షించుకునేదానో భాగంగా మాత్రమే ఒప్పందం మీద ఇతరుల ఏరియాలకు వలస వెళ్తారు.

వీరు వివాహాలు చేసుకునే పద్ధతి, పూర్వం వీరిలో వీళ్ళే పెద్దలద్వారా చేసుకునే వారు, నేడు నాగరికత పెరిగింది కనుక బ్రాహ్మణ పురోహితుల ద్వారా వివాహాలు చేసుకుంటున్నారు. వీళ్ళలో కొన్ని ప్రత్యేకమైన, ఖచ్చితమైన వివాహ నియమాలు నేటికీ సజీవంగానే వున్నాయి. వీరు ఇతర కులాల, మతాల వారిని పెళ్ళిళ్ళు చేసుకోరు. ఇతరులను చేసుకున్నా ఊరుకోరు. వీరిలో వీరే వివాహాలు చేసుకుంటారు తప్ప బయటకు పోరు.

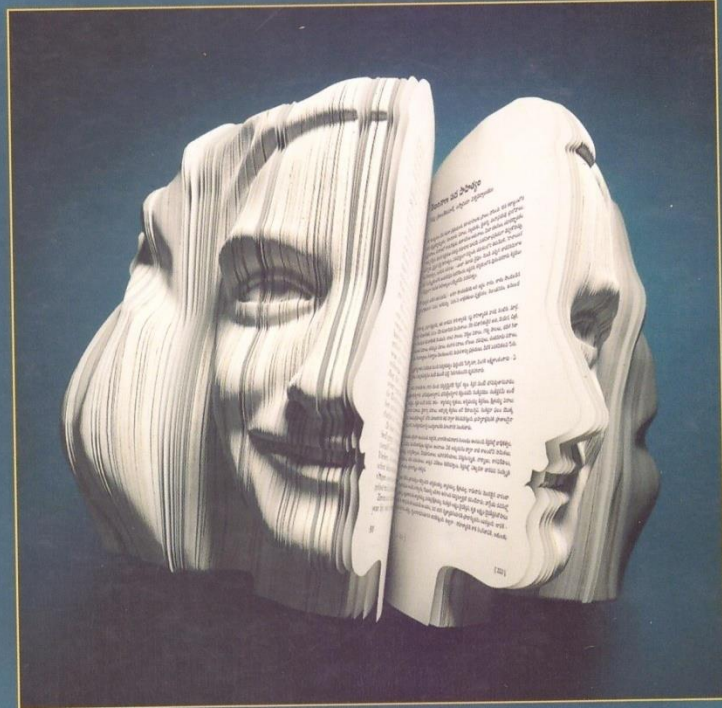
వీరిలో ఇంకొక ప్రత్యేకమైన లక్షణం ఏమిటంటే వీరు పోలీస్ కేసుల జోలికి వెళ్ళరు. వీరి జీవితంలో ఏవిధమైన సమస్యవైనా కులపెద్దలే పంచాయితీలోనే తేల్చుకుంటారు, వారు కూడా పెద్దలిచ్చిన తీర్పుల ప్రకారమే.



11.

పరిశోధన: నాడు, నేడు, రేపు

(అంతర్జాతీయ సదస్సు పత్రాలు)



సంపాదకులు

ఆచార్య మాడభూషి సంపత్ కుమార్

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<p>001. ఆరాల లింగమల్లయ్య</p> <p>002. ఆరాల సైదులు</p> <p>003. ఈశ్వరబాబు.కె.</p> <p>004. కంబాల మురళీకృష్ణ</p> <p>005. కదిరి కృష్ణయ్య</p> <p>006. కళ్యాణి జిల్లా</p> <p>007. కాశింబాబు.ఎ.</p> <p>008. పి.కాళియప్ప</p> <p>009. కుంజం శ్రీనివాస్</p> <p>010. కృష్ణారెడ్డి.సి.యన్</p> <p>011. కొక్కిలిగడ్డ వాణి</p> <p>012. కోదండ లక్ష్మణ</p> <p>013. గంధసిరి వీరన్న</p> <p>014. గరికిపాటి గురజాడ</p> <p>015. గరిగె రాజేష్</p> <p>016. గల్లా జ్యోత్స్న</p> <p>017. గాదిరాజు రంగరాజు</p> <p>018. గాయత్రి.ఎస్</p> <p>019. గిన్నారపు ఆదినారాయణ</p> <p>020. గొంగులూరి కృష్ణవేణి</p> <p>021. గోపాల్.పి</p> <p>022. గోపాల్ ఆర్.</p> <p>023. గోపినాథ్ రాథోడ్.పి</p> <p>024. గోవిందు. హెచ్</p> <p>025. గౌతమ.బి.వి.ఎస్</p> <p>026. చంద్రమౌళి మొరవపల్లి</p> <p>027. చంద్రయ్య.ఎస్</p> <p>028. చెన్నకేశవులు.సి</p> <p>029. డుంగావత్ నరేష్ కుమార్ నాయక్</p> <p>030. తిరుపతి కల్లెబోయిన</p> <p>031. దస్తగిరి.పి</p> <p>032. దార సుమన్</p> <p>033. దాసరి విజయ లక్ష్మి</p> <p>034. దుర్గ.సి</p> <p>035. దైద వీరయ్య</p> <p>036. నగరి చాముండేశ్వరరావు</p>	<p>గంగిరెద్దులాట 001</p> <p>తెలుగు పత్రికలలో బాల సాహిత్య ఆవిర్భావం-వికాసం 004</p> <p>ఆంధ్ర మహాభాగవతం-శ్రీకృష్ణుని అష్టభార్యలు 007</p> <p>తెలుగు దినపత్రికలు ఆధునిక ధోరణుల అనుశీలన 011</p> <p>విద్వాన్ విశ్వం 'పెన్నేటి పాట' - భాషా పరిశీలన 015</p> <p>తెలంగాణ రచయితల నవలలు-స్త్రీల జీవిత చిత్రణ 018</p> <p>కారకవిశేషాలు-తిక్కనగారి ఉద్యోగ పర్వం 021</p> <p>ఆధునికానంతర సాహిత్య విమర్శ-ధోరణులు 025</p> <p>కోయతెగ-పండుగలు 029</p> <p>సీమ కథాశిల్పి - సింగమనేని 031</p> <p>స్వాతంత్ర్య పోరాటంలో తెలుగు స్త్రీలు 034</p> <p>లకుమ 'గోరింటాకు చందమామ' కవితా వైభవం 038</p> <p>బందూక్ నవల- సామాజిక పరిశీలన 042</p> <p>ఆంధ్ర మహాభారతంలో యక్ష ప్రశ్నలు : మానసిక పరిపక్వత 047</p> <p>కరీంనగర్ జిల్లా కవిత్వం - పన్ను విశ్లేషణ 049</p> <p>కొలకలూరి ఇనాక్ 'ఉరబావి' - వస్తువైవిధ్యం 054</p> <p>సాహిత్యంలో చారిత్రక నాటకాల విశిష్టత 060</p> <p>కడుపు కోత కథా సంపుటి- సామాజిక విశ్లేషణ 063</p> <p>దళిత సాహిత్యంలో ఆత్మకథలు 066</p> <p>గంగుల శాయిరెడ్డి కాపుబిడ్డ-రైతు జీవిత చిత్రణ 070</p> <p>గోపిచంద్ వ్యక్తిత్వం 073</p> <p>కప్పగంతుల లక్ష్మణశాస్త్రి సాహిత్య ప్రస్థానం 075</p> <p>మహబూబ్ నగర్ జిల్లా పత్రికలు - సాహిత్య సేవ 078</p> <p>మానవల్లికవి మనోహర కల్పనాకావ్యం 'మృగావతి' 082</p> <p>సూర్య దినపత్రికలో కవిత్వం : చర్చనీయాంశాలు 085</p> <p>కవి జీవిత పరిశోధనలో డా.సి.ఆర్.రెడ్డి జీవితం, రచనలు 087</p> <p>తిమ్మాజిపేట మండల మాఖిక భాష-చర్లనాత్మక వ్యాకరణం 090</p> <p>కథామహల్ కథల్లో వస్తువైవిధ్యం 093</p> <p>గోర్బోలి భాషా - వ్యాకరణం 096</p> <p>నాడు తెలుగు పరిశోధనకు దీప్తి తెలుగు పరిశోధన పత్రిక 103</p> <p>ఆధునిక తెలుగుసాహిత్యం - చాకలివారి జీవిత ప్రస్తావన 105</p> <p>సినిమాలుగా రూపొందిన తెలుగు నవలలు-నాటకీయత 108</p> <p>కొలకలూరి ఇనాక్ కథానికలలో మానవత 112</p> <p>సర్వజగన్నాథ రెడ్డిగారి 'కచ్చపి కావ్యం' - ప్రబోధాంశాలు 116</p> <p>డక్టర్లుకుల సాంస్కృతిక సామ జిక జీవనం 119</p> <p>తరికొండ వెంగమాంబ రచనలు-యోగదర్శనం 121</p>
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కొలకలూరి ఇనాక్ కథానికలలో మానవత

దాసరి విజయ లక్ష్మి, ఆచార్య నాగార్జునా విశ్వవిద్యాలయం

తెలుగు కథ ఎప్పుడు పుట్టింది అన్న ప్రశ్నకు “అనగనగా ఒకరాజు... ఆ రాజుకు ఏడుగురు కొడుకులు” అన్న కథ పుట్టినప్పడే అని సమాధానం రావచ్చు. నిజమే కథలు మనకు క్రొత్తకారు. కథానికలు అర్వాచీనాలు కావచ్చు కానీ కథలు అతి ప్రాచీనాలు. ప్రతి సమాజంలోనూ కథలు లిఖిత సారస్వతానికి ముందే మౌఖిక ప్రచారంలో ఉన్నాయి. వేదాలలో ఉపనిషత్తులలో రకరకాల కథలున్నాయి. పంచతంత్రం కథలు, విక్రమార్కుని కథలు, సింహాసన ద్వారాతింకిక, కథాసరిత్సాగరం, శుకసప్తతి, మొదలైనవి బహుళప్రచారం పొందిన కథలు, తెనాలి రామలింగని కథలు, కాశిమజిలీ కథలు, తాతాచార్ల కథలు, పేదరాశి పెద్దమ్మకథలు, మర్యాద రామన్న కథలు, ప్రజల ఆదరాన్ని అందుకొన్న కథలు కానీ ఈ కథలన్నీంటికి కథ ప్రధానమైతే నేటి కథానికకు కథనం ప్రధానం.

ఈ కథానిక ప్రక్రియ ఆధునిక కాలంలో గురజాడవారి ‘దిద్దుబాటు’తో ప్రారంభమై రాజకీయ, ఆర్థిక, సామాజిక, మానసిక రంగాలలో, అనేకానేక వాదాల దొంతరల్లో అలరారుతున్న ప్రక్రియ, ఈ కథానిక ప్రక్రియ. కథానిక ప్రక్రియను దళిత వాద నేపథ్యంతో దళిత జాతులు రాజకీయంగా, సామాజికంగా, ఆర్థికంగా, మానసికంగా, ఎలా దోపిడాకి గురువుతున్నారో తెలిపే క్రమంలో ఈ కథానిక ప్రక్రియను సాధనంగా చేసుకున్న సాహితీ త్రివిక్రములు ఆచార్యులు కొలకలూరి ఇనాక్ గారు.

అక్షరాలు నేర్పని ఇంట పుట్టి లక్షలాది అక్షర రేణువులను సృష్టించి గొప్ప రచయితగా, తెలుగు సరస్వతీ కంఠహారంలో మణిపూసగా కీర్తి ప్రతిష్ఠ లాభించిన వీరి నేపథ్యం గొప్పది. ఆకలితో పూరిగుడిసెలో పైకప్పు సందుల్లోంచి కారే వాన చినుకునకు చెంబు, తెసాళాలు అడ్డుపెట్టి కూర్చున్న స్థితి నుండి, ఐదు నక్షత్రాల దశవరకూ అన్నీ అనుభవించి, పలవరించి, మదిలో నిక్షిప్తం చేసుకున్న నిజమైన డా॥ బి.ఆర్.అంబేద్కర్ వారసుడి ఆచార్యులు, వారి జననం దళిత జాతికి మరో శుభోదయం.

ఇనాక్ గారి సాహిత్యం సామాజిక దురాచారాన్ని ఖండించి, మనిషిని మనిషిగా పునర్నిర్మిస్తుంది. మానవ సమాజ ప్రగతికి ప్రేరణ శక్తి అవుతుంది. ఆ ప్రేరణ శక్తిలో మానవతాంశం వుంది. అది ఎదుటివారి గుండెను తాకుతుంది. అది కథ, కథానిక, నాటిక, నాటకం, విమర్శ, వచనం, పద్యం ఏదైనా అది విశ్వ జనరంజకమౌతుంది.

వీరి విశిష్ట రచనలు ఆంగ్ల, కన్నడ, తమిళ, హిందీ భాషలలోనికి అనువాదమయ్యాయి. సామాన్య మనుష్యులలో చాలాగొప్ప ప్రజ్ఞావంతులు వుంటారు. అటువంటి ప్రజ్ఞావంతుల వరుసలో సువర్ణాక్షరాలతో లిఖించదగిన వ్యక్తి కొలకలూరి ఇనాక్ గారు. వీరి పండిన ప్రజ్ఞకు మరో దళిత స్వరమే ఈ ‘కాకి’ కథానికల సంపుటి. ఏ ఉద్యమానికైనా దానికి చెందిన చరిత్రముఖ్యం. ఆ చరిత్రను భవిష్యత్ తరాలకోసం భద్రపరచడం అత్యవసరం, తరతరాలుగావున్న దళితుల చరిత్ర సమగ్రంగా లేకపోవడమనేది తీవ్రమయిన లోటు అనే విషయం నిర్వివాదమయిన అంశం. ఆ లోటును కొన్ని కోణాల్లోనైనా పూర్తిచేసే ప్రక్రియకు తన కథానికలలో ప్రాణం పోసే ప్రయత్నం చేసి, అడుగుంటుతున్న దళిత జాతుల చరిత్రను భద్రం చేస్తూ, ‘అక్షర యజ్ఞం’ చేస్తున్న గొప్పకవి ఇనాక్ గారు. ఇతిహాసపు చీకటి కోణంలో అట్టడుగున పడి కన్నించని చరిత్ర దళిత చరిత్ర. ఈ చరిత్ర రాయడానికి రక్తమూ, కన్నీరూ కలిపిన కొత్త సిరా కావాలి, ఆ సరికొత్త సిరాను తన కలంలో నింపి దళిత చరిత్రను ‘కాకి, ఊరబాచి, అన్నపూర్ణగంగ, తలలెనోడు, సూర్యుడు తలెత్తాడు, ఇదా జీవితం, గులాబీ నవ్వింది, భవానీ, మొదలైన కథానికల్లో నిక్షిప్తంచేసిన వాస్తవ చరిత్రవాది ఆచార్య కొలకలూరి ఇనాక్.

ఈ కథలన్నీ దళిత నేపథ్యం చుట్టూ తిరుగుతూనే వుంటాయి. తరతరాలుగా, అత్యంత హీనమయిన బతుకు బరువులను మోసిన బానిసీండ్లై దళితులు. ఆ దళితులు పందుల గూడుల్లాంటి గుడిసెల్లో మానాన్ని సైతం దాచుకోవడానికి పేల్లికై గతిలేక, ఆకలి, ఆవేదన, అవమానం, అంటరానితనం, నిరంతర దోపిడీలచే బాధింపబడి, పీడింపబడి, ఇన్ని మెతుకులు గతకథానికైనా వీలులేక బ్రతుకుతున్న కోట్లాది భారతీయ బానిసల బాధల గాధయే, కన్నీటి గాధయే ఇనాక్ గారు తన కథానికల రూపంలో ప్రపంచానికి (చాటారు) అందించారు.

ఆచార్య కొలకలూరి ఇనాక్ కథానికలలో ఒక్కొక్క కథకు ఒక్కొక్క చారిత్రక నేపథ్యం వుంది. ఇందులో సామాజికాంశం సంబంధించిన కథలు, దళిత నేపథ్యానికి చెందిన కథలు, మానవత్వానికి సంబంధించినవి, రాజకీయ, ఆర్థికాంశం సంబంధించిన అనేక కథల ద్వారా కవి సమాజానికి ఒక సమున్నత సందేశాన్నిచ్చారు.. అలా తన సందేశాత్మక కథానికల ద్వారా

పరిశోధన: నాడు, నేడు, రేపు

...జీవన స్థితిగతుల్ని, దళిత, దళితేతర సమాజాలకు చేరువ చేస్తూ, వారి చరిత్రను శిలా సదృశ్యంగా అక్షరబద్ధంచేసి, ... సాధించడంలో వీరి ఊరబావి, అస్పృశ్యగంగ, కాకి, మొదలైన కథానికలనేకం. వాటిలో 'కాకి' కథానిక ... కోణంలో దర్శిస్తే. 'కాకి' :- ఈ కథలో ఇతివృత్తం భారతీయ వర్ణవ్యవస్థలో కులాల విభజనవల్ల అస్పృశ్య ... జాతులు మాల, మాదిగ, మొ॥ జాతులు. వీరు సామాజికంగా, ఆర్థికంగా, మానసికంగా అన్నిరంగాల్లో ... దౌర్భాగ్యజీవులు. అటువంటి వీరి బ్రతుకుబండి బహుభారంతో కూడుకున్నది. అటువంటి ఈ కులాలు ... వీరిపై ఆధారపడిన 11 ఉపకులాలైన ఆశ్రితుల్ని పోషించాలని, మనవేద, పురాణాల వాక్కు. ఆశ్రిత కులాలను ... పక్షంలో వారినండి వచ్చే శాపం బహు భయంకరం. అటువంటి ఆశ్రయ, ఆశ్రిత కులాల సామాజిక జీవన ... సమాజానికి అందించడం.

భారత ఆదిమ జాతుల చరిత్రను పాశ్చాత్యులు ఒక పద్ధతిలో, నిర్లక్ష్యంచేస్తే, ఆర్య జాతులు ఇంకో పద్ధతిలో నిర్లక్ష్యం చేశారు. ఒక జాతినీ, అణచివేయడం, అంటే వారి చరిత్ర మొత్తంగా తుడిచివేయడమనే భావన, ఆర్య జాతులకుంది. అందుకే ఆర్య ఆదిమ జాతులను, వారి చారిత్రక గుర్తులను శిథిలం చేయడానికి వారు ప్రయత్నించారు. ఆ శిథిలమైపోయిన గుర్తులను మొగులోనికి తెచ్చే ప్రయత్నం కవి ఈ కథలో చేశారు.

ఈ కథలో ఒక ఇంట్లో ముసలమ్మ, ఆమె కూతురు, మనుమడు వున్నారు. ఆ ఇంటి పైకప్పు పైన, చుట్టూవున్న చెట్లమీద కాకుల గుంపు చేరి వారిని తిడుతున్నట్లుగా, కోపంగా అరుస్తూ, ఆ ఇంట్లో నుండి ఎవరు బయటకొచ్చినా మాడు పగిలేటట్లు పాడుస్తూ, తమ ప్రతీకారాన్ని ప్రకటిస్తూ గోల చేస్తున్నాయి. అప్పుడు అవ్వ బయటకు వెళ్ళబోయిన మనుమడి చెయ్యిపట్టి లాగి "కాకులు మాలావు కోపంగా వున్నాయి యెల్లకు, యెలితే రక్షం కళ్ళ జూడందే వదలవు" అంటూ 'ఇదంతా ఆడిపనే' నంటుంది అవ్వ.

ఎవడాడు? ఏంజేశాడు? అని ప్రశ్నించిన మనుమడికి ఇంకెవరు "బండోడు" అని "వాడు మన గుడిసె ముందు తల, కాళ్ళు, గోళ్ళు పీకిన కాకి ఈకలు కట్టిన పురికొన పడేశాడు, ఈ పని ఆడుతప్ప మరెవ్వరూ చెయ్యరం"ది. అవ్వ, ఎవరీ బండోడు? ఎందుకు చేశాడీపని అనే ప్రశ్న మనుమడి ద్వారా కవి అడిగించి అవ్వ ద్వారా పాఠకుడికి జవాబిస్తారు.

అన్ని కులాల, వర్గాల వారిలో ఆశ్రయ కులాల వాళ్ళు వున్నారు. అవర్ణ కులంలో ఆశ్రితులున్నారు. వారిని ఆశ్రయ కులాలు పోషించాలి. ఆశ్రితులు పోషింపబడాలి. అందుకు ప్రత్యుపకారంగా, ఆశ్రితులు వాళ్ళ కులపురాణం మౌఖికంగా కాపాడతారు. పిండితార్లం, కులపురాణం చెప్పుకుంటూ యాచిస్తుంటారు. అలా ఆశ్రితులుగా యాచిస్తూ, ఆశ్రయ కులమైన మాదిగల దగ్గర మాత్రమే యాచన చేస్తూ బతికే పదకొండు ఉపకులాలలో పదో ఉపకులం వాళ్ళు ఈ బండోళ్ళు. ఈ బండోళ్ళు రోజులో ఒక్క ఇంటివారినే అడుగుతారు. అదీ మాపదేలే అడుక్కుంటారు. యాచనకు వచ్చేటప్పుడు ఏమీ తెచ్చుకోరు, వట్టి చేతులూపుకుంటూ వస్తారు "అమ్మా! బువ్వపెట్టు తల్లీ!" అంటారంతే.

ఆ ఇంటి వాళ్ళు అలా వచ్చిన బండోళ్ళకు లేదు అని అనకూడదు. ఎందుకంటే వీళ్ళు ఆశ్రయ కులాలవారు, వాళ్ళకు ఆశ్రయం కల్పించాలి. పోషించాలి, ఎవ్వరికైనా లేదనొచ్చు గానీ వీళ్ళు అడిగితే లేదని మాత్రం అనకూడదు. అన్నాన్ని చేతుల్లో పెట్టాలి. అది కింద పడకుండా తింటాడు. వాడి కడుపు నిండినా, లేక ఇంటివాళ్ళు తెచ్చిన అన్నం అయిపోయినా " అమ్మా! నీళ్ళు తల్లీ!" అంటాడు. నీళ్ళు పోయాలి, పోస్తే తాగి వెళ్ళిపోతాడు.

ఆశ్రిత కులాలైన బండోళ్ళు, మొండోళ్ళకు వున్న నియమాలవి. మాపదేల ఒక ఇంటివాళ్ళనే బువ్వ అడగటం, ఎప్పుడు తెచ్చి పెడతారోనని ఇంటిముందే కూర్చుంటాడు, పెడితే తింటాడు, లేకపోతే బండోడితో గొడవే! ఏమీ అనడు కాకుల్ని ఉ సిగొల్పుతాడు.

గోలీ చూపుడువేలి క్రింద అదిమిపట్టి, వేలు విసురుకుంటున్నట్లుగా విసురుతాడు. కాకి క్రింద పడుతుంది. అలా తెలివైన కాకి, ఎవరి చేతికీ చిక్కని కాకి, వాడి గోలీ దెబ్బకు చిక్కి చస్తుంది. అలా చిక్కిన కాకి తల, కాళ్ళు, గోళ్ళు, ఈకలు పీకి ఇలా ఇంటిముందు పడేస్తాడు. అప్పుడైనా ఆ ఇంటివారు అన్నం పెడితే వాటిని దూరంగా తీసి పారేస్తాడు. లేకపోతే ఆ కాకుల గుంపు ఆ ఇంటివారిపై దాడిచేస్తాయి. తోటి కాకిని చంపిన హంతకుడు ఈ ఇంటిలోనే వున్నాడని భావిస్తూ, వాటిని ఎవ్వరూ తీయడానికి వీలులేదు, అది నియమం. వాడు తప్ప ఎవరైనా తొలగిస్తే అది దోషం, అది పురాణాల ఘోష. ఈ భూ ప్రపంచంలో కాకిని కాల్చుకుని తినేవాడు వాడొక్కడే, వాడి రూపంకూడా వాటిలాగే వుంటుంది. ముళ్ళకంపలాంటి రేగిన జుట్టుతో భయంకరంగా వుండేవాణ్ణి చూస్తేనే కాకులు పరారౌతాయి. ఒకవేళ వాడిమీద దాడి చేయాలని దగ్గరకొస్తే రేగిన ముళ్ళకంప లాంటి వాడి

జుట్టులో చిక్కి వాడికి ఆహారమౌతాయి. అందుకే అవి వాడిని చూస్తేనే పరారౌతాయి.

కాకుల గుంపు ఇంటిముందు ఇలా వాడికి దిగాయి అంటే ఆ ముందురాత్రి ఆ ఇంటివాళ్ళు బండోడికి అన్నం పెట్టలేదని అర్థం. ఆ అవ్వ వాళ్ళు అన్నం పెట్టక పోవడానికి కారణం ఆర్థికంగా స్థితిలేకపోవడం. అవ్వ అల్లుడు రోడ్డుపనికి చేబ్రోలుపోయి వారమయింది, ఆయన వస్తూ వెచ్చాలు తెస్తేనే వండేది, వాడికి పెట్టగలిగేది, కానీ అల్లుడు రాలేదు. నిన్నటికే మూడు రోజుల నుండి అవ్వ ఇంట్లోని పొయ్యిలో పిల్లి లేవలేదు. వారికి లేక వాడికి అన్నం పెట్టలేదు. కానీ బండోడికి ఇవన్నీ పట్టవు.

ఆ ఉదయం కూడా ఆ ఇంటివాళ్ళు అన్నం పెట్టనందున, వాడు ఆ కాకిని కాల్చుకుని తిని, సాయంత్రం ఆ ఇంటి ముందుకు వచ్చి వాళ్ళు పెరుచుకుంటూ “ అమ్మా! బువ్వబెట్టు తల్లీ!” అని అడగనే అడిగాడు. ఇంటిలో ఉదయం నుండి తలుపులు దిగించుకొని కూర్చున్న అవ్వ భయపరుచుకున్నా ఆయ్యాని. నాకు అడగనే అడిగాడు. నేను, అమ్మ పెట్టలేదు. లేక పెట్టలేదు, కానీ దానికి వాడిచ్చే శాపం తలుచుకుంటే భయంకరం. అవ్వ ఏడుస్తుంది. తను బువ్వ పెట్టలేదు, వాడు కాదు పెడతాడు.

బండోడు కాకీకల కట్ట పంచబొంగుకు కట్టాడు. అరగని కాకి మంసం ముక్కలు ముక్కలుగా కక్కాడు. కాకి మాంసం కంపు, రోత, అరగని, జీర్ణంకాని ముక్కలు మరింత నీను! ముక్క, పగలే దుర్గంధం, కక్కిన బండోడు వెళ్ళిపోయాడు.

రేపు ఉదయం మళ్ళీ కాకుల గుంపు వస్తే బండోడు కక్కిన మాంసం మీద కంపు పోవడానికి మట్టిపోసి కప్పెట్టకూడదు. ఇక ఆ ఇంట్లో కాపురం వుండకూడదు. పంచకు కట్టిన కాకీకల కట్ట తీయకూడదు. ఆ ఇల్లు పాడుబెట్టి తీరాలి. ఎవరూ ఆ ఇల్లు వాడరాదు, ఉండకూడదు. దానికి వ్యతిరేఖంగా కక్కడు మీద మట్టి పోసినా, కాకీకల కట్ట తీసినా, ఇల్లు పాడుబెట్టక పోయినా అనర్థం, పీనుగ లేస్తుంది. అన్నం పెట్టక పోతే ఇంత శాపమా? ఇంత పగా? ఒకవేళ కాకులు రాకపోతే మాత్రం అలికి ముగ్గులు పెట్టి, పొయ్యి ముట్టిచ్చి వండొచ్చు. తినొచ్చు, ఉండవచ్చు. అయితే ఆ ఇంటిమీద కాకి వాలదు, బండోడూ ఇక ఎన్నడూ పెట్టి, పొయ్యి ముట్టిచ్చి వండొచ్చు. తినొచ్చు, ఉండవచ్చు. అంతవరకైతే విముక్తి కానీ, ఆ విముక్తి పల్లెలో వారి కుటుంబానికి శాపం. ఇక రాదు. “అమ్మా! బువ్వబెట్టు తల్లీ!” అని అనడు. అంతవరకైతే విముక్తి కానీ, ఆ విముక్తి పల్లెలో వారి కుటుంబానికి శాపం. ఇక ఆ ఇల్లు కాకి వాలని ఇల్లు, బండోడు బిచ్చం అడగని కొంప. అది అవమానం, అది వెలి.

ఈ కథలో కవి ఇనాక్ గారు సమాజంలో ఆర్థికంగా, అన్ని రంగాల అణగారిన ఈ మాదిగలు ఒకప్పుడు ఆశ్రయం కల్పించిన వారై, పాలకులై ఉండొచ్చు. ఆశ్రితుల్ని పోషించి ఉండొచ్చు. కానీ నేడు, చాలామంది పేదలు, నిరుపేదలు, రైతు కూలీలు, నాటికీ, చేతికీ వెతుక్కునేవాళ్ళు, ఏమీ లేనివాళ్ళు ఆశ్రితులైన 11 ఉపకులాల వాళ్ళను పోషించితిరాలని కుల పురాణాలు, శాసనాలు చేస్తే, ఆ శాసనాల్ని అమలుపరచలేక శాసాల పాలాతున్న జాతి మాదిగ జాతి. దానం చేయడం వీళ్ళకు గర్వ కారణమే, కానీ లేమి? దానం చేయకపోతే, ఆ నియమాలు చాలా కఠినాలు.

ఈ మాదిగలు సమాజంలో అనర్థులుగా ఒక అవస్థ, పేదలుగా మరో అవస్థ, శాపగ్రస్తులుగా వేరొక అవస్థ. కోలుకోలేని ఈ అవస్థల కూపంలో కూరుకు పోవడం వీళ్ళ దౌర్భాగ్య జీవితానికి నిదర్శనం. ఈ దయార్థ జీవితాలను సామాజిక దృక్పథంతో, మానవతా కోణంలో ఈ ఉదంతాన్ని తన కథాజకల్ వివరించాడు. సామాజిక కోణంలో కవి 'కాకి' కథానికలలో వివరించారు.

దళిత సాహిత్యంలో నిబిడీకృతమైన అంశం సాంఘిక సమస్య. ఇది మానశికమైనది. మానవత్వానికి గాయమయ్యే విషయం. చట్టాలకు శాసనాలకు అతీతమైనది. ఒక సమాజం మరో సమాజాన్ని హీనంగా చూచినప్పుడు ఆ హైనాన్ని అనుభవించే ప్రజలు ఎంత సంక్షోభితులు అవుతారో, ఆ భావజాలమంతా అభివ్యక్తికరించబడితే అది సాహితీ సముద్రం అవుతుంది. ఆ సంక్షోభితుల జీవితాల్ని సాహితీ సముద్రపరం చేసిన సాహితీ త్రివిక్రములు ఇనాక్ గారు.

ప్రజా జీవితాల్ని ఆకళింపు చేసుకుని సాహిత్యం ద్వారా బలమైన గొంతుకల్పి వినిపించిన బోయి భీమన్న, కుసుమ ధర్మన్న, డా॥ బి.ఆర్. అంబేడ్కర్ ల ఆశయ సాధనలో ప్రపంచాన్ని అడుగడుగునా ఆకళింపు చేసుకుంటూ, దేశకాల స్థితిగతుల్ని అవగాహన చేసుకుంటూ తమ జాతి జనుల కడగండ్లను తొలగించడం కోసం నిత్యం విజ్ఞాన గనిని, ఉద్యమాల స్ఫూర్తిని ఇస్తున్న మరో స్వరం ఆచార్య కొలకలూరి ఇనాక్ గారు.

భానిసలైన ఇశ్రాయేలీలను ఫరో నుండి విముక్తం చేయడానికి నాయకుడై నడిపించిన మోషే వలే, మరియు ఈ దేశపు ఆదిమ వాసులైన, బడుగు, బలహీన, హరిజన, గిరిజన, మైసూరీ వర్గాల ప్రజా జీవితాల్లో స్పృహ, సమత, మమతల స్థాపనకై నిర్విరామ కృషి సల్పిన డా॥ బాబాసాహెబ్ అంబేడ్కర్ వలే, అన్ని దశల్లో అధోగతిని అనుభవిస్తున్న అణగారిన కులాల ప్రజల పక్షాన నిలబడి బలమైన 'పాళీ'ని దూసిన సమసమాజాభివృద్ధి కాంక్షకుడు కొలకలూరి ఇనాక్.

పరిశోధన: నాడు, నేడు, రేపు

వారి ప్రయోజనం కోసం, సామాన్యులు మహాత్ముల అవతారాలెత్తుతారనేది ఎంత సత్యమో, దళిత జాతి ప్రాధాన్యతను ద్వారా సమాజంలో బలమైన గొంతుకతో కేకవేసిన కవిగా (ఇనాక్) వీరు ప్రసిద్ధులు. ఆ కేక తల్లి ముండ్ల మండి బయటపడ్డ నాటినుండే మొదలైంది. ఆ కేక నేడు 'కాకి'గా మారి ఎందరో దళితుల ఏడుపును జోకొట్టే మార్గమైంది. అడుగడుగునా దళిత జాతులకు పూల బాటైంది.

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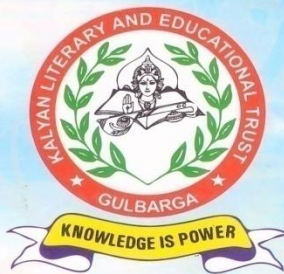
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Elegance of Regional Language in Kolakaluri Enoch's stories

- Dasari Vijaya Lakshmi

Abstract

Prof. Kolakaluri Enoch is a literary giant who has made the short story genre as a tool to show how the dalit races have been exploited politically, economically, socially and psychologically. This paper focuses on the elegance or dalit language found in Pro. Enoch's stories. The elegance in the pronunciation of the dalits' dialects is clearly seen in Prof. Kolakaluri Enoch's writings. As was said by Devarakonda Bala gangadhara Tilak artificiality, pomp and arrogance should be set aside and reality must be crowned. Even today, Prof. Kolakaluri Enoch, who has given a prominent place in his stories to the clear, real telugu and to the language of dalits' huts, is a pioneer to many new writers as a dalit linguist. The paper highlights this regional language of the dalits through the stories he has written.

Key words : regional language, elegance, Enoch

Prof. Kolakaluri Enoch is a literary giant. who has made the short story genre as a tool to show how the dalit races have been exploited politically, economically, socially and psychologically.

The people belonging to the Mala and Madiga castes are once regarded as ineligible to study and have been distanced from education for centuries together. Since the days the Britishers undertook the task of spreading their religion in our country, the lights of knowledge have started dawning on these mala and madiga castes. Today so many among them become educated and rose to the status of teachers, lecturers, professors of universities and vice-chancellors of universities to spread their education to others. Some became social reformers to bring in consciousness in their races. Some became literatures. Today they are exhibiting their worth in all the fields. Prof. Kolakaluri Enoch is one among such intellectuals.

Prof. Kolakaluri Enoch, though born in an uneducated family, has won name and fame as a renowned writer and has become a gem in the necklace of goddess Saraswathi. He is a progressive who have preserved in his mind all his experiences from object poverty to the high class five star prosperity.

Padmasri Kolakaluri Enoch is Dalit linguist who has carefully observed, since his childhood, the behaviour of class societies, their accostings, reproaches, the differences between the pronunciation of the educated and the uneducated people in villages and having understood them reflected them in his writings.

It is common to all the regions of particular languages to have differences between the pronunciation of educated and uneducated speakers. We can identify from the pronunciation of a speaker of a language whether he is an educated one or not. But it is very difficult to say to which caste he belongs. The main reason for the contradiction between the language of the "OORU" (region where upper caste people live) and the language of "VADA" (region where the lower caste people live) is that those who claim today that they belong to upper castes have taken hold of education with the feeling that it is their own property and distanced it from the castes which they feel lower and baser, with only one reason of being distanced from education those who belong to lower castes are suffering from backwardness: politically, economically, socially and psychologically than the people of other castes. If a lower caste person becomes educated, he can master the pronunciation of the educated ones.

There are some differences in the derivative form of certain words and their pronunciation. Mainly in the coastal districts there is a lot of difference between the languages of the cultured and the languages of uneducated rural folk. The language of rural dalits is

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special referring to this matter, Prof. Kolakaluri Enoch, in his book. (criticism on literature, page No. 100) says: "The language of dalits is not our literary language. We have gathered so much of language from Sanskrit, Urdu, English and the languages we do not speak. Dalits language is not known to many people. This is a pure language, clear language and beautiful language. Its vocabulary is not known to people other than dalits. It is not so intimate. This language has not come into utilization as it has not been used as literary language and dalit literature has not been produced in the past. Our telugu in the reason for so many beauties in Jashuva's language. So many words in my story. (village well) were not understood by so many readers. They are living words as people do not know the power of those words, They dismiss them as rude words. There is a danger that our language may not belong to us in future. There is a special dalit language for dalit literature. Not only that there is a special kind of expression there is a special aesthetics. If it is enjoyed by our lovers of literature dalits will enjoy themselves just as they feel elated when they see the people eat the crop they had grown." Thus Prof. Kolakaluri Enoch says that the language of rural dalits is quite different from literary language.

Prof. Kolakaluri Enoch exudes such beauty of dalits special language in his writings and stories. His goal to give new lease of life again to the dalits, own language, true and clear telugu language is clearly discerned in stories like and in so many stories. Prof. Kolakaluri Enoch manifests dalits, pure functionalist language, the elegance of that language and its criticism as upright mirror for natural beauty's disposition.

The stories, songs, proverbs, riddles etc., which were created by the illiterate dalit rural folk in their labour, traditions, festivals and passed on orally from one generation to another are labelled to be folklore literature. The real heirs of these folklore literature are these dalits. This folklore literature is the product of the ceaseless labours of dalits.

The language in this literature is dalits' own. This language is the manifestation of dalits' soul. This language is born and grown with these people. This is a living language. Dalits regional language, in his writings Prof. Kolakaluri Enoch has seated this language on the high throne of importance.

Hundreds of stories written by Prof. Kolakaluri Enoch move us, question us and make us think. In his writings dalits regional language is used to express the agony of the rural folk and their distress. Among such writings the story (Village well) is a perfect example for the use of the language of dalits, which arises from their living conditions.

The Essences of the Story in brief :

Though the village well is in "VADA" (region where the lower caste people live), the authority is of the upper castes. Dalits should get water with the kindness and consideration of the upper caste people. The dalit women who go to the well for water have to experience insults always. The floating of the corpse of an ox is part of resistance against the foolishness in the customs of such village. The munsif of the village has doubt on Chidambaram. His behaviour in the past is the reason for it. To take revenge, Munsif makes Chidambaram and his father Ramudu come to his house and sees that they are beaten black and blue.

During that night there is an attack on the munsif and his property. His hand is broken. Next day after coming from hospital he asks Chidambaram and Ramudu to go home, moreover he asks them to use the village well for themselves. Seeing the villagers who are fearing with the opinion that the villagers are trying to kill them as the well his wanted a sacrifice, Chidambaram's wife goes to the well with ropes and bring the corpse of the ox at a single stroke out of the well and leaves it at the end of the village. The writer does not say in this story directly who has dropped the corpse in the well or who has attacked the munsif. Because of the resemblances in the way of tying the ropes the writer indirectly projects the wife of Chidambaram as source to awake consciousness among the dalits.

The life that entwined around the incidents in the story, the lessons of experience that life has taught, the way of resistance, the strength in the daresness of opposing while safeguarding self esteem, the intelligence that reforms stupidity all these make the language of conversation natural and beautiful.

Chidambaram's wife, who went to the well for water and after slapping a youngman, came home and narrated the incidents, happened at the well. The language used by Chidambaram and his father after

listening to her words expresses the beauty of the illiterates' language clearly. The usage of certain words like (Spitting after biting a leather strap) cannot be easily understood by modern cultured users of language. Most of the words used in this story are related to the madiga profession. This vocabulary is dalit's own. The story (village well) is aimed at awakening consciousness by expressing the natural life style of dalits, their language, meaning, distresses, struggle etc.

In the Telugu used in modern writings, the quality of uniformity naturally appears. This quality has come into existence with the usage of the language used by the literates of coastal andhra region. The language of this region has been mostly spread because most of the writings for some decades together have been written in this language. The words belonging to other dialects have merged with the words of this dialect and have spread and gained popularity. Still there are differences in the vocabulary of the users of this language. It is mainly because the writers fill their writings with the ideas of their region. In the same way Prof. Kolakaluri Enoch, in his story (Thief of oxen), exhibits the beauty of the language of his region i.e. Guntur mandal and mainly the natural conversational style of its rural folk.

The theme of the story belongs to the time of independence movement. The writer Enoch in his writing "GODDU DONGA" makes a reference to the social life conditions, language style and other qualities of the residents of Tenali and its surrounding villages like Kattevaram, Somasundarapalem, Kancherlapalem, Angalakuduru, Kolakaluru etc. The vocabulary in this story may seem obscene and harsh to reader. But real language is always taunting. Words like (Buvva), (Koodu) (Telugu words for food) have become bitter and for the minds which have habituated to say (Annam), (Bhojanam) (Sanskrit words for food), real language is always strange. But the writer has not lost naturalness. The writer reflects that naturalness as the idiom of his region in the story "GODDU DONGA".

In the story "Goddu Donga", Nagadu leads his life by slaughtering oxen and selling their meat. For sometime the oxen in the village have been disappearing. The residents of that village have a doubt on Nagadu. They feel that he has been

slaughtering them and selling. That is why they started examining the heads, legs and skins of the oxen he has slaughtered. But he is not the thief because the young calf he has brought for slaughter also has been stolen by that unknown thief. Then Nagadu wept so bitterly. Since then the villagers' doubt on him has lessened but not exhausted completely.

Nagadu sells meat once in two days. When even he brings an ox for slaughter he does not go to sleep that night. His fear is the ox will be stolen again. One day, as he was awake and keeping watch, he saw the shadow of the "GODDU DONGA" falling on the peg to which the animal was tied. The thief was trying to untie the ropes to steal the animal. Then he went and caught hold of the thief. On recognising the voice of the thief, Nagadu cried "Dora! Idi neekuthagadu" (Lord! This doesn't suit you). But he did not care the pleadings of the thief to release him. Though the thief was using foul language and saying that Nagadu would not get justice even if he was put before the elders of the village, Nagadu did not care a bit but after listening to all those words and after musing for some time he had finished his work before sunrise. The writer ends the story saying that after sometime there appeared the corpse of an ox in the mud of a dried canal and in it a man's skeleton and in the mouth of the skeleton a piece of a blanket with a red border.

The language used by the writer in the way of delineation of the theme of the story, visualizes the village atmosphere. The readers feel that motive of the writer in using the natural and real language of dalits is not to expose obscenity but to show that vocabulary has been in vogue naturally between dalits and non dalits for so many centuries and they are the real forum of the struggle between owner-servant; power-slavery; arrogance-self respect.

The vocabulary used by the writer while describing the atmosphere of the house of Nagadu, and the conversation between Nagadu and the thief of oxen reflect naturalness. At some places the language is continued in mean language. But besides gaining peculiarities of main language, it is flourishing as the spoken language of Guntur Mandal. In most of the occasions the references to incidents display the beauty of the dialect.

While narrating the background of Nagadu's family, the writer skilfully projects the language of

the uneducated not only in the Mala and Madiga wadas but also in the villages. Even to day in the class dialects or caste dialects, caste has greater importance. The pronunciation of a language used basing on the profession of a caste is clearly shown by the writer in the story "Pottapegulibbandigodu" (one who has discomfort in the intestines).

The main theme of the story "Pottapegulibbandigodu".

Pottapegulibbandigodu slaughters animals in the village and sells the meat by arranging in heaps. He sells the meat only on Sunday and remains idle on all the other days. The animals which are slaughtered by him are not sick or ailing. He slaughters only pure and healthy animals. His original name is "Narasimmuti" (Narasimha Murthy). But every body calls him "Ibbandigodu". He too responds to it. If anybody has to tell about him to others, they say "Ibbandigodu or to say in detail "PottapegulaIbbandigodu". Many a time, from sunrise to night he uses the word "Ibbandigundi". (feeling discomfort). Hence his name has become "Ibbandigodu".

Ibbandigodu has antagonism towards the Karanam of the village. He grinds his teeth saying "Adipottajinchipeguljendemesukunta" (I'll tear his stomach and wear his intestines as sacred thread). The reason for it is the land they have been cultivating since the days of his forefathers has been allotted to someone else by the Karanam. Once he lived well. Now he has nothing, no wife, no children. Karanam is responsible for it. Here the writer Enoch uses the illiterates' language. In his young age Ibbandigodu donned the role of Narasimha Murthy and as real Narasimha Murthy chased the one who was in the role of Hiranyakasipa, making him flee with fear. Thus he used to say that one day or other he would tear the stomach of the Karanam and wear his intestines as sacred thread.

Ibbandigodu has great respect towards Lingaraju. Lingaraju is well educated and working in the town. He was the brother of Pothuraju. Pothuraju and Ibbandigodu are of same age. Lingaraju who came from the town went to Ibbandigodu's house. As it was Sunday, ibbandigodu sold away all the meat and closing the door of his house, was eating the cooked intestines of the animal and was drinking toddy. Seeing the intestines Ibbandigodu was eating, Lingaraju

asked him what they were. Ibbandigodu replied that they were intestines - the intestines of Hiranyakasipa and narrated a big story. Hearing it Lingaraju narrated the real history that Narasimha Murthy was a Northern and Hiranyakasipa was a Southern, that means our man. Narasimha Murthy trapped the son of our man and with his help killed our man. Thus he had done a great injustice to our man. After saying all this Lingaraju told Ibbandigodu that Hiranya kasipa is not our foe but our friend. He who takes away food from our mouth is our foe. Ibbandigodu did not slaughter any animal next Sunday. Everyone scolded him. That next Sunday he was sitting laughing under the neem tree near the feet of god Pothuraju. At the end of the story writer Prof. Enoch indirectly reveals the person responsible for the death of the Karanam by narrating that the villagers were saying that the Karanam died with stomach burst and there was not even a single intestine in his stomach.

In the process of revealing the great injustice done in history, the vocabulary of the masses of the rural area seems to be in an integrated form. From the descriptions in the story it is shown how dalits themselves become enemies and scold one another. Even today certain words like "Iradachadinayala! Yevadachaddana!" (You Southern) are used to scold others that too to scold dalits. The Aryan descendents are Northerners. They are considered as gods and goddesses and the AdiAndhras and AdiDravidas, who have been living in Southern areas are described as Rakshasas. The wars that were waged between Northern Aryans and the Southern kings were popularised as wars between Gods and Rakshasas. Eventoday dalits are made to celebrate the deaths of the kings of their race as festivals. In the process of revealing the truth, Enoch seems to give a message that we have to take revenge on those who have made our men like Hiranya kasipa and Narakasura as our enemies.

In this story, the language and its dialectical variations of the villagers around Guntur mandal are clearly discerned by the writer. That is the language of dalits and nondalits. The beauty of the vocabulary has brightness. With some beautiful expressions of the characters, the beauty of certain words of rural masses appear so beautiful before our eyes.

In the society, the allegations laid by haves on havenots will pass on. The story "NALLULU" (Bed bugs) is an example that the society as a whole, with a strong conviction, lays a stamp on truth as untruth.

Subbadu, who has no help and so on, came from some village to that village and has been living there since his childhood. He earns his livelihood by doing physical labour. He used to do any work assigned by anybody. Subbadu is famous for unmanageable works. Such Subbadu is not related to any body. He lives in a hut in that village. There are no owners for that hut. They won't come. He leads a hard way of life. But the police arrest him. Whenever any theft is committed in the village. He who has no support or kith and kin has habituated to both the jail and the village. The police who take him keep him in their custody for two days or two months and release him saying that there are no evidences. But Subbadu is not a thief. The Munsif of the village uses Erragudlodu (Red eyed one) and Midigudlodu (Big eyed one) to commit the thefts and is benefited by them. He supports them by giving them something. But the crime is levelled on Subbadu who has no support. After some, while Subbadu is going home after his release from prison he happens to hear the words of Erragudlodu and Midigudlodu and comes to know that they are going to commit a murder and throw the crime on him and in this conspiracy the Munsif has the support of the police and that is why the Munsif has got him released.

After listening to the words of them, Subbadu bolts the house of the Munsif from outside and sets fire to it while the Munsif, Erragudlodu and Midigudlodu were taking wine. Those three die like bed bugs. It seems that retaliation is the moral of the story as narrated by the writer comprises the internal structure. The methods, language, style in the internal structure do not come into literature from unknown sources. All of them are generated specifically from the real social living conditions entwined around the writer. Such a language has a greater sharpness, beauty, activeness, purity, flavour and modesty. Any thing may be great but the real blessedness adds to those words more beauty. This quality is manifested in the writings of Prof. Kolakaluri Enoch.

The language and style used in Prof. Enoch's story "KOLUPULU" (Festivals of village goddesses) puts before the reader reality as well as resistance. In

the process of satisfying the beauty desires of Aryans who have been desiring dalit women with lust for centuries, the mothers who are becoming victims to their diabolical act are seen even today in our societies. The non dalit society should realise that these dalit women lay before the lusty arians not because they have the quality to win women with love or they have medicines to their ailing husbands or for the milk for their babes or the bright future of their sons whom they have borne in their wombs and given birth. One must understand that along with the truth that facts of the incidents are not known to the arian progeny as they are known to dalit races and the question put by Dr. Ambedkar to Manuvu, the leader of the arians is a slap to the arians. "The dalit mothers who are useful for lust why are the untouchable for marital life". In this story we come across a question when their bodies are touchable why they are untouchable for the marital life with them.

In this story Nallamma is the wife of a Madig priest Lingadu. After the death of her husband, for the money needed to the education of her son Nallamma takes a loan from the wealthy cruel landlord, Nancharayya. For a long time he has had control over Nallamma but she expressed loathsomeness. He like her arrogance and used to say "one day or other you yourself will come to my bed". It was his belief.

The widow Nallamma took the loan from him for the college education of her son in unavoidable circumstances. She gave a promissory note saying that she would repay the amount in a year. As was assured she paid the money back but had forgotten to take back the note from him. It became an opportunity for Nancharayya and he often used to ask Nallamma "When will you repay my loan. Though she said "I have already repaid it", he used to say "Not that loan but this loan".

One night when Nancharayya came to Nallamma's house and tried to molest her, she kicked on his chest and cried "thief, thief". Thus she saved her self-esteem. With that incident Nancharayya again came to her house in the morning and crossing his limits, said, "If you do not pay my loan before "Kolupulu" I see that you will be raped by your son. "Kolupulu" approached. Nancharayya dragged Nallamma by holding her hair and tied her before the temple. The village folk, who were afraid of his cruel nature, stood there as silent spectators.

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Nallamma, who was unable to bear his tortures, began to weep. At that time, Pothuraju, her son, who was coming from college, saw the mob gathered near Pothuraju temple and ran towards it. Seeing his mother tied, he started to untie the knots of his mother. At the same time he was also pleading Nancharayya to let her mother go. Without any consideration that he was a young boy, Nancharayya began to beat Pothuraju black and blue saying "The duration of the loan has already expired. Now pay the loan or rape her. If you cannot do it, I will rape her". Though Pothuraju said that she was his mother, Nancharayya did not care. Even when Pothuraju said, "Take my mother to your house or come to my house and marry my mother" Nancharayya did not care. as he was teasing that she must be raped in the presence of all, Nallamma decided to share Nancharayya's bed and asked her son to go away. But Nancharayya did not agree to it. Finally, when Nancharayya is going to exhibit his devilish lust, just as a hen is sacrificed to god Pothuraju by biting its neck, the mother and son bit the neck of Nancharayya and put an end to his life.

Though the whole village could not do anything to Nancharayya, who was blind with lust, Nallamma killed him with the help of her son. The language used by the writer in this story stands as replica of qualities like distress, grief, agitation, helplessness, indifference and daresness. Nallamma says to her son, "Aadumondinabatta! Nannodaladu! Adinuvvusuda levu. Naa karma minthetagaladindiKadanteid darini samputhadu. Nuvelipo! Naasavunesattanu". (He is a stubborn rascal. He won't leave me. You cannot see

it. My fate is like this. If I do not agree he will kill both of us. You go away. I'll die my death) "Nenu ponu! NeekadeUnta" (I won't. I'll stay with you)". Aadunannemainasethenenubathakanu. Ne jatha" (If he does me any wrong, I won't live. I'll die)." Nuvvuja the ninnubathi kinchukoleninenubathi kemi, sachemi" (If you die, what if I live or die when I cannot keep you living)". "Kadanteaadu manalnija mputh aduAunan temena nthatamanamejathamu. Etugudisa chedithappanapudu, eelaitheadinokka dinisampi manamiddarambathikedisa ddema? saddeme". (If I decline he will kill both of us. If I agree we ourselves die. when death is unavoidable is n't it possible to kill him and save our lives. possible) The aim of the story is to retaliate efficiently the raids on dalits with the superiority and lordship and mobilizing and making them realise their duty. Though the language used in the story is some what harsh, it reflects the self-agony of the races undergoing harassment.

If we go on saying like this Prof. Kolakaluri Enoch's literature is a flood of waves. It is a meaning less conception to doubt and insult the usage of dalit regional dialects and the existence of language in use by the Universities and educated elite. The elegance in the pronunciation of the dalits' dialects is clearly seen in Prof. Kolakaluri Enoch's writings. As was said by Devarakonda Balagangadhara Tilak artificiality, pomp and arrogance should be set aside and reality must be crowned. even today, Prof. Kolakaluri Enoch, who has given a prominent place in his stories to the clear, real telugu and to the language of dalits' huts, is a pioneer to many new writers as a dalit linguist.

Translated by:
P.J.VardhanRao

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13. Published a paper titled "Sport Sector in India : A Review in a peer reviewed international research journal that is International Journal of Law Education, Social and Sports studies with ISSN 2394-9724 on 16th October 2015.

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SPORT SECTOR IN INDIA: A REVIEW

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INTRODUCTION

Globally, the sports sector is estimated to be worth USD 480-620 billion¹ and contributes about 1-5 per cent to the GDPs² of various countries. In India, sport is yet to be recognized as a sector and there is no comprehensive study on the industry's estimated size in the country. Sports can make significant socioeconomic impact on a nation and its citizens. It plays an important role in ensuring physical fitness and healthy lifestyle among the citizens of a country. It unites people from diverse backgrounds, hence promoting peace and development. The sports sector has the potential to make significant contribution to the economy. A study undertaken by Sport England³ in 2013 highlights the significant contribution that it could make to a country's society and economy. The potential of sport in bringing about a positive social change is evident from initiatives such as the 'FIFA Football for Hope' movement. 'Sport the Bridge' is another such initiative that lays emphasis on sport pedagogies to promote social inclusion among street children in Ethiopia. India's economic growth potential, thanks to a large young population, is of interest to the entire world. Inculcating a healthy sporting culture among its youth to build a physically and mentally sound nation is integral in ensuring sustainable growth in the future. As per a survey conducted by Edu Sports in 2011-12 covering more than 49,000 across the country, obesity is increasing among schoolchildren in urban India with one in four in the metros and one in six in non-metros being overweight⁴. According to the survey, about 39 per cent children do not have correct Body Mass Index levels and about 20 per cent demonstrate signs of obesity. Nearly one in two children covered under the study have poor flexibility levels and body strength. It has been observed that fitness levels drop sharply as children grow older, highlighting the risk of an unfit generation. The survey highlights lack of structured inclusive sports curriculum as the primary reason for alarming obesity and poor health levels apart from lack of proper sports infrastructure and urban lifestyle.

Performance of India in sports

The survey supports the findings of a previous study conducted by the Government of Kerala among schoolchildren as part of its Total Physical Fitness Program⁵. Kerala ranks high on health and education parameters in comparison to majority of the Indian states. However, the fitness standards of schoolchildren in the state were found to be low in comparison to the minimum recommended standards. In 2010-11, only 16 per cent of the state's children from class five to 10 met the minimum recommended standards on all health-related physical fitness test items. Therefore, sports not only instil pride among a nation's citizens, but they also facilitate social and economic development of a nation. This can be achieved by building a sporting culture in the country. That's why Confederation of Indian Industry (CII) has adopted the Government of India's objectives of achieving excellence in sports and broad basing them as part of its India@75 vision. CII's India@75 vision as a means of building strong sporting culture aims to attain the following objectives:

- Achieving excellence in sports – Win 20 gold medals at Olympics 2020.

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road-basing of sports in India - Create sports infrastructure accessible to common people in tier 2/3 cities; joint coaches in infrastructural facilities and provide them with equipment; provide 10,000 children in rural areas with scholarships to pursue sports. This may help identify potential improvement or focus areas, and bring the country closer to achieving its goals for the sector.

Performance at international events

The country's performance has not been up to the mark at various Olympic Games. India's medal tally witnessed marginal improvement in the past few Olympics Games, with the 2012 games being the best so far for the country. India's Olympic medal tally has increased from zero in 1988 and 1992 to one each in the 1996, 2000 and 2004 Olympics. This was followed by three medals in 2008 (including the first Olympic gold medal for India) and six medals at the London Olympics 2012⁶. However, India lags far behind countries such as Australia, China, Japan, South Korea, Russia, the U.S. and some smaller countries such as Ethiopia and Cuba. India's Olympic Games 2012 performance can be judged on the following parameters, where the country won

- 3.3 medals per USD 1 trillion of GDP versus 10.5 of China, 40.2 of Russia, 162.3 of Ethiopia, 217.4 of Cuba and 808.5 of Jamaica.
- 0.005 medals per 1 million people (population) versus 0.331 of China, 0.564 of Russia, 0.076 of Ethiopia, 0.331 of Cuba and 4.425 of Jamaica.

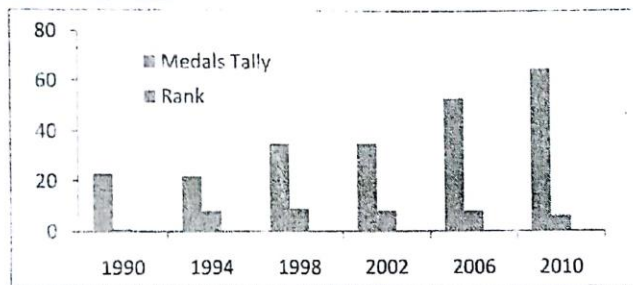


Figure 1.1. India medal tally and rank in Commonwealth Games since 1990

India has traditionally performed better in the Commonwealth Games and Asian Games than the Olympics and has managed to rank among the top nations.

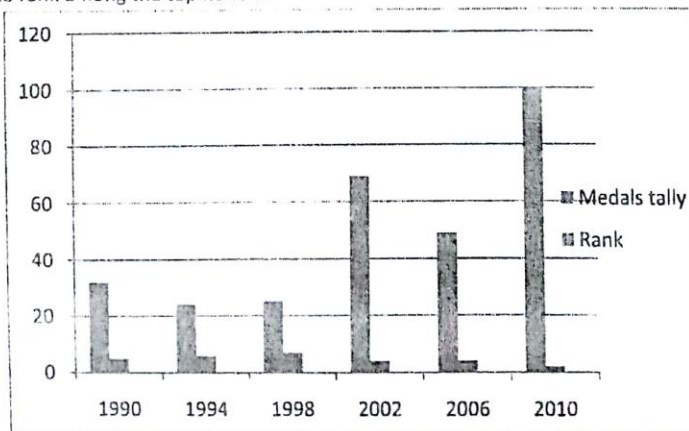


Figure 1.2: India medal tally and rank in the Asian Games since 1990.

India has performed well in certain non-Olympic sports like cricket, chess, snooker and billiards.

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Table 1: Achievements of India in certain non-Olympic sports

Cricket	<ul style="list-style-type: none"> • Winner of Cricket World Cup in 1983 and 2011 • Winner of World Twenty20 in 2007 and 2013 ICC Champions Trophy
Chess	<ul style="list-style-type: none"> • Viswanathan Anand has won the World Chess Championship five times (2k, 07, 08, 10 & 2012) • Indian women's chess team finished fourth in the Chess Olympiad at Istanbul in 2012 • Indians won eight medals at Maribor, Slovenia, in the World Youth Chess Championship 2012, including three gold medals • Parimarjan Negi won the Asian Continental Championship 2012 at Vietnam
Snooker and Billiards	<ul style="list-style-type: none"> • In the last 20 years, India has won the World Championship five times • Pankaj Advani has 8 world titles under his belt. He also won the gold medal for the English Billiards Singles at the Asian Games. He won the World Billiards Championship 2009 and 2012 • Anuja Thakur won the WLBPA ladies world billiards championship in 2005 and Chitra Magimairaj won the Australian Open Women in 2008 • India has performed well at the Asian Games since 1982, winning a gold medal in each of the games.

<http://www.olympic.ind.in/images/AGMedalTally.pdf> accessed on 15 January 2014

An analysis of India's performance at various international events also highlights the contribution of a few states in India's success.

1. Performance at the 2008 and 2012 Olympics:

India has won nine medals in total in the last two summer Olympics. If we categorize athletes on the basis of states where they received a majority of their training or spent a substantial portion of their youth, then two medals can be attributed to Haryana (Vijender Singh and Yogeshwar Dutt), two to Andhra Pradesh (Saina Nehwal and Gagan Narang), two to Delhi (Sushil Kumar) and one medal each to Punjab (Abhinav Bindra), Himachal Pradesh (Vijay Kumar) and Manipur (Mary Kom).

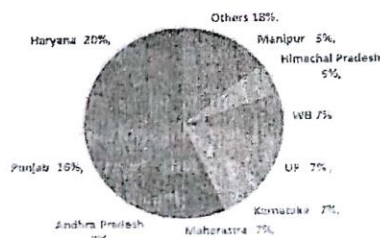
2. Asian Games 2010

Out of the total 65 medals won by India at the Asian Games 2010, 20 were won by sportspersons from Haryana. Sportspersons from Manipur, Kerala, Karnataka, Andhra Pradesh and Maharashtra also performed well. This holds true for domestic games as well, with a few states accounting for a significant share of the total medals.

2. Commonwealth Games 2010

India showcased its best performance so far at the Commonwealth Games (CWG) 2010 with an overall medal tally of 101 medals. Haryana's performance was significantly better than other states. Punjab, Maharashtra, Andhra Pradesh were other states that performed well. The contribution of Manipur, considering it has a small population, was also significant.

CONTRIBUTION OF INDIVIDUAL STATES AT CW GAMES.



Source: <http://blogs.wsj.com/indiarealtime/2010/10/15/indias-cwg-medal-winners-men/> accessed on 18 November 2013,

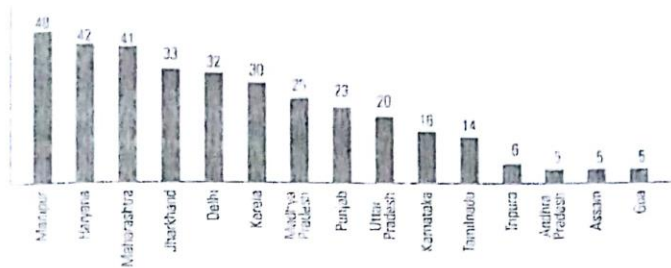
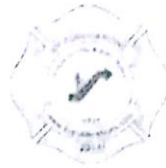


Figure 1.3: Number of gold, silver and bronze medals won by top 15 states respectively at the National Games 2011

Source: <http://www.34thnationalgamesjharkhand.in/> accessed on 15 January 2014

Performance of states in the National Games

The National Games 2011 were held in Jharkhand. Figure 1.5 demonstrates that Manipur and Haryana are the best performing states on the basis of the number of gold medal wins. The absence of large states like Uttar Pradesh, West Bengal, Gujarat and Rajasthan from the top 15 states could mean that these states are not doing enough to cultivate their sporting talent.

Performance from the leading states

Athletes from Haryana and Manipur have been making significant contribution to India's performance in recent global events such as the Olympics, Commonwealth Games and Asian Games. The two states are also among the top performing states in the last few editions of the National Games of India.

Case study – Haryana⁷

Even though the state has less than 2 per cent of India's land and population, its contribution to national sports has been higher than other states. The credit for Haryana's success can largely be attributed to government policies in the past few decades. The state's sports policy was launched in 2006 and has been regularly revisited and updated — there has been an increase in the incentives for sportsmen and several initiatives have been launched. Three important aspects of the state Government's policy are:

Talent spotting and grooming: The Government has launched the '*Play 4 India*' initiative with an aim to enable young boys and girls to realize their athletic potential and subsequently hone their skills by providing support. Under this initiative, a Sports and Physical Aptitude Test (SPAT) is conducted in all schools across the state to identify high potential athletes in the 8–14 age group. About 5,000 children - with boys and girls in equal numbers - are identified, and a sport is allocated to them based on seven physical parameters such as strength, flexibility and the reaction time of various body parts. These students are then supported financially and provided with training, proper diet and health checkups. A yearly appraisal assesses the progress and their assistance is provided based on this assessment.

Infrastructure: To support development of sports, the state has built the following infrastructure:

- 100 schools to train athletes, including provision of free hostel, games kit and food.
- 100 stadiums at block level with fulltime coaches, managed by district authorities, schools and parents.
- Sports complex in every district
- Sports library and a centre for conducting research in sports medicine
- Centres of Excellence for sports like boxing in Bhiwani and wrestling in Rohtak and Sonapat

Incentives: The Govt. provides several incentives to winners and other stakeholders in various sports:

Winners and participants of various sporting events: Financial incentives, government jobs and reservation in admission to professional institutions are awarded to the winners in various international events. For example, gold medal winner in the Olympics/Paralympic Games 2016 would be awarded INR 5 crore.

14. Published a paper titled Higher Education Institutions in India : A brief view in the National Seminar “Academic and Administrative Audit” with ISBN 978-93-85100-38-3 on 12th and 13th August 2015.

HIGHER EDUCATION INSTITUTIONS IN INDIA: A BRIEF VIEW

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A brief view of the Indian higher education system provides an essential backdrop for the following research findings and comments. There are three main types of tertiary institution in India: 1) universities and university-level institutions, 2) colleges and 3) diploma-awarding institutions. These are categorised by funding source: central government, state government and private.

Table: Higher education institutions in India

Type & No. of Institution	Central	State	Private	Total
University & University-level institution	152	316	191	659
College	669	13,024	19,930	33,623
Diploma Institutions	00	3,207	9,541	12,748
Percentage enrolment in 2012	2.6%	38.6%	58.9%	100%

Source: 'Higher education in India: twelfth five year plan and beyond', Ernst and Young (2012)

If there is one overall structure which defines Indian higher education, it is the affiliated college system. The bulk of students study at public and private colleges, which are affiliated to state universities. These colleges do not have their own degree awarding powers; they deliver the courses, curricula and examinations specified and regulated by their parent state university. The affiliated college sector is huge, enrolling over 90% of undergraduates, 70% of postgraduates and 17% of doctoral students¹. Some universities have as many as 1000 colleges affiliated to them. There are considerable challenges in regulation and quality control; and while there are notable exceptions, many are perceived to be sub-standard. Last year, accreditation through the National Assessment and Accreditation Council and the National Body for Accreditation of all universities and colleges was made mandatory. A huge exercise is underway to accredit the two-thirds of universities and four-fifths of colleges that do not have accredited status.

State universities, therefore, through their activities, form by far the greatest element of higher education in India. They are run and funded through their respective state governments. There is wide variation in the amount of funding they receive, but in general, they have been critically underfunded over the last 20 years. State universities depend on affiliation fees paid by the colleges for their survival. These fees, supplemented by state government funding, are generally used to pay salaries and little else; most have poor infrastructure and conduct little research, although pockets of excellence exist. Many state universities spend much of their time administering the exams and admissions to their affiliated colleges. Places at state universities are highly sought after by students.

Most, but not all, state governments have legislation in place to grant university status to private colleges, providing them with their own degree-awarding powers and much more autonomy. This is the fastest area of growth in new universities. There are currently 100 such private universities in India (16% of degree-awarding institutions)².

The central government also has the means to grant university status to private institutions, under the 'deemed university' category. There are currently 129 deemed universities (20% of degree awarding institutions). It is unclear whether or not this central role will continue, given the plans to devolve more decision-making to the states.

Over the last two decades, central universities and Institutes of National Importance have been the focus of central government priorities and funding. These include the IITs, IIMs and IISERs and several national institutes in specific discipline areas. Most international collaboration is concentrated in these institutes, many of which are research-based. They have high prestige in India and beyond. The private sector has outpaced the state sector in tertiary education and is rapidly expanding. The private sector will continue to be crucial in the growth of higher education in India and already comprises 64% of the total number of institutions and 59% of tertiary enrolment across the country⁴. Currently, private higher education universities are growing at 40% per annum and worth \$6.5 billion⁵. Many potential private investors are waiting in the wings.

There remains limited international research collaboration with state universities and private institutions, with a few notable exceptions. Therefore, the international higher education community is generally not engaging with the institutions where most students (97.5%) are studying.

Undergraduate boom, research gloom

The undergraduate sector in India is huge: currently 14.6 million (86%) students are enrolled on undergraduate courses, compared to 2 million (12%) on post-graduate courses⁶. Under the new five-year plan (2012-17), undergraduate education, for the first time, has been elevated to a top priority position in the government's push on expansion, inclusion and excellence. While general university and diploma courses account for the majority of students (two-thirds of tertiary enrolment), there has been much faster growth over the last five years in professional courses (one third of tertiary enrolment), which include engineering, medical, management, law and other vocational courses. Professional courses form the bulk of study in private institutions and are significantly more expensive than general courses, sometimes up to ten times more⁷.

India is not producing enough PhDs. Very few students continue on to research degrees compared to other countries: only 140,000 (1%) students are enrolled as post-graduate researchers. The lack of enquiry-based learning and early researcher skills is limiting the capacity of Indian institutions to engage in vital research and innovation activity.

Not-for-profit?

University education is, by law, not-for-profit in both public and private sectors. The reality is little more complicated. The majority of private institutions in certain parts of the country operate a widely prevalent means of making money through illegal 'capitation fees', in the form of on- or off- fees paid by the student, off-the-books. It is reported that in Tamil Nadu the capitation fee for an engineering course can be 3-400,000 rupees and has been reported to reach up to 45 lakhs rupees at a prestigious medical college. The private sector argues that caps on the low, legitimate, student fees, make it impossible for private institutions to operate without charging capitation fees. There are indications that the government increasingly recognizes that the levels of funding support and student fees in both private and state-funded institutions are unsustainable and are therefore likely to rise in the future.

Challenges facing higher education

These fall into four broad categories: the low quality of teaching and learning; the supply-demand gap; uneven growth and access to opportunity; and constraints on research capacity and innovation.

a) *The low quality of teaching and learning*

Arguably, the greatest challenge facing higher education in India is the chronic shortage of faculty. Various reports estimate that 30-40% of faculty positions are unfilled⁸. Most faculty have had no training in teaching. Other issues in teaching and learning which compound the problems include:

- Outdated, rigid curricula and the absence of employer engagement in course content and skills development. Very few opportunities for interdisciplinary learning.
- Pedagogies and assessment are focused on input and rote learning; students have little opportunity to develop a wider range of transversal skills, including critical thinking, analytical reasoning, problem-solving and collaborative working.
- High student: teacher ratio, due to the lack of teaching staff and pressure to enroll more students.
- Separation of research and teaching; lack of early stage research experience.
- An ineffective quality assurance system and a complete lack of accountability by institutions to the state and central government, students and other stakeholders.

This has resulted in graduates with low employability, a common feature of higher education across south Asia⁹, and an insufficient basis for movement to higher levels of study and research. These problems are endemic across higher education institutions in India, including many of the 'top tier' institutions, but particularly so in affiliated colleges and state universities.

b) *The supply-demand gap*

Despite an average growth rate of over 7% in the last decade, India's GER (Gross Enrollment Ratio) in higher education is very low. By some estimates, even if India succeeds in its target of 30% GER by 2020, 100 million qualified students will still not have places at university¹⁰. India needs to drastically increase the number of places at universities and enrolment through distance learning programmes. Over the last decade, the diversity of courses offered by universities and colleges has narrowed, resulting in saturated markets for engineers, technology graduates and MBAs. Uneven growth and access to opportunity Despite efforts to spread the location of higher education institutions more evenly across the country, there is wide variation, particularly between urban and rural areas, but also between states.

There are still significant multi-dimensional inequalities in enrolment rates between rural and urban populations, rich and poor, minority and mainstream communities, men and women and people with disabilities. 'Inclusive growth' is a priority for reform in Indian education. With the growth in the middle classes, Indian universities must prepare themselves for considerable changes in student profile.

c) *Constraints on research capacity and innovation*

India does not have enough high quality researchers. The number of students taking PhDs and entering research posts is very low. 4,500 PhDs are awarded per year in science and engineering, compared to 30,000 in China and 25,000 in the US¹¹. There is systemic segregation of teaching and research; most teaching-focussed universities (the vast majority) do not provide

students with research experience or the skills which would prepare them for research careers. Despite a growing reputation for 'frugal innovation'³⁵, mainly driven from the private sector, the ecosystem for innovation in Indian research institutions is weak. The causes, among others, stem from a lack of multidisciplinary working, no development for faculty and students in order to stimulate innovation and few links with industry. These constraints reveal themselves in the failure of Indian institutions to make their mark in the world global rankings. All the above challenges are addressed through the Government of India's 12th Five Year Plan for higher education, the main points of which are outlined below¹².

Key reforms in India planned in the next five years

The central government operates a five-year planning cycle. The twelfth five-year plan (2017) for higher education addresses three overarching challenges: excellence, equity and expansion.

i) Excellence

Priority issues include improvements in teaching and learning, and a focus on learning outcomes; faculty development to improve teaching; increased integration between research and teaching; more international partnerships in teaching as well as research; better links between industry and research to stimulate innovation; and connecting institutions through networks, alliances and consortia.

ii) Equity

Further initiatives targeted at underprivileged and underserved populations in socio-economic geography, addressing urban/rural, gender, people with disabilities and community diversity and inequities.

iii) Expansion

Scaling up capacity in existing institutions, rather than creating many new government-funded institutions; enabling discipline diversity, counteracting the skewed growth towards engineering and other technical subjects; enabling flexible and skills-based learning; ensuring a more equitable spread across the country; alignment to the needs of the economy; and encouraging private investment.

Key elements of the 12th Five Year Plan

These three interrelated areas are not new: all have been addressed in various forms in previous five-year plans dating back to 1980. The main difference in the 12th plan is its holistic approach with a clear focus on quality, or 'excellence', as an overarching guiding principle for expansion and equity. The excellence principle incorporates the diversification of higher education in response to changing economic and industry needs, the provision of greater choice and multiple paths for students and brings teaching quality to the fore, alongside research capability.

Underpinning these reforms are:

- An emphasis on leveraging technology: a huge investment in ICTs and internet access to create a 'meta university framework', which enables multi-disciplinary collaboration and development of technology-enhanced learning and teaching, including MOOCs and blended courses
- A national mission for 'teachers and teaching'
- Further support for multi-disciplinary research in research institutions

Key proposals in the 12th Five Year Plan include:

- A strengthened accreditation system along with more autonomy for states and universities
- Improving the quality of teaching and doubling the number of faculty
- Doubling of investment in R&D to 2% over five years
- Significant investment in ICT in terms of infrastructure and content development
- A shift to a credit-based and internationally recognized assessment system
- Strengthening the capacity of existing institutions, establishing 20 'innovation and research universities' and 50 centers of excellence, training and research in science, technology, social sciences and humanities
- A review which could pave the way for for-profit private education in some areas
- The introduction of schemes to target underprivileged and underrepresented students
- Support for further internationalization through a broad range of initiatives, including increased international research collaboration, international programmes for faculty development and attracting foreign faculty to India.

Devolution to the states

The greatest reform in the governance and funding of state universities will come through the central government's Rashtriya Uchchatar Shiksha Abhiyan (RUSA) or National Mission for Higher Education programme, a key part of the 12th Five Year Plan. RUSA aims to "have a completely new approach towards funding, regulation and governance of higher education in state universities; it will be based on key principles of performance-based funding, incentivizing well performing institutions and decision-making through clearly defined norms."¹² This new framework was approved, with funding, by the Indian government in October 2013. Although it is too early to make any long term predictions, the initial stages of the programme, which lay the groundwork for national implementation, have been markedly swift.

Under RUSA, the central government has committed extra funding to most states for higher education in the ratio 65:35 central to state funding. This represents a significant increase in ring-fenced funding to state universities. However, there are conditions: state governments have to set up autonomous State Higher Education Councils (SHECs), which will be responsible for the planning, quality assurance, monitoring and evaluation of the state's higher education provision, in order to enhance quality and improve access to the sector. In effect, the governance of higher education, except for centrally-funded institutions of national importance, will be devolved almost entirely to the states. This will have important implications for UK cooperation in system and institutional capacity building, where opportunities for consultancy services are likely to come directly from state governments.

If successful, RUSA will bring in a new era of quality assurance and accountability in state universities and colleges in India. At the time of writing, 19 states had signed up to the RUSA reforms, with more expected to follow in the next year. The first funding round is due to take place in October 2014.

Like its predecessors, the 12th plan is highly ambitious with challenging targets. Although substantial progress was made under the 11th plan (2007-2011), particularly in the creation of new institutions and driving significant expansion which moved Indian higher education from an elite to a mass system, 46.5% of the plan's budget for higher and vocational education was unspent at the end of the term. It remains to be seen whether the 12th plan can be effectively

transformed into action. Interviews with Indian stakeholders in the following sections provide insights into this crucial question.

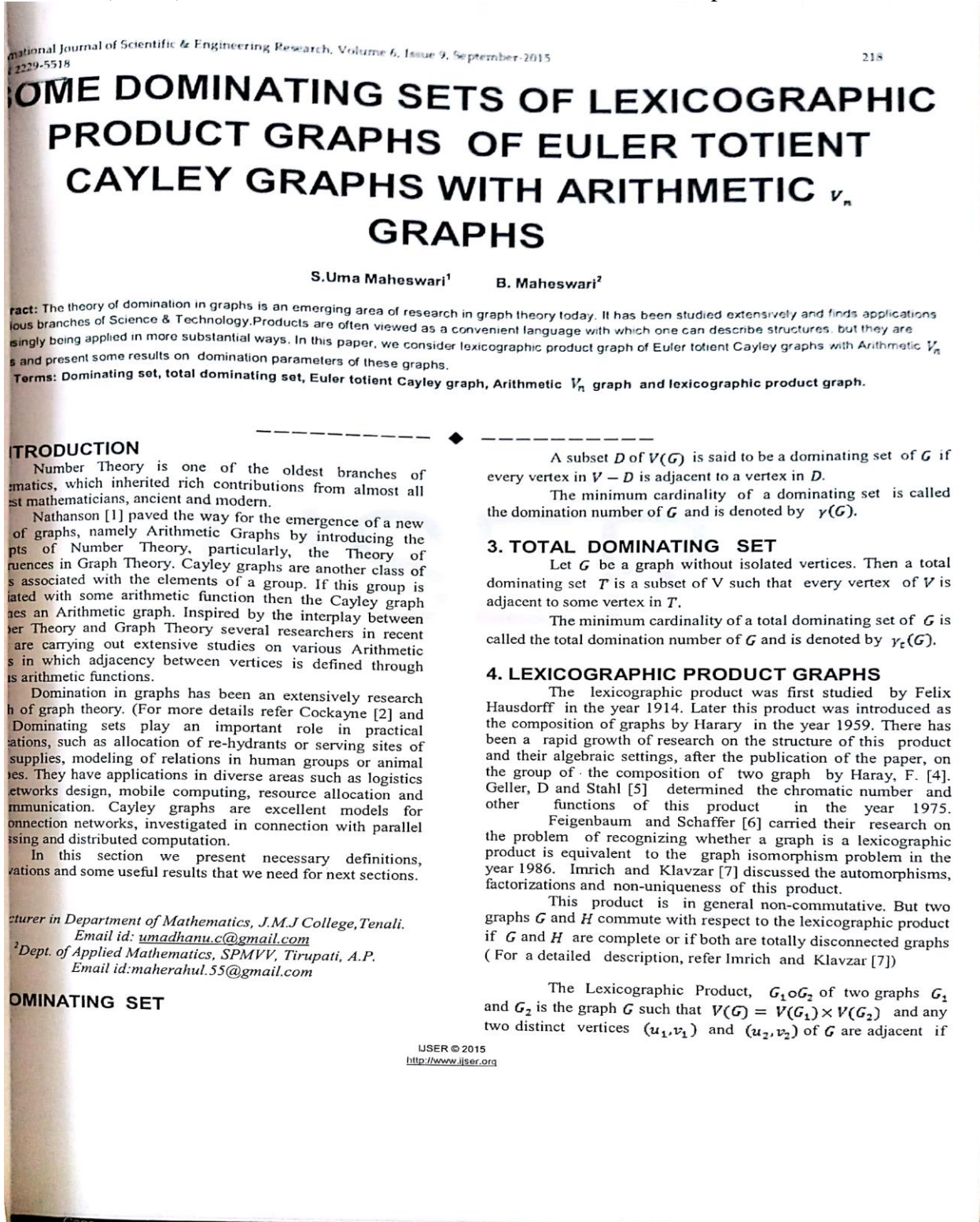
Abbreviations

GER	Gross Enrollment Ratio
IIM	Indian Institute of Management
IISER	Indian Institute of Science Education and Research
IIIT	Indian Institute of Technology
MOOC	Massive Online Open Course NAAC National Assessment and Accreditation Council
NAAC	National Assessment and Accreditation Council
NBA	National Body for Accreditation
RUSA	Rashtriya Uchchatar Shiksha Abhiyan
SHEC	State Higher Education Councils

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SOME DOMINATING SETS OF LEXICOGRAPHIC PRODUCT GRAPHS OF EULER TOTIENT CAYLEY GRAPHS WITH ARITHMETIC V_n GRAPHS

S.Uma Maheswari¹ B. Maheswari²

Abstract: The theory of domination in graphs is an emerging area of research in graph theory today. It has been studied extensively and finds applications in various branches of Science & Technology. Products are often viewed as a convenient language with which one can describe structures, but they are increasingly being applied in more substantial ways. In this paper, we consider lexicographic product graph of Euler totient Cayley graphs with Arithmetic V_n graphs and present some results on domination parameters of these graphs.

Terms: Dominating set, total dominating set, Euler totient Cayley graph, Arithmetic V_n graph and lexicographic product graph.

INTRODUCTION

Number Theory is one of the oldest branches of mathematics, which inherited rich contributions from almost all great mathematicians, ancient and modern.

Nathanson [1] paved the way for the emergence of a new class of graphs, namely Arithmetic Graphs by introducing the concepts of Number Theory, particularly, the Theory of residues in Graph Theory. Cayley graphs are another class of graphs associated with the elements of a group. If this group is associated with some arithmetic function then the Cayley graph is called an Arithmetic graph. Inspired by the interplay between Number Theory and Graph Theory several researchers in recent years are carrying out extensive studies on various Arithmetic Graphs in which adjacency between vertices is defined through arithmetic functions.

Domination in graphs has been an extensively researched area of graph theory. (For more details refer Cockayne [2] and Dominating sets play an important role in practical applications, such as allocation of re-hydrants or serving sites of supplies, modeling of relations in human groups or animal societies. They have applications in diverse areas such as logistics networks design, mobile computing, resource allocation and communication. Cayley graphs are excellent models for connection networks, investigated in connection with parallel processing and distributed computation.

In this section we present necessary definitions, notations and some useful results that we need for next sections.

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DOMINATING SET

A subset D of $V(G)$ is said to be a dominating set of G if every vertex in $V - D$ is adjacent to a vertex in D .

The minimum cardinality of a dominating set is called the domination number of G and is denoted by $\gamma(G)$.

3. TOTAL DOMINATING SET

Let G be a graph without isolated vertices. Then a total dominating set T is a subset of V such that every vertex of V is adjacent to some vertex in T .

The minimum cardinality of a total dominating set of G is called the total domination number of G and is denoted by $\gamma_t(G)$.

4. LEXICOGRAPHIC PRODUCT GRAPHS

The lexicographic product was first studied by Felix Hausdorff in the year 1914. Later this product was introduced as the composition of graphs by Harary in the year 1959. There has been a rapid growth of research on the structure of this product and their algebraic settings, after the publication of the paper, on the group of the composition of two graphs by Harary, F. [4]. Geller, D and Stahl [5] determined the chromatic number and other functions of this product in the year 1975.

Feigenbaum and Schaffer [6] carried their research on the problem of recognizing whether a graph is a lexicographic product is equivalent to the graph isomorphism problem in the year 1986. Imrich and Klavzar [7] discussed the automorphisms, factorizations and non-uniqueness of this product.

This product is in general non-commutative. But two graphs G and H commute with respect to the lexicographic product if G and H are complete or if both are totally disconnected graphs (For a detailed description, refer Imrich and Klavzar [7])

The Lexicographic Product, $G_1 \circ G_2$ of two graphs G_1 and G_2 is the graph G such that $V(G) = V(G_1) \times V(G_2)$ and any two distinct vertices (u_1, v_1) and (u_2, v_2) of G are adjacent if

is an edge of G_1 or $u_1 = u_2$ and $v_1 v_2$ is an edge of

Now we consider the lexicographic product graph of Euler totient Cayley graphs with Arithmetic V_n graphs. The domination numbers of these graphs are presented in [8]. We briefly present the Euler totient Cayley graph and Arithmetic V_n graph.

EULER TOTIENT CAYLEY GRAPH

Madhavi [9] introduced the concept of Euler totient Cayley graphs and studied some of its properties. For any positive integer n , let $Z_n = \{0, 1, 2, \dots, n-1\}$. Then (Z_n, \oplus) , where \oplus is addition modulo n , is an abelian group of order n . The number of positive integers less than n and relatively prime to n is denoted by $\phi(n)$ and is called Euler totient function.

Let S denote the set of all positive integers less than n and relatively prime to n .

$$S = \{r \mid 1 \leq r < n \text{ and } \text{GCD}(r, n) = 1\}$$

$$|S| = \phi(n).$$

We define Euler totient Cayley graph as follows.

For each positive integer n , let Z_n be the additive group of integers modulo n and S be the set of all numbers less than n and relatively prime to n . The Euler totient Cayley graph $G(Z_n, \phi)$ is defined as the graph whose vertex set V is given by $\{0, 1, 2, \dots, n-1\}$ and the edge set E is given by $E = \{(x, y) \mid x - y \in S \text{ or } y - x \in S\}$.

The domination parameters of these graphs are studied by Uma Maheswari [8] and we present some of the results which we need without proofs and can be found in [10].

Theorem 5.1: If n is a prime, then the domination number of $G(Z_n, \phi)$ is 1.

Theorem 5.2: If n is power of a prime, then the domination number of $G(Z_n, \phi)$ is 2.

Theorem 5.3: The domination number of $G(Z_n, \phi)$ is 2, if $n = 2p$ where p is an odd prime.

Theorem 5.4: Suppose n is neither a prime nor $2p$. Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where p_1, p_2, \dots, p_k are primes and $\alpha_1, \alpha_2, \dots, \alpha_k$ are integers ≥ 1 . Then the domination number of $G(Z_n, \phi)$ is given by $\gamma(G(Z_n, \phi)) = \lambda + 1$, where λ is the length of the longest stretch of consecutive integers in V , each of which is a prime factor with n .

Theorem 5.5: If n is a prime, then the total domination number of $G(Z_n, \phi)$ is 2.

Theorem 5.6: If n is power of a prime, then the total domination number of $G(Z_n, \phi)$ is 2.

Theorem 5.7: The total domination number of $G(Z_n, \phi)$ is 4, if $n = 2p$, where p is an odd prime.

Theorem 5.8: Suppose n is neither a prime nor $2p$. Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where p_1, p_2, \dots, p_k are primes and $\alpha_1, \alpha_2, \dots, \alpha_k$ are integers ≥ 1 . Then the total domination number of $G(Z_n, \phi)$ is given by $\gamma_t(G(Z_n, \phi)) = \lambda + 1$, where λ is the length of the longest stretch of consecutive integers in V , each of which shares a prime factor with n .

6. ARITHMETIC V_n GRAPH

Vasumathi [11] introduced the concept of Arithmetic V_n graphs and studied some of its properties.

Let n be a positive integer such that $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$. Then the Arithmetic V_n graph is defined as the graph whose vertex set consists of the divisors of n and two vertices u, v are adjacent in V_n graph if and only if $\text{GCD}(u, v) = p_i$ for some prime divisor p_i of n .

In this graph vertex 1 becomes an isolated vertex. Hence we consider Arithmetic graph without vertex 1 as the contribution of this isolated vertex is nothing when the properties of these graphs and enumeration of some domination parameters are studied.

Clearly, V_n graph is a connected graph. Because if n is a prime, then V_n graph consists of a single vertex. Hence it is connected. In other cases, by the definition of adjacency in V_n , there exist edges between prime number vertices and their prime power vertices and also to their prime product vertices. Therefore each vertex of V_n is connected to some vertex in V_n .

The domination parameters of these graphs are studied by S.Uma Maheswari [8] and we present some of the results which we need without proofs and can be found in [12].

Theorem 6.1: If $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where p_1, p_2, \dots, p_k are primes and $\alpha_1, \alpha_2, \dots, \alpha_k$ are integers ≥ 1 , then the domination number of $G(V_n)$ is given by

$$\gamma(G(V_n)) = \begin{cases} k-1 & \text{if } \alpha_i = 1 \text{ for more than one } i \\ k & \text{Otherwise.} \end{cases}$$

where k is the core of n .

Theorem 6.2: Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$ where $\alpha_i \geq 1, \forall i$. Then the total domination number of $G(V_n)$ is k , where k is the core of n .

7. DOMINATION IN LEXICOGRAPHIC PRODUCT GRAPH $G_1 \circ G_2$

In this section we discuss the dominating sets of the lexicographic product graph of Euler totient Cayley graph G_1 and Arithmetic V_n graph G_2 .

Theorem 7.1: If n is a prime, then the domination number of $G_1 \circ G_2$ is 1.

is a prime, then $G_1 \circ G_2$ is a complete graph. Hence single vertex set in $G_1 \circ G_2$ constitute a minimum dominating set. Therefore domination number of $G_1 \circ G_2$ is 1, if a prime.
Theorem 7.2 : The domination number of $G_1 \circ G_2$ is 2, if $2p$ where p is an odd prime.
Proof: Let $n = 2p$. p is an odd prime. Consider the graph

G_1
 $V(G_1) = \{0, 1, 2, \dots, 2p-1\} = V_1$
 $V(G_2) = \{2, p, 2p\} = V_2$ and
 $V(G_1 \circ G_2) = V_1 \times V_2 = V$
 The sets of vertices of the graphs G_1 , G_2 and $G_1 \circ G_2$ respectively. By Theorem 1.3, we know that $\gamma(G_1) = 2$. Without loss of generality we may take a minimum dominating set of G_1 as $\{u_{d_1}, u_{d_2}\}$ where $|u_{d_1} - u_{d_2}| = p$.
 It is obvious that $\{2p\}$ is a dominating set of G_2 .
 Consider $D = D_1 \times \{2p\} = \{(u_{d_1}, 2p), (u_{d_2}, 2p)\}$. We claim that D is a dominating set of $G_1 \circ G_2$.
 Let $(u, v) \in V - D$.

Following cases arise.
 Case 1: Suppose $u = u_{d_1}$, $v = 2$ or p . Then by the definition of lexicographic product, vertices $(u_{d_1}, 2)$ and (u_{d_1}, p) in $V - D$ are adjacent to $(u_{d_1}, 2p)$, because 2 and p are adjacent to $2p$ as $\text{GCD}(2, 2p) = 2$ and $\text{GCD}(p, 2p) = p$.
 Case 2: Suppose $u = u_{d_2}$, $v = 2$ or p . By the similar argument as case 1, vertices $(u_{d_2}, 2)$ and (u_{d_2}, p) in $V - D$ are adjacent to $(u_{d_2}, 2p)$.
 Case 3: Suppose $u \neq u_{d_1}$ and $u \neq u_{d_2}$, $v = 2$ or p or $2p$. Since D_1 is a dominating set of G_1 , u is adjacent to either u_{d_1} or u_{d_2} . Then by the definition of lexicographic product, (u, v) is adjacent to $(u_{d_1}, 2)$, (u_{d_1}, p) and $(u_{d_2}, 2p)$. Thus (u, v) is adjacent to $(u_{d_1}, 2p)$.

Thus (u, v) in $V - D$ is dominated by at least one vertex in D . Therefore D becomes a dominating set.

Further deletion of any vertex from D does not make D as a dominating set. Suppose we delete a vertex, say $(u_{d_1}, 2p)$ from D . Then vertices $(u_{d_1}, 2)$ and (u_{d_1}, p) are not dominated by the remaining vertex $(u_{d_2}, 2p)$. This is because $u_{d_1} \neq u_{d_2}$ and u_{d_1} is not adjacent to u_{d_2} as $|u_{d_1} - u_{d_2}| = p$. Similar is the case if we delete the vertex $(u_{d_2}, 2p)$ from D . Thus D becomes a minimum dominating set.

Thus $\gamma(G_1 \circ G_2) = |D| = 2$. ■

Theorem 7.3: If n is neither a prime nor $2p$ then the domination number of $G_1 \circ G_2$ is

$\lambda + 1$, where λ is the length of the longest stretch of consecutive integers in V_1 of G_1 each of which shares a prime factor with n .

Proof: Suppose n is neither a prime nor $2p$ and $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where $\alpha_i \geq 1$. Let $V_1 = \{0, 1, 2, \dots, n-1\}$ and $V_2 = \{v_1, v_2, \dots, v_m\}$ be the vertex sets of the graphs G_1 and G_2 respectively.

Recall a dominating set of G_1 with minimum cardinality $\lambda + 1$ which is given in Theorem 1.4 by $D_1 = \{u_{d_1}, u_{d_2}, \dots, u_{d_{\lambda+1}}\}$ where $u_{d_1}, u_{d_2}, \dots, u_{d_{\lambda+1}}$ are consecutive integers.

Let $D = D_1 \times v_x$ where v_x be any vertex in V_2 of G_2 . Then $D = \{(u_{d_1}, v_x), (u_{d_2}, v_x), \dots, (u_{d_{\lambda+1}}, v_x)\}$.

We now claim that D is a dominating set of $G_1 \circ G_2$. Let $(u, v) \in V - D$.

Case 1: Suppose $u = u_{d_i}$ for $i = 1, 2, 3, \dots, \lambda + 1$. Then $(u, v) = (u_{d_i}, v)$ where $1 \leq i \leq \lambda + 1$ and $v \in V_2$ and $v \neq v_x$. Since $u_{d_1}, u_{d_2}, \dots, u_{d_{\lambda+1}}$ are consecutive integers, each u_{d_i} is adjacent to $u_{d_{i+1}}$ for $i = 1, 2, \dots, \lambda$, because $\text{GCD}(u_{d_i} - u_{d_{i+1}}, n) = 1$. Hence by the definition of Lexicographic Product, $(u, v) = (u_{d_i}, v)$ is adjacent to $(u_{d_{i+1}}, v)$ for $i = 1, 2, \dots, \lambda$ in D . In particular for $v = v_x$ in V_2 , the vertex $(u, v) = (u_{d_i}, v_x)$ in $V - D$ is adjacent to $(u_{d_{i+1}}, v_x)$ in D .

Case 2: Suppose $u \neq u_{d_i}$ for $i = 1, 2, 3, \dots, \lambda + 1$ and $v \in V_2$. Since D_1 is a dominating set of G_1 , the vertex u must be adjacent to at least one of the vertices of D , say u_{d_i} . Since u and u_{d_i} are adjacent, by the definition of lexicographic product the vertex (u, v) is adjacent to the vertex (u_{d_i}, v_q) , $\forall v_q \in V_2$. In particular to the vertex (u_{d_i}, v_x) in D . Thus all the vertices in $V - D$ are adjacent to at least one vertex in D and D becomes a dominating set in $G_1 \circ G_2$.

We now show that deletion of any vertex from D does not make D as a dominating set. Suppose we delete a vertex (u_{d_i}, v_x) from D for some i , $1 \leq i \leq \lambda + 1$. Since each vertex in G_1 is of degree $\varphi(n)$, vertex u_{d_i} is adjacent to the vertices, say $u_1, u_2, \dots, u_{\varphi(n)}$ respectively. Then the vertices $(u_1, v_x), (u_2, v_x), \dots, (u_{\varphi(n)}, v_x)$ are all not dominated by other vertices of $D - \{(u_{d_i}, v_x)\}$. If so then $u_1, u_2, \dots, u_{\varphi(n)}$ are also dominated by the other vertices of $D_1 - \{u_{d_i}\}$, which implies that D_1 is not a minimum dominating set of G_1 , a contradiction.

Therefore D is a minimum dominating set. Further if we construct a dominating set in any other manner then the order of such a set is bigger than the order of D . This follows from the properties of the prime divisors of a number.

Hence $\gamma(G_1 \circ G_2) = |D| = \lambda + 1$. ■

Domination in Lexicographic Product

Graph $G_1 \circ G_2$

In this section the results on the total dominating sets of direct product graph are discussed for different values of n .

Theorem 8.1 If n is a prime, then the total domination number of G_2 is 2.

Proof: If n is a prime, then $G_1 \circ G_2$ is a complete graph. Hence two vertices in $G_1 \circ G_2$ form a minimum total dominating set of G_2 . Thus the total domination number of $G_1 \circ G_2$ is 2. ■

It is interesting to see that the dominating set given in theorem 2.3, is also a total dominating set. This is proved in the following.

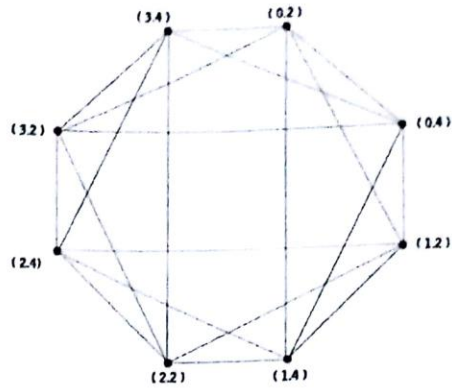
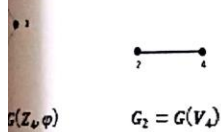
Theorem 8.2: Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where $\alpha_i \geq 1$. Then total domination number of $G_1 \circ G_2$ is given by $\gamma_t(G_1 \circ G_2) = \lambda + 1$, where λ is the length of the longest stretch of consecutive integers in V each of which shares a prime factor n .

Proof: We have proved in Theorem 5.3.3 that the following set $\{(u_{d_i}, v_x), (u_{d_2}, v_x), \dots, (u_{d_{\lambda+1}}, v_x)\}$ where v_x is any vertex of G_2 is a dominating set of $G_1 \circ G_2$. We now show that vertex of T is adjacent to some other vertex of T , so that T becomes a total dominating set.

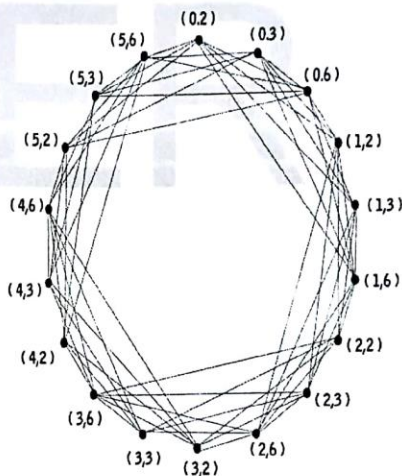
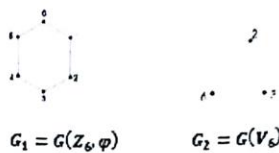
Since $u_{d_1}, u_{d_2}, \dots, u_{d_{\lambda+1}}$ are consecutive integers, each is adjacent to $u_{d_{i+1}}$ for $i = 1, 2, \dots, \lambda$, because $\text{GCD}(u_{d_{i+1}}, n) = 1$. Hence by the definition of Lexicographic product, each vertex (u_{d_i}, v_x) of T is adjacent to $(u_{d_{i+1}}, v_x)$ of T vice versa. Thus all the vertices of T are dominated by the vertices of T . Therefore T becomes a total dominating set of $G_1 \circ G_2$ with minimum cardinality.

Hence $\gamma_t(G_1 \circ G_2) = |T| = \lambda + 1$. ■

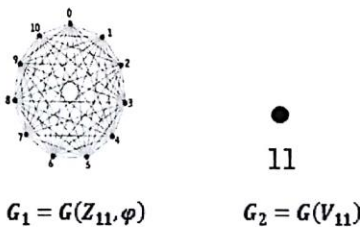
ILLUSTRATIONS



$G_1 \circ G_2$



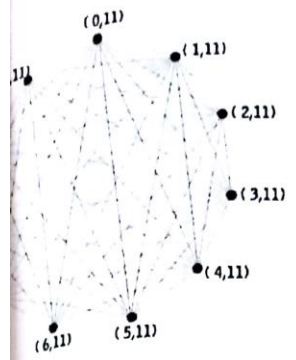
$G_1 \circ G_2$



$G_1 = G(Z_{11}, \varphi)$

$G_2 = G(V_{11})$

5518



$G_1 o G_2$

Lexicographic product Graph $G_1 o G_2$

Minimum dominating sets	$G_1 = G(Z_n, \varphi)$	$G_2 = G(V_n)$	$G_1 o G_2$	Domination Number in $G_1 o G_2$
Minimum dominating set	{0,1}	{2}	{{(0,2), (1,2)}	$\gamma = 2$
Minimum Total dominating set	{0,1}	{2,4}	{{(0,2), (1,2)}	$\gamma_t = 2$
Minimum dominating set	{0,3}	{6}	{{(0,6), (3,6)}	$\gamma = 2$
Minimum Total dominating set	{0,1,2,3}	{2,6}	{{(0,6), (1,6), (2,6), (3,6)}	$\gamma_t = 4$
Minimum dominating set	{0}	{11}	{{(0,11)}	$\gamma = 1$
Minimum Total dominating set	{0,1}	Does not exist	{{(0,11), (1,11)}	$\gamma_t = 2$

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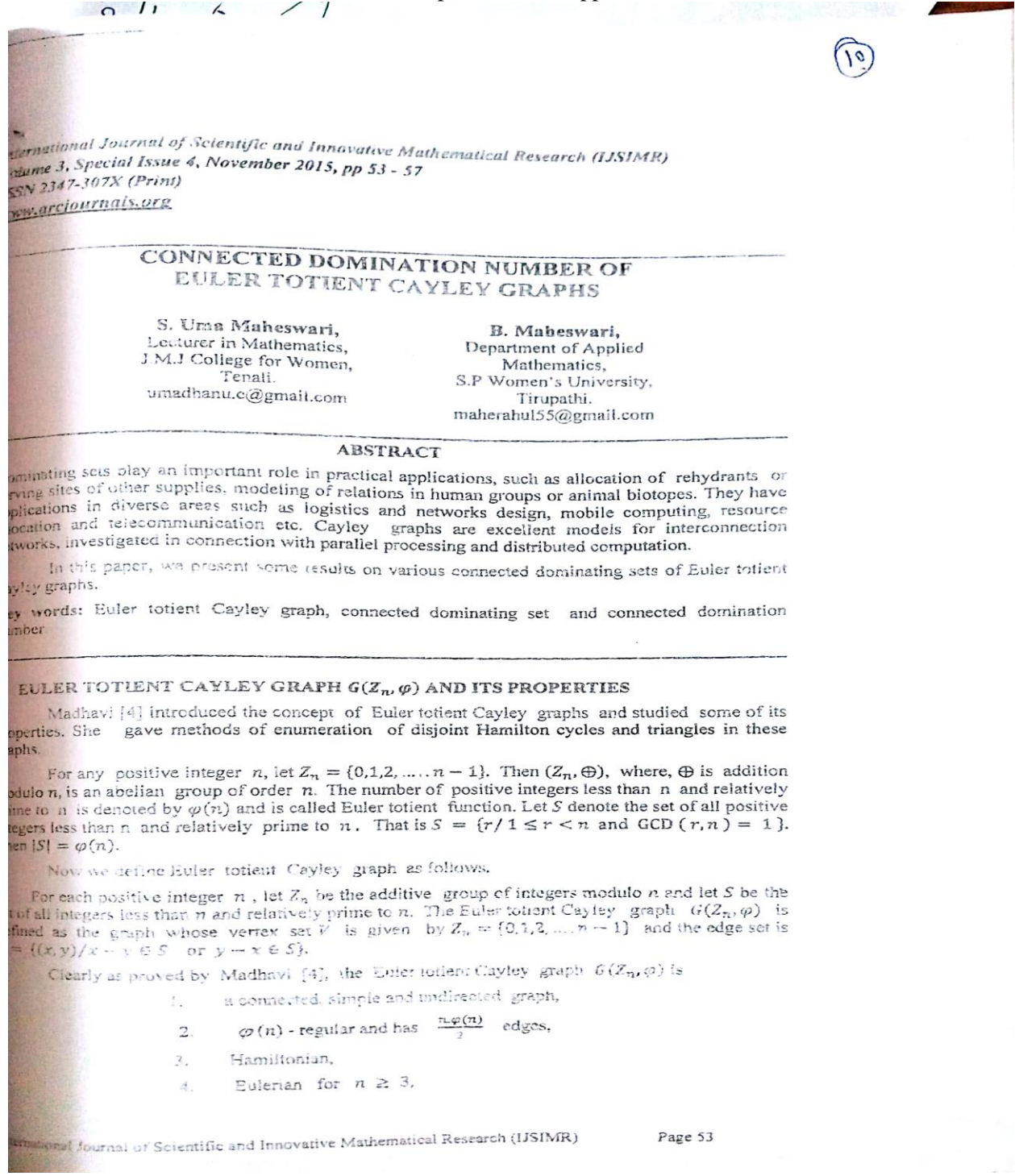
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**CONNECTED DOMINATION NUMBER OF
 EULER TOTIENT CAYLEY GRAPHS**

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ABSTRACT

Dominating sets play an important role in practical applications, such as allocation of rehydrants or serving sites of other supplies, modeling of relations in human groups or animal biotopes. They have applications in diverse areas such as logistics and networks design, mobile computing, resource allocation and telecommunication etc. Cayley graphs are excellent models for interconnection networks, investigated in connection with parallel processing and distributed computation.

In this paper, we present some results on various connected dominating sets of Euler totient Cayley graphs.

Key words: Euler totient Cayley graph, connected dominating set and connected domination number

EULER TOTIENT CAYLEY GRAPH $G(Z_n, \varphi)$ AND ITS PROPERTIES

Madhavi [4] introduced the concept of Euler totient Cayley graphs and studied some of its properties. She gave methods of enumeration of disjoint Hamilton cycles and triangles in these graphs.

For any positive integer n , let $Z_n = \{0, 1, 2, \dots, n-1\}$. Then (Z_n, \oplus) , where \oplus is addition modulo n , is an abelian group of order n . The number of positive integers less than n and relatively prime to n is denoted by $\varphi(n)$ and is called Euler totient function. Let S denote the set of all positive integers less than n and relatively prime to n . That is $S = \{r / 1 \leq r < n \text{ and } \text{GCD}(r, n) = 1\}$. Then $|S| = \varphi(n)$.

Now we define Euler totient Cayley graph as follows.

For each positive integer n , let Z_n be the additive group of integers modulo n and let S be the set of all integers less than n and relatively prime to n . The Euler totient Cayley graph $G(Z_n, \varphi)$ is defined as the graph whose vertex set V is given by $Z_n = \{0, 1, 2, \dots, n-1\}$ and the edge set is $E = \{(x, y) / x - y \in S \text{ or } y - x \in S\}$.

Clearly as proved by Madhavi [4], the Euler totient Cayley graph $G(Z_n, \varphi)$ is

1. a connected, simple and undirected graph,
2. $\varphi(n)$ - regular and has $\frac{n\varphi(n)}{2}$ edges,
3. Hamiltonian,
4. Eulerian for $n \geq 3$.

5. bipartite if n is even and
6. complete graph if n is a prime

The Euler totient Cayley graphs for $n = 11, 14, 25, 30$ are given in the last section.

2. DOMINATION IN EULER TOTIENT CAYLEY GRAPH

Domination in graphs has been an extensively research branch of graph theory (For more details refer [1, 2, 3]).

We know that a dominating set of a graph $G(V, E)$ is a subset D of $V(G)$ such that every vertex in $V - D$ is adjacent to at least one vertex in D .

The minimum cardinality of a dominating set of G is called the domination number of G and is denoted by $\gamma(G)$.

While studying several properties of Euler totient Cayley graphs, it is discovered that the domination parameters of these graphs have come to be realized as functions of λ , where λ is the length of the longest stretch of consecutive integers in V , each of which shares a prime factor with n . Here V is the vertex set of Euler totient Cayley graph.

We studied dominating sets of Euler totient Cayley graphs in [6] and obtained domination numbers in various cases as follows.

Theorem 2.1: If n is a prime, then the domination number of $G(Z_n, \varphi)$ is 1.

Theorem 2.2: If n is power of a prime, then the domination number of $G(Z_n, \varphi)$ is 2.

Theorem 2.3: The domination number of $G(Z_n, \varphi)$ is 2, if $n = 2p$ where p is an odd prime.

Theorem 2.4: Suppose n is neither a prime nor $2p$. Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where p_1, p_2, \dots, p_k are primes and $\alpha_1, \alpha_2, \dots, \alpha_k$ are integers ≥ 1 . Then the domination number of $G(Z_n, \varphi)$ is given by $\gamma(G(Z_n, \varphi)) = \lambda + 1$, where λ is the length of the longest stretch of consecutive integers in V , each of which shares a prime factor with n .

3. CONNECTED DOMINATION IN EULER TOTIENT CAYLEY GRAPH

S.T. Hedetniemi, R.C. Laskar [3] introduced the connected domination number in graphs. For a survey of connected domination see [5]. It is easy to observe that only connected graphs have a connected dominating set.

A dominating set D of G is said to be a connected dominating set if the induced subgraph $\langle D \rangle$ is connected.

Cardinality of the minimum connected dominating set is called the connected domination number of G and is denoted by $\gamma_c(G)$.

We characterize connected dominating sets of Euler totient Cayley graphs as follows.

Theorem 3.1: If n is a prime, then the connected domination number of $G(Z_n, \varphi)$ is 1.

Proof: Let n be a prime. Then $G(Z_n, \varphi)$ is a complete graph.

Let $D_c = \{u\}$ where u is any vertex in V . Then every t in V is adjacent to vertex u . Thus every vertex in $V - D_c$ is adjacent to u , so that D_c forms a dominating set in $G(Z_n, \varphi)$. Since $|D_c| = 1$, it is evident that D_c is a minimum dominating set in $G(Z_n, \varphi)$.

In fact every singleton vertex set forms a minimum dominating set of $G(Z_n, \varphi)$.

Obviously this dominating set becomes a connected dominating set.

Hence $\gamma_c(G(Z_n, \varphi)) = 1$. \square

Theorem 3.2: The connected domination number of $G(Z_n, \varphi)$ is 4, if $n = 2p$ where p is an odd prime.

Proof: Let us consider $G(Z_n, \varphi)$ for $n = 2p$, p is an odd prime. Then the vertex set is given by $V = \{0, 1, 2, \dots, 2p - 1\}$. Let V be decomposed into the following disjoint subsets.

1. The set of odd integers which are less than n and relatively prime to n .

But this set is nothing but S , since $n = 2p$.

- 2. The set M of non-zero even integers,
- 3. The set D of integers 0 and p .

We now show that $D = \{0, p\}$ is a dominating set of $G(Z_n, \varphi)$. By the definition of edges in $G(Z_n, \varphi)$, it is clear that the vertices in S are adjacent to 0 and hence they are dominated by the vertex 0.

Now consider the elements of M . By the definition of M , it contains non-zero even numbers. If $v \in M$ then $v - p$ is an odd number, because p is an odd prime. Hence $v - p$ or $p - v \in S$. Thus every vertex of $V - D$ is adjacent to vertex p . This implies that the vertices of M are dominated by vertex p . But the graph $G(Z_n, \varphi)$ is $\varphi(n)$ -regular. So for $n = 2p$, $G(Z_n, \varphi)$ is $(p-1)$ -regular. Hence every vertex of $G(Z_n, \varphi)$ is of degree $p-1$. Hence a single vertex cannot dominate the rest of $p-1$ vertices. Therefore $D = \{0, p\}$ becomes a minimum dominating set with cardinality 2. Since 0 and p are non-adjacent, $D = \{0, p\}$ is not connected.

Again, there is no vertex v which is connected to both the vertices 0 and p . This implies that D is not connected.

Now consider a vertex u from M which is adjacent to p and a vertex v from S which is adjacent to 0. Then u and v are also adjacent to each other and thus the vertices 0, p , u , v are connected.

Thus if $D_c = \{0, p, u, v \mid u \in M, v \in S, |u - v| = p\}$, then D_c becomes a connected dominating set of $G(Z_n, \varphi)$ with minimum cardinality.

Hence $\gamma_c(G(Z_n, \varphi)) = 4$. \square

Remark 1: If $D_c = \{u_{d_1}, u_{d_2}, u_{d_3}, u_{d_4}\}$ where $u_{d_1}, u_{d_2}, u_{d_3}, u_{d_4}$ are any four consecutive integers then D_c will become a connected dominating set of $G(Z_n, \varphi)$.

Theorem 3.4: Suppose n is neither a prime nor $2p$ and $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$, where p_1, p_2, \dots, p_k are primes and $\alpha_1, \alpha_2, \dots, \alpha_k$ are integers ≥ 1 . Then the connected domination number of $G(Z_n, \varphi)$ is given by $\gamma_c(G(Z_n, \varphi)) = \lambda + 1$, where λ is the length of the longest stretch of consecutive integers each of which shares a prime factor with n .

Proof: Suppose $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_k^{\alpha_k}$ and n is neither a prime nor $2p$. Let us consider the vertex v of $G(Z_n, \varphi)$ given by $V = \{0, 1, 2, \dots, n-1\}$. Then the set V falls into the following disjoint sets:

1. The set S of integers relatively prime to n ,
2. The set $X = \{S_i\}$, where S_i is a collection of consecutive integers in V such that for every x in S_i , $\text{GCD}(x, n) > 1$,
3. The singleton set $\{0\}$.

By the definition of adjacency in $G(Z_n, \varphi)$, it is obvious that the vertices of S are dominated by the vertex 0. Let S_λ be a subset in X with maximum cardinality λ . Suppose $S_\lambda = \{x_1, x_2, x_3, \dots, x_\lambda\}$ where $\text{GCD}(x_i, n) > 1$ for $i = 1, 2, 3, \dots, \lambda$.

Since $x_1, x_2, x_3, \dots, x_\lambda$ are in consecutive order, we have $\text{GCD}(x_1 - 1, n) = \text{GCD}(x_2 - 2, n) = \dots = \text{GCD}(x_\lambda - \lambda, n) = 1$. Therefore it follows that $x_1 - 1, x_2 - 2, \dots, x_\lambda - \lambda \in S$. So the vertices $x_1, x_2, x_3, \dots, x_\lambda$ are adjacent to the vertices $1, 2, 3, \dots, \lambda$ respectively. Hence the vertices in S_λ are dominated by the vertices $1, 2, \dots, \lambda$.

In a similar manner, we can show that all vertices of each collection S_i in X are dominated by the vertices $1, 2, \dots, \lambda$. Thus the set $D = \{0, 1, 2, \dots, \lambda\}$ becomes a dominating set in $G(Z_n, \varphi)$ and dominates every vertex in $V - D$.

We claim that D is minimal. Suppose we delete 0 from D and let $D' = \{1, 2, \dots, \lambda\}$. Then D' cannot be a dominating set of $G(Z_n, \varphi)$, since the vertices of S are dominated only by the vertex 0 and $0 \notin D'$.

Suppose we delete any vertex, say j from $\{1, 2, \dots, \lambda\}$. Let $D'' = \{0, 1, 2, \dots, j-1, j+1, \dots, \lambda\}$. Consider the vertex x_j in S_1 . Suppose D'' is a dominating set of $G(Z_n, \varphi)$. Then vertex x_j is dominated by some vertex k in D'' and $k \neq 0$. This implies that $x_j - k \in S$. Now $x_1, x_2, x_3, \dots, x_\lambda$ are in consecutive order implies that $x_j - k = x_{j-k}$. Now $x_j - k \in S$ implies that $x_{j-k} \in S$, for all j and k such that $1 \leq j \leq \lambda$ and $1 \leq k \leq \lambda - 1$. For $j = \lambda, k = \lambda - 1$, we get $x_{\lambda - (\lambda - 1)} = x_1 \in S$, a contradiction because $\text{GCD}(x_1, n) > 1$. Therefore it follows that D'' cannot be a dominating set of $G(Z_n, \varphi)$ and hence D is minimal.

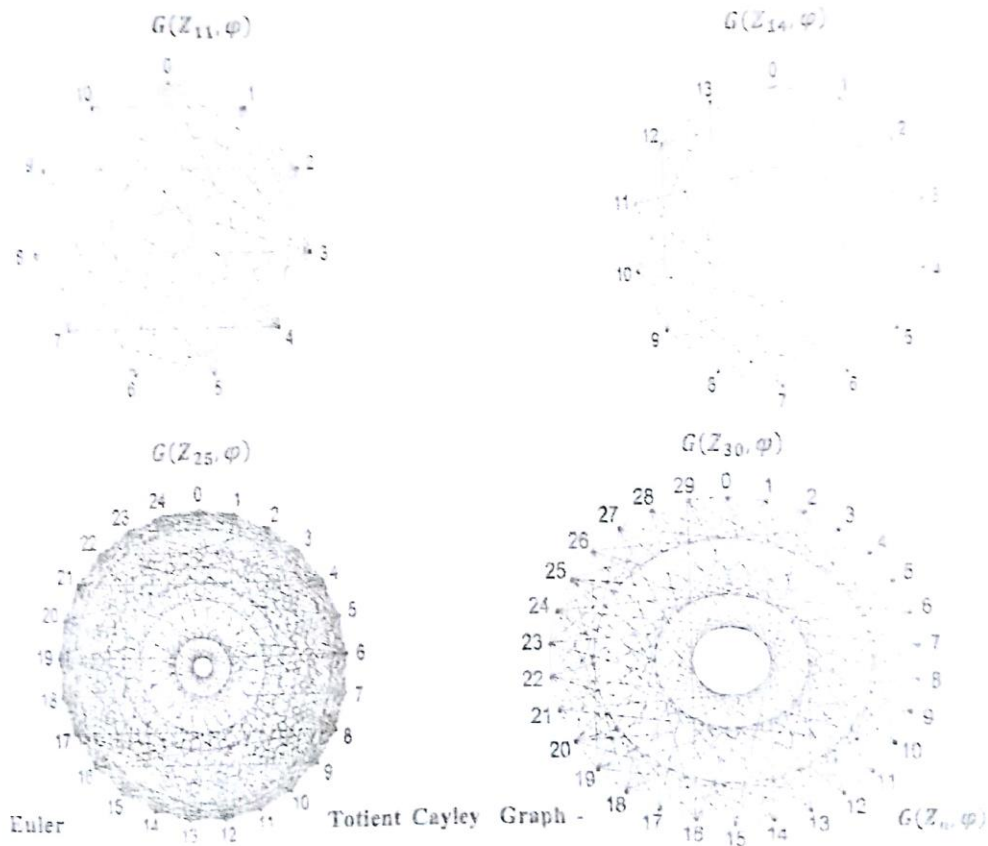
If a minimal dominating set is formed in any other way, then the cardinality of such a set is not smaller than that of D . This follows from the properties of the prime divisors of a number.

Hence D becomes a dominating set of $G(Z_n, \varphi)$ with minimum cardinality.

Let $D_c = \{u_{d_1}, u_{d_2}, \dots, u_{d_{\lambda+1}}\}$. As per Remark 1, D_c is a dominating set of $G(Z_n, \varphi)$. Now the elements of D_c are consecutive integers so that their difference is 1 and $1 \in S$ (hence it follows that each vertex u_{d_i} of D_c dominates its preceding vertex $u_{d_{i-1}}$ of D_c and its succeeding vertex $u_{d_{i+1}}$ of D_c and vice versa. Thus D_c becomes a connected dominating set with minimum cardinality.

Therefore $\gamma_c(G(Z_n, \varphi)) = \lambda + 1$. \square

4. ILLUSTRATIONS



$G(Z_n, \varphi)$	$n = 11$	$n = 14$	$n = 25$	$n = 30$
Minimum Dominating Set	{0}	{0,7}	{0,1}	{0,1,2,3,4,5}
$\gamma(G(Z_n, \varphi))$	1	2	2	6
Minimum Connected Dominating Set	{0}	{0,1,2,3}	{0,1}	{0,1,2,3,4,5}
$\gamma_c(G(Z_n, \varphi))$	1	4	2	6

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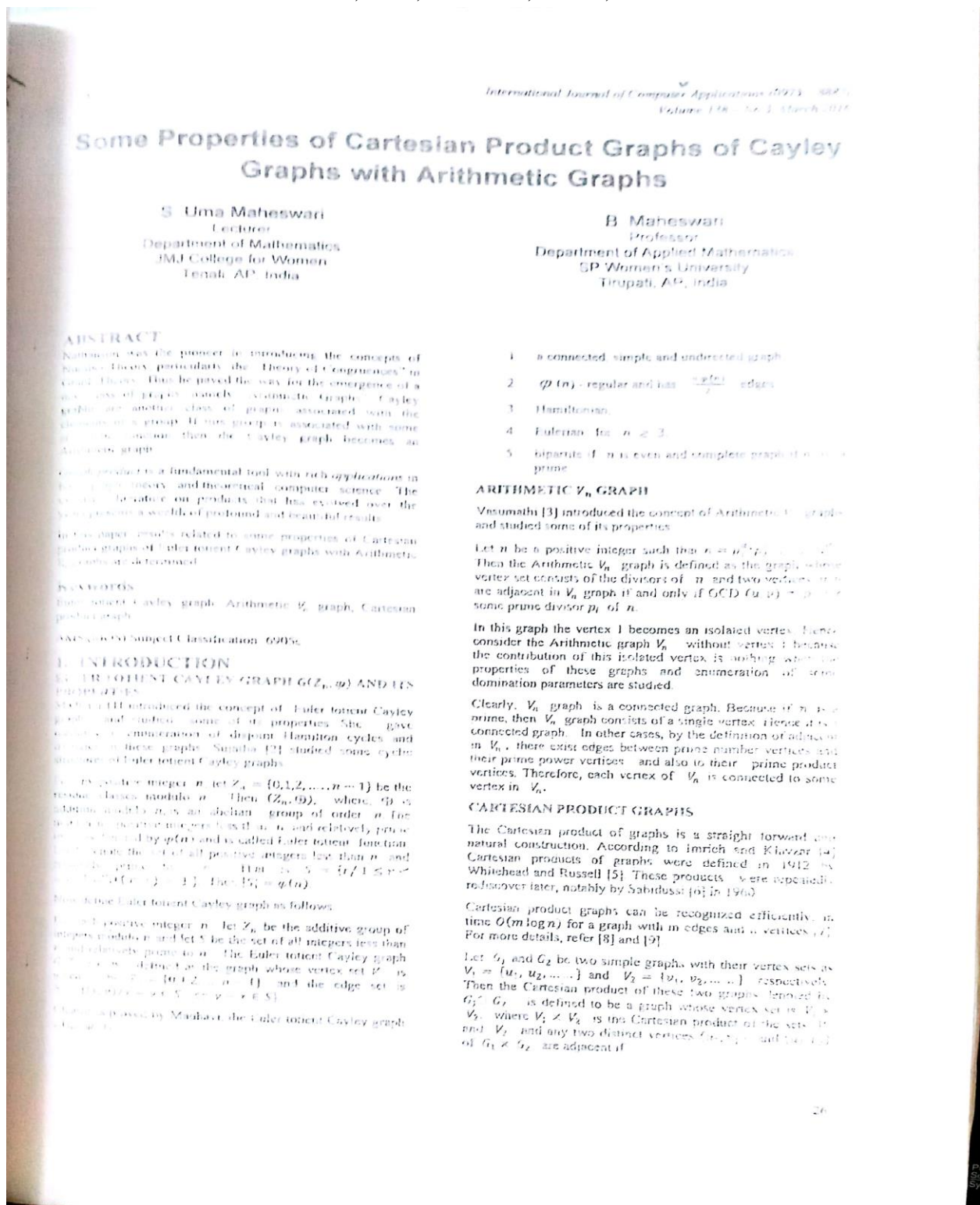
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Some Properties of Cartesian Product Graphs of Cayley Graphs with Arithmetic Graphs

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ABSTRACT

Namias was the pioneer in introducing the concepts of binary theory, particularly the "Theory of Coproducts" in graph theory. This he paved the way for the emergence of a new class of graphs namely Arithmetic Graphs. Cayley graphs are another class of graphs associated with the elements of a group. If this property associated with some prime power function then the Cayley graph becomes an Arithmetic graph.

Cartesian product is a fundamental tool with rich applications in both graph theory and theoretical computer science. The existing literature on products that has evolved over the years presents a wealth of profound and beautiful results.

In this paper, results related to some properties of Cartesian product graphs of Euler totient Cayley graphs with Arithmetic graphs are determined.

KEYWORDS

Euler totient Cayley graph, Arithmetic V_n graph, Cartesian product graph.

AMS Subject Classification: 6905c.

1. INTRODUCTION

1.1. EULER TOTIENT CAYLEY GRAPH $G(Z_n, \phi)$ AND ITS PROPERTIES

Miller [1] introduced the concept of Euler totient Cayley graphs and studied some of its properties. He gave results on enumeration of disjoint Hamilton cycles and automorphisms of these graphs. Samal [2] studied some cyclic automorphisms of Euler totient Cayley graphs.

Let n be a positive integer. Let $Z_n = \{0, 1, 2, \dots, n-1\}$ be the residue classes modulo n . Then (Z_n, \oplus) , where \oplus is addition modulo n , is an abelian group of order n . The set of all positive integers less than n and relatively prime to n is denoted by $\phi(n)$ and is called Euler totient function. Let S denote the set of all positive integers less than n and relatively prime to n . Then $S = \{x/1 \leq x < n \text{ and } \gcd(x, n) = 1\}$. Then $|S| = \phi(n)$.

Now define Euler totient Cayley graph as follows:

Let n be a positive integer. Let Z_n be the additive group of integers modulo n and let S be the set of all integers less than n and relatively prime to n . The Euler totient Cayley graph $G(Z_n, \phi)$ is defined as the graph whose vertex set V is Z_n and whose $E = \{0, 1, 2, \dots, n-1\}$ and the edge set is $E = \{(x, y) \in V \times V : x - y \in S\}$.

It was proposed by Manjula, the Euler totient Cayley graph $G(Z_n, \phi)$.

1. $G(Z_n, \phi)$ is a connected, simple and undirected graph.
2. $G(Z_n, \phi)$ is $\phi(n)$ -regular and has $\frac{n\phi(n)}{2}$ edges.
3. Hamiltonian.
4. Eulerian for $n \geq 3$.
5. bipartite if n is even and complete graph if n is a prime.

ARITHMETIC V_n GRAPH

Vasumathi [3] introduced the concept of Arithmetic V_n graphs and studied some of its properties.

Let n be a positive integer such that $n = p_1^{a_1} p_2^{a_2} \dots p_r^{a_r}$. Then the Arithmetic V_n graph is defined as the graph whose vertex set consists of the divisors of n and two vertices u, v are adjacent in V_n graph if and only if $\gcd(u, v) = p_i$ for some prime divisor p_i of n .

In this graph the vertex 1 becomes an isolated vertex. Hence, consider the Arithmetic graph V_n without vertex 1 because the contribution of this isolated vertex is nothing when the properties of these graphs and enumeration of some domination parameters are studied.

Clearly, V_n graph is a connected graph. Because of n is a prime, then V_n graph consists of a single vertex. Hence it is a connected graph. In other cases, by the definition of adjacent in V_n , there exist edges between prime number vertices and their prime power vertices and also to their prime product vertices. Therefore, each vertex of V_n is connected to some vertex in V_n .

CARTESIAN PRODUCT GRAPHS

The Cartesian product of graphs is a straight forward and natural construction. According to Imrich and Klavzar [4] Cartesian products of graphs were defined in 1912 by Whitehead and Russell [5]. These products were repeatedly rediscovered later, notably by Sabidussi [6] in 1960.

Cartesian product graphs can be recognized efficiently, in time $O(m \log n)$ for a graph with m edges and n vertices [7]. For more details, refer [8] and [9].

Let G_1 and G_2 be two simple graphs with their vertex sets as $V_1 = \{u_1, u_2, \dots\}$ and $V_2 = \{v_1, v_2, \dots\}$ respectively. Then the Cartesian product of these two graphs denoted by $G_1 \times G_2$ is defined to be a graph whose vertex set is $V_1 \times V_2$, where $V_1 \times V_2$ is the Cartesian product of the sets V_1 and V_2 and any two distinct vertices (u_i, v_j) and (u_k, v_l) of $G_1 \times G_2$ are adjacent if

- 3. $v_1 = u_1$ and $v_1 v_2 \in E(G_2)$ or
- 4. $u_1 v_1 \in E(G_1)$ and $v_1 = v_2$.

RESULTS

Let G_1 be an Euler Totient Cayley graph and G_2 be an arithmetic V_n graph. Then G_1 and G_2 are simple graphs as they have no loops and multiple edges. Hence by the definition of adjacency in Cartesian product, $G_1 \square G_2$ is also a simple graph.

We investigate some properties of $G_1 \square G_2$.

Theorem 2.1: The degree of a vertex in the Cartesian product graph $G_1 \square G_2$ is given by

$$deg_{G_1 \square G_2}(u, v) = deg_{G_1}(u) + deg_{G_2}(v)$$

where $u \in V_1$ and $v \in V_2$.

Proof: By the definition of Cartesian product, vertex (u, v) in $G_1 \square G_2$ is adjacent to all the vertices of the sets $\{(u, v_1) \mid v_1 \in N_{G_2}(v)\}$ and $\{(u_1, v) \mid u_1 \in N_{G_1}(u)\}$ where $N_{G_1}(u)$ denotes the open neighbourhood set of u in the graph G_1 and $N_{G_2}(v)$ denotes the open neighbourhood set of v in G_2 .

$$N_{G_1 \square G_2}(u, v) = \{(u, v_1) \mid v_1 \in N_{G_2}(v)\} \cup \{(u_1, v) \mid u_1 \in N_{G_1}(u)\}$$

$$|N_{G_1 \square G_2}(u, v)| = |N_{G_1}(u)| + |N_{G_2}(v)|$$

$$deg_{G_1 \square G_2}(u, v) = deg_{G_1}(u) + deg_{G_2}(v)$$

Remark: Since graph G_1 is a $\phi(n)$ -regular graph, we have $deg_{G_1}(u) = \phi(n)$, for any u . Hence we can write $deg_{G_1 \square G_2}(u, v) = \phi(n) + deg_{G_2}(v)$.

Theorem 2.2: $G_1 \square G_2$ is a simple finite graph without isolated vertices.

Proof: Since G_1 and G_2 are simple finite graphs, by the definition of Cartesian product it follows that $G_1 \square G_2$ is also a simple finite graph.

Proof: G_1 is a graph without isolated vertices for all values of n ($deg_{G_1}(u) \neq 0$ for any u). G_2 is a single vertex graph if n is prime. Otherwise G_2 is graph without isolated vertices.

$deg_{G_2}(v) = 0$ if n is a prime and $deg_{G_2}(v) \neq 0$ otherwise. Hence by Theorem 2.1, $deg_{G_1 \square G_2}(u, v) \neq 0$ for $\forall (u, v) \in V(G_1 \square G_2)$.

Hence $G_1 \square G_2$ admits no isolated vertices. \blacksquare

Theorem 2.3: The number of vertices and edges in $G_1 \square G_2$ is given respectively by

$$|V(G_1 \square G_2)| = |V(G_1)| |V(G_2)|$$

$$|E(G_1 \square G_2)| = |E(G_1)| |V(G_2)| + |V(G_1)| |E(G_2)|$$

Proof: Let p_1, p_2, p denote the number of vertices and

edges of graphs G_1, G_2 and $G_1 \square G_2$ respectively. By the definition of Cartesian product, it follows that $p = p_1 p_2$.

$$|V(G_1 \square G_2)| = |V(G_1)| |V(G_2)|$$

$$|E(G_1 \square G_2)| = p_1 = \frac{1}{2} \sum_{u \in V_1} deg(u)$$

$$|E(G_2 \square G_1)| = p_2 = \frac{1}{2} \sum_{v \in V_2} deg(v)$$

Now

$$|E(G_1 \square G_2)| = q = \frac{1}{2} \sum_{(u, v)} deg(u, v)$$

$$= \frac{1}{2} \left\{ \sum_{(u, v)} [deg(u) + deg(v)] \right\} \quad (\text{By Theorem 2.1})$$

$$= \frac{1}{2} \left\{ \left(\sum_{u \in V_1} deg(u) \right) + \left(\sum_{v \in V_2} deg(v) \right) \right\}$$

$$= \frac{1}{2} \left\{ p_1 (2q_1) + p_2 (2q_2) \right\}$$

$$= \frac{1}{2} \left\{ p_1 (2q_1) + p_2 (2q_2) \right\}$$

$$= p_1 q_1 + p_2 q_2$$

$$= |V(G_1)| |E(G_2)| + |V(G_2)| |E(G_1)| \quad \blacksquare$$

Now examine the property of connectivity in Cartesian product of these graphs.

It is proved by Wilfried Imrich and Sandi Klavzar [10] that the Cartesian product of two graphs is connected if and only if both the graphs are connected.

Since the graphs G_1 and G_2 are connected, the following result is an immediate consequence.

Theorem 2.4: $G_1 \square G_2$ is a connected graph.

Theorem 2.5: $G_1 \square G_2$ is a complete graph, if n is a prime.

Proof: Suppose n is a prime. Then Euler totient Cayley graph G_1 is a complete graph and Arithmetic V_n graph G_2 is a single vertex graph K_1 . Hence by the definition of Cartesian product, $G_1 \square G_2$ becomes a complete graph. \blacksquare

It is known that a graph is bipartite if and only if it contains no odd cycles.

To examine the property of bipartite of $G_1 \square G_2$, recall the following result given by Sabidussi.

Result: A Cartesian product graph is bipartite if and only if each of its factors is bipartite.

Assume that G_1 and G_2 are bipartite. By the definition of Cartesian product, each cycle in $G_1 \square G_2$ has edges either from G_1 or from G_2 (but not both). Since G_1 and G_2 are bipartite, these edges form an even cycle in G_1 or an even cycle in G_2 . So the number of edges of the cycle in $G_1 \square G_2$ is even. Hence there is no odd cycles in $G_1 \square G_2$. Hence $G_1 \square G_2$ is bipartite.

Conversely if $G_1 \square G_2$ is bipartite then there are no odd cycles in $G_1 \square G_2$. Since both G_1 and G_2 are subgraphs of $G_1 \square G_2$, it follows that there are no odd cycles in G_1 and there are no odd cycles in G_2 . Hence they are bipartite.

We now examine for what values of n , the Cartesian product

$G_1 \times G_2$ is a bipartite graph?

By the above result given by Sabidussi, bipartition of graph $G_1 \times G_2$ depends on the bipartition of both the graphs G_1 and G_2 .

As proved by Madhavi, Euler Totient Cayley Graph G_1 is not bipartite for odd values of n and it is bipartite for even values of n . This implies that Cartesian product graph $G_1 \times G_2$ may be bipartite only for even values of n and not for its odd values.

Theorem 2.6: Let n be an even number such that $n > 2$, $n = 2^k$ or $n = 2p$ where p is a prime. Then the Cartesian product graph $G_1 \times G_2$ is a bipartite graph.

Proof: Suppose n is an even number such that $n > 2$, $n = 2^k$ or $n = 2p$ where p is a prime. Then Euler totient Cayley graph G_1 is a bipartite graph.

Now it has to be proved that G_2 is also a bipartite graph by showing that G_2 contains no odd cycles. The proof follows in two cases.

Case 1: Suppose $n = 2^k$.

In this case Arithmetic graph G_2 contains the vertices $2, 2^2, 2^3, \dots, 2^k$. Since $\text{GCD}(2^i, 2^j) \neq 2$ for any $i, j > 1$, there exists no edge between any two powers of 2. The only edges are between 2 and its powers. Hence odd cycles cannot occur in G_2 .

Case 2: Suppose $n = 2p$ where p is a prime.

In this case Arithmetic graph G_2 has the vertices $2, p$ and $2p$. Then by the definition of edges in G_2 , there are edges between 2 and $2p$ since $\text{GCD}(2, 2p) = 2$ and p and $2p$ since $\text{GCD}(p, 2p) = p$. Since p being an odd prime, we have $\text{GCD}(2, p) = 1$. This implies that there is no edge between the vertices 2 and p of G_2 . Thus G_2 has no odd cycle.

Thus in either of the cases, G_2 has no odd cycle. And hence it is a bipartite graph. Therefore G_1 and G_2 are bipartite graphs and the even number $n > 2$ is of the form 2^k or $2p$ which implies that the Cartesian product graph $G_1 \times G_2$ is a bipartite graph. ■

Theorem 2.7: $G_1 \times G_2$ is not a bipartite graph, if the even number n is neither in the form 2^k nor $2p$.

Proof: Suppose n is an even number such that $n \neq 2^k$ or $n \neq 2p$ where p is a prime.

Since n being an even number, Euler totient Cayley graph G_1 is a bipartite graph. Since the even number n is not in the form 2^k and $2p$, it can be written as

$n = 2^a p_1^{a_1} p_2^{a_2} \dots p_k^{a_k}$, where p_1, p_2, \dots, p_k are odd primes and $a_i \geq 1$. Then G_2 contains three distinct vertices $2, 2p_1, 2p_2$ with $\text{GCD}(2, 2p_1) = 2$, $\text{GCD}(2, 2p_2) = 2$, and $\text{GCD}(2p_1, 2p_2) = 2$. This implies that these vertices are connected by edges. So, G_2 contains an odd cycle and hence it is not bipartite.

Now, G_1 is a bipartite graph and G_2 is not a bipartite graph implies that $G_1 \times G_2$ is not a bipartite graph. ■

3. ILLUSTRATIONS

Let $n = 4$.

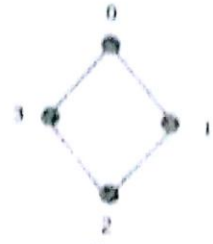
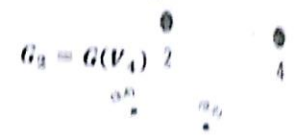


Fig 1

$$G_1 = G(Z_4, \varphi)$$

Fig 2



$$G_2 = G(V_4, \varphi)$$



Fig 3

$$G_1 \times G_2$$

Let $n = 6$.

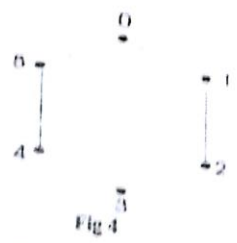


Fig 4

$$G_1 = G(Z_6, \varphi)$$



Fig 5

$$G_2 = G(V_6)$$



Fig 6. $G_1 \square G_2$



Fig 7

$$G_1 = G(Z_{11}, \varphi)$$

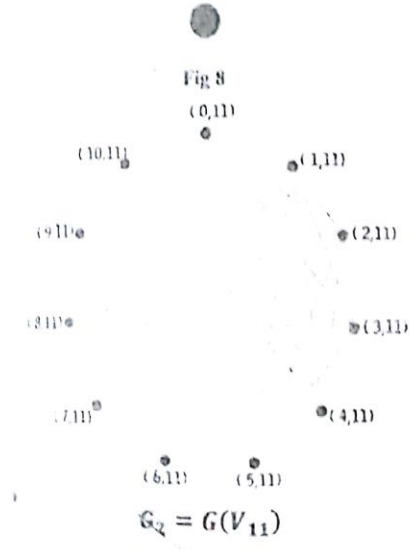


Fig 8

$$G_2 = G(V_{11})$$

Fig 9. $G_1 \square G_2$

4. CONCLUSION

Graph Theory is young but rapidly maturing subject. Its basic concepts are simple and can be used to express problems from many different subjects. The purpose of this work is to familiarize the reader with the Cartesian product graph of Euler Totient Cayley graph with Arithmetic V_n graph.

It is useful other Researchers for further studies of other properties of these product graphs and their relevance to both combinatorial problems and classical algebraic problems.

5. ACKNOWLEDGMENTS

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RECENT TRENDS IN ICT EDUCATION

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INTRODUCTION

During the past few years, there has been a tremendous growth in communication computer network and information technology. New technologies are being created for teaching and learning systems with the integration of telecommunications and computers. This convergence has helped to create many opportunities to the education system to enhance and interact with other way to achieve the learning objectives. ICT opens up opportunities for learning. It enables learners to access, extend, transform and share ideas and information through multimedia. It also helps the learner to enhance critical thinking, creative thinking and problem solving. Not only mastering ICT skills, but also utilizing ICT to improve teaching is of utmost importance for teachers in performing their role of creators of pedagogical environments. The very essence of Information and Communication Technology is not just using gadgets. The focus is on managing large quantities of information and communicating the same to the concerned parties. It is not limited to the computers or the internet. It ranges from the use of FM radio to the satellite for communication. ICT has the potential to make learning more experiential. Moreover, the large amount of data, visuals available on any topic can be brought to the classroom from over the world. That is why ICT has been considered an emerging area with lots of potential in making educational process more meaningful.

Educational technology includes numerous types of media that deliver text, audio, interactive animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet and web-based learning.

USES OF MEDIA AND TOOLS IN EDUCATION

Education media and tools can be used for:

- Task structuring support: helps how to do a task (procedures and processes),
- Access to knowledge bases and help user find information.
- Alternate forms of knowledge representation (multiple representations of knowledge such as video, audio, text, image, data)

TYPES OF PHYSICAL TECHNOLOGY WHICH CURRENTLY USED

Now, digital cameras, video cameras, interactive whiteboard tools, document cameras, electronic media, and LCD projectors are extensively used. Combinations of these techniques include blogs, collaborative software, e-Portfolios, and virtual classrooms.

COMPUTERS, TABLETS AND MOBILE DEVICES

Computers and tablets enable learners and educators to access websites as well as products such as Microsoft Word, PowerPoint, PDF files, and images. Many mobile devices support learning. Mobile devices such as clickers and smart phones can be used for interactive assessment and response feedback. Mobile learning can provide performance support for checking the setting reminders, retrieving worksheets, and instruction manuals.

AL NETWORKS

Group web pages, blogs, wikis and Twitter allow learners and educators to post their posts, ideas, and comments on a website in an interactive learning environment. Social networking sites are virtual communities for people interested in a particular subject to communicate by voice, chat, instant message, video conference, or blogs.

CAMS

Webcams and webcasting have enabled creation of **virtual classrooms** and **virtual learning environment**.

TEBOARDS

Whiteboards predate tablets and other technological tools enhances teaching and learning. Current **interactive whiteboards** and **smart boards** allow learners and instructors to write on a touch screen. Depending on permission settings, this visual learning can be interactive and participatory, including writing and manipulating images on the interactive whiteboard.

ENCASTING

Screencasting allows users to share their screens directly from their browser and make video available online so that other viewers can stream the video directly. The presenter has the ability to show their ideas and flow of thoughts rather than simply explain them as text content. In combination with audio and video, the educator can mimic the one-on-one experience of the classroom and deliver clear, complete instructions. Learners have an ability to pause, rewind and to review at their own pace, something a classroom cannot always offer.

TUAL CLASSROOM

A virtual learning environment (VLE), is also known as a learning platform, it simulates a virtual classroom or meetings by simultaneously mixing several communication technologies. For example, web conferencing software such as GoToTraining, WebEx Training or Adobe Connect enables students and instructors to communicate with each other via webcam, telephone, and real-time chatting in a group setting. Participants can raise hands, answer polls and take tests. Each class is recorded and stored on a server, which allows for instant playback of the class over the course of the college year. This can be extremely useful for students to retrieve recorded material or review concepts for an upcoming exam. Parents and auditors have the conceptual ability to monitor any classroom to ensure that they are satisfied with the education the learner is receiving.

IN TEACHING

Information and Communication Technologies (ICT) have an immense potential to impact education of students, teachers, teacher educators and others, and provide more effective ways of mitigating some of the challenges being faced by the present educational system.

Information and Communication Technology (ICT) can contribute universal access to education, equity in education, improve quality of teaching, teachers' professional development in education management, governance and administration. The Organization's Intersectoral Platform for ICT in education focuses on these issues through the joint work of three of its sectors: Communication & Information, Education and Science.

With availability of user friendly tools, multimedia courseware can be developed by teachers to master basic skills, simulate complicated situations, produce individualized instructions with built in evaluation questions and scores. It is now feasible and possible to implement and flexible learning strategies using ICT as tools. Online tools help to create content with online education to support and assist face to face instruction in an innovative way. Communication with e-mail, searching for information, locating a proper website are the keys to success.

The role of the teachers will change from knowledge transmitter to that of a knowledge navigator and sometime as co-learner. The new role of teachers demands a new way of thinking and understanding the new vision of learning process.

ICT IN LEARNING

Some of the benefits of incorporating technology into learning may include:

- Improved open access to education, including access to full degree programs.
- Better integration for non-full-time students, particularly in continuing education.
- Improved interactions between students and instructors.
- Provision of tools to enable students to independently solve problems.
- Acquisition of technological skills through practice with tools and computers.
- No age-based restrictions on difficulty level, i.e. students can go at their own pace.
- Reduce travel costs.
- Easy-to-access course materials.
- Student motivation.
- Students can access and engage with numerous online resources at home.
- Using online resources can help students spend more time on specific aspects of work they may be learning in school, but practicing at home.
- Wide participation. Learning material can be used for long distance learning and are accessible to a wider audience.
- Improved student writing. It is convenient for students to edit their written work with word processors, which can, in turn, improve the quality of their writing.
- Effective technologies use many evidence-based strategies (e.g. adaptive content, formative testing, immediate feedback, etc.), as do effective teachers.
- The Internet has unlocked a world of opportunities for students. Information and ideas that were previously out of reach are now a click away. Students of all ages can connect and learn on a global scale.
- Using computers or other forms of technology can give students practice on core concepts and skills while the teacher can work with others, conduct assessments, or perform other tasks.
- Studies completed in "computer intensive" settings found increases in student self-direction, cooperative and higher order learning, writing skills, problem solving, and using technology.

The following are some of the ways where technology can help to achieve the goals of a learner-centred classroom:

Shift the balance of power toward the learner: Interactive online assignments can facilitate the transfer of power and give students an opportunity to practice mastering the material at their own pace. The technologies that support these activities could include wikis, online quizzes, blogs, and discussion boards.

Use content to organize activities: Students appreciate a structured, logical flow to their courses. How you organize your assignments and activities can go a long way in minimizing confusion.

Think of teaching as facilitating learning: Teaching with technology enables the instructor to create learning experiences that complement each other whether the students are working on an assignment online or meeting in a face-to-face environment. The technologies that support this goal include online homework, clickers and surveys.

Responsibility for learning rests with the learner: Learner-centred teaching means creating assignments that allow students to practice building connections with the material, and evaluate their learning. The technologies that can be used to help students take ownership of their learning include blogs, wikis, online quizzes, and Voice Thread.

Using Google Apps. Using Google's Web apps, specifically Google Docs and Google Slides, will facilitate in-class discussions and collaborative projects.

Flipped Class Room Model. Follow the "Flipped Classroom" model which involves filming some of the teacher's lectures and making them available to students prior to class meetings and also make a way for more elaborate group review, discussions, and other collaborative assignments during class.

Face Book. Face book can be used as home base, where we may post announcements, assignment directions, and reminders. Face book also allows us to post pictures and videos, add "handouts" (under files), and survey students to get their feedback. Being able to do all of these things in one place saves a lot of time and confusion.

Curriculum

Given the dynamic nature of ICT in education and learning the curriculum to develop should be generic in design and focus on broad exposure to technologies, together aimed at enhancing creativity and imagination of learners. It should also realise the goals of the National Policy of ICT in College Education.

For the teacher, it is an initiation into:

- Exploring educational possibilities of technology,
- Learning to make right choices of hardware, software and ICT interactions, and
- Growing to become a critical user of ICT.

For the student, it is an initiation into:

- Creativity and problem solving,
- An introduction to the world of information and technologies, and
- An opportunity to shape career pursuits.

The curriculum should be so designed that after undergoing this course the teacher

- Effectively use ICT tools, software applications and digital resources.
- Integrate ICT into teaching-learning and its evaluation.
- Acquire, organize and create her own digital resources.
- Participate in the activities of teachers' networks.
- Participate in the evaluation and selection of ICT resources.
- Practice safe, ethical and legal ways of using ICT.
- Use ICT for making classroom processes more inclusive and to address multi abilities.

In case of the students they should be able to:

- Develop digital literacy skills that will enable them to function as discerning an increasingly digital society.
- Access various tools and applications for learning and skill development.
- Operate a variety of hardware and software independently and troubleshoot problems.
- Use the ICT facility with care, ensuring the safety of themselves, others and the
- Create a variety of digital products using appropriate tools and applications storing and managing digital resources.
- Practice safe, legal and ethical means of using ICT.

Disadvantages of ICT

a) Govt has spend large sums of money on technology. However, no Govt looks at return on investment (ROI) to connect expenditures on technology with improved outcomes.

b) New technologies are frequently accompanied by unrealistic hype and promise their transformative power to change education for the better or in allowing better opportunities to reach the masses. Examples include silent film, broadcast radio, and none of which have maintained much of a foothold in the daily practices of formal

c) Technology, in and of itself, does not necessarily result in fundamental improvement in educational practice.

CONCLUSION

The developments in the use of the electronic media have influenced all aspects of Education is no exception to this. The use of computers and the internet for enhancement of education by making learning more relevant to life has been seen as an ideal by the institution. As we become increasingly supported by ICT, teaching and learning will be the same as before. Technology and teacher professional development in its use are being in the context of broader educational reform which embraces a shift away from teacher lecture oriented towards learner centred, interactive and constructive learning. Multimedia and ICT can play the role of catalyst for such educational reforms. ICT can promote effective instruction that is more engaging, learner centred, interdisciplinary more closely related to real life events and processes and adaptive to individual learning and needs. The citizens of tomorrow who are our students now are going to live in

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media. They need to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socio-economic development of the nation and to global competitiveness. Here it is pertinent to say that this is possible only when we integrate ICT more meaningfully into our education system.

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ROLE OF YOUTH ENGAGEMENT IN PREVENTING DRUG ABUSE AND CRIME

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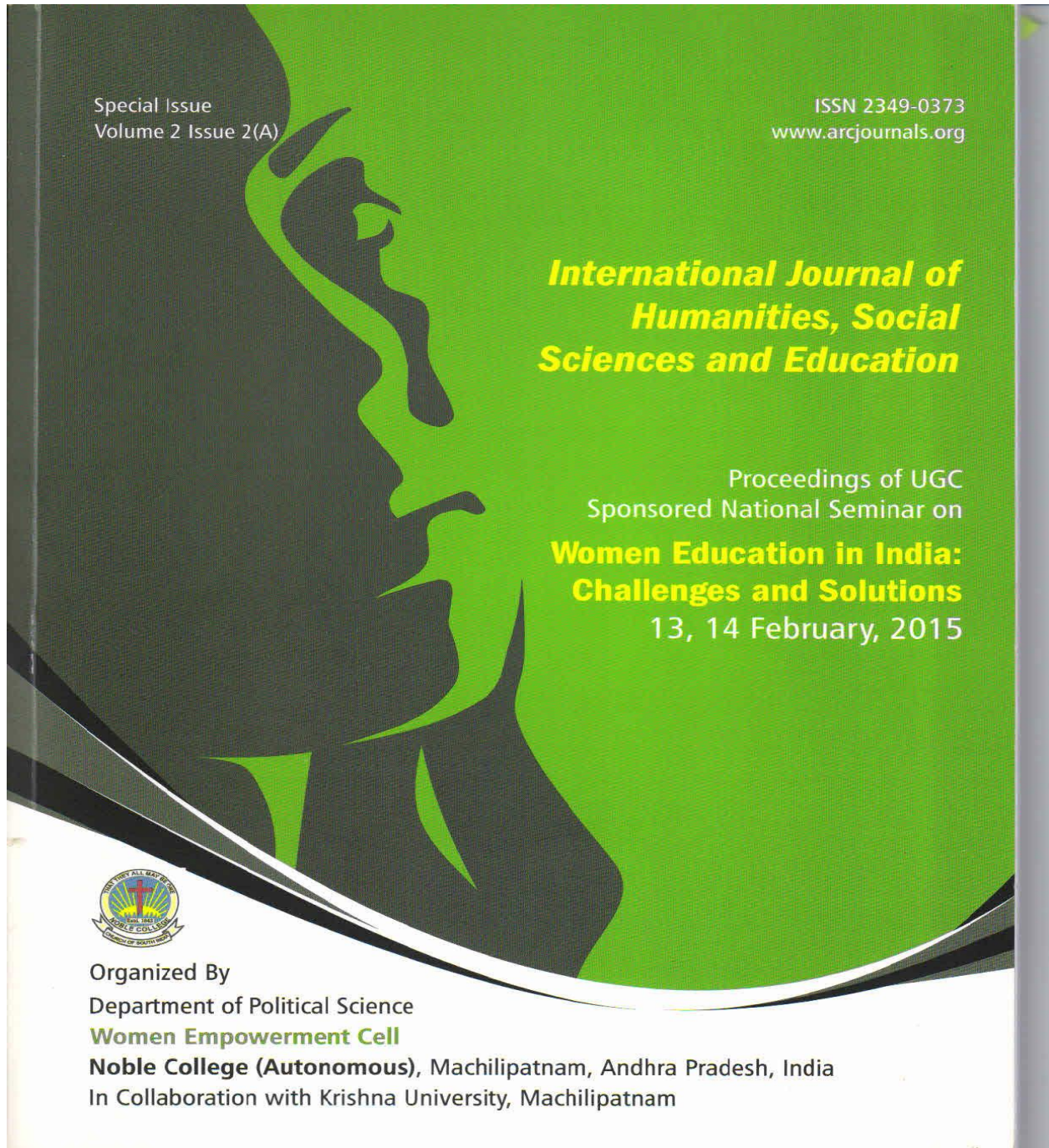
Youth engagement plays an important role in preventing substance abuse among youth. Youth engagement is defined as the sustained and meaningful involvement of youth in an activity focusing outside him or herself. A broad range of activities are effective in engaging youth; including but not limited to school or community volunteering, sports, the arts, music and politics.

The benefits of engaging youth are significant. Positive outcomes of engagement include a decrease in the rate of substance abuse, a decrease in rate of crime, an increase in academic performance and a more meaningful connection with a youth's community.

Several studies prove that the engagement of youth has a significant impact in the healthy development of a youth's life. The academic performance of youth was significantly influenced, where students who were involved in extra-curricular activities were less likely to drop out of school than students who were not. This was particularly true for youth from poor families and youth with poor social and academic skills. These young people were 5 times less likely to drop out than similar youth who weren't engaged.

Boys and girls who were more involved in extra-curricular activities were less likely to be arrested for criminal offenses as young adults than those who did not participate in extra-curricular activities.

How do we engage our youth? Communities that play an active role in engaging their youth are likely to prevent their youth from risky behavior, such as the use of drugs. Youth that are involved in important decision making that affect their lives, youth that are encouraged and supported to reach their full potential and youth who receive mutual respect from adults, parents, educators and peers are more likely to live a healthy life. The full paper talks about few tips for prevention of crime and Drugs.



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Women Empowerment and Higher Education

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Abstract: *Empowerment is a multidimensional social process which helps people to gain control over their own lives and fosters power in people for use in their own lives, their communities and in their society. It improves personal knowledge, gives her courage to try non-traditional behaviors, to view herself as a complete human person, creativity, helps in making decisions shaping society and influencing the decision being made in society. Higher education, a process by which skills and creativity can be developed, empowers women which include welfare access participation and control. Gender main streaming of higher education sector is the need of the hour*

The American Oxford dictionary defines “empowerment” as to make someone stronger and more confident especially in controlling their life and claiming their rights.

Higher education is directly proportional to an individual’s capacity to earn progress and development .It empowers women by improving their living standards .It is the starting point for advancement in different fields and a basic tool to fulfill their roles as equal members of the society .It empowers women to develop ability for critical thinking, fostering decision making and action through collective processes. It ensures equal participation in developmental processes and enhances self- esteem and self-confidence in women

The Indian **National policy of Education**, set up in 1990, recognizes this when it states “Wider Women’s access to vocational technical and professional education at all levels, breaking gender stereo types, will ensure better financial stability for women and lead to national development”.

After independence to promote higher education of women, government established separate women universities and women’s colleges. During the last six decades no. of women colleges increased by nearly ten times but the percentage of women colleges to total colleges remains more or less the same i.e., about 12%

On the eve of independence the share of women in total enrolment is about 10%. When the country was approaching its diamond jubilee of independence it crossed 40%.This shows awareness about women’s higher education in the society.

In 1958, Govt .of India appointed a National committee for the education of women. The Kothari commission (1964-66) emphasized equal opportunities for women. These efforts resulted in increase in women literacy rate.

Poverty is the main reason of dropouts of girl students and break in their education. Due to our socio-cultural condition, a major portion of the women’s population is away from higher education .College students should learn present gender in equality, social discrimination and the values of life which will help the younger generation to become mature and in-turn it will benefit society at large. The subject relating to this study should be an integral part of undergraduate study.

Higher education needs to be reoriented to increase women’s entry and equip them to take up entrepreneurial administration and management roles and tasks. Gender discrimination at work constrains economic growth and has a negative effect on the wealth and well being of families and communities.

Women Empowerment and Higher Education

Institution of higher education should establish linkage with such government and non-government organizations who would help for empowerment of women. As part of globalization process, many changes have occurred in the educational system from a gender perspective questions that might rise are,

- a. Does the curriculum content promote research and gender equality?
- b. Does the learning environment foster assertiveness and empowerment in girls?
- c. How will the education system foster sensitization of members towards girl's Higher education and empowerment?

The lack of educational and training facilities for studying science and the type of employment available for women holds them back. Thus one of the thrust areas of higher education is to include technology studies to help women's development in research and employment. Academic policy designing must include the enrolment of more women to ensure "Productivity ethics- to increase women's productivity is imperative".

STRATEGIES OF EMPOWERMENT-HIGHER EDUCATION

1. Cultivation of positive self- image and self-confidence.
2. Developing capacity for critical thinking
3. Achieving group cohesion and fostering decision making and action.
4. Providing women's centers in Agricultural and Home science colleges
5. Providing continuing education and correspondence centers for organizing vocational and literary skills.
6. Revamping the industrial training institutes in-terms of diversification of trades and courses-keeping in view the job potential, facilities for vocational counseling, imparting information about credit, banking, entrepreneurial development and access to women's technical education.
7. Providing women's studies research centers to identify issues and access to organize seminars and workshops to discuss and analyze women related issues and disseminate information and to encourage interaction of students with general public through the media.
8. Providing classes on legal literacy programmers for women's socio-economic development delivered via media, adult education and information and training support.
9. A more relevant and responsive curriculum catering to the cultural and occupational needs of women.
10. Meeting the expenses of higher education for the rural backward sections with incentives like scholarships and fee concessions.

Identifying and resolving barriers such as male attitudes to women roles and capabilities can help to open up more involvement of women in higher education

FOR THE SOCIAL EMPOWERMENT OF WOMEN

A holistic approach to women's health that includes both nutrition and health services should be adopted. Women should be involved in using solar energy, bio-gas, and smokeless chulha's so as to have a visible impact of these measures in influencing eco-system and change the life styles of rural women. Special assistance should be given to women in difficult circumstances. Institutions and mechanism / schemes that deals with violence against women, Physical or mental, domestic or social levels, arising from customs or traditions should be strengthened. Violation of her rights, discrimination against girl child should be eliminated by undertaking strong measures both preventive and punitive. Media should be encouraged to develop codes of conduct. Removal of references derogatory to the dignity of women from public and legal documents and use of mass media to communicate social messages related to women's equity and empowerment are needed. Promotion of social awareness to gender issues and women's human rights is required

At work place, high level of corporate leadership gender equality should be established. Co-operative credit societies, exclusively for women to facilitate financial clout should be created. All

Women Empowerment and Higher Education

women and men should be treated fairly at work without discrimination, respecting and supporting human rights Education, training and professional development for women should be promoted. Health safety and wellbeing of all women should be ensured. Areas and levels of operation for women, where they are not present as of now should be identified

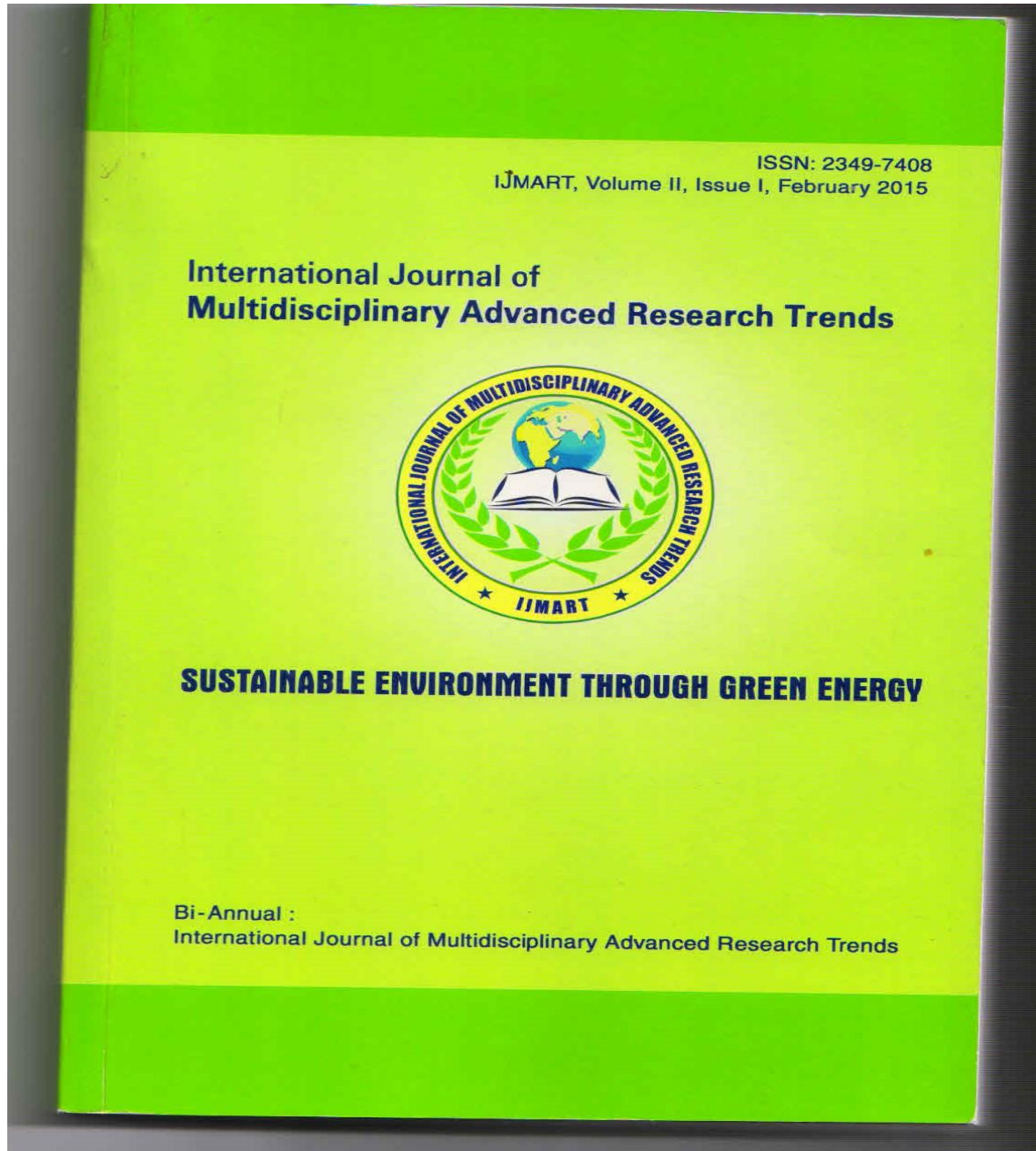
CONCLUSION

Thus higher education is the best tool to achieve women empowerment in India. It should become an agent for ending gender discrimination.

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21. Municipal solid waste-The challenges it poses” in International Journal of Multidisciplinary Advanced Research Trends on 27th & 28th Feb 2015 with ISSN:2349-7408



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MUNICIPAL SOLID WASTE – THE CHALLENGES IT POSES

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ABSTRACT

According to the 2011 census, population of India was 1,217 million out of which 32% live in cities and it is projected that by 2050 half of the Indians will live in cities. Urban India is facing a huge challenge to cope with the infrastructural requirements of its ever-increasing population. Municipal Solid Waste Management (MSWM) despite being the primary responsibility of the urban local bodies still remains as a major obligation that has to be improved. To improve the urban infrastructure and basic services for the poor, with an estimated provision of 500 Billion Indian Rupees, the Government of India launched the single largest Central Government initiative in the urban sector in 2005, the "Jawaharlal Nehru National Urban Renewal Mission (JNNURM)". The primary objective of the JNNURM is to create economically productive, efficient, sustainable and responsive cities. As improvement in MSWM is one of the major issues, many cities in India for the first time have sufficient funding mechanisms for shaping comprehensive MSWM systems.

Keywords: Urbanization, Environment pollution, Municipal solid waste, solid waste management, Clean development mechanism, Bio-remediation units



Introduction:

Solid waste in developed and least developed countries in the economic development

The last three decades witnessed the development in urban areas over rural ones in a process called urbanization. Growth of urbanization is more in developing countries than the developed countries to the extent that it became a trend characterizing several developed and even least developed countries. Growth in urbanization is coupled with the growth of population living in urban areas. In figure 1, China, urbanization led to increase in the population to about 35% percent of its total population with annual growth of urban population of about 4%. Similarly, it is anticipated that by 2025 urban population will reach 50% of the total population; and probably more. This expected increase will cause major shift in the distribution of the countries' populations and will lead to the expansion of urban boundaries (World Bank, 2014).

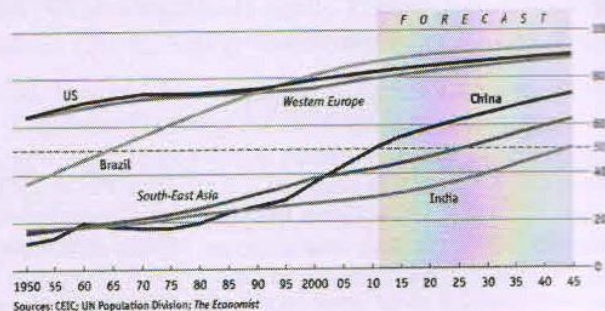


Figure 1 Urbanization Population living in urban areas, % of total

The reality is that the growth in urbanization does not always mean improving situations, including sectors developments. In the recently published 2013 human development report (UNDP, 2013), indicators that describe the accessibility to water and sanitations in developing and least developed countries are not encouraging at all. It is found that an average of about 45% of countries' populations are lacking proper sanitation infrastructures, and an average of 20% are lacking proper accessibility to water. In addition, the report showed that the percentage of populations living on degraded land is increasing to an average that exceeds 15%. The growth will result in increase in the quantity and complexity of the generated wastes and overburdens, including solid wastes, and in particular municipal solid waste (MSW). Low income countries with yearly per capita GDP that does not exceed 5000 Euro have the lowest MSW generation rates, which are in the range 0.3 – 0.9 kg/capita/day. The increase in per capita daily



generated waste is found linearly proportion to the per capita GDP. In high income countries it reaches a range of 1.4 – 2.0 kg/capita/day. Another element that characterizes differences between the generated MSW in low and high income countries (developed and most developing countries) is the percentage composition of MSW constituents. There, the lifestyle of peoples decisively characterizes the percentage composition where organic waste stream and overburden form more than 50% of the total generated MSW. This is the opposite in high income countries, where lifestyle favors fewer homes cooking, relying mainly on the readymade backed food. This is reflected in the figure 2 that represent the percentage of organic waste stream which does not exceed an average of 30% of the total generated waste and that more packing material characterizes the MSW.

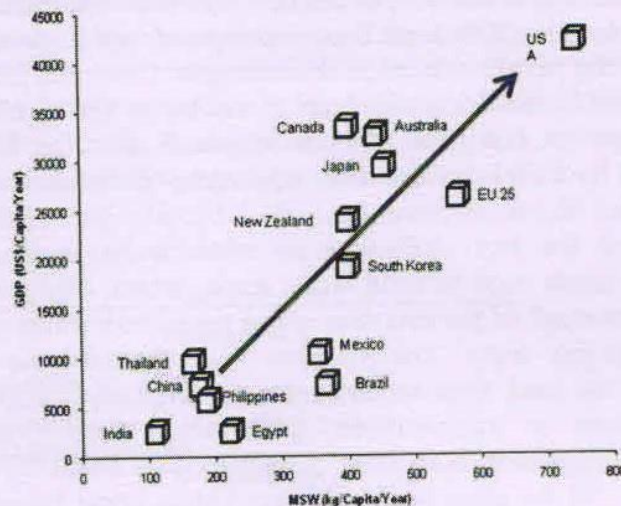


Figure 2 Municipal Solid Waste vs GDP in various countries

In urban areas of most developing and least developed countries generated MSW is at best collected and dumped in arbitrary dump sites that mostly lack the appropriate norms. Such disposal requires collecting, transport and dumping into the nearest open space area. In other countries MSW is dumped into water bodies and wetland and part of the waste is burned to reduce its volume. Such practices have their adverse environmental impacts ranging from polluting the natural resources and the ecology to the creation of health problems which might turn into long-term public health problems. Studies conducted in the last decade in several developing countries showed that same old non environmental sound practice are still used. Although lots of significant efforts have been done in the last few decades in many developing countries supported technically and financially



by developed countries and international organizations, substantial reforms in the management of MSW are still not attained. This is due to the fact that frameworks recommended were mostly similar to that adopted in developed countries but without seriously addressing the socio-economic differences between the developed and developing countries.

Solid waste in the context of development in India

India's economy is growing at a faster pace than ever before in the history of the country. With an average growth rate of more than 7% since the year 1997, the country is ranked as the 10th largest GDP in the world. Urban India is the major driving force of the country's economic growth contributing to more than 60% of the GDP. It is estimated that by 2030, urban India could generate 70% of net new jobs and contribute to more than 70% of the Indian GDP. India has experienced rapid increase in urban population in the past few decades. According to Census of India, the urban population of India has increased from 25 million in 1901 to 368 million in 2014. This growth has been more pronounced after the 80's and it is estimated that by 2050 half the Indian population will live in cities.

One of the key challenges in urban India is to cater to the infrastructure needs such as solid waste management, transportation, water supply and sewerage of the ever-increasing population which calls for huge investments in this sector. The XII Five Year Plan of India (2013-2017), foresees that the total fund requirements for implementation of the Plan target in respect to transportation, urban water supply, sewerage and sanitation, drainage and solid waste management is about 3.3 Mio INR (~43,000 Euro). On the other hand till today Urban Local Bodies (ULBs) in India, which can be divided on the basis of population, into Municipal Corporations, Municipalities, Municipal Committees or Nagar Panchayats, usually do not have financial and technical abilities to plan for, implement, operate and maintain improved infrastructure facilities.

Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

As a response to the increasing stress on urban infrastructure and basic services for poor, the Government of India launched a massive investment and reform programme in December 2005. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) provides infrastructure improvements in 65 Indian cities including seven mega cities, all the state capitals and other cities of outstanding religious and touristic importance. The primary objective of the JNNURM is to create economically productive, efficient, equitable and responsive cities. The reform programme has two



major components. Ref. figure 3., The first component is substantial investment in urban infrastructure wherein 50% of the investment is contributed by the Central Government and the remaining 50% is jointly contributed by the respective State Governments and the Urban Local Bodies (ULBs) depending on their population. The second component comprises of mandatory reforms to be undertaken at the respective State and ULB level to ensure good governance and financial sustainability of the proposed interventions. Municipal Solid Waste Management is one of the key issues being addressed under the JNNURM reform programme.

Municipal Solid Waste Management in India:

Municipal Solid Waste Management (MSWM) is one among basic essential services provided by Urban Local Bodies in the country to keep urban centres clean. However, it is one of the most poorly rendered services in the basket. The total waste production in urban India is estimated to be 115,000 MT/d (metric tonnes/day). Per capita generation of waste in Indian cities ranges from 0.2kg -0.6 kg per day. As in Table 1, An assessment states that the per capita waste generation is increasing by about 1.3% per year. With an urban growth rate of 3-3.5% per annum, the annual increase in waste quantities has been estimated at 5 % per annum.

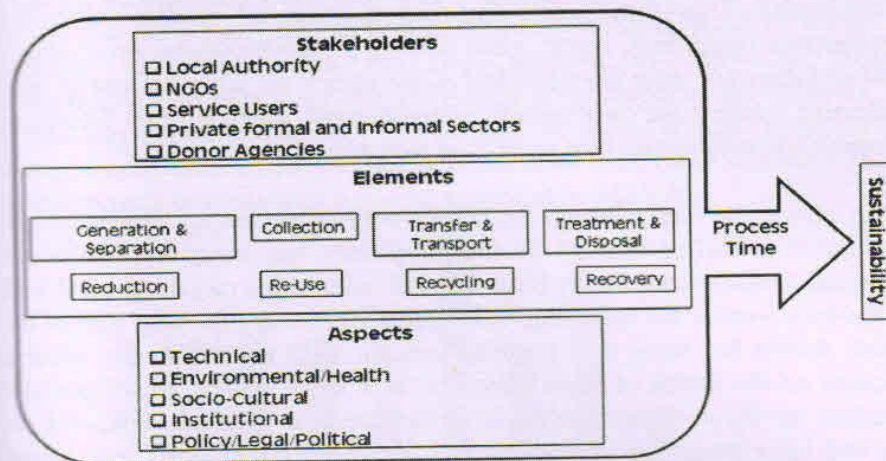


Figure 3 Components of Reform Programme



Population range (in million)	Average per capita waste generation gms/capita/day
0.1 to 0.5	210
0.5 to 1.0	250
1.0 to 2.0	270
2.0 to 5.0	350
5.0 plus	500

Table 1 Population range and Waste Generation

Municipal Solid Waste Management (MSWM) being the statutory responsibility of the Urban Local Bodies (ULBs), it is usually looked after by the Public Health and Sanitation Department, as one of its many fold duties. However, on a pan India scale till about a decade ago, most ULB's did not have the adequate infrastructure or funds to cater to the various systems needed to manage a good municipal waste management system including collection, transportation, storage, processing and disposal. Technological options for proper treatment and scientific disposal of municipal waste were also largely unknown till about a decade ago. All Indian households segregate and sell dry waste to the informal recyclers (kabariwala). Thus most waste that has a perceived market value like newspapers, magazines, metal, glass bottles, plastic bottles/material, etc. is sold and does not enter the municipal waste stream ref table 2. Door to door collection systems are only recently emerging and waste is often littered or dumped into community bins or on road side dumps.

Once the waste leaves the house, the rag-pickers come into action. The waste is shifted through by the rag-pickers and most recyclables are collected from the community bins, the road sides or the city dumps and sold to the local vendor for recycling. This sector takes care of a large part of the waste stream but there is a growing concern with regards to the adverse impacts on the health of these recyclers, as a large number of women and children are involved and the use of protective gear is largely unknown. In the end large quantities of waste including plastic are dumped and littered which is severely disturbing the urban environment including the cities aesthetics'.



City	Paper	Metals	Glass	Textiles	Plastic ¹	Ash, dust	Organics	Others ²
Chennai	5.90	0.70	-	7.07	-	16.35	56.24	13.74
Delhi	5.88	0.59	0.31	3.56	1.46	22.95	57.71	7.52
Kolkata	0.14	0.66	0.24	0.28	1.54	33.58	46.58	16.98
Bangalore	1.50	0.10	0.20	3.10	0.90	12.00	75.00	7.20
Ahmedabad	5.15	0.80	0.93	4.08	0.69	29.01	48.95	10.39
Mumbai	3.20	0.13	0.52	3.26	-	15.45	59.37	18.07

Table 2 Wastes based on materials in cities

According to Ministry of Urban Development, Government of India (MoUD), 72.5 percent of the total solid waste generated in the country is generated in cities with a population of more than 0.1 million, of this the 35 million plus cities account for approximately 35 percent of the total garbage generation. The remaining 3,955 urban centres produce only 17.5 percent of the waste. The collection efficiency ranges between 70 to 90% in major metro cities as in figure 4. In smaller cities, it is often below 50%. It has been estimated that the ULBs spend about INR 500 to 1500 per tonne on solid waste collection, transportation, treatment and disposal (8 to 25 Euros per tonne). About 60-70% of this amount is spent on street sweeping, 20-30% on transportation, and less than 5% on final disposal of waste, which shows that hardly any attention is given to scientific disposal of waste. In practice, this means that the final disposal of MSW is mainly uncontrolled. The launch of the JNNURM programme of the Ministry of Urban Development (MoUD), Government of India, brought considerable change in the status of the ULBs. Suddenly there were funds available for all infrastructural projects with a special emphasis on MSWM.

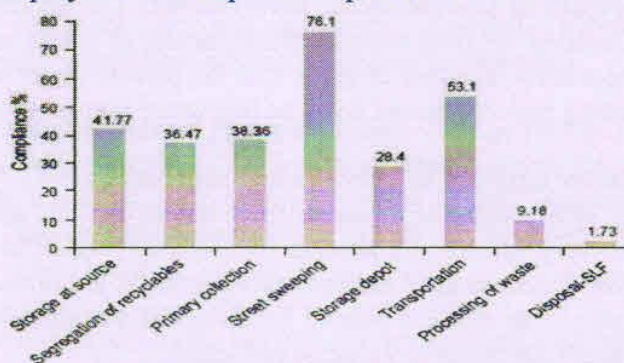


Figure 4 Collection Efficiency

The JNNURM has also encouraged private sector involvement for innovative financing and technical up-gradation. As on March 2014, a total



of 51,064 million INR (735 million Euros) have been sanctioned for 67 Indian cities to improve their solid waste management. Despite huge investments and the encouragement of the Central Government to invest in and adapt to the MSW (M&H) Rules 2000, improvement in this sector is very slow. To further encourage the ULBs, the 13th Finance Commission of the Government of India, has sanctioned 25,104 Million INR (343 million Euros) to the MoUD for strengthening the SWM schemes in ULBs and the 14th Finance Commission of the Government of India, recommends that of all grants to be given to the ULBs, 50% should be for SWM (2016-2020).

Main reasons for weak implementation by Indian ULBs:

Institutional weakness: The administrative structure of Municipal Corporations in India has traditionally not been designed to manage the enormous change processes necessary in the urban sector. Quantity and often more important, lack of qualification of staff is hindering adequate institutional development. Top municipal managers, though often qualified, get frequently transferred. Generally, citizens' trust in public sector performance is very limited.

Lack of financial sustainability: Till today only very few Municipal Corporations have been able to achieve transparency in their MSW budgets. Dependence on (irregular) funding from the state level has led to lack of accountability towards the citizens. Regular funding for SWM usually derives from property tax, the collection efficiency for which is widely inefficient, keeping many municipal budgets on the minimum.

Lack of experience in private sector involvement: The enormous amount of investment needed for infrastructure development in SWM needs private investments. Moreover, it is felt in India, that the private sector will be more efficient in dealing with municipal services like waste management.

Need for capacity building of elected local representatives: Although the involvement of local elected representatives in day to day city administration is usually not very strong. In absence of a clear understanding of an integrated MSWM system local elected representatives are often reluctant to approve necessary user charges needed for financial sustainability, creating political drawbacks for necessary change processes.

Inadequate land use planning and its enforcement: Urban areas are also expanding rapidly and the local authorities are not able to keep pace with an



ever expanding urban sprawl. This lack of enforcement on the part of the authorities also aggravates the problem and results in considerable delays in the construction of treatment facilities and scientifically engineered landfills in many places. Public Interest Litigations (PILs) in some cases have also resulted into the closure of functioning facilities.

Lack of environmental awareness and weak enforcement: Although, according to Indian laws, Environmental Impact Assessment (EIA) is mandatory for common MSW treatment facilities, the practical procedure is often inadequate or simply ignored, leading to critical site selections in some cases. The extreme scarcity of land is often dragging decision makers into unsuitable land for infrastructure development. Once operation starts, operation and compliance to the consent conditions is not always properly monitored by the responsible authorities.

Agents of change: Despite all these problems, issues related to MSWM have come on the political and administrative agenda in urban India. SWM is increasingly becoming a prime subject in local elections. Growing concern in the society about the urban sector in general and SWM especially have resulted into many fold activities, promising a much faster progress to come in the near future. Some of the key activities and approaches are listed below.
Government Initiatives: The JNNURM reform programme is currently under revision and is likely to be extended beyond 2012. The MoUD is evaluating the impact and will readjust policies wherever needed.

As part of the National Urban Sanitation Mission, which was launched in December 2008, SWM is addressed through a set of instruments on state and city level (state and city sanitation plans). Therefore liquid and solid waste management are getting strategically connected.

The National Action Plan on Climate Change (NAPCC), which was launched in 2008, formulates the Indian strategy towards climate change. It consists of 8 missions. One of the missions is the "National Mission on Sustainable Habitat" addresses SWM as one of the relevant issues to be improved in urban India.

Government of India has started to generate competition through service level benchmarks amongst cities and states. The MoUD has formulated Service Level Benchmarks for the basic urban services of SWM, water supply, sewerage and storm water drainage with an aim to improve



performance of the ULBs and therefore the service delivery to the community. The SWM benchmarks include 8 aspects:

1. Household level coverage of SWM services
2. Collection efficiency
3. Extent of source segregation at consumer level
4. Extent of waste reused/recovered/recycled
5. Extent of scientific disposal
6. Extent of cost recovery
7. Efficiency in redressal of customer complaints and
8. Efficiency in collection of user charges.

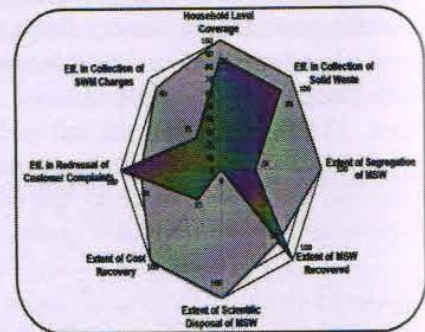


Figure 5 Aspects of Benchmarks

CDM potential in MSW in India is being used; 12 CDM (Clean Development Mechanism) projects have been registered from India in MSW which have a potential of generating approximately 3.28 million CERs (Certified Emission Reductions) by the end of the first commitment period (2012). Majority of these projects are composting projects. GTZ conducts an annual event viz. 'Carbon Bazaar' in collaboration with German Federal Ministry for the Environment, Nature Conservation & Nuclear Safety (BMU) and Ministry of Environment & Forests (MoEF), Government of India to strengthen Indian Carbon Market and provide a common platform for different market players.

SWM has become a major focus for service level improvement and provision of investment from the public side. It is increasingly becoming a business opportunity for private sector in India. This will lead to increased competition and improved services by the private sector while the national institutions face the challenge of providing the rules and a level playing field. At the same time Municipal Corporations will gain experience in shaping and monitoring sensible PPP projects.

Waste to Energy: Though highly promoted in India there are so far only few examples for successful waste to energy projects in the urban sector. After a



few prominent failures in large scale biomethanisation plants (Lucknow, Vijayawada) due to various technical, Institutional and financial reasons, organic waste gets mainly processed in compost plants. Considering the growing energy demand in urban India, biomethanisation offers a large potential for energy production, methane avoidance and recovery of nutrients in an integrated waste management system. GTZ under the International Climate Change Initiative (IKI) of the German Ministry for Environment, Nature Protection and Nuclear Safety (BMU) is currently carrying out a pilot project for treatment of black water from community toilet complexes and segregated organic waste through co-fermentation. The project only recently started and so far, first results are being awaited.

Co-processing of fractions of MSW: Co-processing of the high caloric fraction of MSW could be a cost effective and environmentally sound alternative to landfilling, in many cases. On the basis of already ongoing pilots and internationally accepted principles, as elaborated during a PPP project between the cement company Holcim and GTZ, the concerned Ministries in India are currently considering a suitable regulatory framework for the promotion of co-processing of certain fractions of MSW in cement kilns as well as in other industries (thermal, steel).

Conclusion and outreach: Developing and least developed countries have no alternative but to plan for a sustainable development processes acknowledging the importance of encountering the problems in persistence and facing the development challenges with an active participation of stakeholders including the public. With the growth in urbanization MSW services is becoming one of the most challenges which if not properly and sustainably dealt with will adversely impact all other development sectors. The best approach for dealing with solidwaste sector is by implementing an integrated and sustainable management approach that ensures the good health of the society and the environment and the active participation of the society.

Looking into the huge infrastructure requirements for liquid (waste water) and solid waste management processes, innovative decentralized solutions, which make use of the energy and nutrient content of wastes will be most appropriate and cost effective. Therefore technology cooperation is a key success factor for sustainable waste management in urban India.



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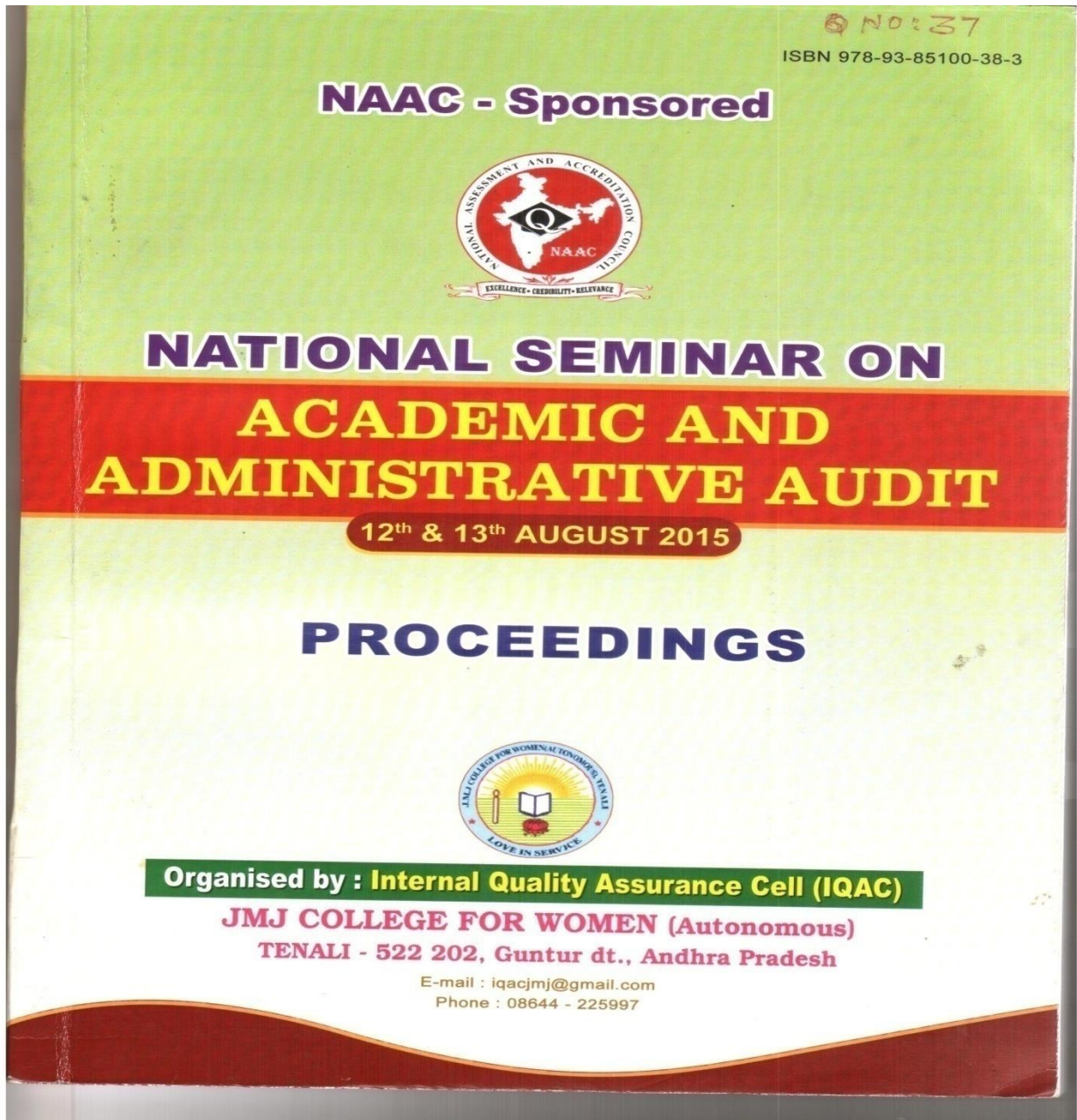
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USE OF ICT IN TEACHING AND LEARNING PROCESS

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Paradigm Shifts:

Education around the world is experiencing major paradigm shifts in educational practices of teaching and learning under the umbrella of ICT enabled learning environment. Whereas learning through facts, drill and practices, rules and procedures was more adaptive in earlier days, learning through projects and problems, inquiry and design, discovery and invention, creativity and diversity, action and reflection is perhaps more fitting for the present times. The major hallmark of this learning transition is from teacher centred to learner focus paradigm. Learners will have more responsibilities of their own learning as they seek out, find, synthesize, and share their knowledge with others^[2]. ICT provides powerful tools to support the shift from teacher centred to learner centred paradigm and new roles of teacher, learner, curricula and new media. All these changes taking place in learning and teaching demand a new learning environment to effectively harness the power of ICT to improve learning.

Practical ideas to support teaching and learning in a digitally rich learning environment:

Reflecting Students use a webcam to record a video reflection and upload to an edTube gallery to share with peers. Digital storytelling Students use digital cameras to capture images to create a comic in Microsoft PowerPoint. Creating Students use a digital camera with a green screen to create contextualised scenes to create a digital story in Microsoft Movie Maker or Microsoft PhotoStory. Gathering Students use GPS-capable digital cameras to tag images as part of longitudinal investigations or scientific data collection. Sharing ideas Students use a document camera to share ideas or findings with peers over iConnect web conferencing as part of a cross school collaborative online project. Sharing Students share their work on their laptop with peers using an interactive whiteboard. Publishing Students use a high-quality digital voice recorder to capture a series of podcasts demonstrating understanding of key concepts and publish on edTube to share with peers. Understanding Students use an MP3 player with a multi-user audio adapter to engage with teacher-created instructional content. Digital storytelling Students take a series of photos with a digital camera and manipulate in Paint.NET to create a digital story, demonstrating visual literacy and to influence and position an audience. Annotating Students use a pocket digital camera with a 360 degree lens to capture a physical space, save to their laptop and annotate planned modifications with Paint.NET. Narrating Students use a digital camera to capture their own original images and use to tell a digital narrative using Microsoft PhotoStory. Publishing Students create digital book trailers using Microsoft PowerPoint, export as a video with narration and publish to edTube to share with peers^[3].

A Few Emerging Topics in ICT Integration:

Multimedia: The pedagogical strength of instructional multimedia is that it uses the natural information processing abilities that we already possess as humans. The major challenge in designing instruction through multimedia is, therefore, the choice of media and their application for optimising human learning with respect to the learning objectives. Multimedia courseware

development process^[4] is the systematic approach to the analysis, design, development, implementation and evaluation of learning materials

E-learning: One of the most innovative and promising outcomes of this relationship is e-learning and online education, notably a process whereby teachers and students are linked up in an electronic/computer network^[5]. The concept of e learning and how it relates to effective use of ICT is critically important for teacher education, because it places the focus firmly where it should be - jointly on pedagogy and the new ICT. In other words, e-learning for teacher development is learning about, with, and through all electronic media (i.e., ICT) across the curriculum to support student learning. ICT is the means, and e-learning and the effective integration of pedagogy and ICT constitute the goal. There are a number of benefits to e-learning.

Blogs: or classroom web logs are becoming increasingly popular with teachers and teacher education. Many experts predict that blogs will eventually become more successful teaching tools than websites^[6]. A blog is a web page made up of usually short, frequently updated posts that are arranged chronologically-like a "what's new" page of a journal. There are many ways teachers can use blogs, some of them include content-related blog, networking and personal knowledge sharing, instructional tips for learners, course announcements and readings, annotated links etc., most importantly for the purpose of knowledge management. Teachers can build a blog or start a new topic in an existing blog by simply typing text into a box and clicking a button. Such ease of use is the primary reason to predict that blogs are more successful teaching tools than web sites.

Pedagogical Content Knowledge: Pedagogy cannot exist in isolation to contents. In fact, there is a new beginning to appreciate that the two intertwined into what is described as Pedagogical Content Knowledge (PCK), and is an essential tenet in the current thinking about teacher education. The basic principles of PCK is to make teaching and learning a) Engaging and motivating, b) Interactive, c) Contextual, d) Reducing cognitive load, e) Scaffolding and, finally, f) Collaborative^[7].

With ICT, there are better ways and opportunities to make above principles more realistic learning experiences. ICT encourages interactions, development of collaborative culture, and utilization of active learning and introduction of feedback in proper context^[8]. ICT can bring abstract concept to life by bringing into the teaching and learning the real world experiences through simulation, modelling, capturing and analysing real event. Let us take a simple example of pedagogical content knowledge with high ICT integrated approach as described below^[9].

Conclusion:

As we become increasingly supported by ICT, teaching and learning will not be the same as before. One of the objectives of the present paper is to provide better understanding and appreciation of the role of ICT in teaching and learning system. Several viewpoints of integrating ICT in teaching and learning system has been discussed. Learning is not a transfer of knowledge, rather an active construction. Multimedia and ICT can play the role of catalyst for such educational reforms. Multimedia courseware can promote effective instruction that is more engaging; learner centred, interdisciplinary and more closely related to real life events and processes and adaptive to individual learning styles and needs. It also encourages higher order thinking skills and help to construct knowledge socially. Thus teacher professional development in the use of interactive technology should embody and model the forms of pedagogy that teacher can use themselves in their classroom.

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MEASURES FOR PROMOTION OF QUALITY AND EXCELLENCE IN HIGHER EDUCATION

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Lecturer in Physics,
JMJ College

Due to growing pressures of liberalization, privatization and Globalization an interesting relationship has been developed between education and economy of the Nation.

Today, we see an enormous increase in the number of colleges, universities and students. But the quality in Higher Education (HE) is deteriorating. Our system of HE is facing the challenge of managing quality assurance. Quality and excellence of HE has become a major concern of today. Increasing cross-border education opportunities, technological development resulting in new modes of educational provisions and emergence of knowledge society demand HE to provide improved and speedy methods to meet today's needs and face tomorrow's challenges.

Quality assurance agencies and organizations play a great role in HE accreditation. Quality would mainly depend on the quality of all its facets, be it the faculty, students, infrastructure curriculum pedagogy, effective leadership and governance, partnerships, funding, regulatory bodies, industry interface, alumni, research and innovation, participatory teaching and learning, E-initiatives and E-resources availability, Faculty development programmes etc.....All the policies, systems, processors should be clearly directed towards attaining improvements in all the relevant facets for the overall rise in quality education.

To achieve the status of excellence, institutions are expected to take the following measures - Implementation of recommendations of National Knowledge Commission(NKC), installation of well equipped laboratories and libraries, periodical academic and administrative audits, ICT based teaching and learning methods, encouraging and supporting competency and professional development, updating of curriculum etc..... Education and assessment strategies, SWOT analysis, accreditation by external bodies like NAAC, quality of students learning opportunities, bench marking etc.... are also important among the measures to be taken.

Several schemes and programs of quality improvement have been launched by UGC, such as FIP, NET, ASC, Autonomous colleges. To achieve excellence in teaching and research activities, UG C introduced a scheme namely, CPE (college with potential for excellence). Stake holders participation in quality assessment, encourages H.E Institutions to develop internal system process for quality assessment, promotes the development and dissemination of best practices and bench-marks of assessment and quality enhancement.

U.G.C & NAAC have made and are marking commendable contribution towards generating consciousness in H.E circles. NBA has become a global seal for the quality of professional education, and takes over the AICTE's responsibility.

The quality enhancement system thus includes self – evaluation and development planning, performance management, quality audits, approval and validation procedures, staff development and learner and stake holder's feedback.



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**Development and Validation of RP-LC Method for Curcumin in
Pharmaceutical Formulations**

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ABSTRACT

A new, simple, rapid, selective, precise and accurate isocratic reverse phase high performance liquid Chromatography assay method has been developed for estimation of Curcumin in tablet formulations. The separation was achieved by using column Hypersil BDS C18, 150x4.6 mm, 5 μ (Make: Thermo), in mobile phase consisted of tetrahydrofuran and citric acid buffer in the ratio of (550:450, v/v). The flow rate was 1.0 mL.min⁻¹ and the separated curcumin was detected using UV detector at the wavelength of 425 nm. The retention time of curcumin, was noted to be 8.05 min respectively, indicative of rather shorter analysis time. The method was validated as per ICH guidelines. The proposed method was found to be accurate, reproducible, and consistent.

Keywords: Liquid Chromatography; Curcumin, Validation

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INTRODUCTION

Curcumin is the principal curcuminoid of popular Indian spice Turmeric, which is a member of Ginger family (Zingiberaceae). The other two curcuminoids are Demethoxy and Bis-demethoxy Curcumin. The curcuminoids are natural phenols and responsible for the yellow colour of turmeric. Curcumin can exist in several tautomeric forms. The enol form is more energetically stable in the solid phase and in solution¹.

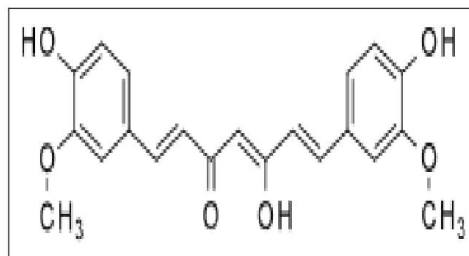


Figure 1: The Structure of Curcumin

IUPAC name is (1E, 6E)-1, 7-bis (4-hydroxy-3-methoxyphenyl) -1, 6-heptadiene-3, 5-Dione. Curcumin is Anti microbial, Anti inflammatory, Hepato protective, Anti carcinogenic, Anti bacterial, Anti oxidant, Anti mutagenic, lower blood cholesterol level. Its molecular formula and molecular weight is C₂₁H₂₀O₆ and 368.38 g/mol. Curcumin is Bright yellow-orange powder. It is insoluble in water and soluble in THF, acetonitrile and methanol. Literature review revealed that some methods for the determination of curcumin in spectrophotometric², thin layer chromatography³, HPTLC⁴⁻⁹, RP-HPLC¹⁰⁻¹⁶ there were no methods for the estimation of curcumin. Hence in the present chapter new sensitive, economical, stability indicating RP-HPLC method was developed and validated in accordance with ICH guidance.

MATERIALS AND METHOD

Chemicals and Reagents

Analytical-grade Citric acid, Tetrahydrofuran, Methanol, Acetonitrile and Water HPLC-grade, were from Merck Chemicals. Mumbai, India. Millex syringe filters (0.45 µm) were from Millex-HN, Millipore Mumbai, India.

Instrumentation and Chromatographic Conditions

Instrumentation

Waters 2489 U.V-Visible detector/2695 Separation Module, equipped with Empower 2 software, Bandelin ultrasonic bath, pH Meter (Thermo Orion Model), Analytical Balance (Mettler Toledo Model) were use in the present assay.

Buffer preparation

Accurately weighed 5.5 g of Citric acid was dissolved in 1000 ml milli-Q water, the solution was filtered through 0.45 μ filter paper and degassed.

Mobile phase preparation

550 volumes of buffer and 450 volumes of filtered and degassed Tetrahydrofuran were mixed and sonicated.

Diluent preparation

Mobile phase was used as blank.

Standard preparation

About 25 mg of Curcumin was accurately weighed and transferred into a 100 ml volumetric flask and added 25 ml of THF was added and sonicated for 15 min and volume was made up with Mobile phase. From the above stock solution 5ml was transferred to a 50 ml volumetric flask and the volume was made up with mobile phase. Filtered through the 0.45 μ membrane filter. (The final concentration of resulting was 25 μ g/ml).

Sample preparation

20 tablets were weighed and average weight was found out. The tablets were powdered and about 5 mg equivalent of Curcumin (about 8.066 g of diazen tablet powder) was weighed and transferred into 200 ml volumetric flask. 40 ml THF was added and sonicated for 20 min and finally the volume was made up with mobile phase. Filtered through the 0.45 μ membrane filter. (The final concentration of resulting was 25 μ g/ml).

Chromatographic conditions

Chromatographic analysis was performed on Hypersil BDS C18, 150x4.6 mm, 5 μ (Make: Thermo) column. The mobile phase consisted of Tetrahydrofuran and citric acid buffer in the ratio of (550:450, v/v). The flow rate was 1.0 mL/min, column oven temperature ambient temperature, the injection volume was 20 μ L, and detection was performed at 425 nm using a photodiode array detector (PDA).

RESULTS AND DISCUSSION**Method development**

Spectroscopic analysis of compound curcumin showed that maximum UV absorbance (λ_{max}) at 425 nm respectively. To develop a suitable and robust LC method for the determination of curcumin, different mobile phases were employed to achieve the best separation and resolution. The method development was started with Hypersil BDS 250mmx4.6mm, 5 μ with the following

different mobile phase compositions like that Buffer and Acetonitrile in the ratio of 80:20 v/v 65:35 v/v & 50:50. It was observed that when curcumin was injected, Peak Tailing, not satisfactory. For next trial the mobile phase composition was changed slightly. The mobile phase composition was buffer and acetonitrile in the ratio of 55:45 v/v. respectively as eluent at flow rate 1.0 mL/min. UV detection was performed at 425nm. The retention time of curcumin is 8.05 minutes and the peak shape was good. The chromatogram of curcumin standard using the proposed method is shown in (Figure 2) system suitability results of the method are presented in Table 1

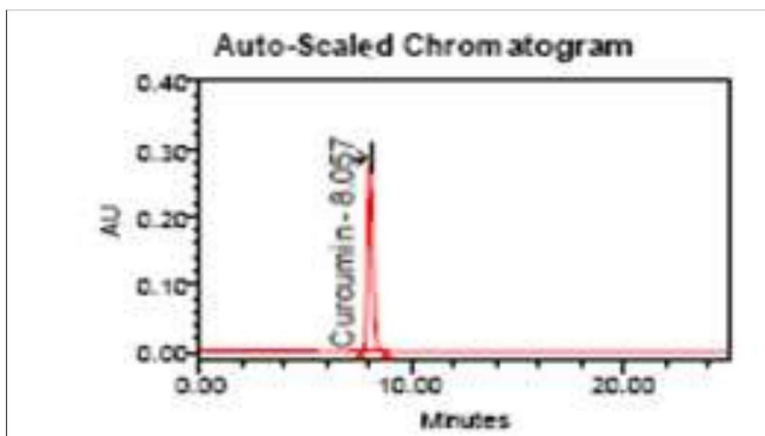


Figure 2: Chromatogram Showing the Peak of Curcumin

Method validation

The developed RP-LC method extensively validated for assay of curcumin using the following parameters.

Specificity

Preparation of blank solution:

Citric acid buffer and Tetrahydrofuran were mixed in the ratio of 55:45 and degassed.

Preparation of Placebo solution

Placebo solution was prepared in duplicate by weighing the equivalent amount of excipients present in the finished drug product and analyzed as per proposed method. Interference due to placebo was evaluated for each of the placebo preparations.

Blank and Placebo interference

A study to establish the interference of blank and placebo were conducted. Diluent and placebo was injected into the chromatograph in the defined above chromatographic conditions and the blank and placebo chromatograms were recorded. Chromatogram of blank solution (Figure 3)

showed no peak at the retention time of curcumin peak. This indicates that the diluent solution used in sample preparation do not interfere in estimation of curcumin in curcumin tablets. Similarly chromatogram of placebo solution (Figure 4) showed no peaks at the retention time of curcumin peak. This indicates that the placebo used in sample preparation do not interfere in estimation of curcumin in curcumin tablets.

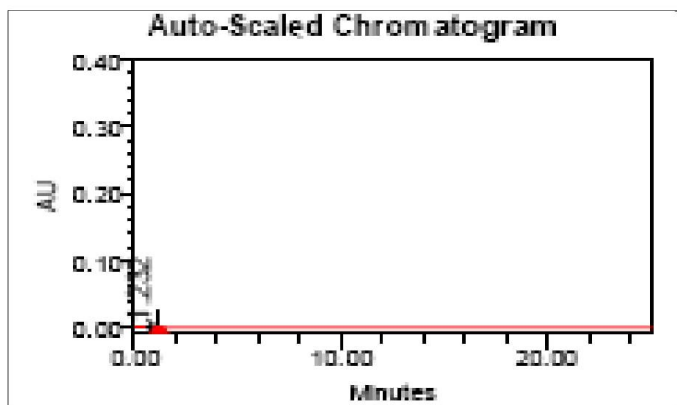


Figure 3: Chromatogram showing the no interference of diluent for curcumin

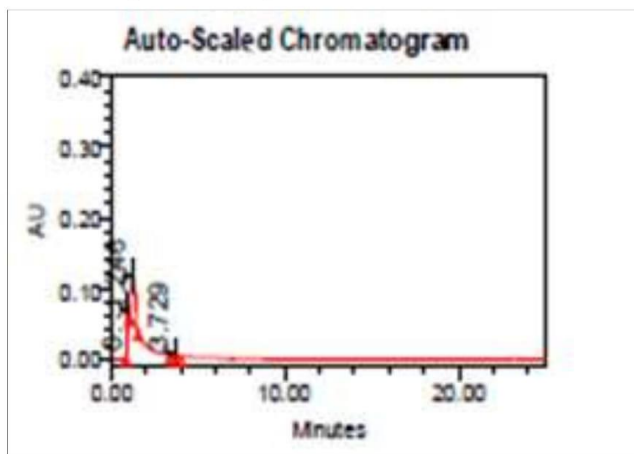


Figure 4: Chromatogram showing the no interference of placebo for curcumin

Table 1: System Suitability Parameters for Curcumin by Proposed Method

Name of the Compound	Retention Time	Theoretical plates	Tailing factor
Curcumin	8.057	8566	1.1

System precision

The standard solution was prepared as per the test method, injected into the HPLC system for six times and evaluated the % RSD for the area responses. The chromatogram was shown in Figure 5 and data were shown in Table 2

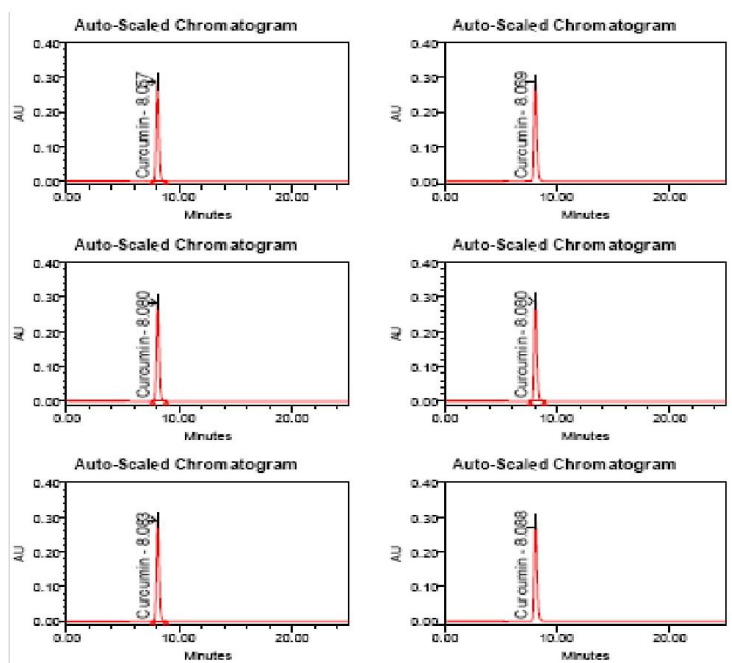


Figure 5: System precision standard chromatogram

Table 2: System Precision Data for Curcumin

No. of injections	Area
1	4765464
2	4769515
3	4789437
4	4629991
5	4600278
6	4600598
Average	4692546
SD	91115.256
% RSD	1.9

Method precision

The precision of test method was evaluated by doing assay for six samples of curcumin tablet as per test method. The content in mg and % label claim for curcumin for each of the test preparation

were calculated. The average content of the six preparations and % RSD for the six observations were calculated. The chromatogram was shown in **Figure 6** and data were shown in **Table: 3**

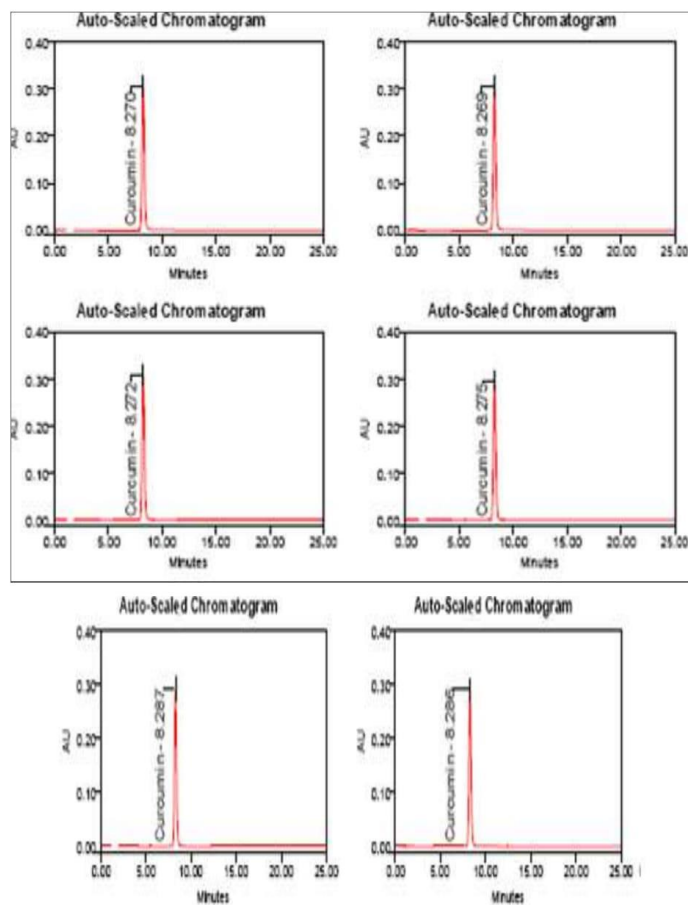


Figure 6: Method precision sample chromatogram

Table 3: Method precision data for Curcumin

No. of injections	Curcumin % Assay
1	109.6
2	109.4
3	108.8
4	109.8
5	109.8
6	108.8
Average	109.4
SD	0.01
%RSD	0.42

Linearity of detector response

The standard curve was obtained in the concentration range of 20.0-30.0 $\mu\text{g}/\text{ml}$ for curcumin. The linearity of this method was evaluated by linear regression analysis. Slope, intercept and correlation coefficient [r²] of standard curve were calculated and given in Figure 7 to demonstrate the linearity of the proposed method. From the data obtained which given in Table 4 the method was found to be linear within the proposed range.

Table 4: Linearity studies for curcumin by proposed method

Level no.	Curcumin	Linearity concentration	Concentration ($\mu\text{g} / \text{ml}$)	Average area response
1	80		19.9564	3817757
2	90		22.5963	4349852
3	100		24.8896	4812110
4	110		27.6058	5359588
5	120		29.9517	5832441
Correlation coefficient:				0.9980
Slope (m):				19551
Intercept (y):				-12054

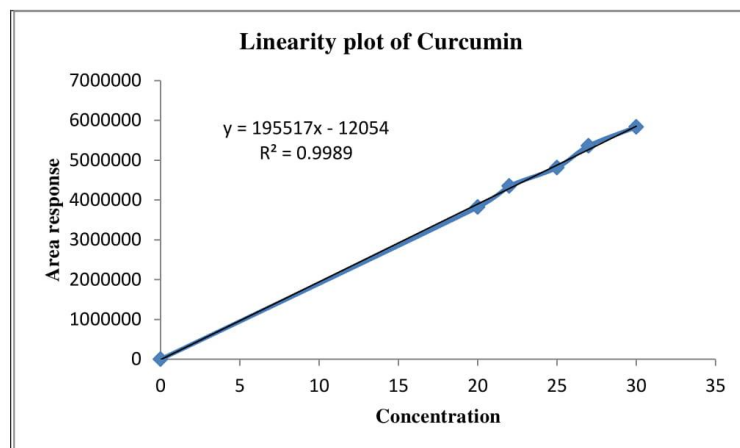


Figure 7: Calibration curve for Curcumin

Accuracy

The accuracy of the method was determined on three concentration levels by recovery experiments. The recovery studies were carried out in triplicate preparations on composite blend collected from 20 tablets of Curcumin, analyzed as per the proposed method. The percentage recoveries with found in the range of 98.9 to 100.4 for curcumin. The chromatogram was shown in Figure 7 to 9 the data obtained which given in Table 5 the method was found to be accurate.

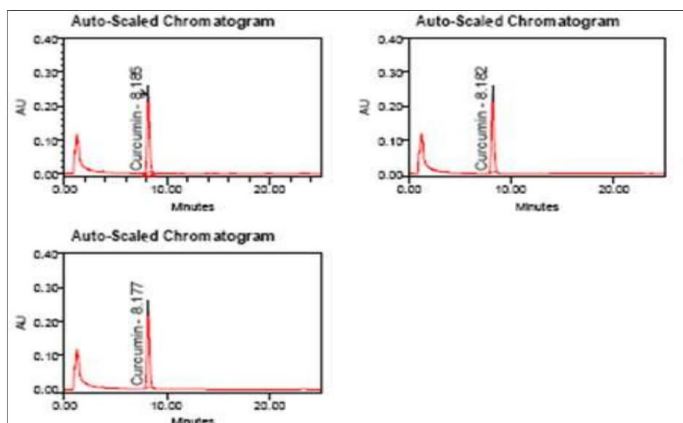


Figure 7: Accuracy (Spike level 80%) chromatogram

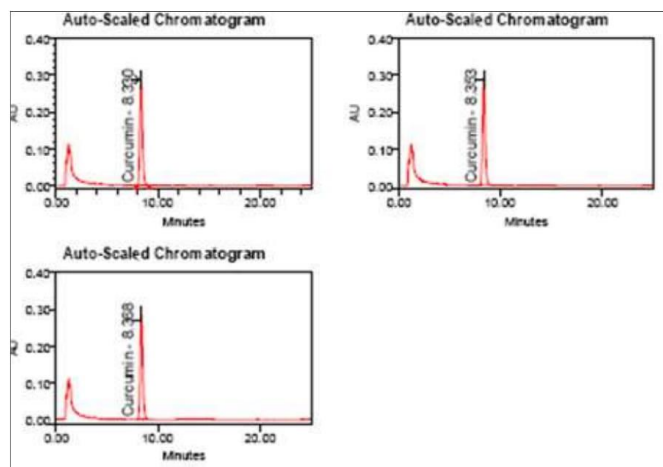


Figure 8: Accuracy (Spike level 100%) chromatogram

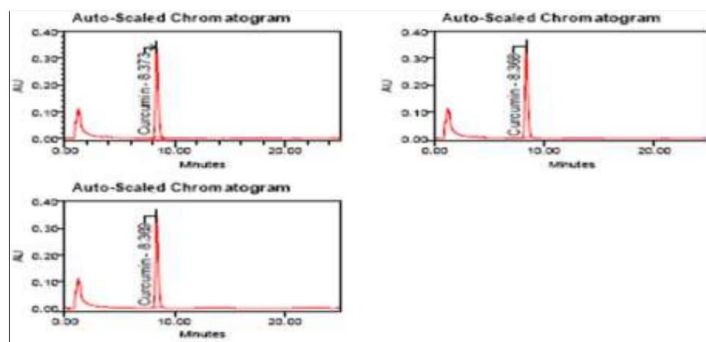


Figure 9: Accuracy (Spike level 120%) chromatogram

Table 5: Recovery studies for curcumin by proposed method

Recovery Level	Curcumin Amount Added (mg)	Amount recovered (mg)	Percentage recovery	Average Recovery (%)	% RSD
50%	4.02	3.98	99.0	98.9	0.4
	4.05	3.99	98.5		
	4.03	4.00	99.3		
100%	5.12	5.05	98.6	99.4	0.8
	5.07	5.05	99.6		
	5.05	5.06	100.1		
150%	6.13	6.17	100.7	100.4	0.9
	6.08	6.15	101.2		
	6.18	6.14	99.4		
Overall percentage recovery				99.6	
Overall percentage RSD for percentage recovery				0.8	

CONCLUSION

An RP-HPLC method for estimation of curcumin was developed and validated as per ICH guidelines. The results obtained indicate that the proposed method is rapid, accurate, selective, and reproducible. Linearity was observed over a concentration range of 20-30µg/ml. The method has been successfully applied for the analysis of marketed tablets. It can be used for the routine analysis of formulations containing any one of the drug or their combinations without any alteration in the assay. The main advantage of the method is the common chromatographic conditions adopted for all formulations. Therefore, the proposed method reduces the time required for switch over of chromatographic conditions, equilibration of column and post column flushing that are typically associated when different formulations and their individual drug substances are analyzed. We have developed a fast, simple and reliable analytical method for determination of curcumin in pharmaceutical preparation using RP-LC. As there is no interference of blank and placebo at the retention time of curcumin. It is very fast, with good reproducibility and good response. Validation of this method was accomplished, getting results meeting all requirements. The method is simple, reproducible, with a good accuracy and Linearity. It allows reliably the analysis of curcumin in its different pharmaceutical dosage forms.

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DEVELOPMENT AND VALIDATION OF RP-LC METHOD FOR RESIPERIDONE IN PHARMACEUTICAL FORMULATIONS

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ABSTRACT

A new, simple, rapid, selective, precise and accurate isocratic reverse phase high performance liquid Chromatography assay method has been developed for estimation of Resiperidone in tablet formulations. The separation was achieved by using column Hypersil BDS C18, 150x4.6 mm, 5 μ (Make: Thermo), in mobile phase consisted of methanol and ammonium acetate buffer pH adjusted to pH 6.2 with the help of dilute glacial acetic acid in the ratio of (50:50, v/v). The flow rate was 1.5 mL. min⁻¹ and the separated Resiperidone was detected using UV detector at the wavelength of 275 nm. The retention time of Resiperidone, was noted to be 5.25 min respectively, indicative of rather shorter analysis time. The method was validated as per ICH

guidelines. The proposed method was found to be accurate, reproducible, and consistent.

KEYWORDS: Liquid Chromatography; Resiperidone, Validation.

1.0 INTRODUCTION

Resiperidone^[1] is an atypical antipsychotic medication. It is most often used to treat delusional psychosis including schizophrenia, but Resiperidone is also used to treat some forms of bipolar disorder and psychotic depression. It also has shown some success in treating symptoms of Asperger's Syndrome and autism. Resiperidone is now the most commonly prescribed antipsychotic medication in the United States. Blockade of dopaminergic D2 receptors in the limbic system alleviates positive symptoms of Schizophrenia such as hallucinations, delusions and erratic behaviour and speech. Blockade

of serotonergic 5-HT₂ receptors in the mesocortical tract, causes an excess of dopamine and an increase in dopamine transmission, resulting in an increase in dopamine transmission and an elimination of core negative symptoms. Dopamine receptors in the nigrostriatal pathway are not affected by Resiperidone and extra pyramidal effects are avoided. Like other 5-HT₂ antagonists, Resiperidone also binds at alpha (1)-adrenergic receptors and, to a lesser extent, at histamine H₁ and alpha (2)-adrenergic receptors.^[2]

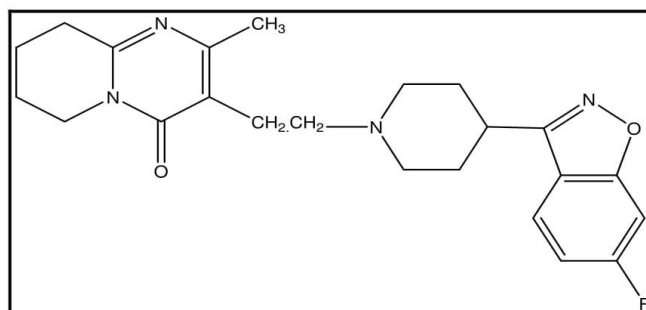


Fig.1.1 The structure of Resiperidone

IUPAC name is 3-[2-[4-(6-fluoro-1,2-benzisoxazol-3-yl)-1-piperidinyl]ethyl]-6,7,8,9-tetrahydro-2-methyl-4H-pyrido[1,2-a]pyrimidin-4-one. Resiperidone is antipsychotic, agents, Antipsychotics, Dopamine antagonists, Serotonin antagonists. Its molecular formula and molecular weight is C₂₃H₂₇FN₄O₂ and 410.49g/mol. Resiperidone is white to slightly beige powder. It is practically insoluble in water, freely soluble in methylene chloride, and soluble in methanol and 0.1 N HCl. It dissolves in dilute acid solutions, sparingly soluble in alcohol.

Literature review revealed that some methods for the determination of Resiperidone in RP-HPLC^[3, 4, 5], capillary electrophoresis^[6, 7, 8], thin layer chromatography^[9, 10], LC-MS^[11-15] there were no methods for the estimation of Resiperidone Extended Release Tablet. Hence in the present chapter new sensitive, economical, stability indicating RP-HPLC method was developed and validated in accordance with ICH guidance.

2.0 EXPERIMENTAL

2.1. Chemicals and Reagents: Analytical-grade Ammonium acetate, Glacial acetic acid, were from Merck Chemicals Mumbai, India. Methanol and water, both HPLC-grades, were

from Merck Chemicals. Mumbai, India. Millex syringe filters (0.45 μm) were from Millex-HN, Millipore Mumbai, India.

2.2. Instrumentation: Waters 2489 U.V-Visible detector/2695 Separation Module, equipped with Empower 2 software, Bandelin ultrasonic bath, pH Meter (Thermo Orion Model), Analytical Balance (Mettler Toledo Model) were use in the present assay.

2.3 Buffer preparation: 5.0 gm of ammonium acetate was dissolved in 1000 ml milli-Q-water, adjusted pH to 6.2 ± 0.05 with glacial acetic acid. The solution was filtered through 0.45 μ filter paper and degassed.

2.4 Mobile phase preparation: 500 volumes of buffer and 500 volumes of filtered and degassed methanol were mixed and sonicated.

2.5 Diluent preparation: Methanol and water were mixed in the ratio of 20:80 and degassed.

2.6 Standard preparation: 50.0 mg of Resiperidone working standard was accurately weighed and transferred into a 100 ml volumetric flask. 70ml of diluent was added and sonicated to dissolve the Resiperidone. The volume was diluted up to the mark and mixed well. 5ml of this solution was transferred into 25ml standard flask and volume was made up to the mark. The solution was filtered through 0.45 μ PTFE filter. (Concentration of Resiperidone was about 100 $\mu\text{g/ml}$).

2.7 Sample preparation: 20 tablets were weighed and the average weight was determined. The tablets were crushed to fine powder. The powder equivalent to 10mg of Resiperidone was accurately weighed and transferred in to 100 ml volumetric flask. To this 20ml of water was added and sonicated for 5 minutes. To this 60ml of methanol added and sonicated for 15 minutes. Cooled at room temperature and made up to volume with methanol and mixed well. The solution was filtered through 0.45 μ PTFE filter. (Concentration of Resiperidone was about 100 $\mu\text{g/ml}$).

2.8 Chromatographic conditions: Chromatographic analysis was performed on Hypersil BDS C18, 150x4.6 mm, 5 μ (Make: Thermo) column. The mobile phase consisted of methanol and ammonium acetate buffer pH adjusted to pH 6.2 with the help of dilute glacial acetic acid in the ratio of (50:50, v/v). The flow rate was 1.5 mL/min, column oven

temperature 40°C, the injection volume was 20 μ L, and detection was performed at 275 nm using a photodiode array detector (PDA).

3.0 RESULTS AND DISCUSSION

Method development: Spectroscopic analysis of compound Resiperidone showed that maximum UV absorbance (λ_{max}) at 275 nm respectively. To develop a suitable and robust LC method for the determination of Resiperidone, different mobile phases were employed to achieve the best separation and resolution. The method development was started with Hypersil BDS 250mm \times 4.6mm, 5 μ with the following different mobile phase compositions like that Buffer and methanol in the ratio of 85:15 v/v 75:25 v/v & 65:35. It was observed that when Resiperidone was injected, Peak Tailing, not satisfactory.

For next trial the mobile phase composition was changed slightly. The mobile phase composition was buffer and methanol in the ratio of 50:50 v/v. respectively as eluent at flow rate 1.5 mL/min. UV detection was performed at 275nm. The retention time of Resiperidone is 5.25 minutes and the peak shape was good.

The chromatogram of Resiperidone standard using the proposed method is shown in (Fig: 1.2) system suitability results of the method are presented in Table-1.1.

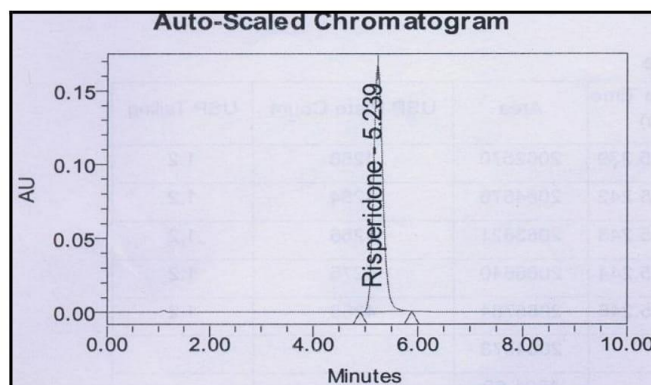


Figure 1.2: Chromatogram showing the peak of Resiperidone

4.0 Method validation

The developed RP-LC method extensively validated for assay of Resiperidone using the following parameters.

4.1 Specificity

Preparation of blank solution: Methanol and water were mixed in the ratio of 20:80 and degassed.

Preparation of Placebo solution: Placebo solution was prepared in duplicate by weighing the equivalent amount of excipients present in the finished drug product and analysed as per proposed method. Interference due to placebo was evaluated for each of the placebo preparations.

Blank and Placebo interference: A study to establish the interference of blank and placebo were conducted. Diluent and placebo was injected into the chromatograph in the defined above chromatographic conditions and the blank and placebo chromatograms were recorded. Chromatogram of blank solution (**Fig: 1.3**) showed no peak at the retention time of Resiperidone peak. This indicates that the diluent solution used in sample preparation do not interfere in estimation of Resiperidone in Resiperidone tablets. Similarly chromatogram of placebo solution (**Fig: 1.4**) showed no peaks at the retention time of Resiperidone peak. This indicates that the placebo used in sample preparation do not interfere in estimation of Resiperidone in Resiperidone tablets.

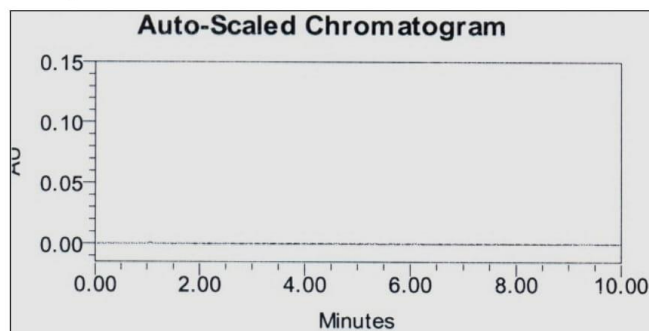


Fig: 1.3 Chromatogram showing the no interference of diluent for Resiperidone

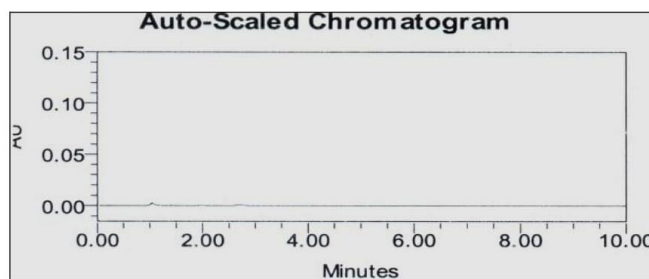
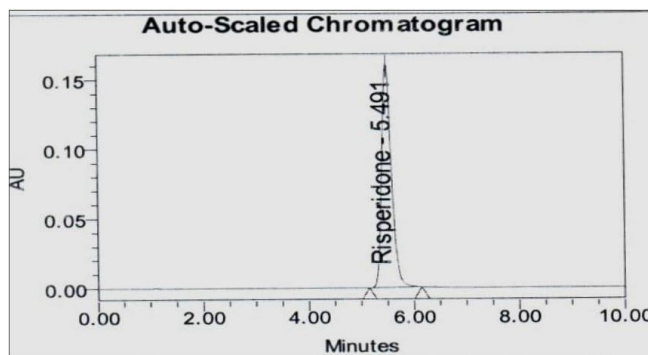


Fig: 1.4 Chromatogram showing the no interference of placebo for Resiperidone

Table 1.1: System suitability parameters for Risperidone by proposed method

Name of the Compound	Retention Time	Theoretical plates	Tailing factor
Risperidone	5.239	4266	1.2

4.2 System precision: The standard solution was prepared as per the test method, injected into the HPLC system for six times and evaluated the % RSD for the area responses. The chromatogram was shown in **Figure: 1.5** and data were shown in **Table: 1.2**

**Fig: 1.5 System precision standard chromatogram****Table: 1.2 System precision data for Risperidone**

No. of injections	Peak area response
1	2069888
2	2076751
3	2077679
4	2073110
5	2075938
6	2072871
Average	2074373
SD	2933
% RSD	0.14

4.3 Method precision

The precision of test method was evaluated by doing assay for six samples of Risperidone tablet as per test method. The content in mg and % label claim for Risperidone for each of the test preparation were calculated. The average content of the six preparations and % RSD for the six observations were calculated. The chromatogram was shown in **Figure: 1.6** and data were shown in **Table: 1.3**.

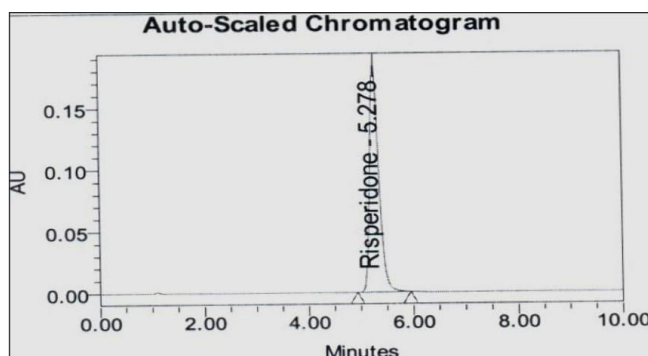


Fig: 1.6 Method precision sample chromatogram

Table: 1.3 Method precision data for Risperidone

No. of injections	Resiperidone
	Percentage assay
1	100.0
2	99.8
3	100.5
4	100.0
5	100.5
6	100.3
Average	100.2
SD	0.3
%RSD	0.3

4.4 Linearity of detector response: The standard curve was obtained in the concentration range of 50.0-150.0 μ g/ml for Risperidone. The linearity of this method was evaluated by linear regression analysis. Slope, intercept and correlation coefficient [r²] of standard curve were calculated and given in **Figure: 1.7** to demonstrate the linearity of the proposed method. From the data obtained which given in **Table: 1.4** the method was found to be linear within the proposed range.

Table: 1.4 Linearity studies for Risperidone by proposed method

Level no.	Resiperidone		
	Linearity concentration	Concentration (μ g / ml)	Average area response
1	50	49.7500	1029050
2	60	59.7000	1238989
3	70	69.6500	1462950
4	80	79.6000	1654194
5	90	89.5500	1892700
6	100	99.5000	2069299

7	110	109.4500	2288313
8	120	119.4000	2486928
9	140	139.3000	2889123
10	150	149.2500	3123287
Correlation coefficient			0.9990
Slope (m)			20761
Intercept (y)			-289.0

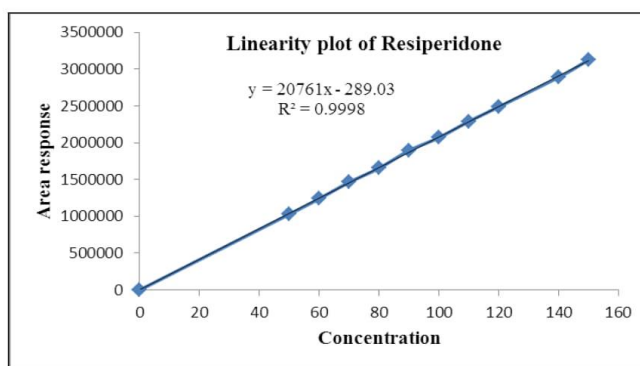


Figure: 1.7 Calibration curve for Resiperidone

4.5 Accuracy

The accuracy of the method was determined on three concentration levels by recovery experiments. The recovery studies were carried out in triplicate preparations on composite blend collected from 20 tablets of Resiperidone, analyzed as per the proposed method. The percentage recoveries with found in the range of 99.1 to 100.2 for Resiperidone. The chromatogram was shown in **Figure: 1.7 to 1.9** the data obtained which given in **Table: 1.5** the method was found to be accurate.

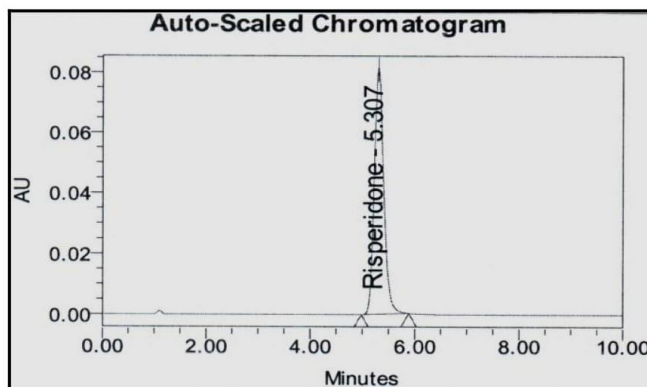


Fig: 1.7 Accuracy (Spike level 50%) chromatogram

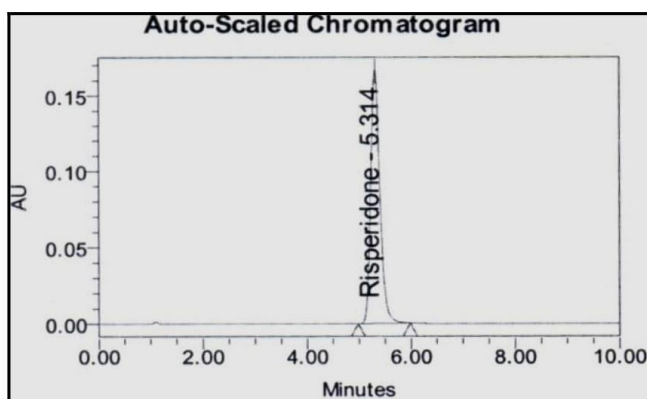


Fig: 1.8 Accuracy (Spike level 100%) chromatogram

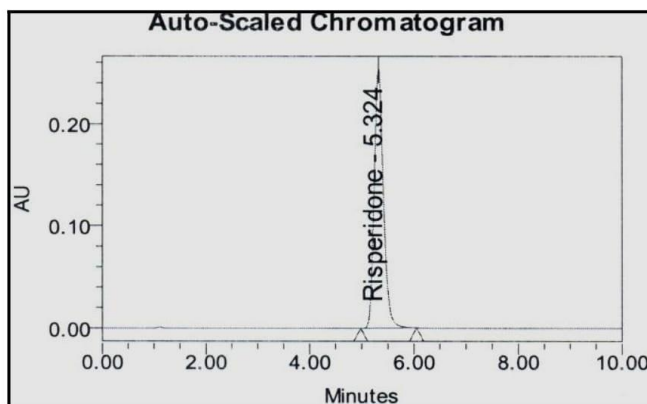


Fig: 1.9 Accuracy (Spike level 150%) chromatogram

Table: 1.5 Recovery studies for Risperidone by proposed method

Recovery Level	Risperidone			Average Recovery (%)	% RSD
	Amount Added (mg)	Amount recovered (mg)	Percentage recovery		
50%	5.02	4.98	99.2	99.1	0.3
	5.05	4.99	98.8		
	5.03	5.00	99.4		
100%	10.12	10.05	99.3	99.7	0.4
	10.07	10.05	99.8		
	10.05	10.06	100.1		
150%	15.13	15.17	100.3	100.2	0.4
	15.08	15.15	100.5		
	15.18	15.14	99.7		
Overall percentage recovery				99.7	
Overall percentage RSD for percentage recovery				0.6	

5.0 CONCLUSION

An RP-HPLC method for estimation of Resiperidone was developed and validated as per ICH guidelines.

The results obtained indicate that the proposed method is rapid, accurate, selective, and reproducible. Linearity was observed over a concentration range of 50-150µg/ml. The method has been successfully applied for the analysis of marketed tablets. It can be used for the routine analysis of formulations containing any one of the drug or their combinations without any alteration in the assay. The main advantage of the method is the common chromatographic conditions adopted for all formulations. Therefore, the proposed method reduces the time required for switch over of chromatographic conditions, equilibration of column and post column flushing that are typically associated when different formulations and their individual drug substances are analyzed.

We have developed a fast, simple and reliable analytical method for determination of Resiperidone in pharmaceutical preparation using RP-LC. As there is no interference of blank and placebo at the retention time of Resiperidone. It is very fast, with good reproducibility and good response. Validation of this method was accomplished, getting results meeting all requirements. The method is simple, reproducible, with a good accuracy and Linearity. It allows reliably the analysis of Resiperidone in its different pharmaceutical dosage forms.

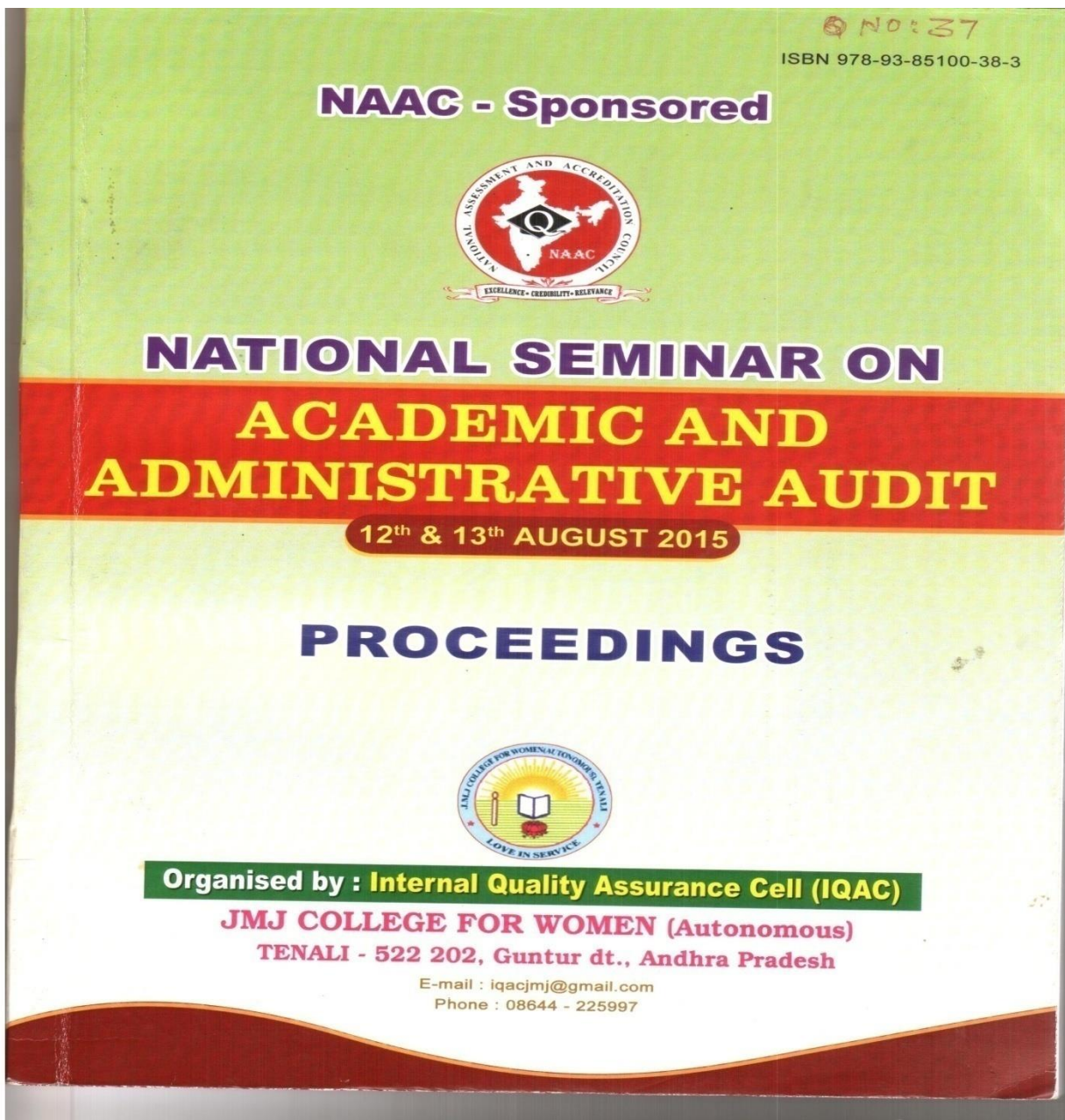
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DEPARTMENT OF ZOOLOGY

26. Mrs.M.Adilakshmi and Mrs.M.Aruna Department of zoology attended two day NAAC sponsored National Seminar on “ Academic and Administrative Audit” from 12/8/15 to 13/8/15 organized by IQAC, JMJ College for women,Tenali. And published a paper on “ Funding Agencies in India for research in science and technology. With ISBN no:978-93-85100-38-3



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FUNDING AGENCIES IN INDIA FOR RESEARCH IN SCIENCE AND TECHNOLOGY

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and
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INTRODUCTION: Research funding is a term generally covering any funding for scientific research, in the areas of both "hard" science and technology and social science. It is a competitive process, in which potential research projects are evaluated and only the most promising receive funding. Such processes, which are run by government, corporations or foundations, allocate scarce funds.

Most research funding comes from two major sources, corporations (through research and development departments) and government (primarily carried out through universities and specialized government agencies). Some small amounts of scientific research are carried out (or funded) by charitable foundations, especially in relation to developing cures for diseases such as cancer, malaria and AIDS.

Different funding agencies are: All India Council for Technical Education (AICTE), Council of Scientific and Industrial Research (CSIR), Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Department of Biotechnology (DBT), Department of Science and Technology (DST), Technology Information, Forecasting and Assessment Council (TIFAC), Indian Council of Medical Research (ICMR), Gujarat Council on Science and Technology (GUJCOST) & Indian National science Academy (INSA)

All India Council for Technical Education (AICTE) was established by an Act of Parliament in the year 1987, with a view to promote proper planning and coordinated development of technical education system throughout the country. The Council has been performing its regulatory, planning and promotional functions through its Bureaus.

Name of schemes: Research and Institutional Development Schemes Modernization and Removal of Obsolescence Scheme (MODROBS) Research Promotion Schemes (RPS) Industry-Institute Interaction Schemes Industry Institute Partnership Cell (IIPC) Entrepreneurship Development Cells (EDC) National Facilities in Engineering and Technology with Industrial Collaboration (NAFETIC)

Objectives: i). To equip technical institutions with modern infra-structural facilities in laboratory(s)/workshop(s)/computing facilities to enhance functional efficiency for teaching, training and research purposes. ii). to create research ambience by promoting research in technical disciplines and innovations in established and emerging technologies; and to generate Masters and Doctoral degree candidates. iii). To establish institute-industry liaison by encouraging: (1) conduct of industrial training programmes (2) facilitating exchange of resource personnel (3) carry out industrial R&D (4) conduct of industrial visits (5) developing appropriate curricula and (6) undertake consultancy services, etc. iv). To encourage students to consider self-employment as a career option and provide training in entrepreneurship. v). To establish national level facilities in the frontier areas of Engineering and Technology through collaboration between

industry(s) and institutions for product development, basic research, trouble shooting, consultancy, testing and training purposes. vi). To plan, coordinate and execute integrated R&D programmes at national level by a group of institutions. The technical/ financial/ administrative deliverables are to be spelled out clearly by the networking institutions with the lead institution being an IIT/ IISc/IIM/NIT.

Eligibility : The Council invites fresh proposals annually from AICTE approved technical institutions, University Departments, Government Institutions, Grant-in-aid Institutions and Accredited Institutions in the private sector for financial assistance for schemes operated by the RID Bureau.

Areas of research support: Engineering and Technology, Architecture, Town Planning, Management, Pharmacy, Hotel Management and Catering Technology, Applied Arts and Crafts.

II). Council of Scientific and Industrial Research (CSIR) The major functions of CSIR include promotion, guidance and coordination of scientific and industrial research in India; establishment or development of and assistance to existing special institutions or departments for scientific study of problems affecting particular industries and trades; award of fellowship; utilization of Council's R&D results for industrial development; collection and dissemination of S&T information; and technology generation, absorption and transfer.

Name of schemes: Research Schemes, Sponsored Schemes, Emeritus Scientist Scheme, Research Fellowships/Associate ships Other Science and Technology Promotion Programmes **Research Schemes:**

Objectives: i). To promote research work in the field of S&T including agriculture, engineering and medicine. Multi-disciplinary projects which involve inter-organisational cooperation (including that of CSIR Laboratories) are also considered. Preference is given to schemes which have relevance to research programmes of CSIR laboratories. ii). The Directors of CSIR laboratories may invite applications for research grants in specific areas of interest to their respective laboratories. iii). To provide support to superannuated outstanding scientists to pursue research in their respective field of specialization and having relevance to the programmes of CSIR. iv). To attract the meritorious young school children towards science through CSIR Programme on Youth Leadership in Science. The top 100 science students of CBSE, ICSE and State Boards in Class X examination are contacted by the CSIR laboratories. A traveling allowance to visit the CSIR laboratory and facilities to carry out project work at the CSIR laboratory is provided. This scheme is tenable till graduation. v). To invite guest scientists from outside CSIR laboratories to make use of advanced R&D facilities available in the CSIR setup. Under this programme the scientist is provided to and fro traveling expenses and daily allowance at CSIR rates for a period of maximum 60 days for two visits in a year. The associate ship is tenable for 3 years. vi). To provide partial foreign travel grants to research scholars (not in regular employment), whose papers are accepted for oral or poster presentation at the International Conference abroad on recommendations of the Expert Committee. vii). Entrepreneurship Support to Research Scholars: This programme is for Research Scholars working in CSIR laboratories.

Eligibility: Professors/Scientists and other experts in regular employment in Universities, IITs, Post Graduate Institutions, Colleges, recognized R&D laboratories etc. A scientist who has been actively engaged in scientific research during the preceding five years of superannuation

Areas of research support: Science and Technology including agriculture, engineering and medicine.

III). Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH) The AYUSH Systems include Ayurveda, Yoga and Naturopathy, Unani, Siddha, Homoeopathy and include therapies documented and used in these Systems for the prevention and cure of various disorders and diseases. The Department of AYUSH has introduced a Scheme for extra-mural research in addition to the intra-mural research undertaken by four Research Councils for Ayurveda and Siddha, Unani, Homoeopathy, Yoga and Naturopathy set up by the Ministry of Health and Family Welfare three decades ago. The off take and output from this scheme has so far been limited and has not been able to meet the standards for scientific enquiry and outcome effectively. The Department has taken up a series of programs/interventions wherein evidence based support for the efficacy claims is needed. Safety, quality control and consistency of products are also very much required.

Name of scheme(s): Extra-mural Research (EMR) project Scheme of AYUSH Systems of medicine and Accreditation of Organizations for Research and Development in the fields of AYUSH. Golden Triangle Partnership (GTP) Scheme for validation of traditional Ayurvedic Drugs and development of new drugs.

Objectives: i). To develop evidence based support on the efficacy of AYUSH drugs and therapies. ii). To generate data on safety, standardization and quality control of AYUSH products and practices. iii). To investigate the fundamental principles of Indian Systems of Medicine. iv). To generate data on Heavy metals, Pesticide residues, Microbial load, Safety/Toxicity in the raw drugs and finished ASU and H drugs. v). To utilize appropriate technologies for development of single and Poly-herbal/herbomineral products to make it globally acceptable.

Eligibility: The institutions/investigators seeking a project from the Department of AYUSH should have adequate infrastructure to pursue the research project. In case of clinical research, the hospital, laboratory facilities for bio-chemical, pathological, radiological and electrophysiological investigations supported with necessary equipment relevant to the project should be available.

Areas of research support: Clinical trials, pharmacology, toxicology, standardization and study of Pharmacology kinetics Components of grant. Financial support for staff and contingencies – recurring and non-recurring for the project over a period of 1-3 years up to a maximum of Rs. 30.00 lakhs.

IV). Department of Biotechnology (DBT): The setting up of a separate Department of Biotechnology (DBT), under the Ministry of Science and Technology in 1986 gave a new impetus to the development of the field of modern biology and biotechnology in India. In more than a decade of its existence, the department has promoted and accelerated the pace of development of biotechnology in the country. Through several R&D projects, demonstrations and creation of infrastructural facilities a clear visible impact of this field has been seen. The department has made significant achievements in the growth and application of biotechnology in the broad areas of agriculture, health care, animal sciences, environment, and industry.

Objective: To promote the goals of the Institute and to facilitate re-entry of scientists of Indian origin working abroad

Eligibility: Applicants for this Fellowship should possess Ph.D., M.D., or an equivalent degree

relevant to biomedical genomics, with an outstanding track record reflected in publications and other professional achievements. Academic Institutions, R&D Laboratories, Autonomous bodies, Industries etc.

Areas of research support: Animal Biotechnology, Aquaculture and Marine biotechnology, Basic Research in Biotechnology, Biofuels, Bioinformatics, Biological Control of Plants pests, diseases and weeds, Bioprospecting and Molecular Taxonomy, Biotech process engineering and industrial biotechnology, Biotechnology of Medicinal and Aromatics plants, Biotechnology of Silkworms and host-plants, Crop Biotechnology, Environment and Conservation Biotechnology, Food Biotechnology, Medical Biotechnology, Microbial Biotechnology, Plant tissue Culture, Human Resource Development, Nano Biotechnology, Women Biotechnology and Programme for Rural Areas and SC/ST population, Jai Vigyan National S&T Missions, Patent Facilitation

V. Department of Science and Technology (DST) The Department of Science and Technology plays a pivotal role in promotion of Science and Technology in the country. Science and Technology Policy-2003 states that “Special emphasis will be placed on equity in development, so that the benefits of technological growth reach the majority of the population, particularly the disadvantaged sections, leading to an improved quality of life for every citizen of the country.” The Department has wide ranging activities ranging from promoting high end basic research and development of cutting edge technologies on one hand to service the technological requirements of the common man through development of appropriate skills and technologies on the other. The Department supports research through a wide variety of schemes specifically carved out to meet the requirements of different sections of the scientific and engineering community.

Name of scheme(s): Deep Continental Studies (DCS) · Himalayan Glaciology (HG) · Indian Climate Research Programme (ICRP) · Instrument Development Programme (IDP) · International S&T Cooperation (ISTC) · Joint Technology Projects under STAC/IS-STAC · Monsoon and Tropical Climate (MONTCLIM) and Agrometeorology · Natural Resources Data Management System (NRDMS) · Pharmaceuticals Research and Development Support Fund (PRDSF) Programme Soft Loan for Pharma Industrial R&D Projects:

Eligibility: Any Indian company/firm engaged in drug development manufacturing jointly with:
a) National laboratory under CSIR, ICMR, etc. b) University department/other academic institution such as IIT/IISc., etc. c) Any other publicly funded R&D Institution.

Areas of research support: Science and Technology including agriculture, engineering and medicine.

VI. Technology Information, Forecasting and Assessment Council (TIFAC): The Technology Information, Forecasting and Assessment Council (TIFAC) is a registered society under Department of Science and Technology. The main objectives of TIFAC include generation of Technology Forecasting/Technology Assessment/ Techno Market Survey documents, developing on-line nationally accessible information system, promotion of technologies and evolving suitable mechanism for testing of technology and enabling technology transfer as well as commercialisation.

Name of scheme(s): Specialized studies in technology linked business opportunities, Bioprocesses and Bioproducts Programme ,Technology Refinement and Marketing Programme (TREMAPP) ,SME Technology Upgradation Programme ,TIFAC-SIDBI Revolving Fund for

Technology Innovation ,SRIJAN) Mission – Relevance and excellence in achieving new heights in technical education ,TIFAC-SIDBI Revolving Fund (SRIJAN):

Objectives: i) To facilitate commercialization / scaling-up of innovative technologies in terms of novel process / product development. ii) To extend financial support as soft loan to Indian industries for scaling up technology innovations developed at R&D / prototype / pilot scale.

Areas of research support: Project proposals will be evaluated based on their scientific, technological, commercial and financial merits. The evaluation criteria includes: Innovation content / uniqueness / novelty in process or product. Advantages of the proposed technology over the existing technologies.

VII. Indian Council of Medical Research (ICMR) The primary aim of the ICMR is to promote research in the country in the fields of medicine, public health and allied areas. The Council promotes biomedical research in the country through intramural research (through Institutes totally funded by ICMR) and extramural research (through grants-in-aid given to projects in non- ICMR Institutes).

Name of the scheme(s): Ad-hoc Research Schemes Senior Research Fellowship/Research Associate Ad-hoc Research Schemes:

Objective: i). To provide financial assistance to promote biomedical and health research. ii). To provide Senior Research fellowships opportunities to bright young men and women to pursue research and training invariably leading to Ph.D/MD etc.

Eligibility: The assistance is provided by way of grants to scientists in regular employment in the Universities, medical colleges, postgraduate institutions, recognized research and development laboratories and NGOs.

Areas of research support: Communicable diseases , Reproductive health , Maternal and Child Health, Nutritional and major metabolic disorders, Primary health care, Non-communicable diseases etc. Drug research including medicinal plants and indigenous/or traditional systems of medicine. · Basic medical research in disciplines such as anatomy, allergy, anthropology, physiology, biochemistry, immunology, cell and molecular biology, genetics, pharmacology, haematology etc.

VIII. Gujarat Council on Science and Technology (GUJCOST): Gujarat Council on Science and Technology (GUJCOST) established in 1986 under Education Department, Gujarat State. Gujarat Council on Science and Technology is functioning as an autonomous society from Date 1-2-2000 under department of Science and Technology to promote popularization of science and the spread of scientific temper, attitude among the people of the State.

Name of the scheme(s): Student Science and Technology (Sci - Tech) Project:

Objective: To encourage the students and Faculty members of Science and Technology institutes to use their talents for working on innovative projects. Maximum grant per project is Rs. 25,000/- Maximum 5 projects scrutinized at Institute level committee and forwarded by Head of Institute/ Deemed University will be accepted.

Minor Research Project (MRP) (Other than Biotechnology Sector):

Objective: To Provide Financial assistance to the researchers through institutions to carry out research work. Science and Technology studies and surveys

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Eligibility: Scientists from Universities, their affiliated colleges and research institutions having some essential basic facilities for carrying out research.

Areas of research support: Location specific Research and Technology Development · Pilot scale demonstration Projects · Innovative Research Work · Solution of Industrial Problem

IX. Indian National science Academy (INSA) The Indian National Science Academy (INSA) is the apex body of Indian scientists representing all branches of science and technology. .

Name of the scheme(s): INSA-JRD TATA Fellowship:

Objectives:i). To encompass Promotion of scientific knowledge in India including its practical application to problems of national welfare and Co-ordination among scientific academies, societies, institutions, the Government scientific departments and servicesii). To extend facilities of the advance scientific infrastructure and expertise of India to scientists and researchers.

Eligibility: Scientist, teacher or a research scholar, preferably below 45 years of age affiliated to a scientific or academic institution.

CONCLUSION: All funding agencies in India for research in science and technology provide financial assistance to enhance research among students, scholars, teachers, professors and scientists to promote further investigation in different sectors like Agriculture, Drugs & Pharmaceuticals, Life sciences, Health science, Engineering and Technology etc for benefit of society and human welfare.

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27 . Mrs.M.Aruna and Mrs.M.Adilakshmi Department of zoology attended two day NAAC sponsored National Seminar on “ Academic and Administrative Audit” from 12/8/15 to 13/8/15 organized by IQAC, JMJ College for women,Tenali. **And published a paper on “ Achieving effectiveness in teaching learning”**. With ISBN no:978-93-85100-38-3

ACHIEVING EFFECTIVENESS IN TEACHING LEARNING

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and
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Introduction: The most accepted criterion for measuring good teaching is the amount of student learning that occurs. A teacher's effectiveness is about student learning. However, all teachers realize that what a student learns is not always within the teachers' control. The literature on teaching is crammed full of well researched ways that teachers can present content and skills that will enhance the opportunities for students to learn. It is equally filled with suggestions of what not to do in the classroom. Students often have little expertise in knowing if the method selected by an individual instructor was the best teaching method or just “a method” or simply the method with which the teacher was most comfortable.

Teachers also have limited control over many of the most important factors that impact students' learning, including students' attitudes, background knowledge of the course content, study and learning skills, time, students will spend on their learning, their emotional readiness to learn, and on. Since there is clearly a shared responsibility between the teacher and the student as to what that student learns, and because many students are able to learn in spite of the teacher, while others fail despite all of the best efforts of a skilled practitioner, the definition of “teacher effectiveness appears to be “an act of faith” on the part of students and teachers to do their best. To bring improvement in any civilization, efforts are always on by intellectuals. To provide education three interwoven elements are involved – Matter, Student and Teacher. Out of these, teacher is equally important because he is the one who induce the desired knowledge in students. Some Teachers are by birth and others can be trained to desired skills because psychologist claims that behaviour is modifiable. Therefore, required type of behaviour is must for affective and efficient teacher. So, it's needed to modify the behaviour to required situation and profession. Thus teaching process can be developed and improved to prepare effective teacher. There are various feedback devices to be used to modify the teacher behaviour. The following are few commonly used such as Simulated Social Skill Training, Micro-Teaching, Programmed Instruction, Team Teaching, Interaction Analysis and T. Group Training. These are briefly explained as below:

- **Simulated Social Skill Training:** The simulation technique is to induce certain behaviour in an artificial situation. Pupil teacher has to play several roles as a teacher, as a student and as a supervisor. It's a feedback mechanism. It is a socio-drama related to practice and gives control over teaching variables. Important is pupil teacher is teaching in non stressful conditions.

- **Micro-Teaching:** Micro-Teaching provides teachers with a practice setting or instruction in which the normal complexities of class room are reduced and in which the teacher gets feedback on performance.

- **Programmed Instruction:** The method is a individualized instruction in which students are active and proceed at his own pace and provided with immediate knowledge of result. The programmed learning is a strategy in which various kinds of intellectual, emotional and motor experiences are provided to learner in a controlled situation through a variety of devices like book, teaching machines, teacher, radio, television etc.

- **Team Teaching:** It is an instructional situation where two or more teachers possessing complementary teaching skills cooperatively plan and implement the instruction for a single group of students using flexible scheduling and grouping techniques to meet the particular instruction.

- **Interaction Analysis:** It is a technique for analyzing and observing the classroom behaviour. It provides the structure, component and flow of behaviour of classroom activities. It is a feedback device.

- **T- Group Training:** It is also a feedback device. It is leaderless group of trainees numbering eight to twelve, discuss their own problems of teaching without any agenda and suggest some solutions on basis of their experiences.

Challenges faced in the Teacher Effectiveness To make dramatic improvements in all students' preparation for college and careers, states need thoughtful, intentional human capital strategies that get the right teachers in the right places in the right subjects.

- **Measuring Effectiveness.** States need viable approaches to measure the effectiveness of teachers. State should provide an effectiveness rating to each individual teacher, and should use those ratings to inform professional development, compensation, promotion, tenure, and dismissal. A state's 4 measure must include multiple inputs, but must include "student growth." The experts and education leaders have increasingly come to see current teacher evaluation methods as inadequate, largely because they fail to differentiate between teachers with varying levels of effectiveness.

- **Building student level growth measurement into revised high school assessment systems:** Many states should revise their high school assessment systems as they advance the college and career ready agenda. As they do so, states can design their new systems to measure high school students' progress toward college and career standards from year to year. The challenge should be to create a system of assessments with the right sequence and relationship. States pursuing this option would need to design assessments aligned to college and career ready end of high school standards, and then design a sequence of assessments taken earlier in high school that share sufficiently related content with the end of high school tests. School systems would need to report growth results using a metric that allows for meaningful and straightforward

interpretations of student progress over time, which could include approaches using common scales, value tables, or growth percentiles.

- **Introducing pre-tests or interim assessments aligned to college and career-ready standards:** States should also consider using interim assessments aligned to college and career ready standards and assessments as a method for evaluating individual students' growth towards standards throughout the year. Such approaches may allow states to develop measures of teacher effectiveness for content areas in which year to year growth measures are not feasible.

- **Recruitment, hiring, and placement :** The demands are two fold such as pressing for effective teachers to be placed both at high poverty schools and in hard to staff subjects. Both are priorities for the college and career readiness agenda as well. High poverty schools face the biggest challenges in meeting new standards; and the higher level demands of new standards and graduation course requirements, particularly in mathematics and science, make these subjects even harder to staff than previously. States can launch their own recruitment plans or partner with organizations such as SSA (Sarv Shiksha Abhiyaan) Project and RMSSA (Rashtriya Madhyamik Shiksha Abhiyaan Authority) Project to reach these new candidates.

- **Compensation and promotion opportunities:** Retooling teacher compensation and career advancement take on more pressing importance under a college and career ready agenda. Particularly in the advanced levels of subjects such as science and mathematics, prospective and current teachers typically have a plethora of other employment opportunities that offer higher pay than teaching. Yet almost all teacher salary schedules reward teachers only for accumulating additional years of experience or advanced degrees of any kind (not just in high demand subjects), neither of which appear to contribute very much to teachers' effectiveness.

- **Tenure and dismissal :** The states should rethink teacher tenure and dismissal, changes in policy and practice that research suggests could have a positive impact on student performance. Central to meeting that ambitious goal is finding ways to extend the reach of the best teachers, so that more students benefit from their excellent instruction. Reach extension can happen within a school or across a group of schools.

- **More easily access high quality curricula aligned to the common, college and career ready, internationally benchmarked standards:** Teachers should increasingly be easily able to go online and find a myriad of resources linked to the specific standards they are teaching, with high quality resources "rising to the top" because they are downloaded and cited often and rated highly by other teachers. This includes a growing repository of open education resources – online open source instructional materials that can be modified and customized by end users.

Twelve Principles of Effective Teaching and Learning: These twelve principles are intended as guidelines to faculty and administrators interested in the improvement of teaching and learning. That study reported seven principles of good practice and six powerful forces in higher education which has been extracted from fifty years of research on teaching and learning in higher education.

1. Teachers' knowledge of the subject matter is essential to the implementation of important teaching tasks: Teachers who know their subject matter thoroughly can be more effective and efficient.

2. Active involvement of the learner enhances learning: Learning is an active process which requires that the learner work with and apply new material to past knowledge and to everyday life. Some of the methods that encourage active learning in the classroom are: discussion, practice sessions, structured exercises, team projects, and research projects.

3. Interaction between teachers and students is the most important factor in student motivation and involvement: Interaction between students and faculty, particularly informal interaction, is one of the most important factors in student motivation for learning. The opportunity to know a few faculty well often enhances students' intellectual commitment and provides valuable role modeling.

4. Students benefit from taking responsibility for their learning. Students are more motivated when they take control of their own learning. This is the belief which has stimulated active interest in self-directed learning.

5. There are many roads to learning: Students learn in different ways and vary in their abilities to perform certain tasks. Understanding that each student has unique strengths and weaknesses related to the ways in which they approach learning is an important component of effective education. Providing a variety of learning activities for a class enables individual students to choose the activity which is the most effective for them at the moment.

6. Expect more and you will achieve more. Simply stated, if an educator conveys to students that he or she believes in their ability to succeed learning is enhanced.

7. Learning is enhanced in an atmosphere of cooperation. Learning is enhanced when it is perceived as a collaborative and cooperative effort between students. The opportunity to share ideas without threat of ridicule and the freedom to respond to the ideas of others increases complexity of thinking and deepens understanding.

8. Material must be meaningful. If new material is presented in a pattern or framework that the learner can perceive, it is more readily learned and retained. New material will be more easily learned if the learner is helped to see its relationship to what s/he already knows. Material which is seen by the learner as relevant to his or her own problems and experiences will be more readily learned.

9. Both teaching and learning are enhanced by descriptive feedback. Without feedback neither learner nor teacher can improve because they will not know what they need to know or to what extent they are fulfilling their goals. The learners' behavior will more quickly reach the objectives if they are informed (or given feedback) frequently about the correctness of their responses. Correct responses should be immediately reinforced to increase the "permanence" of learning. A positive reinforcer is anything that will increase the probability that the desired behavior will be repeated. A smile or comment to let the learner know he or she has successfully completed the task is especially good because awareness of successful completion is, in itself, the most effective of all reinforcers.

10. Critical feedback is only useful if the learner has alternatives to pursue. There is no use giving teachers or students feedback about their performances unless they can do something about it, that is, unless they have some alternative course of action or behaviour.

11. Time plus energy equals learning: Lectures or seminars that are canceled will not help the learner. Conversely, teachers

28.Mrs.Ch.Sarojini Department of zoology attended two day NAAC sponsored National Seminar on “ Academic and Administrative Audit” from 12/8/15 to 13/8/15 organized by IQAC, JMJ College for women,Tenali. **Mrs.Ch.Sarojini** published a paper on “**Revolutionary potentials of ICT in improving the quality of Education.**” With ISBN no:978-93-85100-38-

REVOLUTIONARY POTENTIALS OF ICT IN IMPROVING THE QUALITY OF EDUCATION

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INTRODUCTION :

ICT is important as a source of knowledge medium to transit knowledge and it is a means of interaction. Globalization of Economy and Information Technology Innovations became Knowledge-based Economy and Society Escalating the Demand for Education with effective learning for all any time any where increasing the rate of learning enabling the teacher to teach less and the learner to learn more. development of ICTs specifically for teaching/learning purposes involving the adoption of general components of ICTs is needed. The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research (Yusuf, 2005). A great deal of research has proven the benefits to the quality of education (Al-Ansari, 2006). ICTs have the potential to innovate, accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; cited by Yusuf, 2005). As Jhuree (2005) states, much has been said and reported about the impact of technology, especially computers, in education.

Unique features of ICT: **Efficiency:** faster, cheaper, fewer steps, with the involvement of less man power and less paper work. **Effectiveness:** most interactive with fewer errors can be customized, personalized, achievable, transparent and searchable; on-line examination and On-line tutoring is possible. Innovates new products and new technology. (Dr.B. Victor, Ph.D., 2015). ICT facilitates collaboration and communication, aid in the visualization of difficult concepts, promotes creativity, enables multiplier effect of documents, provides flexibility and variety in learning, and provides a multimedia effect.

Scope of ICT in Education: A person from village also can refer the latest information and research every day. In recent years there has been a groundswell of interest in how ICT can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings as ICTs are more than older technologies such as the telephone, radio and television which are most dominant delivery mechanism in both developed and developing countries for over forty years. But different technologies are typically used in combination rather than as the sole delivery mechanism. For instance, the Kothmale Community Radio Internet uses both radio broadcasts and computer and Internet technologies to facilitate the sharing of information and provide educational opportunities in a rural community in Sri Lanka. Similarly, the Indira Gandhi National Open University in India combines the use of print, recorded audio and video, broadcast radio and television, and audio conferencing technologies (<http://www.ignou.ac.in>).

ICT tools and products used in education: Multimedia, PC, laptop, note book, CD's DVD's Digital video still camera. Internet and its tools-e-mail, browsers, World Wide Web (WWW), Website search engines Chat etc. Digital libraries, e-books and electronic publications. Microsoft

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publishing- news letter, poster, brochure. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs etc. have been used in education for different purposes (Sharma, 2003; Sanyal, 2001; Bhattacharya and Sharma, 2007). The development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into schools at a rapid rate. ICTs have been utilized in education ever since their inception, but they have not always been massively present (Hepp, Hinostroza, Laval and Rehbein, 2004).

When the potential use of computers in schools was first mooted, the predominant conception was that students would be 'taught' by computers (Mevarech & Light, 1992) and computer would 'take over' the teacher's job in much the same way as a robot computer may take over a welder's job. Collis (1989) refers to this as "a rather grim image" where "a small child sits alone with a computer". According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services, and other related information and communication activities.

Integration of ICT in teaching – learning is for Digital library, Word processing for documents, notes, projects, assignments; Spread sheet programming for records, exam scores; Data bases for information storage; Graphing software to prepare teaching, learning resources; Developing multimedia kits to make process interesting; Using internet and e – mail facilities to gain knowledge; Games and simulation to improve quality of learning. ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality. The direct link between ICT use and students' academic performance has been the focus of extensive literature during the last two decades. ICT helps students to their learning by improving the communication between them and the instructors (Valasidou and Bousiou, 2005).

Influence of ICT on student learning: ICT helps to provide interactive learning experiences, stimulates and motivates students to learn, provides comfortable learning, aids in the understanding of difficult concepts and processes, caters to different learning styles, helps Learners to gain valuable computer skills, aids in collaboration and group work, learning process can be anywhere and anytime, Learners use computer-based services to search and find relevant information, retrieve relevant information, decode information in variety of forms i.e. written, statistical and graphic, and critically evaluate information of different fields of knowledge, to write, analyze, present and communicate information. Learners can create networks of co-learners and share, collaborate and construct knowledge. Researchers use ICT as a reference tool, tool to collect project information and literature survey, process and analyze Data. ICT opens up opportunities for learning and promote learner centered and collaborative learning principles and enhance learning Environment, critical thinking, creative thinking and problem solving skills; satisfies the diverse needs of all kinds of learners characterized by all kinds of socio-cultural conditions including the diversity of multiple intelligences making them independent learners and self-starters. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through (New Media Consortium, 2007). ICTs allow learners to

explore and discover rather than merely listen and remember. The World Wide Web (WWW) also provides a virtual international gallery for students' work (Loveless, 2003). ICT can engage and inspire students, and this has been cited as a factor influencing ready adopters of ICT (Long, 2001; Wood, 2004). The bivariate correlation between the availability of ICT and students' performance is strongly and significantly positive; the correlation becomes small and insignificant when other student environment characteristics are taken into consideration (Fuchs and Woessman, 2004). ICT helps in providing a catalyst for rethinking teaching practice (Flecknoe, 2002; McCormick & Scrimshaw, 2001) developing the kind of graduates and citizens required in an information society (Department of Education, 2001); improving educational outcomes (especially pass rates) and enhancing and improving the quality of teaching and learning (Wagner, 2001; Garrison & Anderson, 2003). ICT can help deepen students' content knowledge, engage them in constructing their own knowledge, and support the development of complex thinking skills (Kozma, 2005; Kulik, 2003; Webb & Cox, 2004). Albert Bandura, Girasoli and Hannafin (2008) urge the use of asynchronous CMC tools to promote student self-efficacy and hence academic performance. Fister et al (2008) also depict the power of tablet PCs to improve mathematics instruction. ICTs have the potential for increasing access to and improving the relevance and quality of education and acts as a catalyst for change in this domain. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves and Jonassen, 1996).

Use of ICT in Day to Day life of Teachers: Teachers use ICT in research for preparing teaching material to support traditional learning methods, to maintain the student Datalike attendance, marks; preparation of Question papers, PPTs, Videos and to participate in online forums and conferences and create pedagogical environments for the growth of their learners as well as the very systems of education; Access ideas and information from diverse sources in a wide range of multimedia forms and extend them through processing, manipulating, analyzing and publishing material to Transform into new or different forms; Share it across local, national and international networks.

ICT to support innovative pedagogy: ICT Focuses on the skills needed to build and communicate knowledge. Goal oriented curricula and syllabuses can be changed according to learner's needs. The ICT Test Bed evaluation (Underwood 2006) provides evidence that many teachers use ICT to support innovative pedagogy. Though ICT has a positive impact on teaching and learning situations, its impact on teaching and learning must still be considered to be limited" (Ramboll, 2006).

Role of ICT in teaching and learning system at global level: ICT has highly changed the face of education over the last few decades and became a significant research area for many scholars around the globe.

Change in the Role of both teachers and learners: The role of the teachers changed from knowledge transmitter to that of facilitator, knowledge navigator, Controller of Learning, Creator of Learning Environment Always Expert Collaborator & Co-learner Learning to use ICT Using ICT to Enhance Learning Didactive/ Expository Interactive/ Experiential/ Exploratory Changes in Learners' Roles From To Passive Learner Active Learner Reproducer of Knowledge Producer of Knowledge Dependent Learner and sometime as co-learner. The new role of teachers demands a new way of thinking and understanding of the new vision of learning process. Learners will have more responsibilities of their own learning as they seek out, find, synthesize, and share their knowledge with others (Resta, P. (Ed.). 2002). ICT provides powerful tools to support the shift from teacher centered to learner centered paradigm and new roles of teacher, learner, curricula and new media.

Vital contributions of ICT in transforming the nature of education: There are major paradigm shifts in education in recent years due to ICT. Learning through facts, drill and practices, rules and procedures was more adaptive in earlier days, learning through projects and problems, inquiry and design, discovery and invention, creativity and diversity, action and reflection is perhaps more fitting for the present times. The major hallmark of this learning transition is from teacher centered to learner focus paradigm, from traditional instruction to virtual learning environment creating a more interactive and engaging learning environment for teachers and learners emerging the responsible knowledge society emphasizing lifelong learning with meaningful and enjoyable learning experiences. It permitted the move from reproductive model of teaching and learning to an independent, autonomous learning model that promotes initiation, creativity and critical thinking with independent research. Learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in authentic and active learning paradigm. Teachers are expected to create a new flexible and open learning environment with interactive, experiential and multimedia based delivery system. ICT should help teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities. The use of ICT changes the distribution and ownership of information resources in the space of teaching and learning and thus changes the relationship among educational participants (Zhu, Z.T. 2003). ICT is a potentially powerful tool for offering educational opportunities. Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. One of the most vital contributions of ICT in the field of education is- Easy Access to Learning by browsing through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002). Wider availability of best practices and best course material in education can be shared by means of ICT, can foster better teaching and allows the academic institutions to reach disadvantaged groups and new international educational markets. The growth of ICT their ease of use, the power and diversity of information transfer allow teachers and students to have access to a world beyond the classroom (Majumdar, S. 1997).

European countries: For most European countries, the use of ICT in education and training has become a priority during the last decade but yet very few have achieved progress. Indeed, a small percentage of schools in some countries achieved high levels of effective use of ICT to support and change the teaching and learning process in many subject areas. Others are still in the early phase of Information and Communication Technologies adoption.

ICT primary schools of European countries: ICT has positive impact on students' performances in primary schools particularly in English language and less in science in national, international, and European schools, motivated pupils, reduced the social disparities between pupils (Blanskat, Blamire, kefala 2006). By virtue of government Interventions and training seminars organized in this regard, ICT tools stimulated absolute majority of teachers in Europe (90 %) to use ICT for preparing lessons, sequencing classroom activities, etc.

ICT in education in UK: The use of ICT increased in education in UK to take full advantages of new opportunities that ICT offer and there are groundswells of interest of academic researchers in UK in how technological tools can enhance the quality of teaching and learning in schools, and so help learners to achieve better outcomes. Furthermore, it has been proved that new technologies have lots of benefits on the students (G. Galea 2002). ICT allow for a higher quality lessons through collaboration with teachers in planning and preparing resources (Ofsted, 2002).

Students learn new skills: analytical, including improvements in reading comprehension (Lewin et al, 2000). ICT also develop some writing skills: spelling, grammar, punctuation, editing and re-drafting (Lewin et al, 2000). ICT proves that students who used educational technology felt more successful in school they are more motivated to learn more and have increased self- confidence and self-esteem. It is also confirmed that many students found learning in a technology-enhanced setting more stimulating and much better than in a traditional classroom environment (Pedretti and Mayer-Smith 1998).

Portuguese Education System: A massive technological transformation process is undergoing in The Portuguese Education System very slowly because of the lacking of a clear-cut strategy in the integration of ICTs in secondary education curricula. Broadband networks, computers and white boards, are being deployed in schools all over the country; computers and white boards are being installed in the classrooms; laptops and internet connections are being sold to students and teachers at below the market prices. (Ana Nunes de Almeida (Coordinator), Ana Delicado, Nuno de Almeida Alves, Tiago Carvalho, research project concerning children and the internet in Portugal (2008-2010).

ICT a solution to the problems in education system of India and in other countries: ICT helps to overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and geographical barriers, communication barriers lead to the democratization of education. (Young, 2002; McGorry, 2002). ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. There exist **drawbacks in general education** in India as well as all over the world like lack of learning materials, teachers, remoteness of education facilities, high dropout rate etc. (UNESCO, 2002). Innovative use of ICT can potentially solve this problem. People have to access knowledge via ICT to keep pace with the latest developments (Plomp, Pelgrum & Law, 2007). ICT can be used to remove communication barriers such as that of space and time (Lim and Chai, 2004). ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time (Bhattacharya and Sharma, 2007; Cholin, 2005). Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work (Cholin, 2005). ICT eliminating time barriers in education for learners as well as teacher. It eliminates geographical barriers as learners can log on from any place (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007). ICT provides new educational approaches (Sanyal, 2001). It can provide speedy dissemination of education to target disadvantaged groups (UNESCO, 2002; Chandra and Patkar, 2007). ICT enhances the international dimension of educational services (UNESCO, 2002). It can also be used for non-formal education like health campaigns and literacy campaigns (UNESCO, 2002). Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems (Bottino, 2003; Bhattacharya and Sharma, 2007; Mason, 2000; Lim and Hang, 2003). It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy (Kozma, 2005). Plomp et al (2007) state that the experience of many teachers, who are early innovators, is that the use of ICT is motivating for the students as well as for the teachers themselves. Bottino (2003) and Sharma (2003) mention that the use of ICT can improve performance, teaching, administration, and develop relevant skills in the disadvantaged communities. It also improves the quality of education by facilitating learning by doing, real time conversation, delayed time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn (Yuen et al, 2003). A great deal of research has proven the benefits to the

quality of education (Al-Ansari 2006). Hepp, Hinojosa, Laval and Rehbein (2004) state that the literature contains many unsubstantiated claims about the revolutionary potential of ICTs to improve the quality of education in the global village. Knowing the effectiveness and control over ICTs teachers have to introduce ICT into their classrooms (Zhao and Cziko 2001). Most of the teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). The benefits of ICT will be gained "...when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT (Harris, 2002). The use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001). Changed pool of teachers will come changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Littlejohn et al., 2002). "The flexibilization time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information (Cabero, 2001). ICT through curriculum integration has a significant and positive impact on student achievement, especially in terms of "Knowledge Comprehension" "Practical skill" and "Presentation skill" in subject areas such as mathematics, science, and social study (National Institute of Multimedia Education in Japan).

Main advantages of ICT tools for education: Through ICT, images can easily be used in teaching and improving the retentive memory of students, teachers can easily explain complex instructions and ensure students' comprehension, teachers are able to create interactive classes and make the lessons more enjoyable, which could improve student attendance and concentration.

Main disadvantages of ICT tools for education: Setting up the devices can be very troublesome, too expensive to afford, Hard for teachers and learners to use with a lack of experience of using ICT tools, Excess usage of ICT is harmful to health. Eye sight of learners will be affected. Lack of qualified and experience ICT literate human resource in the country, of affordable ICT tools, power especially in the remote areas, reliable communication networks.

Conclusion: Educators became more focused on the use of the technology to improve student learning as a rationale for investment all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICT. The use of ICT in education has intensely reformed learning and teaching processes, it has expanded new opportunities for learning and accessing to educational resources beyond those traditionally available, created a method of training called E-learning, a broader educational reform which embraces a shift away from teacher-centered, lecture oriented towards learner - centered, interactive and constructive learning environment. ICT has both positive as well as negative impact on education depending on using ICT in a useful manner or have its negative impacts on our life the most deciding factor is each individual's learning Style. Especially in developing countries like India, effective use of ICT for the purpose of education has the potential to bridge the digital divide. The commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs (Pelgrum, W.J., Law, N., 2003). Students should feel confident about using ICT and should be aware of how ICT changes job.

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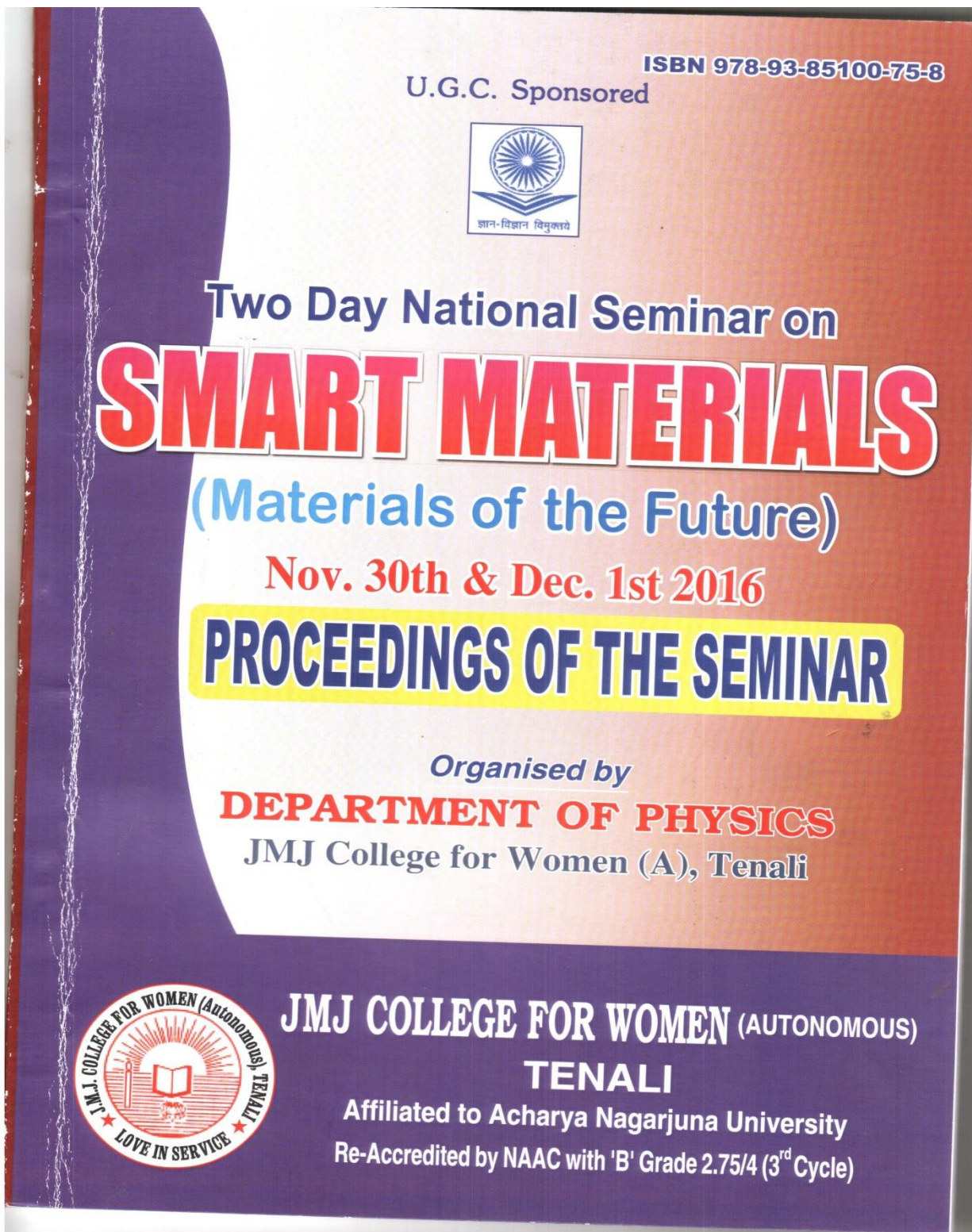
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29. Mrs.M.Aruna and Ms. M. Adilakshmi published a paper on "Biofuels from Algae" in national seminar on "Smart Materials" held at JMJ College for women, Tenali on 30th Nov and 1st December 2016, with ISBN No- 978-93-85100-75-8



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BIOFUELS FROM ALGAE

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ABSTRACT

Humans use algae as food, for production of useful compounds, as biofilters to remove nutrients and other pollutants from wastewaters, to assay water quality, as indicators of environmental change, in space technology, and as laboratory research systems. Algae is commercially cultivated for Pharmaceuticals, Nutraceuticals, Cosmetics, Biofuels and Aquaculture purpose. Population outburst together with increased motorization has led to an overwhelming increase in the demand for fuel. In the milieu of economical and environmental concern, algae capable of accumulating high starch/cellulose can serve as an excellent alternative to food crops for bioethanol production, a green fuel for sustainable future. Certain species of algae can produce ethanol during anaerobic fermentation and thus serve as a direct source for ethanol production. Of late, oleaginous microalgae generate high starch/cellulose biomass waste after oil extraction, which can be hydrolyzed to generate sugary syrup to be used as substrate for ethanol production. Macroalgae are also harnessed as renewable source of biomass intended for ethanol production. Algal biofuels are an alternative to liquid fossil fuels that uses algae as its source of energy-rich oils. Several companies and government agencies are funding efforts to reduce capital and operating costs and make algae fuel production commercially viable. Like fossil fuel, algae fuel releases CO₂ when burnt, but unlike fossil fuel, algae fuel and other biofuels only release CO₂ recently removed from the atmosphere via photosynthesis as the algae or plant grew. The energy crisis and world food crisis have ignited interest in algaculture for making biodiesel and other biofuels using land unsuitable for agriculture. Among algal fuels' attractive characteristics are that they can be grown with minimal impact on fresh water resources, can be produced using saline wastewater, have a high flash point, and are biodegradable and relatively harmless to the environment if spilled. Algae cost more per unit mass than other second-generation bioenergy crops due to high capital and operating costs, but are claimed to yield between 10 and 100 times more fuel per unit area.

Keywords : Bioethanol; Biomass; Microalgae; Macroalgae; Biodiesel.

INTRODUCTION

In 1942 Harder and Von Witsch were the first to propose that microalgae be grown as a source of lipids for food or fuel. Following World War II, research began in the US, Germany, Japan, England, and Israel on culturing techniques and engineering systems for growing microalgae on larger scales, particularly species in the genus *Chlorella*. Meanwhile, H. G. Aach showed that *Chlorella pyrenoidosa* could be induced via nitrogen starvation to accumulate as much as 20% of its dry weight as lipids. Since the need for alternative transportation fuel had subsided after World War II, research at this time focused on culturing algae as a food source or, in some cases, for wastewater treatment. The research program focused on the cultivation of microalgae in open outdoor ponds, systems which are low in cost but vulnerable to environmental disturbances like temperature swings and biological invasions. 3,000 algal strains were collected from all over the country and screened for desirable properties such as high productivity, lipid content,

thermal tolerance, and the most promising strains were included in the SERI microalgae collection at the Solar Energy Research Institute (SERI) in Golden, Colorado and used for further research. Among the program's most significant findings were that rapid growth and high lipid production were "mutually exclusive," since the former required high nutrients and the latter required low nutrients. The final report suggested that genetic engineering may be necessary to be able to overcome this and other natural limitations of algal strains, and that the ideal species might vary with place and season. Although it was successfully demonstrated that large-scale production of algae for fuel in outdoor ponds was feasible, the program failed to do so at a cost that would be competitive with petroleum, especially as oil prices sank in the 1990s.

Other contributions to algal biofuels research have come indirectly from projects focusing on different applications of algal cultures. For example, in the 1990s Japan's Research Institute of Innovative Technology for the Earth (RITE) implemented a research program with the goal of developing systems to fix CO₂ using microalgae. Although the goal was not energy production, several studies produced by RITE demonstrated that algae could be grown using flue gas from power plants as a CO₂ source, an important development for algal biofuel research. Other work focusing on harvesting hydrogen gas, methane, or ethanol from algae, as well as nutritional supplements and pharmaceutical compounds, has also helped inform research on biofuel production from algae. *Chondrus crispus*, (probably confused with *Mastocarpus stellatus*, common name: Irish moss), is also used as "carrageen". It is an excellent stabiliser in milk products - it reacts with the milk protein caesin. Other products include: petfoods, toothpaste, ice-creams and lotions etc., Alginates in creams and lotions are absorbable through the skin.

Fuels: Algae can be converted into various types of fuel, depending on the technique and the part of the cells used. The lipid, or oily part of the algae biomass can be extracted and converted into biodiesel through a process similar to that used for any other vegetable oil, or converted in a refinery into "drop-in" replacements for petroleum-based fuels. Alternatively or following lipid extraction, the carbohydrate content of algae can be fermented into bioethanol or butanol fuel.

Biodiesel: Biodiesel is a diesel fuel derived from animal or plant lipids (oils and fats). Studies have shown that some species of algae can produce 60% or more of their dry weight in the form of oil. Because the cells grow in aqueous suspension, where they have more efficient access to water, CO₂ and dissolved nutrients, microalgae are capable of producing large amounts of biomass and usable oil in either high rate algal ponds or photo bioreactors. This oil can then be turned into biodiesel which could be sold for use in automobiles. Regional production of microalgae and processing into biofuels will provide economic benefits to rural communities.

As they do not have to produce structural compounds such as cellulose for leaves, stems, or roots, and because they can be grown floating in a rich nutritional medium, microalgae can have faster growth rates than terrestrial crops. Also, they can convert a much higher fraction of their biomass to oil than conventional crops, e.g. 60% versus 2-3% for soybeans. The per unit area yield of oil from algae is estimated to be from 58,700 to 136,900 L/ha/year, depending on lipid content, which is 10 to 23 times as high as the next highest yielding crop, oil palm, at 5,950 L/ha/year.

Biobutanol : Butanol can be made from algae or diatoms using only a solar powered biorefinery. This fuel has an energy density 10% less than gasoline, and greater than that of either ethanol or methanol. In most gasoline engines, butanol can be used in place of gasoline with no modifications. In several tests, butanol consumption is similar to that of gasoline, and when blended with gasoline, provides better performance and corrosion resistance than that of ethanol or E85. The green waste left over from the algae oil extraction can be used to produce butanol. In addition, it has

been shown that macroalgae (seaweeds) can be fermented by Clostridia genus bacteria to butanol and other solvents.

Biogasoline: Biogasoline is gasoline produced from biomass. Like traditionally produced gasoline, it contains between 6 (hexane) and 12 (dodecane) carbon atoms per molecule and can be used in internal-combustion engines.

Methane : Methane, the main constituent of natural gas can be produced from algae in various methods, namely Gasification, Pyrolysis and Anaerobic Digestion. In Gasification and Pyrolysis methods methane is extracted under high temperature and pressure. Anaerobic Digestion is a straight forward method involved in decomposition of algae into simple components then transforming it into fatty acids using microbes like acidific bacteria followed by removing any solid particles and finally adding methanogenic bacteria to release a gas mixture containing methane. A number of studies have successfully shown that biomass from microalgae can be converted into biogas via anaerobic digestion. Therefore, in order to improve the overall energy balance of microalgae cultivation operations, it has been proposed to recover the energy contained in waste biomass via anaerobic digestion to methane for generating electricity.

Ethanol : The Algenol system which is being commercialized by BioFields in Puerto Libertad, Sonora, Mexico utilizes seawater and industrial exhaust to produce ethanol. *Porphyridium cruentum* also have shown to be potentially suitable for ethanol production due to its capacity for accumulating large amount of carbohydrates.

Hydrotreating to traditional transport fuels : Algae can be used to produce 'green diesel' (also known as renewable diesel, hydrotreating vegetable oil or hydrogen-derived renewable diesel) through a hydrotreating refinery process that breaks molecules down into shorter hydrocarbon chains used in diesel engines. It has the same chemical properties as petroleum-based diesel meaning that it does not require new engines, pipelines or infrastructure to distribute and use. It has yet to be produced at a cost that is competitive with petroleum. While hydrotreating is currently the most common pathway to produce fuel-like hydrocarbons via decarboxylation/ decarbonylation, an alternative process offering a number of important advantages over hydrotreating. In this regard, the work of Crocker et al. and Lercher et al. is particularly noteworthy. For oil refining, research is underway for catalytic conversion of renewable fuels by decarboxylation.

Jet fuel : Rising jet fuel prices are putting severe pressure on airline companies, creating an incentive for algal jet fuel research. The International Air Transport Association, for example, supports research, development and deployment of algal fuels. IATA's goal is for its members to be using 10% alternative fuels by 2017. Trials have been carried with aviation biofuel by Air New Zealand,^[63] Lufthansa, and Virgin Airlines. In February 2010, the Defense Advanced Research Projects Agency announced that the U.S. military was about to begin large-scale oil production from algal ponds into jet fuel. After extraction at a cost of \$2 per gallon, the oil will be refined at less than \$3 a gallon. A larger-scale refining operation, producing 50 million gallons a year, is expected to go into production in 2013, with the possibility of lower per gallon costs so that algae-based fuel would be competitive with fossil fuels. The projects, run by the companies SAIC and General Atomics, are expected to produce 1,000 gallons of oil per acre per year from algal ponds.

Species : Research into algae for the mass-production of oil focuses mainly on microalgae (organisms capable of photosynthesis that are less than 0.4 mm in diameter, including the diatoms and cyanobacteria) as opposed to macroalgae, such as seaweed. The preference for microalgae

has come about due largely to their less complex structure, fast growth rates, and high oil-content (for some species). However, some research is being done into using seaweeds for biofuels, probably due to the high availability of this resource.

As of 2012 researchers across various locations worldwide have started investigating the following species for their suitability as a mass oil-producers: *Botryococcus braunii*, *Chlorella*, *Dunaliella tertiolecta*, *Gracilaria*, *Pleurochrysis carterae* and *Sargassum*.

Dehydration : Often, the algae is dehydrated, and then a solvent such as hexane is used to extract energy-rich compounds like triglycerides from the dried material. Then, the extracted compounds can be processed into fuel using standard industrial procedures. For example, the extracted triglycerides are reacted with methanol to create biodiesel via transesterification. The unique composition of fatty acids of each species influences the quality of the resulting biodiesel and thus must be taken into account when selecting algal species for feedstock.

Hydrothermal Liquefaction : An alternative approach called Hydrothermal liquefaction employs a continuous process that subjects harvested wet algae to high temperatures and pressures—350 °C (662 °F) and 3,000 pounds per square inch (21,000 kPa). Products include crude oil, which can be further refined into aviation fuel, gasoline, or diesel fuel. The test process converted between 50 and 70 percent of the algae's carbon into fuel. Other outputs include clean water, fuel gas and nutrients such as nitrogen, phosphorus, and potassium.

Use of Byproducts : Many of the byproducts produced in the processing of microalgae can be used in various applications, many of which have a longer history of production than algal biofuel. Some of the products not used in the production of biofuel include natural dyes and pigments, antioxidants, and other high-value bio-active compounds. These chemicals and excess biomass have found numerous use in other industries. For example, the dyes and oils have found a place in cosmetics, commonly as thickening and water-binding agents. Discoveries within the pharmaceutical industry include antibiotics and antifungals derived from microalgae, as well as natural health products, which have been growing in popularity over the past few decades. For instance *Spirulina* contains numerous polyunsaturated fats (Omega 3 and 6), amino acids and vitamins, as well as pigments that may be beneficial, such as beta-carotene and chlorophyll.

Conclusion: One of the main advantages that using microalgae as the feedstock when compared to more traditional crops is that it can be grown much more easily. Algae can be grown in land that would not be considered suitable for the growth of the regularly used crops. In addition to this, wastewater that would normally hinder plant growth has been shown to be very effective in growing algae. Because of this, algae can be grown without taking up arable land that would otherwise be used for producing food crops, and the better resources can be reserved for normal crop production. Microalgae also require fewer resources to grow and little attention is needed, allowing the growth and cultivation of algae to be a very passive process. Using algae as a source of biodiesel can alleviate an increased cost for both the food and the fuel produced. First, algae is not used as a primary food source for humans, meaning that it can be used solely for fuel and there would be little impact in the food industry. Second, many of the waste-product extracts produced during the processing of algae for biofuel can be used as a sufficient animal feed. This is an effective way to minimize waste and a much cheaper alternative to the more traditional corn or grain based feeds. Growing algae as a source of biofuel has also been shown to have numerous environmental benefits, and has presented itself as a much more environmentally friendly alternative to current biofuels. It prevents this contaminated water from mixing with the lakes and rivers that currently supply our drinking water. In addition to

this, the ammonia, nitrates, and phosphates that would normally render the water unsafe actually serve as excellent nutrients for the algae. Many algae species used in biodiesel production are excellent bio-fixers, meaning they are able to remove carbon dioxide from the atmosphere to use as a form of energy for themselves. Because of this, they have found use in industry as a way to treat flue gases and reduce GHG emissions.

While the technology exists to harvest and convert algae into a usable source of biodiesel, it still hasn't been implemented into a large enough scale to support the current energy needs. Further research will be required to make the production of algae biofuels more efficient, and at this point it is currently being held back by lobbyists in support of alternative biofuels, like those produced from corn and grain.

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Isolation and Molecular (RAPD) Identification of Alkaline Protease Producing Fungi from Dissimilar Soil Areas of Andhra Pradesh

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ABSTRACT

Three soil samples were collected in depth of 5-6 cm from soil. Alkaline pH was observed across the sampling sites and a total of 3 samples were found with plenty of microflora occurrence. The total microorganism counts of the soils were estimated by standard dilution plate technique. The isolated microbes were identified by their cultural and morphological characteristics. Total 74 microorganism forms (includes bacteria (4), fungi (69) and actinomycetes (1)) were obtained from the positive three soil samples. These are 10 fungal forms from Kakinada, 9 from Vishakhapatnam and 40 from Tenali black field soils. Alkaline proteases fungi were isolated using milk agar plate assay consists of 0.5% casein from different soils collected from Kakinada, Vishakhapatnam beach soil and Tenali black soil fields of Andhra Pradesh. Three soil fungal isolates were examined for protease producing microorganism. Isolation and RAPD-identification of the highest alkaline protease producer under submerged fermentation, using czepekdox media.

KEYWORDS : Enzyme production and optimization, fungal protease, tyrosine production.

Introduction

Soil is the natural medium for the growth of both microbial and biological activities (Griffin, 1972). Prescott *et al.* (1993) Microbial fauna was always depends on different influencing factors such as nutrients, moisture and aeration rate pH, temperature etc. Environmental factors play vital role in the conversion of complex organic compound into reusable compounds in the nature. Plant and animal origin complex matter conversion of bioavailability of nitrates, sulfates, phosphates etc., and by different biochemical processes produce industrially useful primary and secondary metabolites such as enzymes, amino acids and vitamins and antibiotics, alcohol and organic acids (Bridge and Spooner, 2001).

High depth of soil samples having much biomass (fungi) than bacteria, and also where the soil nutrients were more concentrated than surface area, which also plays crucial role (Ainsworth and Bisby, 1995). Fungi are fundamental microorganism in soil ecosystem and execute useful ecological processes to maintain the quality of human life, which facilitate economic benefits. According to the Hawks worth and Ross man, in the year (1997) and (2001) predicted that 70,000 fungi were identified and used as the industrial source out of 1.5 million fungal species on earth.

Atlas and Bartha, studied in the year 1998 and describes that the count of fungi for gram soil was up to 5×10^3 to 9.0×10^6 and were accomplished to grow and survive at broad range of pH. But fungi were destructive at acid, neutral and alkaline pH. Fungi were able to uptake and utilize high concentration of substrates at favorable conditions with adequate moisture, aeration (Miyamoto *et al.*, 2002). Waksman (1922) and Warcup (1950) isolated fungi from soil by plate count method. Manivannam and Kathiresan (2007) isolated fungi from Rhizosphere soils and Charles *et al.*, (2008) isolated fungi named as *Aspergillus nidulans* from poultry farm soils. Nehra *et al.*, (2002) Kalpana Devi *et al.*, (2008) isolated proteolytic fungi from diverse sources such as garden soil and alkaline soil. Al- Fallih, (2001), isolated yeast from sandy soil and soil samples from butcheries (Usama, 2008) etc.

Proteases have wide applications in many industries such as textiles, detergents, food processing, meat tenderizing, animal nutrition, pharmaceuticals, paper industry and food industry and these proteases account for 60% of industrial enzymes in the market demand (Negi and Banerjee, 2006). The detergent industry is the major users of hydrolytic enzymes, working on alkaline pH and now more than a quar-

ter of the global enzyme production. The huge amounts of alkaline protease used commercially and industrially. Alkaline proteases are used as the index of some horrible diseases such as cancer and AIDS. Hence clinical importance was increased and the demand for the highest alkaline protease producers was increased day by day (Rath *et al.*, 2002). The present study aim to isolate and molecular identification of the alkaline protease producing fungi from different soils, such as Kakinada and Vishakhapatnam beach soil and Tenali black soils from fields of Andhra Pradesh.

MATERIAL AND METHODS

Identification of the culture

The fungal isolate was subjected to some gross morphological and biochemical studies viz., gelatin liquefaction, casein hydrolysis, tyrosine utilization and carbohydrate utilization. Gelatin was added at 15% level to sterile nutrient agar plates, inoculated with the fungal isolate and incubated at 30°C for 96 h. After incubation, the plates were kept at a temperature of 2-3° for 1h and tested for liquefaction if any. PDA, supplemented with 20% skimmed milk, was used for casein hydrolysis and incubated at 30°C for 96 h for the organism.

Culture and Identification

A morphological identification was performed using culture media, potato dextrose agar media for the primary identification of isolated molds (Moghim *et al.*, 2012). The fungal strain was then confirmed by molecular identification using restriction fragment length polymorphism (RFLP) followed by random amplified polymorphic DNA (RAPD) for the epidemiological linkage among clinical and environmental sources.

DNA extraction

Aspergillus mycelial mass was harvested from the 12 to 24 hr fungal liquid cultures, filtered and purified. The genomic DNA was extracted by glass beads and phenol-chloroform method, (a solution of 1mM EDTA, 1% SDS, 100mM NaCl, 10 mM Tris-HCl and 2% Triton X-100, in distilled water, pH 8.0 was used as Lysis Buffer). The extracted DNA was checked by using 1.5% agarose gel electrophoresis (Rath *et al.*, 2002).

PCR for identification

The PCR assay was performed using 5 µl of the DNA template in a total reaction volume of 50 µl (consisting of PCR buffer [20 mMTris-HCl at pH 8.0], 50 mM KCl, 0.1 mM each of forward [ITS: 5-TCC GTA GGT

GAA CCT GCG G-3] and reverse [ITS-4 5-TCC TCC GCT TAT TGA TAT GC-3] primers for ITS regions of rDNA [purchased from Mirhendi Molecular Biology Lab, TUMS], and 1.5 U of Taq DNA polymerase). We used universal primers for the amplification of *Aspergillus* ITS regions (forward primer: 5'-TCC GTA GGT GAA CCT GCG G - 3', reverse primer: 5'-TCC TCC GCT TAT TGAT TAT GC-3') (Loudon *et al.*, 1993). The reactions were performed in a thermo cycler (XP Cycler, BIOER, China). Thermal program included an initial DNA denaturation at 95°C for 5 min that followed by 30 cycles, consisting of the stages; denaturation at 95°C for 30 sec, annealing at 55°C for 30 sec, and extension at 72°C for 1 min, with a final extension at 72°C for 5 min following the last cycle. The DNA fragments were length separated by electrophoresis through 1.5% agarose gels in Tris Borate EDTA (TBE) buffer and 0.50 mg of ethidium bromide per ml. Results were documented by using a UV trans illuminator (SynGene SYDR4/680X, UK) (Mirhendi *et al.*, 2007).

Digestion of PCR products using RFLP method:

Digestion of amplified ITS fragments by using a novel restriction enzyme, MwoI at 37°C enabled us to differentiate most of *Aspergillus* isolates in level of species. The method was performed for both clinical and environmental isolates. For the restriction enzyme digestion, 13 µl of each PCR product was directly digested by 5 U (0.5 µl) of the restriction enzyme MwoI, 1.5 µl of the enzyme buffer, and then incubated at 37°C for 180 min (Mirhendi *et al.*, 2007). Digested PCR products were subjected to a 2% agarose gel electrophoresis and visualized intrans illuminator (Gel Doc system). *Aspergillus* isolates were identified comparing the electrophoretic DNA patterns with standard measures (Table 1).

Random amplification of polymorphic DNA (RAPD)

For the RAPD-PCR, six single primers which successfully tested before were used as random primers on *Aspergillus* genomic DNA. The primers: P1 (Rp4): 5'-CAGATGCTTC-3', P2 (Rp1): 5'-TAGGATCGA-3', P3 (SOY): 5'-AGGTCACCTGA-3', P4 (RP2): 5'-AAGGATCAGA-3', P5 (R108): 5'-GATTGGCCCT-3', P6 (UBC90): 5'-GGGGTTAGG3' were randomly selected from many available primers (Purchased from Molecular Biology Lab, TUMS). The primers were run into a PCR master mix containing 3 mM MgCl₂, 200 pmol of each primer, and 5 ng of DNA, in final volume of 100 µl. The thermal protocol used in thermo cycle system included 5 min at 95°C, 45 cycles of 94°C for 45 sec, 35°C for 1 min, 72°C for 1.5 min and a final 72°C for 5 min (Mirhendi *et al.*, 2009). Agarose gel electrophoresis of the PCR products followed by an ethidium bromide staining showed various patterns making DNA bands which analyzed by using Image Master software (Gene Snap Tool, SynGene, version: 4.01.0, UK). Reproducibility of DNA patterns was demonstrated by the analysis of two to three *Aspergillus* subcultures. The RAPD-PCR patterns were compared between the clinical and environmental *Aspergillus* isolates for each case and the similarity of RAPD patterns was analyzed.

RESULTS AND DISCUSSION

Isolation and morphological Identification of fungi from collected soil samples:

Totally four samples were collected from various areas of Andhra Pradesh includes Kakinada beach soil, Vishakhapatnam beach soil and Tenali black soil from fields. The soil samples were serially diluted and counted for no of microbial organisms. Which includes bacteria, fungi and actinomycetes etc. Total 74 strains were identified by morphological identification and microscopic identification (Visagie *et al.*, 2014). Further screened for alkaline protease screening media with the 0.5% of casein agar media and the results revealed that 20 fungi were able to produce zone of clearance on gelatin agar and milk agar media that indicates that fungi could able to degrade the protein. Among the 20 fungi five has shown highest protein degradation, and further conformed by RAPD characterization method and named as which includes *Penicillium oxalicum* KRSS-S-FP10 produced highest alkaline protease activity (25.64 ±0.02 U/mL) comparison with known sources has shown that alkaline proteases excreted effectively by *penicillin* species among the best alkaline producers (*Aspergillus terreus* KRSS-S-FBR1 (04.9 ±0.02), *Aspergillus niger* KRSS-S-FG8 (16.24 ±0.02), *Talaromyces radicus* KRSS-S-FYG7 (17.48 ±0.05) and *Aspergillus flavus* KRSS-S-FBL3 (18.56 ±0.05)).

Isolation and Screening for protease producing organisms:

A total of 74 and 69 fungi from beach soils and black soils respectively were obtained by employing different techniques of isolations (Table 1). Among these, 10 from Kakinada beach soil and 9 from Vishakhapatnam beach soil and 40 fungi from Tenali black soil. Among the isolated and screened fungi 5 were selected as highest protease producers at 30°C. A total of 74 fungi were isolated from the soil samples collected from beach soils and black soil (Visagie *et al.*, 2014). Single isolated colonies were selected and inoculated on casein agar plate for protease activity. The diameters of hydrolyzed zones around the colonies were calculated as a measure of caseinolytic activity of isolates. Isolates were initially screened based on zone of clearance on agar plates. Among the 74 isolates FCS1, FCS3, FCS7, FCS8 and FCS10 were found to have maximum protease activity and was selected for further studies (Maria Papagianni (2014).

Table 1- screening for alkaline protease enzyme activity

species code	Zone of clearance (mm)	Enzyme activity U/mL
FCS1	3.5	4.6
FCS2	0.3	1.0
FCS3	1.5	18
FCS4	1.8	3.8
FCS5	0.8	1.8
FCS6	0.5	1.4
FCS7	4.8	16
FCS8	2.4	14
FCS9	0.5	3.2
FCS10	5.6	22.4
FCS11	0.48	2.0
FCS12	0.32	1.4
FCS13	0.38	1.8
FCS14	0.30	1.4
FCS15	0.24	0.8
FCS16	0.28	1.2
FCS17	0.2	2.0
FCS18	0.30	0.4
FCS19	0.24	1.4
FCS20	0.2	0.14

Molecular identification of isolated fungal strains by RAPD

For making an exact correlation among the environmental isolates, the findings of RAPD-PCR were analyzed. The random primers, P1-P6 made different electrophoretic DNA patterns for most cases. For example, application of P1 resulted in different DNA patterns for the pairs (clinical and environmental isolates) 16, 36 and 37 from 65 cases of *Aspergillois*. Just in one case (pair 31) same DNA patterns were observed (Fig: 1c).

Use of primer P2 resulted in identical patterns for three pairs:

16, 31 and 37 as shown in (Fig: 1 d). At the same way, the other primers created common patterns not more than one. Comparison of environmental pairs with RAPD-PCR using six random primers revealed similar electrophoretic DNA patterns for environmental *Aspergillus* isolates (Fig: 1 a, b) just in two of 28 pairs including 32 and 45. *A. niger* and *A. flavus* were included in the pairs 32 and 45 respectively. The *Aspergillus* isolate of bronco alveolar lavage of case 32 was completely similar to that of relevant air conditioner used in the private room. Also, DNA pattern of *A. flavus* isolated from sinus discharge of case 45 was similar to the isolate of wall swabs. Other *Aspergillus* pairs showed no similarity (Vaishali Choudhary and Jain (2012).

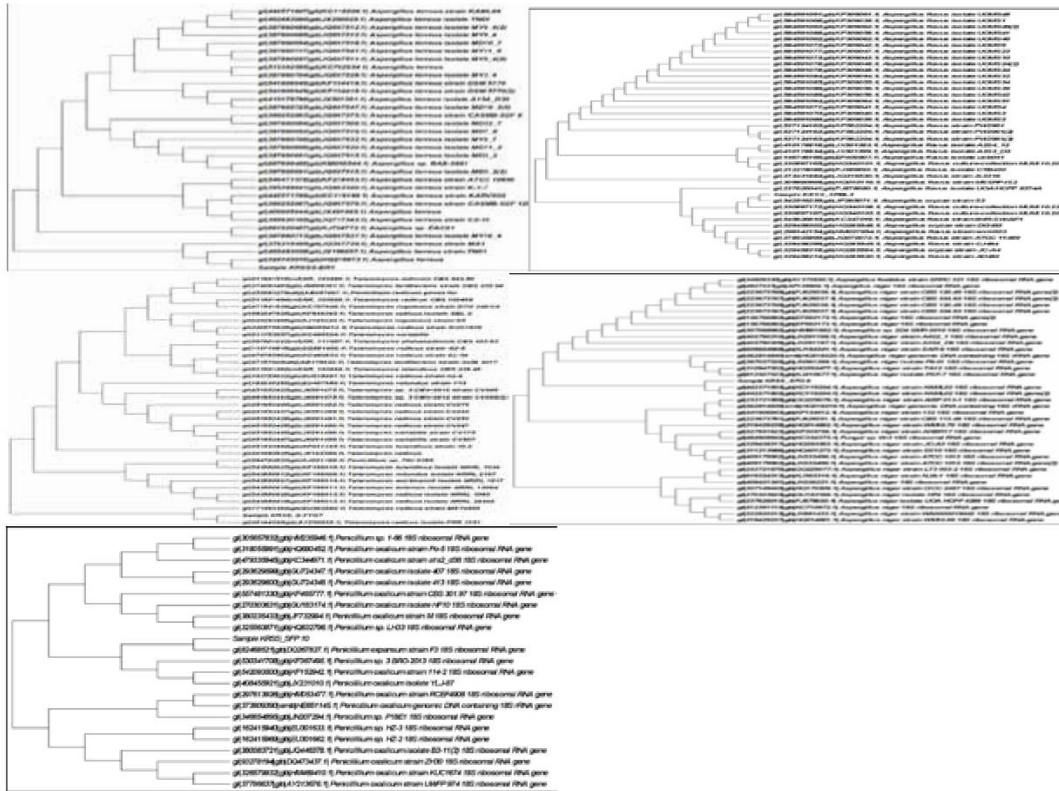


Fig No: 1- Dendrogram of isolated fungi
Talaromyces radicus BankIt1756133 *Talaromyces* KM486548 KRSS-S-FYG7
Aspergillus terreus BankIt1756143 *Aspergillus* KM486549 KRSS-S-FBR1
Penicillium oxalicum BankIt1756444 *Penicillium* KM486550 KRSS-S-FP10
Aspergillus flavus BankIt1756449 *Aspergillus* KM486551 KRSS-S-FBL3
Aspergillus niger BankIt1756450 *Aspergillus* KM486552 KRSS-S-FG8

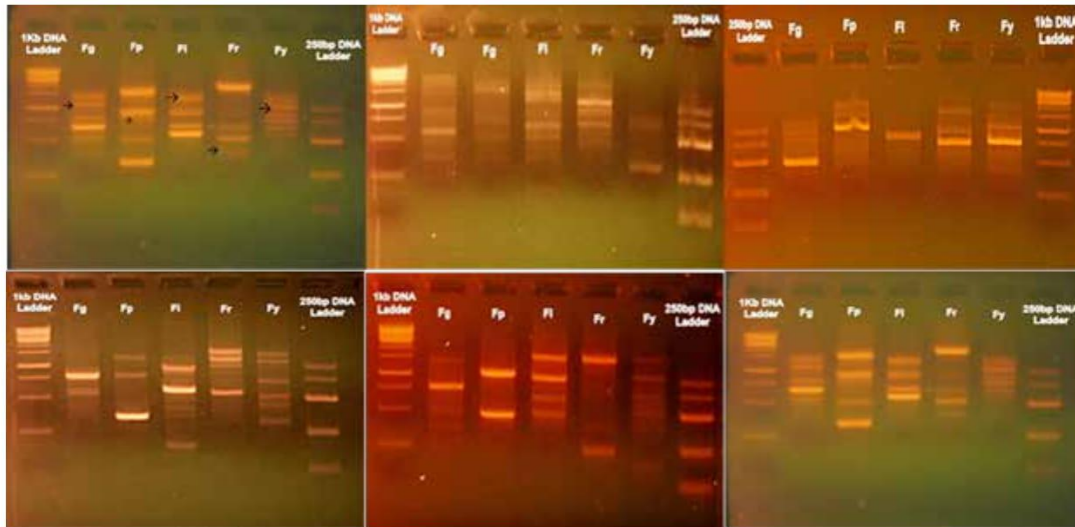


Fig 2. Banding pattern of Random amplified polymorphic DNA (RAPD)
 Banding pattern of Random amplified polymorphic DNA (RAPD) obtained from 4 isolates of *Aspergillus* and one belongs to *Penicillium* (Lane 1 to 28) M=1kbp ladder with random primers.

In the present investigation, RAPD-PCR based tools could be used to characterize the fungal species or molecular identification of micro-organism. Before subjecting with RAPD-PCR analysis assessed the differences in the DNA configurations can be produced so that the data useful for fingerprinting. *A. fumigatus*, *A. flavus*, *A. niger* and *A. terreus* (Kambiz Diba *et al.*, 2014).

In the RAPD analysis, random primers were used to screen among the data present in the gene bank *Aspergillus* species, *Penicillium* and *Teleroomyces* species (Novak *et al.*, 2004). In fact, we considered a 100% similarity of RAPD patterns of *Aspergillus* isolates, *Penicillium* isolates and *Teleroomyces* species. In these cases, *A. niger*, *Aspergillus terreus* and *A. flavus* were included as the *Aspergillus* species. Present results of *Aspergillus* species identification of collected samples is confirmed by other studies, so that in a similar study, *A. fumigatus* and *A. flavus* were the most frequently isolated *Aspergillus* spp. PCR based methods for detection of fungi have been described and there is a problem of finding the real source of opportunistic fungi such as *Aspergillus* spp..

The previous data verify that RAPD analysis is useful for fingerprinting *A. fumigatus*, *A. flavus*, *A. niger* and *A. terreus* (Raclavsky *et al.*, 2006).

Conclusion

As a conclusion, RAPD-PCR can be applied as a simple, rapid, and useful method, but it plays a trivial role in finding the hospital sources of *Aspergillus* clinical isolates. It should be noted, however, that selecting the random primers is an important point to find the highest level of molecular similarity.

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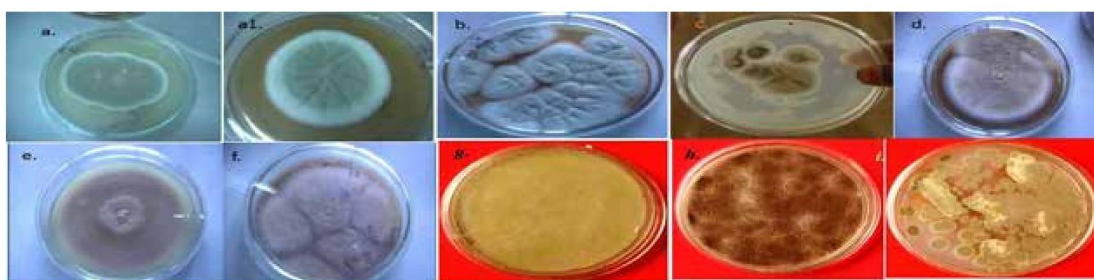
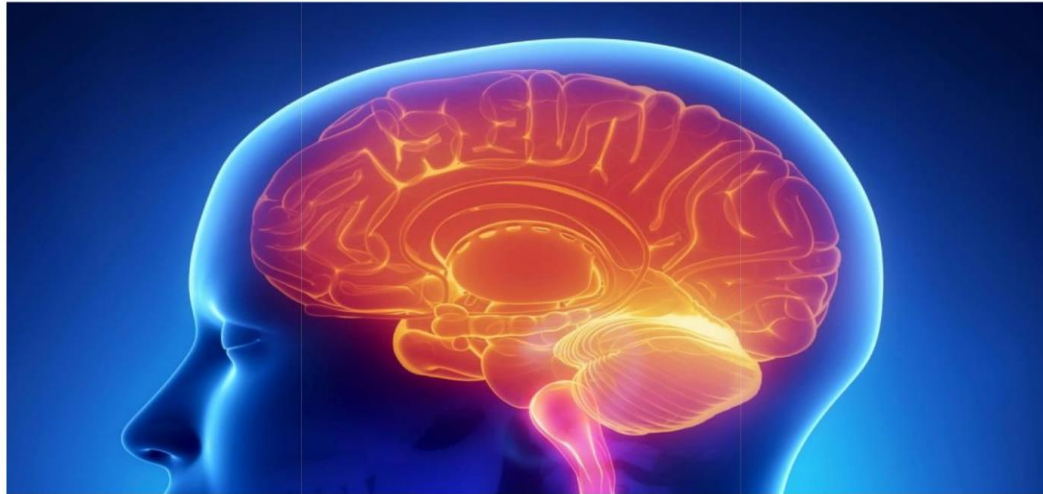


Figure 3: a., a 1., b. KRSS-S-FP10-*Penicillium oxalicum* at pH 6, 10; c. KRSS-S-FP10- *Penicillium oxalicum* with clearance zone; d., e. KRSS-S-FP11-*Aspergillus terreus* at pH 11; f., g. KRSS-S-FBL3-*Aspergillus flavus* at pH 11; h. KRSS-S-FC8-*Aspergillus niger*; i. KRSS-S-FY7-*Talaromyces radicus*

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RESEARCH ARTICLE

PARTIAL PURIFICATION AND CHARACTERIZATION OF ALKALINE PROTEASE FROM *PENCILIUM OXALICUM* KRSS-S-FP10 ISOLATED FROM BEACH SOIL OF KAKINADA, ANDHRA PRADESH

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ABSTRACT

An alkaline protease producing strain *Pencilium oxalicum* KRSS-S-FP10 was isolated from beach soil samples collected from Kakinada, Andhra Pradesh and enzyme production was optimized under submerged conditions. Maximum enzyme production of the culture occurred at 30°C temperature and pH 9.0. glucose 28.02 U/mL and soya bean meal 23.80±0.01U/mL proved to be the best carbon and nitrogen sources respectively. The molecular weight of the enzyme determined by SDS-PAGE was found to be 28 kDa. The enzyme acted optimally at pH 9.2 and 50°C. It was thermo stable and retained full activity even at the end of 1 hour of incubation at 40°C. It was inhibited by Cu⁺⁺, Fe⁺⁺, no activity found with Zn⁺⁺ and PMSF. The enzyme retained more than 50% activity after 60 min incubation at 40°C in the presence of tannic acid, gallic acid, propyl gallate, methyl gallate and with natural plant tannins used for the tanning process indicating its suitability for application in leather processing industry.

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INTRODUCTION

Soil is the natural medium for the growth of both microbial and biological activities (Griffin, 1972). Prescott *et al.* (1993) Microbial fauna was always depends on different influencing factors such as nutrients, moisture and aeration rate pH, temperature etc. Environmental factors play vital role in the conversion of complex organic compound into reusable compounds in the nature. Plant and animal origin complex matter conversion of bioavailability of nitrates, sulfates, phosphates etc., and by different biochemical processes produce industrially useful primary and secondary metabolites such as enzymes, amino acids and vitamins and antibiotics, alcohol and organic acids (Bridge and Spooner, 2001). High depth of soil samples having much biomass (fungi) than bacteria, and also where the soil nutrients were more concentrated than surface area, which also plays crucial role (Ainsworth and Bisby, 1995). Fungi are fundamental microorganism in soil ecosystem and execute useful ecological processes to maintain the quality of human life, which facilitate economic benefits. According to the Hawks worth and Ross

man, in the year (1997) and (2001) predicted that 70,000 fungi were identified and used as the industrial source out of 1.5 million fungal species on earth. Atlas and Bartha, studied in the year 1998 and describes that the count of fungi for gram soil was up to 5×10³ to 9.0×10⁶ and were accomplished to grow and survive at broad range of pH. But fungi were destructive at acid, neutral and alkaline pH. Fungi were able to uptake and utilize high concentration of substrates at favorable conditions with adequate moisture, aeration (Miyanoto *et al.*, 2002). Waksman (1922) and Warcup (1950) isolated fungi from soil by plate count method. Manivannam and Kathiresan (2007) isolated fungi from Rhizosphere soils and Charles *et al.*, (2008) isolated fungi named as *Aspergillus nidulans* from poultry farm soils. Nehra *et al.*, (2002) Kalpana Devi *et al.*, (2008) isolated proteolytic fungi from diverse sources such as garden soil and alkaline soil. Al-Falih, (2001), isolated yeast from sandy soil and soil samples from butcheries (Usama, 2008) etc.

Protease have wide applications in many industries such as textiles, detergents, food processing, meat tenderizing, animal nutrition, pharmaceuticals, paper industry and food industry and these proteases account for 60% of industrial enzymes in

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the market demand (Negi and Banerjee, 2006). According to the (1-6) the detergent industry is the major users of hydrolytic enzymes, working on alkaline pH and now more than a quarter of the global enzyme production. The huge amounts of alkaline protease used commercially and industrially (7). Alkaline proteases are used as the index of some horrible diseases such as cancer and AIDS (2). Hence clinical importance was increased and the demand for the highest alkaline protease producers was increased day by day (3). The present study aim to partial purification, studies on influencing nutritional factors on alkaline protease enzyme activity and its kinetic studies also application of alkaline protease as an alternative for leather processing.

MATERIAL AND METHODS

Identification of the culture

The fungal isolate was subjected to some gross morphological and biochemical studies *viz.*, gelatin liquefaction, casein hydrolysis, tyrosine utilization and carbohydrate utilization. Gelatin was added at 15% level to sterile nutrient agar plates, inoculated with the fungal isolate and incubated at 28° for 48 h. After incubation, the plates were kept at a temperature of 2-3°C for 1h and tested for liquefaction if any. PDA, supplemented with 20% skimmed milk, was used for casein hydrolysis and incubated at 28° for 96 h for the organism.

Screening of Fungi by bioassay

Gelatin agar assay

15% of gelatin dissolved in 100mL distilled water and mix with 4% of agar, sterilize the given mixture media and pour into the Petri plates and let it for solidification and inoculate fungal stains respectively and see the zone of clearance, measure the diameter according to the zone of clearance select the highest tannase activity fungal stain.

Production of protease under submerged fermentation

The spore suspension was inoculated in 125 ml Erlenmeyer flasks containing 25 ml of sterilized mineral medium containing per liter (g l^{-1}): KH_2PO_4 , 5; NH_4NO_3 , 10; $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 1; $\text{CaCl}_2 \cdot 6\text{H}_2\text{O}$, 0.1; $\text{MnCl}_2 \cdot 6\text{H}_2\text{O}$, 0.02; $\text{NaMoO}_4 \cdot 2\text{H}_2\text{O}$, 0.01; $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, 0.125; Glucose, 2.5. Tannic acid 0.01% the pH was adjusted to 5.5 with 100 mM NaOH.

This mineral medium was autoclaved at 121 °C for 15 min. A tannic acid (Sigma) solution was adjusted to pH 5.5, filter-sterilized and added to a final concentration of 0.01 % to the fermentation medium. The cultures were grown for up six days at 320 rpm in an incubator shaker at 28°C. The samples were withdrawn at regular intervals of one day. The biomasses were separated by the filtration through what man no-1 filter paper. The cell-free culture broth was assayed for the protease activity.

Effect of pH and temperature on the activity and stability of tannase

The optimum pH was determined using the substrate in acetate buffer (pH 3.5 to 8.5). The stability of the crude enzyme was examined at different pH by incubating the enzyme with the buffers of different pH ranging from 3.5 to 9.0 for 24 h. The residual activity was estimated after incubation under the standard assay conditions and expressed as the percentage of the initial activity. For the determination of the temperature optimum, the enzyme assays were carried out at temperature ranging from 30 to 90° C. The thermal stability was investigated by incubating the enzyme at 30, 40, 50 and 60° C for 2 h. immediately afterwards the reaction mixtures were immersed in an ice bath and then the residual activities were tested under standard conditions and it is expressed as the percentage of the initial activity.

Enzyme assay

Three ml of reaction mixture containing 0.5% casein in 2.95 ml of 0.1 M Tris-HCl buffer, pH 8.5 and 0.1 ml of enzyme was incubated at 50°C. After 10 min, the reaction was stopped by adding 3ml of cold 10% TCA. After 1 hour, the culture filtrate was centrifuged at 8,000 rpm for 5 min to remove the precipitate and absorbance of the supernatant was read spectrophotometrically at 690nm. Enzyme activity was calculated by measuring mg of tyrosine equivalent released and compared with the standard. One unit (U) of enzyme activity represents the amount of enzyme required to liberate 1 μg of tyrosine under standard assay conditions.

Enzyme extraction

After complete fermentation, the broth was centrifuged at 10000 rpm for 10 min at 4° to remove mycelium. The supernatant was added with ammonium sulphate to obtain 50% saturation for the precipitation of the enzyme. The precipitated proteins were pelletized by centrifugation at 8000 rpm at 4° for 20 min. The protein pellet was then suspended in 5 ml 50mM Tris-HCl buffer pH 5.5 and stored at -20°C.

Anion-exchange chromatography

The dialyzed tannase sample (3 ml) was filtered and applied at 1 ml/ min to a 2cc mm syringe as a column equilibrated in acetate buffer 50 mM sodium acetate pH 5.5. The column was washed with 50 mM acetate buffer pH 5.5, until the A310 was equal to that of the buffer. The column was eluted at 1 ml/min with 50 mM acetate pH 5.5 and eluted with 1 M NaCl (100mM to 1000mM collected), in a stepwise manner starting with 100 to 1000mM concentration buffer for 10 ml, followed by a linear gradient from. Each fraction was analyzed for tannase activity. Tannase-containing fractions were pooled and concentrated to 500 ml in a prior to gel-filtration chromatography. The proteins in each of the fractions were monitored by reading absorbance 310nm with UV Spectroscopy.

Gel filtration

The concentrated sample (10 ml) was applied to a Sephadex G-50. And 50 ml capacity syringe used as a column for gel-filtration column pre-equilibrated with 50 mM acetate buffer with pH 5.5 and eluted with the same buffer at 1ml/ min. Fractions were analyzed for tannase activity at 310nm by using Lekha and Lonsane tannase assay method to find out the activity and protein content, followed by SDS-PAGE.

Molecular mass of tannase in SDS-PAGE

SDS-PAGE was conducted using a 10% (w/v) polyacrylamide gel based on the protocol of Laemmli (1970). Protein bands were detected by either Coomassie blue staining. Molecular mass markers were purchased from Helix biomolecules.

Kinetic studies

Enzyme was incubated with various concentrations of casein (2-20 mg/ml) in Tris-Hcl buffer (pH 9.2) at 50°C. Kinetic parameters Km and Vmax were calculated by linear regression from Lineweaver- Burk plots (Lineweaver & Burk, 1934).

RESULTS AND DISCUSSION

Isolation and Screening of Protease Producing Organisms:

A total of 74 and 69 fungi from beach soils and black soils respectively were obtained by employing different techniques of isolations Table: 1 and Fig:1. Among these, 10 from Kakinada beach soil and 9 from Vishakhapatnam beach soil and 40 fungi from Tenali black soil. Among the isolated and screened fungi 5 were selected as highest protease producers at 30°C. A total of 74 fungi were isolated from the soil samples collected from beach soils and black soil. Single isolated colonies were selected and inoculated on casein agar plate for protease activity. The diameters of hydrolyzed zones around the colonies were calculated as a measure of caseinolytic activity of isolates. Isolates were initially screened based on zone of clearance on agar plates. Among the 74 isolates 1, 3, 7, 8 and 10 were found to have maximum protease activity and 10 was selected for further studies and pure culture was identified as *Penicillium oxalicum* KRSS_S_FP10 by RAPD method (Fig: 2).



Fig 1 screening for protease production by *Penicillium oxalicum* KRSS-S-FP10

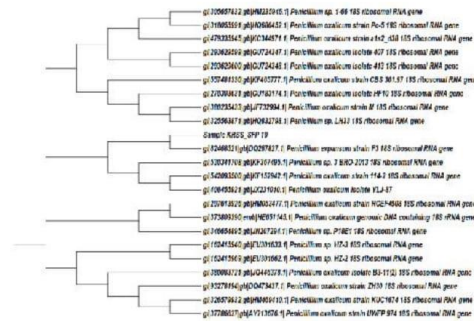


Fig: 2 Characterization by RAPD and named as *Penicillium oxalicum* KRSS-S-FP10 isolates:

Purification of alkaline protease from *Penicillium oxalicum* KRSS_S_FP10

Alkaline protease was purified by four step purification method includes ammonium sulphate precipitation, Dialysis and DEAE cellulose chromatography followed by sephadex G-100 gel filtration. The purification procedures of the alkaline protease secreted by the *Penicillium oxalicum* KRSS_S_FP10 was summarized in (Table: 2). The results revealed that the enzyme was purified 67.47 folds with a specific activity 420 U/mg protein after ammonium sulfate fractionation similar studies on alkaline protease enzyme fractionation at 30-70 % ammonium sulfate, there was 3.34-fold purity with 90.6% yield using *A. oryzae* (Jitender Sharma *et al.*, 2006). The enzyme was then purified with DEAE cellulose chromatography and has shown 49.45 folds protease enzyme purification with specific activity of 306.6 U/mg protein. However Ogundero and Osunlaja 13 purification studies revealed that the enzyme was recovered 26.2% by using DEAE-cellulose and Sephadex G-200 columns by *Aspergillus clavatus*. The final purification step with sephadex G-100 column chromatography showed 67.74 folds enzyme purification with a specific activity of 420 U/mg of proteins. These results indicate that the effective purification methods were applied recover the enzyme. Nevertheless, the yield of the enzyme after purification was found to be more than 60% and the remained 40% recovery of enzyme might be due to the result of autolysis of the enzyme in each purification step. Similarly purification of enzyme resulted in 49% yield and purification fold is about 1.8. And also extracellular alkaline protease produced by *B. licheniformis* AP1 was purified with 76 fold of purification and 20% yield (Tang Ming *et al.*, 2004).

Table 2 alkaline protease purification table

<i>Penicillium oxalicum</i> KRSS-S-FP10	Crude	Centrifuged	Precipitated/ Dialyzed	Ion-exchange chromatography	Gel fractionation sample
Total protein	4.603	3.000	0.463	0.635	0.481
Total activity	28.6	13.8	12.4	18.4	20.2
Specific activity	6.2	46	269.56	306.6	420
Purification Folds	0	7.4	43.47	49.45	67.74
Yield of activity	100	48.25	942.5	1069.9	1463.5
Volume	100mL	10mL	10mL	10mL	1mL

Determination of Molecular Weight of Purified Enzyme by Sodium dodecyl sulphate polyacrylamide gel electrophoresis: (SDS-PAGE)

The purified protease along with standard molecular weight markers were run on SDS -PAGE. The protein in the sample migrated as a single band (Fig: 3) which indicate its homogeneity. The molecular weight of the alkaline protease was determined by comparison of the migration distances of standard marker proteins.

The molecular mass standards used were supplied by Sigma Aldrich. Depending on the relative mobility the molecular weight of the protein band was calculated to be around 22kDa. Similar studies were carried out by the Ghorbel *et al.*, (2005) and reported that the silver stained SDS-PAGE gel consists of crude, fractionated and purified fractions had shown one band corresponding to the molecular mass of 34kDa. Huang *et al.*, (2003), reported a purified dehairing protease from *B. pumilus* about 32kDa. Sierecka, (1997) reported similar to the relative molecular mass of 29kDa by virulent strain of *B. cereus*. Tang Ming X *et al.*, (2004) also reported more or less similar to the present research findings of the alkaline protease molecular mass when compared with the *B. licheniformis* alkaline protease molecular mass of 28kDa.

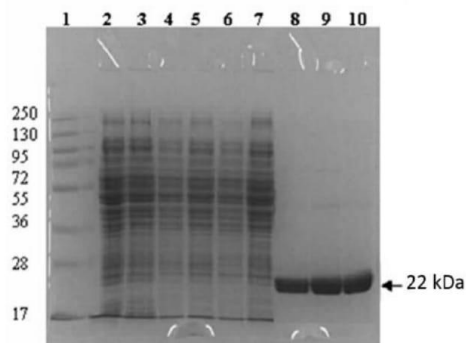


Fig: 3 characterization of alkaline protease by SDS-PAGE

Characterization of alkaline protease *Penicillium oxalicum* KRSS-S- FP10

Effect of pH on alkaline protease activity

Different pH conditions ranging from 7.0 to 11.5 were chosen to determine the influence of pH on the catalytic activity of alkaline protease enzyme. Fig:4. demonstrates the relationship, between pH and alkaline protease activity of *Penicillium oxalicum* KRSS_S_FP10 where maximal enzyme activity was obtained at pH 9.5 and the amount of consumed substrate reached 20.4±0.01 U/mg.

By increasing the pH value above 10, a gradual decrease in enzyme activity was recorded. The enzyme was stable over a broad range of pH 7 to 11.5. Ramnani *et al.*, (2005) reported that the pH optima has shown for alkaline protease in *Bacillus licheniformis*, *Serratia marcescences* (Salamone and Wodzinski, 1997), *Periserrula leucophryna* (Joo *et al.*, 2001)

and Sam sun Kim *et al.*, (2001) reported that the optimal pH of the Alkaline protease of *Bacillus cereus* KCTC 3674 was 8.0. Nilegaonkar *et al.*, (2006) has reported with *B. cereus* MCM B-326 protease were active in the pH range of 6-12.0, with optimum activity at pH- 9.0 and pH-10.6.

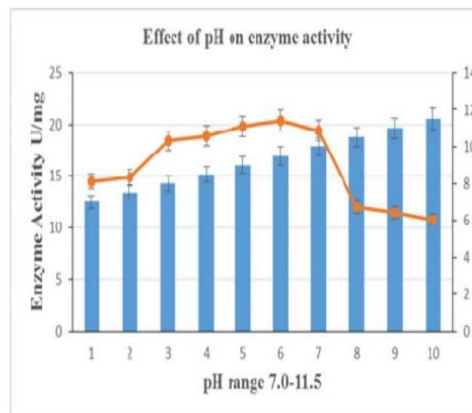


Fig: 4 Effect of pH on alkaline protease activity

Effect of temperature on alkaline protease activity

An experiment was conducted to find out the degree of temperature at which optimum activity of alkaline protease was found out. A series of identical reaction mixtures were made and each was incubated at a different temperature. The range of temperatures used was from 25°C to 75°C. Fig. 4.7.2 showed a maximal enzyme activity being achieved at 50°C. The *Penicillium oxalicum* KRSS_S_FP10 activity at 70°C was about 70% of that obtained at 60°C. Presumably the enzyme was denatured at 70°C, which indicates the property of its thermostability (Fig: 5). Ghorbel *et al.*, (2002) has reported similar results using *Bacillus cereus* BG1 with optimum temperature of 60°C in presence of 2mM of Ca²⁺ and 50°C in the absence of Ca²⁺. The optimum temperature of protease from virulent strain of *Bacillus cereus* was 40°C with haemoglobin as the substrate reported by Sierecka, (1997). The *B. licheniformis* RP1 has been reported that the optimum temperature in between the 65-70°C and active from 50-75°C reported by Sellami-Kamoun *et al.*, (2006).

These results indicate that elevating temperature to certain limit has a positive effect on activity; this could be attributed to increase in the kinetic energy of the substrate and enzyme molecules or/and increase the reaction rate with elevating temperatures. Beyond the optimum level of temperature, the internal energy of the molecules including translational, vibrational and rotational energy of the molecules increased, some of the weak bonds determining the three-dimensional shape of the active proteins break leading to thermal denaturation of the protein causing its inactivation. Temperatures above the optimum value also affect the protein ionization state, and the solubility of species in solution, which thus resulted in a reduction in enzyme activity (Mukherjee and Banerjee, 2006).

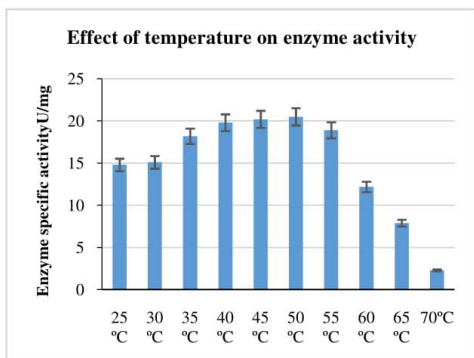


Fig: 5 Effect of temperature on alkaline protease activity

Effect of metal ions on enzyme activity

Various metal ions like Zn²⁺, Mg²⁺, B²⁺, Cu⁺, Mn²⁺, Fe³⁺ and Ca²⁺ at 1mM concentrations were tested for their individual effect on the activity of the enzyme. Among all the metal ions studied (Table: 3), B²⁺, Mn²⁺, Ca²⁺, Mg²⁺, elevated the activity by 16.5%, 15.0%, 14%, and 12%, respectively. Zn²⁺ did not show any significant effect. Cu²⁺, Fe³⁺, was found to be strongly inhibiting the activity. These results suggest that these metal ions apparently protected the enzyme against thermal denaturation and played a vital role in maintaining the active conformation of enzyme at high temperature. In contrast most of the metal ions tested had exhibited a stimulatory effect on purified protease. Gupta *et al.*, (2005) has shown similar reports on protease activity was decreased to 78% with 1mM Cu²⁺ but was slightly enhanced (121%) with 5mM Cu²⁺ using *Bacillus sp.* Ghorbel *et al.*, (2003) has studied the effect of metal ions on Protease activity from *B. cereus* BG1 Ca²⁺, Mg²⁺ and Mn²⁺ salts increased the protease activity by 450, 285 and 157%, while Zn²⁺ and Cu²⁺ decreased the activity to 28% and 35.5% of the control. Beg and Gupta (2003) reported form *B. mojavensis* slightly increased by Mn²⁺, Cu²⁺ and Co²⁺ up to 36% at 1mM concentration.

Table 3 Effect of metal ions on enzyme activity

Metal Ions	Concentration	Residual activity
Control	1mM	100 %
Zn ⁺⁺	1mM	0.2±0.01
Mg ⁺⁺	1mM	12.8±0.02
B ⁺⁺	1mM	16.5 ±0.01
Cu ⁺	1mM	4.2±0.02
Mn ⁺⁺	1mM	15.0 ±0.03
Fe ⁺⁺	1mM	2.5±0.05
Ca ⁺⁺	1mM	14 ± 0.02

Effect of inhibitors on enzyme activity

Sigma and Mooser (1975) studied on enzyme inhibition gave an insight into the nature of the enzyme, and its cofactor requirements and the nature of the active centre. In order to determine the nature of the protease, activities were measured in the presence of different protease inhibitors and reducing agents. Metal chelating agents such as EDTA at 25mM concentration inactivated the proteolytic activity of purified enzyme to a greater extent (75%) confirming it to be a metalloprotease. Inhibitors of serine protease (PMSF)

decreased the enzyme activity to 100 (Table: 4). Similar results reported as EDTA and sodium azide decreased the enzyme activity to 100% and 20% DMSO shown effect on the protease activity reduced up to 50%. Gupta *et al.*, (2005) and Ghorbel *et al.*, (2003) has revealed the results of effect of metal-complexing agents such as EDTA at 5mM concentration inactivated the proteolytic activity to 100% inhibition with *Pseudomonas aeruginosa* Pse A, *Bacillus cereus* BG1. Inhibition by metal chelater EDTA is a common property of all metalloproteases.

Table 4 Effect of inhibitors on enzyme activity

Inhibitors	Concentration	Protease activity U/mg
EDTA	25mM	5.9 ±0.01
DMSO	20%	8.8 ±0.25
PMSF	1mM	No activity
PMSF	2mM	No activity

Determination of Km of alkaline protease

Determination of the apparent K_m (Michaelis constant) value of purified and crude alkaline protease was achieved through a study relating substrate concentration to the velocity of the reaction. Different concentrations of substrates were incubated with the same amounts of enzyme protein in tris buffer (pH 9.2) at 50°C for 20 minutes where the effect of substrate concentration on alkaline protease activity of *Penicillium oxalicum* KRSS-S-FP10 was represented in the Line weaver Burk plot (Line weaver and Burk, 1934) of the reciprocal of initial velocities and concentrations. From this plot the apparent K_m values of crude and pure alkaline protease enzyme were calculated and found to be 2.2 K_m and 1.5 mM with casein. It is also clear from the results (Table: 5) It could be suggested for such finding that as a product of the reaction catalyzed by may have an inhibitory effect on enzyme activity.

Table 5 Determination of K_m of alkaline protease

Kinetic values	Substrate casein
Crude K _m	2.2mM
Crude V _{max}	6200mM
Pure K _m	1.5mM
Pure V _{max}	5800 mM

CONCLUSIONS

The fungal isolate has shown higher protease activity comparatively reports of *Penicillin* spp. and was selected for further nutritional and influencing factors identification. The organism was identified as *Penicillium*. Further, authentic identification at Helini Biomolecules Ltd., Chennai reveled that organism belongs to *Penicillium oxalicum*. This is the first report on alkaline protease production by (*Penicillium oxalicum* KRSS-S-FP10). The alkaline protease optimized conditions were used for further industrial scale production.

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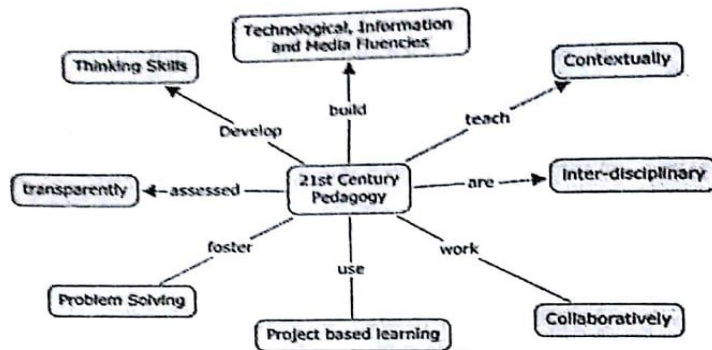
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ROLE OF ICT IN EDUCATING NEW GENERATION LEARNERS

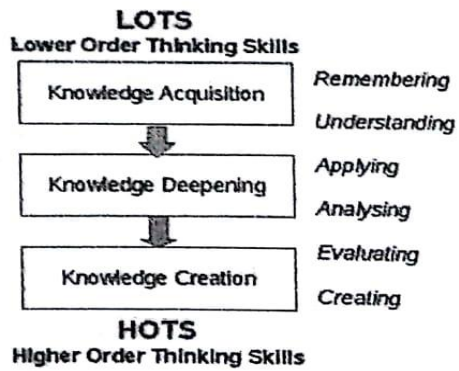
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"A good teacher makes you think even when you don't want to". (Fisher)

This is a world which is rapidly changing, connected, adapting and evolving. Our style and approach to teaching must emphasise the learning in the 21st century.



"The mind is not a vessel to be filled, but a fire to be ignited". (Plutarch)



Much of the knowledge we teach may be obsolete within a few years, but thinking skills acquired will remain with our students for their entire lives. Industrial age education has had a focus on Lower Order Thinking Skills. 21st Century pedagogy focuses on moving students from Lower Order Thinking Skills to Higher Order Thinking Skills.

ICT as an acronym for "Information and Communication Technologies". Information technology is defined as the study or use of electronic equipment, especially computers, for storing, analyzing and sending out information.

Communication technology is the process of sending, receiving and exchanging information

ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, them, such as videoconferencing and distance learning.

ICT has facilitated not only classroom teaching but also online learning and E-learning. ICT has opened new avenues, like, Online learning, e-learning, Virtual University, e-coaching, e-education, e-journal, etc. Third Generation Mobiles are also part of ICT.

The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to use maximum senses to get the information. It has broken the monotony and provided variety in the teaching – learning situation.

The teacher can never be replaced by any technology, because the technology is a tool to transmit knowledge, it does not generate it. The teacher decides the learning experiences and provides them using the tool. So the role of the teacher is very important.

The role of the teacher shifts from leader to facilitator and creator. The most effective uses of ICT are those in which the teacher, aided by ICTs, can challenge pupils understanding and thinking. ICT are seen as important tools to enable and support the move from tradition 'teacher-centric' teaching styles to more 'learner centric' methods.

Collaborative learning is a general move towards greater learner autonomy. ICT promotes collaborative learning by virtual class, and social networking. Geographical distance is no longer a barrier. We have become a "global citizen", we are communicating with the people across the globe just like our next door neighbour face to face.

It is a well known fact that not a single teacher is capable of giving up to date and complete information in his own subject. The ICT can fill this gap because it can provide access to different sources of information. It will provide correct information. ICT provides online interaction facility.

ICT provides variety in the presentation of content which helps learners in concentration, better understanding, and long retention of information which is not possible otherwise. The learners can get opportunity to work on any live project with learners and experts from other countries. Students and teachers collaborate across the planet, and beyond the time constraints of the teaching day. Students work with other students regionally, nationally and globally.

"Any technology which increases the rate of learning would enable the teacher to teach less and the learner to learn more"

The Effectiveness of ICTs in 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, etc.

∴ One defining feature of ICTs is their ability to transcend time and space. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).

Access to remote learning resources: 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 anytime of the day and by an unlimited number of people. ICTs also facilitate access to resource persons, mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

ICTs help prepare individuals for the workplace: Using ICTs in the classroom prepare the current generation of students for a workplace where ICTs becoming more and more ubiquitous. Technological literacy is seen as representing a competitive edge in an increasingly globalizing job market

Benefits/Advantages of ICT in Education

Benefits for teachers

- ICT facilitates sharing of resources, expertise and advice
- Easier planning and preparation of lessons and designing materials
- Access to up-to-date pupil and school data, anytime and anywhere.
- Enhancement of professional image projected to colleagues.
- Students are generally more 'on task' and express more positive feelings when they use computers than when they are given other tasks to do.
- The difficult experiments, advance surgery for medical students etc. can be viewed.
- The man power problem, the human mistakes can be avoided by on-line examination.

Benefits for students

- Higher quality lessons through greater collaboration between teachers in planning and preparing resources .
- ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images provide challenging and authentic content that will engage the student in the learning process.
- More focused teaching, tailored to students' strengths and weaknesses
- Gains in understanding and analytical skills, including improvements in reading
- Encouragement of independent and active learning, and self-responsibility for learning.
- Flexibility of 'anytime, anywhere' access
- Development of higher level learning styles.
- Students who used educational technology in school felt more successful in school
- Students have increased self-confidence and self-esteem
- Students found learning in a technology-enhanced setting more stimulating and student-centred than in a traditional classroom
- Opportunities to address their work to an external audience
- Opportunities to collaborate on assignments with people outside or inside school
- Foster inquiry
- Offer tutored and individualized learning

Benefits for parents

- Easier communication with teachers
- Higher quality student reports – more legible, more detailed, better presented
- Greater access to more accurate attendance and attainment information
- Increased involvement in education for parents and, in some cases, improved self-esteem

- Increased knowledge of children's learning and capabilities, owing to increase in learning activity being situated in the home
- Parents are more likely to be engaged in the school community

ICT and Raising Standards

- ICT contributes in the raising of standards of achievement in schools.
- Schools with very good ICT resources achieved better results than schools with poor ICT.
- Schools that made good use of ICT within a subject tended to have better achievement in that subject than other schools.
- Better data handling skills and increased ability to read, interpret and sketch graphs Improvements in conceptual understanding of Mathematics (particularly problem solving) and Science (particularly through use of simulations)

"Technology will never replace teachers. However, teachers who know how to use technology effectively to help their students connect and collaborate together online will replace those who do not".

Limitations or hindrances to use of ICT

One of the major barriers for the cause of ICT not reaching its full potential is teacher's lackadaisical attitude. In fact, the teachers who had not experienced ICT throughout their learning tend to have a negative attitude towards it, as they may lack the training in that area of the curriculum. Another important drawback to using ICT in schools is the fact that computers are expensive.

Teacher training and continued, on-going relevant professional development are essential if benefits from investments in ICTs are to be maximized.

Very few teachers typically have a comprehensive knowledge of the wide range of ICT tools and resources. ICT literacy and confidence among teachers is very low.

A range of physical and cultural factors that affect ICT use by teachers, including lack of reliable access to electricity, limited technology infrastructure (especially internet access, bandwidth, hardware and software provision), language of instruction and available software

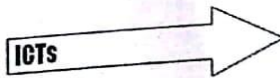
In addition, educational factors including levels of teachers' own education and literacy rates, and access to professional development play an important role

Indeed many studies indicate that it is teachers' attitudes, expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICT in teaching (or technophobia in teachers)" that are the prominent factors hindering teachers readiness and confidence in using ICT support.

ICT makes Education More Effective and Responsive



ICTs



"ICTs for learning will be attained when we apply our minds and emotions to the wonders of learning."

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ENHANCE RESEARCH

"Improve Researching Skills and Write Accurately"

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Introduction:

In most cases, a work of nonfiction requires some amount of research and interviewing. Whether or not you're already an expert on your topic, it's vital that you do all the necessary work to get accurate information. Even though research is essential, it doesn't have to consume all of your time-in fact, it shouldn't. Make sure you leave time to actually write. Take your researching and interviewing seriously, but also enjoy it. After all, if you're interested in writing, you're interested in learning new things and finding answers to questions.

Tackling any topic

Write what you know? While it seems perfectly sound on one level, living by this mantra can limit and even deter your career. In order to grow as professionals, writers should be taught to write what they don't know. Why take on work in this manner? For one, it builds your repertoire. Second, editors want all-around writers whom they can send on any assignment. Third, it opens doors to other opportunities. If you can research and write about an unfamiliar subject, you bring to the table a fresh perspective.

Of course, you can't learn every tiny detail about a subject, or you'll never stay within your deadline. But you must gain a good working knowledge, concentrate on finding key points, get your facts straight and talk with the right people. After hours of research and interviewing, you'll notice when you start to write that your words have a depth, an authority. Suddenly you'll discover that you're a legitimate source of information; in short, you'll have become a kind of expert.

Here's how to get up to speed on any subject:

1. **Do a Targeted Internet Search.** Study every relevant website you can find. You may have some intense reading to do the night before a big interview, but it'll be worth it.
2. **Read all about It.** Read magazines, journals and books related to your subject to pick up the jargon, trends, leads and ideas.
3. **Use Multimedia Sources.** Documentaries and CD-ROMs are fun and quick ways to soak up facts and build a foundation.
4. **When In Doubt, Find Out.** If you're not sure of something, ask an expert. Double-checking with an authority is the safest and quickest way to get information, and it'll save work later.
5. **Let it Breathe.** Give yourself time to nail inconsistencies in your story.

Finding experts.

One of the most important steps in your research is finding the sources you need for the story. If you've written about this topic before, you should have some good ideas about where to start searching for the people you'll need to interview. Here are some ways to track down the right experts.

Back track to the source.

Ideas often come from something you've seen or read elsewhere, a conversation or the experience of an acquaintance. Whose quote in the story started you thinking? With whom was your

conversation? Who had the interesting experience? Often these people will have useful information and can get you started.

Use basic directories.

Your local phone book is a convenient source of experts. It's full of professionals of every stripe. Don't overlook them. The directories available on the Web can broaden your search nationally or even internationally.

Ask other writers

One of the best sources you can tap is your network of other writers who may have worked on a related story. Online communities are perfect for this kind of inquiry. If you want to cast a broader net, Internet newsgroups and e-mail lists are good options.

Seek out groups

If you're looking for a particular kind of expertise, professional organizations can steer you in the right direction. For example, the American Medical Association and the American Bar Association maintain lists of experts in particular topics and can often point you to a qualified person in your area. If you need someone from a less obvious profession say, chicken farmers check the Encyclopedia of Associations at your local library for the right group.

Use public relation to your advantage

Believe it or not, there are people who make their livings finding experts just for you. You'll find them in any public relations office. Start with your local college or university. The PR department will likely have a list of faculty members and their areas of expertise.

Build your own contact files

Make a list of experts and resources. You may spend a day or more looking for that one perfect industry expert or analyst.

Create a list of experts, analysts and industry insiders indexed by category which you can turn to when a specific topic arises in the future. After all, editors hire freelancers for the information they have including the industry contacts they've amassed. Part of your expertise as a writer is your little black book of contacts.

Cast a wider net work

Never miss an opportunity to meet new people. Finding experts can be challenging, but once you learn how to do it, it can become the most rewarding part of writing. At each stop, you'll talk to the best and brightest people who will want to share just what you need to know.

Organizing information

If you've been collecting and recycling information and stockpiling contacts, then the next step is to organize everything so you can find it when you need it. If you have scads of files filled with useful information, but don't look in these vast resources, then your organization and research is useless. Decide what you're going to keep and where you're going to keep it and remember to make the filing system part of your professional life so you don't recreate the research wheel every time you need a pithy piece of insight.

Here are four tips for turning vast stockpiles

- ❖ **Index Your Past Work.** If you specialize in a certain area, create an index of past articles so they can be reused, or at least accessed, for information. This way, you'll have all your work by topic, date, subject, etc. at your fingertips. Just open a Word document or Excel file and start to log your work. Include the date the article was created, the file name, a brief note about the story, and whom it was written for.

- ❖ **Develop a "Topical" tips file.** When editors come calling for story ideas to take into their editorial meetings, grab the hanging file you should have filled with potential leads and clips, and type up some ideas from it. Central to being an expert scribe on a topic is knowing what the trends are and having plenty of story ideas to pursue. This is especially important if you write a recurring feature or column and have to think up stories with regularity.
- ❖ **Revisit Your File Cabinet.** It's great to have a powerful, insightful and deep research archive but only if you actually use it. Every few months, browse through your folders, whether they're on your computer or in the file cabinet, as well as your Internet bookmarks. This will refresh your memory about the data you've amassed and the variety of topics at your fingertips to cover for a new market or from a different angle.
- ❖ **Cull Your Files.** Files bulging with dated clips or reports burden potentially useful reference information with useless old data. Every few months, go through your desk, your files and your e-mail inbox to weed out information that's past its prime. Before you toss that fax, report or e-mail, scan it for any person or organization's name that might be helpful down the road. Transfer that information to your contact management system of choice.

Conclusion:

It's important to have a filing system that fits your personal information needs, but it's more important to live that system. Stay up to date with your data, files and categories. You may find that one category should be broken down into several more to aid in retrieval of useful information.

Researching is an essential part of writing, but it doesn't have to be tedious or difficult. Planning ahead and staying organized can make any daunting research task much easier. Take the time you need, and enjoy the research phase of your writing just don't get so caught up in it that you postpone the actual writing part of the process.

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TECHNIQUES FOR EFFECTIVE TEACHING AND LEARNING

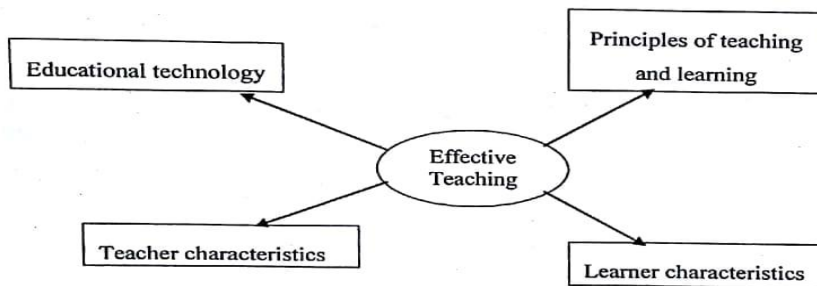
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*"A good teacher can inspire hope, ignite the imagination,
and instill a love of learning".*

-Andy Rooney

The word 'teacher' represents knowledge; transfer of the knowledge from the teacher to the taught. In fact, the foundation that builds a person in life is to great extent based on the knowledge he gets from his teacher. If there is somebody other than our parents who plays an important role in our mental development, it's our teachers. Skilled educators create rich environments where students are introduced to new ideas, developed new skills and expand their perspectives. The use of technology can engage students in new experiences and create a community of learners across geographical boundaries. Effective teaching is not a single task. It is a magic mix of the following components in a need based and required proportions



Role of educational technology:

The use of innovative education technology results in better utilization of existing resources. It helps

- To update global over view about education training trends and products
- To learn new concept and enhance educational standards and practices
- To evaluate a comprehensive range of education and training products and services
- To catch a glimpse of the most advanced and innovative educational material
- Increases student engagement, motivation and auxiliaries learning
- Improves the power to transform teaching by ushering in new model of connected teaching
- Increases education in productivity through on line leaning opportunities and the use of open educational resources.

- Reduces the cost associated with educational material, quality training and assessment.
- A love of course content and willingness to convey that enthusiasm to students is a vital component to effective teaching. But we also need to make sure the methods used to convey that knowledge should serve the purpose. There is no single best teaching method, approach or style. Different strategies are needed to tackle with different groups of students based on the subject, motivation level, goals (personal and classroom goals)

Principles of effective teaching and learning:

- Supportive and productive learning environment which promotes independence, interdependence and self motivation.
- Classroom assessment- assessment practices and reflection
- Relevant instructional rigor and student engagement
- Knowledge of content
- Learning beyond the classroom.

Supportive and productive learning environment

In a safe environment, supported by the teacher in which high, clear expectations and positive relationships are fostered, active learning is promoted. Here the teacher builds positive relationship through knowing and valuing each student. This component is about building quality relationships based on respect, value and care. It is about taking time to get to know and understand students in an educational sense but also in a wider social and personal sense. Here the teacher promotes a culture of value, respect to individual and their communities. Each student's experiences success through structured support, the valuing of effort and recognition of their work.

Classroom assessment- assessment practices and reflection

The teacher and student collaboratively gather information and reflect on learning through a systematic process. The teacher encourages and supports students to take responsibility for their learning. This component involves structuring learning experiences and facilitating learning by clear, transparent, criteria based and often collaborative assessment processes. Assessment practices reflect the full range of learning programme objectives. These should ensure that students received frequent constructive feed back that supports further learning. The teacher makes assessment criteria explicit. This component involves encouraging the development and shared understanding of the assessment tasks. *Assessment* practices should encourage reflection and self assessment. The teacher uses evidence from assessment to inform planning and teaching. Facilitates students in self- and peer-assessment

Relevant instructional rigor and student engagement

A teacher supports and encourages a student's commitment to initiate and complete complex, inquiry-based learning requiring creative and critical thinking with attention to problem solving. Here teaching strategies are flexible and responsive to the values needs and interests of individual students. The class room should be an interesting place and suited to wide range of dispositions. Here learning may involve a negotiation between prior views and knowledge and public knowledge found in the curriculum. The teacher utilizes a range of teaching strategies

that support different ways thinking and learning. The teacher views on student's prior experience, knowledge and skills. The teacher capitalizes on students experience on a technology rich world. Here the teacher uses strategies that build skills required for productive collaboration for ex: arranging group tables, assigning different roles with in groups, allowing to sharing exper-tise, etc. Teacher instructs the complex processes, concepts and principles contained in state and national standards using differentiated strategies that make instruction accessible to all students. Teacher scaffolds instruction to help students reason and develop problem-solving strategies. Teacher orchestrates effective classroom discussions, questioning, and learning tasks that promote higher-order thinking skills.

Knowledge of content

A teacher's ability to facilitate learning experiences that are meaningful to students and prepare them for their futures. Teaching sequences promote sustained learning that builds over time and emphasizes connection between ideas. The teacher promotes substantive discussion of ideas. Substantive refers to a focus on significant ideas, practices or issues that are meaningful to students and that occur over a sufficient period of time to be effectively explored. Here the teacher emphasizes the quality of learning with high expectations of achievement. The teacher uses the strategies that challenge and support students to question and reflect. The teaching strategies should develop investigating and problem solving skills. They should help to foster imagination and creativity. Teacher demonstrates an understanding and in-depth knowledge of content and maintains an ability to convey this content to students. Teacher maintains on-going knowledge and awareness of current content developments. Teacher designs and implements standards-based courses/lessons/units using state and national standards. Teacher uses and promotes the understanding of appropriate content vocabulary. Teacher provides essential supports for students who are struggling with the content. Teacher accesses a rich repertoire of instructional practices, strategies, resources and applies them appropriately

Learning beyond the classroom:

A teacher understands and application of the current theories, principles, concepts and skills of a discipline. Designs lessons that allow students to participate in empowering activities in which they understand that learning is a process and mistakes are a natural part of learning. Teacher integrates a variety of learning resources with classroom instruction to increase learning options.

Teacher structures and facilitates ongoing formal and informal discussions based on a shared understanding of rules and discourse. Teacher integrates the application of inquiry skills into learning experiences. Teacher clarifies and shares with students learning intentions/targets and criteria for success. Teacher links concepts and key ideas to students' prior experiences and understandings, uses multiple representations, examples and explanations. Teacher incorporates student experiences, interests and real-life situations in instruction. Teacher effectively incorporates 21st Century Learning Skills that prepare students to meet future challenges. Teacher works with other teachers to make connections between and among disciplines. Teacher makes lesson connections to community, society, and current events.

Teacher Characteristics:

Effective teacher motivates students and nurtures their desire to learn in a safe, healthy and supportive environment which develops compassion and mutual respect. Cultivates cross-cultural understandings and the value of diversity. Encourages students to accept responsibility for their own learning and accommodates the diverse learning needs of all students. Displays effective and efficient classroom management that includes classroom routines that promote com-

fort, order and appropriate student behaviors provide student's equitable access to technology, space, tools and time. Effectively allocates time for students to engage in hands-on experiences, discuss and process content and make meaningful connections. Creates an environment where student work is valued, appreciated and used as a learning tool.

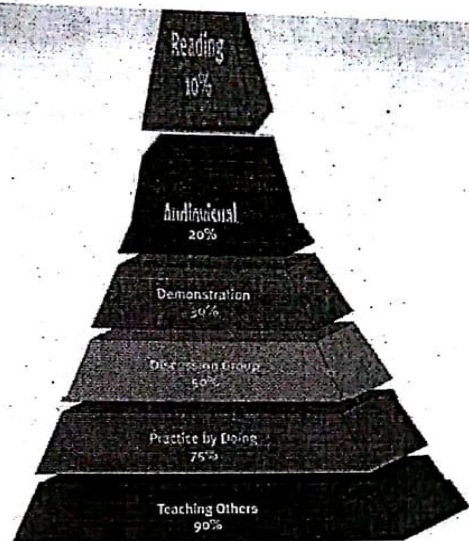
Uses multiple methods to systematically gather data about student understanding and ability. Revises instructional strategies based upon student achievement data. Uncovers students' prior understanding of the concepts to be addressed and addresses students' misconceptions/incomplete conceptions. Co-develops scoring guides/rubrics with students and provides adequate modeling to make clear the expectations for quality performance. Guides students to apply rubrics to assess their performance and identify improvement strategies. Provides regular and timely feedback to students and parents that moves learners forward. Allows students to use feedback to improve their work before a grade is assigned. Teacher challenges students to think deeply about problems and encourages/models a variety of approaches to a solution and use a variety of technology that support student learning.

Learner characteristics:

If the person wants really to learn he/she should possess the following characteristics. They should monitor self progress toward reaching learning targets. Develops and uses scoring guides periodically to assess his/ her own work or that of peers. Uses teacher and peer feedback to improve his/her work. Reflects on work and makes adjustments as learning occurs. Accepts responsibility for his/ her own learning actively participates and is authentically engaged. Collaborates/teams with other students. Exhibits a sense of accomplishment and confidence. Takes educational risks in class. Practices and engages in safe, responsible and ethical use of technology.

Student articulates and understands learning intentions/targets and criteria for success. Student reads with understanding a variety of texts. Student applies and refines inquiry skills. A-Student poses and responds to meaningful questions. Student uses appropriate tools and techniques to gather, analyze and interpret information from quantitative and qualitative evidence. Student develops descriptions, explanation, predictions, and models using evidence. Student works collaboratively to address complex, authentic problems which require innovative approaches to solve

Student communicates knowledge and understanding in a variety of real world forms and purposes. Student demonstrates growth in content knowledge. Student uses and seeks to expand appropriate content vocabulary. Student connects ideas across content areas. Student uses ideas in realistic problem solving situations. Students needs back ground perspectives and interests in the learning programme. Instructional relevance- students are challenged and supported to develop deep levels of thinking and application.



Conclusion:


Effective teaching depends not only on teacher. The learner is also equally responsible. Learning is not a spectator sport. The more actively engaged the learner is the more learning takes place. Different instructional methodologies have greater rates of retention. A wise teacher selects the suitable strategy for his/her learners like Quiz, Games, Role-playing, Brainstorming, Group problem-solving and Lecture etc. according to the need.

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Improving the colour fastness of acidic perspiration and alkaline perspiration with eucalyptus bark dye on cotton

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Abstract
This paper reports the improving the colourfastness of the natural dye with dye fixing agents, extraction of the colourants from natural sources, effects of different mordants and mordanting methods; selection of fixing agents, dyeing variables, post-treatment process and analysis of colour improvement parameters with fixing agents for cotton dyed with natural dye, assessed colour improvement with colourfastness test.

Keywords: *Eucalyptus Bark natural dye, fixing agents, colourfastness, eco-friendly mordants, acidic perspiration and alkaline perspiration.*

1. Introduction
One of the limitations of natural dyes in their availability in limited quantities. The consumption of synthetic dye has been estimated to be closed to 1 million tons per year globally. According to German study, about 90,000 tons of natural dyes can be produced a year about 250 -500 million acres of land will be required to produce about 100 million tons of plant material which is needed to produce 1million tons of natural dyes required to replace synthetic dyes. This is about 10-20 per cent of the area cultivated for grain through out the world. It is a long term goal and cannot be easily achieved in immediate future. The present target of the natural dyes is about 10, 000 tons which is equivalent to 1 per cent of the world's synthetic dye consumption. UAS is one of the major importers of natural dyes. The major advantage of natural dyes is the fact that they are produced renewable sources. Among the few drawbacks of natural dyes low colour fastness property is one. But no specific study was reported on improving the colourfastness [properties of natural dyes with dye fixing agents. Hence, this study was taken.

2. Materials and methods used in this study were given below
In this article we reviewed improving the colourfastness properties of natural dyes with 5 dye fixing agents. Eco friendly mordants such as alum, stannous chloride and ferrous sulphate. Eucalyptus Bark dye was selected for the study as this source produce fugitive colours on cotton. A pre-treatment with myrobalan was given for better dye uptake. After dyeing the sample were post treated with 5 dye fixing agents such as alum, ammonia, lime juice and calcium chloride for better colourfastness of natural dyes on cotton.
The dye extraction and treating procedures were standardized based on the procedures suggested by AICRP- Home science (1997). The treatments were given to the cotton samples and evaluation of treated samples in terms of colour fastness to sun light, washing, crocking and perspiration before and after treatment was undertaken by following the standard procedures laid down by Bureau of Indian standard Test Series IS 768-1956 for colour change and IS 769-1956 for staining using geometric grey scale. The results were analyzed based on the colour fastness of control samples to find out the impact of the treatments.
Alkaline method was suitable for extraction of dye from Eucalyptus Bark. The optimum time for extraction of dye liquor from the Bark 60 minutes. A dye material concentration of 4 percent (2g/g of fabric) was selected. The optimum time for dyeing was 45 minutes for both then dye. Cotton fabric was pre treated with 20 per cent myrobalan concentration. Increase the tannin deposition which intern increased the depth of the shade obtained.

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To improve the colour fastness, 5 per cent solution of fixing was selected. Based on absorption values, depth of the shade and appearance these concentrations for each mordant was selected. In case of alum 5, 10, and 15 per cent and 1, 2, and 3 per cent concentrations of stannous chloride and ferrous sulphate mordants for cotton were selected for pre mordanting cotton fabric. Evaluation of colourfastness of test fabrics with two colour fastness tests were carried out on cotton fabric to evaluate the colours obtained from Eucalyptus Bark and also assess improvement in colour of the fabric treated with fixing agents.

3. Post-treatment with fixing agents

This is a post-treatment given to dyed fabrics to aid fixing of dye on to the fabric. Five eco-friendly fixing agents such as vinegar, alum, ammonia, lime juice and calcium chloride were selected for the re-treatment. These fixing agents were selected,

as they are common fixing agents used for dyeing fabrics. As per Dedhia (1998) [1] first 5 per cent solution of each of the fixing agents was prepared. Five per cent of fixing agents produced noticeable changes in the dyed samples. Hence, 5 per cent fixing agent was selected. Later, the dyed fabric was placed in the solution for 30 minutes. Finally the fabric was removed, rinsed in warm soap solution and dried. The most common serviceable conditions such as the following were selected for evaluation of the colourfastness of fabrics.

4. Evaluation of Colourfastness Tests

Percentage: 3% Mordants: Alum, stannous chloride, ferrous sulphate. Extraction medium: alkaline alkali conc. 1g/100ml. Dye Extraction Time: 60 min, Mordanting time: 30 min, Dyeing time: 45 min.

Table 1: Acidic Perspiration Fastness Properties of Eucalyptus Bark Dye on Cotton

Mordant	Mordant conc. G/100g of fabric	Control			T1			T2			T3			T4			T5		
		CC	CS		CC	CS		CC	CS		CC	CS		CC	CS		CC	CS	
			C	S		C	S		C	S		C	S		C	S		C	S
Alum	5	3/4	4	3	5	4	4	4	4	4	5	4	4	5	4	4	5	4	4
	10	3/4	3	2/3	5	4	4	4	4	3	5	4	3	5	4	4	5	4	3
	15	3/4	3	2/3	5	4	4	4	4	3	5	4	3	5	4	4	5	4	3
Stannous chloride	1	3	4	4	5	5	4	4	4	4	5	4	3/4	5	4	4	4	4	4
	2	3	4	3	5	5	4	4	4	3	5	4	3/4	5	4	4	5	4	4
	3	3	4	3	5	5	4	4	4	3	5	4	3	5	4	4	5	4	4
Ferrous sulphate	1	4	4	3	5	5	4	4	4	3	5	4	4	5	4	4	4	4	3/4
	2	4	4	3	5	5	4	4	4	3	5	4	4	5	4	4	5	4	3/4
	3	4	4	3	5	5	4	4	4	3	5	4	4	5	4	4	5	4	3/4

Note: vinegar (CH₃COOH), T2-Alum (AlK(SO₄)₂), T3-ammonia (NH₃), T4- Lime juice, T5- calcium chloride (CaCl₂).

4.1. The acidic perspiration fastness of eucalyptus bark dye on cotton mordanted with eco-friendly mordants and post treated with various fixing and leveling agents is given in table 1.

The fastness grades of control fabric showed fair to good resistance to colour change when exposed to acidic perspiration. Resistance to colour staining varied as per mordant used. Alum mordanted control sample showed very fair resistance to colour change due to acidic perspiration, where as, in stannous chloride fair resistance to colour change was observed. The grey shades of ferrous sulphate mordanted samples, showed good resistance to colour change. Alum mordanted samples showed fair to good resistance to staining on cotton composite fabric and poor to fair resistance on silk fabric. Stannous chloride and ferrous sulphate mordanted cottons, exhibited good resistance to staining on cotton composite fabric. All mordanted cottons except 1 per cent stannous chloride mordanted samples, showed fair resistance to staining on silk composite fabric. Good resistance was exhibited by cotton mordanted with 1 per cent of stannous chloride.

Post-treatment with vinegar resulted in excellent resistance to colour change in mordanted cottons after exposure to acidic perspiration. Good to excellent resistance to staining was observed due to acidic perspiration. Alum mordanted samples showed good resistance to staining on both cotton and silk composite fabrics. In case of stannous chloride and ferrous sulphate mordanted samples, excellent resistance to staining on cotton and good resistance to staining on silk composite fabric was observed. Post treatment with vinegar seemed to have improved acidic perspiration fastness in all mordanted samples over control. The resistance to staining was also increased in all mordanted samples over control.

Alum post treated cottons exhibited good resistance to colour change due to acidic perspiration irrespective of the mordant used. Good resistance to staining on cotton was also observed in all mordanted samples after exposing to acidic perspiration. Alum, stannous chloride mordanted cottons had registered fair to good resistance to staining on silk composite fabrics. Ferrous sulphate mordanted cottons showed only fair resistance to staining due to acidic perspiration. These treatment imparted slight improvements in acidic perspiration increase of alum and stannous chloride mordanted samples over the control. Slight increase in colour was noted increase of alum and stannous chloride mordanted cottons over control. Ferrous sulphate mordanted cottons did not registered any improvement in fastness to acidic perspiration over control.

Post treatment with ammonia exhibited excellent resistance to colour change with fair to good resistance to staining due to acidic perspiration. After exposure, all mordanted samples exhibited good resistance to staining on cotton composite fabrics. On silk composite fabric, alum mordanted cottons showed fair to good resistance to staining and stannous chloride mordanted samples exhibited fair to very fair resistance. Ferrous sulphate mordanted cottons showed good resistance. Treatment with ammonia had registered improvement in acidic perspiration fastness of mordanted cottons over control. Increase in colour was observed in all mordanted samples. Slight increase in resistance to staining was observed in majority of the post treated samples.

Post treatment with lime juice had registered excellent resistance to colour change with good resistance to staining on both cotton and silk composite fabrics due to acidic perspiration. Improved acidic perspiration fastness was registered in all mordanted samples over control. Increase in depth of the shade was also noticed in all mordanted samples

due to acidic perspiration over control.

Calcium chloride post treated cottons showed good to excellent resistance to colour change after exposure to acidic perspiration. Alum mordanted cottons showed excellent resistance to colour change and good resistance to staining on cottons fair to good resistance to staining on silk. Stannous chloride and ferrous sulphate mordanted cottons showed negligible stains on both the composite fabrics. Calcium

chloride had contributed for improved acidic perspiration fastness of mordanted cottons over control. Increasing resistance to colour change and staining was found in majority of the mordanted cottons.

Percentage: 3% Mordants: Alum, stannous chloride, ferrous sulphate, Extraction medium: alkaline alkali conc. 1g/100ml

Dye Extraction Time: 60 min, Mordanting time: 30 min, Dyeing time: 45 min.

Table 2: Alkaline Perspiration Fastness Properties of Eucalyptus Bark Dye on Cotton

Mordant	Mordant conc. G/100g of fabric	Control			T1			T2			T3			T4			T5		
		CS			CS			CS			CS			CS			CS		
		CC	C	S	CC	C	S	CC	C	S	CC	C	S	CC	C	S	CC	C	S
Alum	5	3/4	3	3	5	4	3	4	4	3/4	4	4	3	5	4	4	5	4	4
	10	3/4	3	2/3	5	4	3	4	4	3/4	4	4	3	5	4	4	5	4	3
	15	3	2	2/3	5	4	3	4	4	3	4	4	3	5	4	4	5	4	3
Stannous chloride	1	3	2/3	2/3	5	5	5	4	4	3/4	4	4	3	5	4	3	4	4	4
	2	3	2	2/3	5	4	4	4	4	3/4	4	4	3	5	3	3	5	4	3
	3	3/4	2	2	5	5	5	4	5	3	4	4	3	5	3	3	5	4	3
Ferrous sulphate	1	3	2/3	2/3	5	4	3	4	4	3	4	4	3	4	3	3	4	4	3
	2	3	2/3	2/3	5	4	2/3	4	4	3	4	4	3	4	3	3	4	4	3
	3	3	2/3	2/3	5	4	2/3	4	3	3	4	4	3	4	3	3	4	4	3

Note: Vinegar (CH₃COOH), T2-Alum AlK (SO₄), T3-Ammonia (NH₃), T4- Lime juice, T5- Calcium Chloride (CaCl₂).

4.2. Alkaline perspiration fastnesses of eucalyptus bark dye on cotton mordanted with eco-friendly mordants and post treated with various fixing and leveling agents is given in table 2;

The alkaline perspiration fastness of eucalyptus bark dye on cotton mordanted with eco-friendly and post treated with various fixing agents is given in the table 2;

The alkaline perspiration fastness grades of eucalyptus bark dye showed fair to very fair resistance to colour change in control sample with all three mordants. Cotton fabric mordanted with alum showed poor to fair resistance, those treated with stannous chloride showed poor to fairly poor resistance and cotton treated with ferrous sulphate showed fairly poor resistance. However, colour staining in silk control sample showed fairly poor to fair resistance when mordanted with alum poor to fairly poor resistance was noticed with stannous chloride mordanted samples and fairly poor resistance was observed when mordanted with ferrous sulphate.

Post treatment with vinegar had contributed for excellent resistance to colour change over control. Cotton fabrics dyed with eucalyptus bark mordanted with alum and ferrous sulphate showed good resistance, samples treated with stannous chloride almost had excellent resistance but for the one treated with 2 per cent which showed good resistance. While colour staining to silk showed fair resistance with alum, fairly poor to fair resistance was observed with ferrous sulphate, whereas, silk behaved similarly that of cotton with stannous chloride mordant.

In case of post treatment with ammonia, colour change with all the three mordants showed good resistance. Colour staining in cotton composite fabric also showed similar fastness, but silk fastness showed fair resistance with all the three mordants. Good resistance to staining was observed on silk, mordanted with 1 per cent stannous chloride. However, improvement in resistance to both colour change and colour staining was observed over control.

Post treatment with lime juice exhibited impact on providing excellent resistance to colour change in case of alum and stannous chloride mordanted cottons, whereas samples mordanted with ferrous sulphate showed good resistance.

Colour staining on cotton composite fabric was found to be fair to good. Among the three mordants alum has good resistance while, stannous chloride and ferrous sulphate showed fair resistance similar behavior was noted even in the case of silk composite fabric. Noticeable change was observed in fastness to acidic perspiration.

The colour change with calcium chloride post treatment ranged from good to excellent due to alkaline [perspiration. While, cotton composite fabric showed good resistance to colour staining, fair resistance was observed in silk fabric with all the three mordants. However improvement in fastness was noticed.

5. Conclusion

Dyes from natural sources have ancient history in India and can trace their root to antiquity. Today, the faded antiquity is unveiling due to the concern manifested globally for saving the environment from pollution. Natural dyes are being considered as a more environment friendly substitute for synthetic dyes. But no specific study was reported on improving the colour fastness properties of natural dyes with dye fixing agents. Hence, this study was taken up to improve colour fastness with fixing agents.

Among the mordanted eucalyptus bark dyed post treated cottons, vinegar post treatment had contributed in deepening the dye shades and leveled dyeing increase of alum and ferrous sulphate mordanted samples. It was found un-suitable from stannous chloride mordanted samples. The sunlight fastness was improved in case of all mordanted samples over control. The acidic perspiration fastness of all mordanted cottons showed increased resistance to colour change and staining. Slight increase in resistance to staining was observed in all post treated cottons due to alkaline perspiration. Slight improvement in acidic perspiration increase of alum and stannous chloride mordanted samples was noticed over control. Improved alkaline fastness with improved resistance to staining in all mordanted samples was registered over control.

Fair to good resistance to staining due to acidic perspiration. The alkaline perspiration fastness of all mordanted cottons was slightly improved. Improved acidic perspiration in all

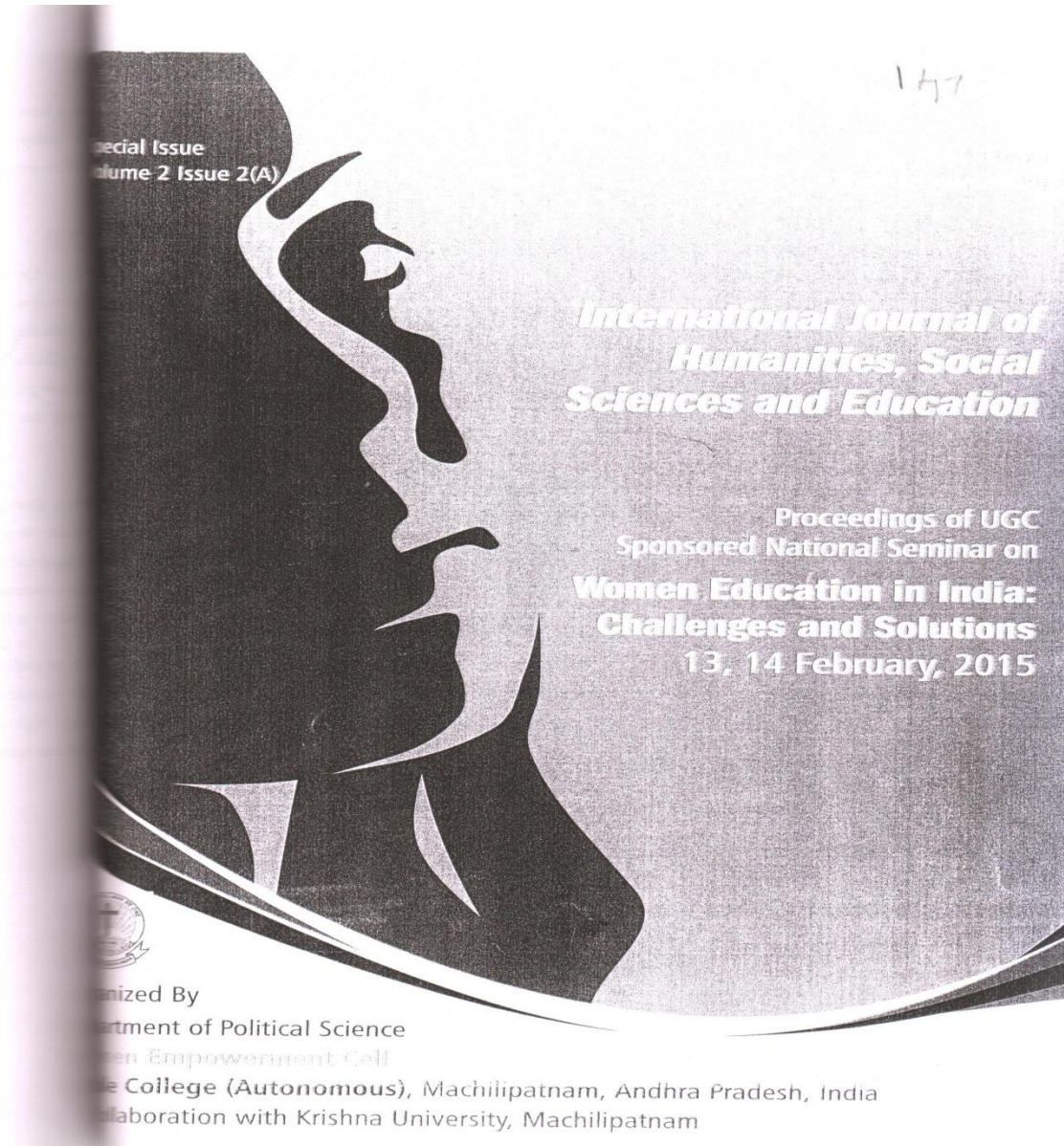
mordanted samples was observed which was graded as excellent fastness. Improved resistance to alkaline perspiration was registered over control in case of alum and stannous chloride mordanted samples increased acidic perspiration fastness was observed over control. The alkaline perspiration fastness was improved in all mordanted samples over control.

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Women Education in India: Challenges and Solutions

13, 14 February, 2015



Organized By

Department of Political Science,
Women Empowerment Cell
Noble College (Autonomous)
Machilipatnam, Andhra Pradesh, India

In Collaboration with

Krishna University
Machilipatnam, Andhra Pradesh, India

Empowering the Indian Woman

P. Jennamma

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For thousands of years woman had a venerable place in Hindu society. It was said "Yatra Nariyastu Poojyante Raman Tatra Devata". The place where Women are respected is the abode of respected is the abode of Gods. There was another saying too, "Janam Janmabhumscha Swargadapi Gariyasi". Mother and the motherland are more important than heaven.

Empowerment: Empowerment has become a fashionable and buzz word. It is a process which changes existing power relations by addressing itself to three dimensions human, material and intellectual resources. It is a process which must challenge the change ideology, the set of ideas, attitudes, beliefs and practices in which gender bias or social bias like caste, class regionalism and communalism are embedded.

Empowerment is not only an external process but process that has to bring these instinctive changes in women as well as men. There have been changes in Woman's empowerment in the economic field since 1947, some progressive and regressive.

Now-a-days some families do not have enough to eat; women and girls bear the brunt of hunger, with predictable efforts on their health and well being. In the economic sphere, women have even less opportunities than men they earn about half of man's income, and they have practically no ownership of resources. Another problem is the limited mobility of women which does not allow them access to improved opportunities in skill development or economic betterment.

Women's status in the social field is much loser than those of men they are always in fear of physical harm, economic deprivation or social oppression. Women face unequal power relations in virtually all their day-to-day interactions not only in their families but in all local institutions.

1. WOMEN IN ANCIENT PERIOD

Our ancient scriptures assigned Woman a place higher than man. It was believed that while man represented the destructive aspect of nature, woman represented the constructive one and that blessed is the home where women were given due respect. In ancient India women enjoyed full respect and honour and were regarded as the better halves of men. No sacrifice was complete without woman's participation.

With the Muslim attacks in the 8th century and later the whole social set up of the society changed. Women were kept within the four walls of their houses to save them from molestation at the hands of the victors. Thus women remained uneducated and illiterate the lost their identity. The new concept came that she depends upon the mercy of her parents before marriage, of husband after marriage and of sons in old age.

2. WOMEN IN MODERN AGE

In Modern India the whole scenario got changed women are the builders of nations. Now the modern woman has distinguished herself in various spheres of life right from household to space with hard work, patience, determination and skillfulness. There is not even single sphere which she has not entered. Knowledge, wisdom, prudence and discrimination have become their assets.

Empowering the Indian Woman

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Empowering the Indian Woman

A French Philosopher stated that "the civilization of a country should be assessed by seeing the social, political and economic conditions of women". Pandit Nehru opined that "if at all any great events happen in future they are possible only because of women". Right from the World War I women took active participation and played an importance role in building the nation. Women like Jhansi Lakshmi Bai and Kakatiya Rudamma fought against the injustice done to Indians and the rude behavior of Britishers. Women like Maguva "Manchala", Shivaji's mother "Jijabai", "Saradamata", Gandhiji's mother "Putlibai", peace propagator "Janakidadi", and "Mother Teresa" stood as symbols for purity, discipline, motherhood, courage, bravery, truth, peace, love and spirituality.

There are some women who distinguished themselves as freedom fighters, social workers, politicians, statesmen, orators, poets, scholars, doctors, diplomats, Women-ministers and ambassadors.

Many people born and died, but some of them will only have destination to reach. To reach that destination some of them work day and night with utmost courage, determination and mental stability they overcome all the hurdles in the way and reach their destination. Those who achieve their goals with constant efforts would live on the golden plates of the world. They become the mahatmas of the nation and motivates the next generations. They lead the society in a special way, which is not possible to all. They are called ideal individuals. Her self-less love and compassionate feelings for others have been recognized by the whole world, and appreciated her. Her main motive is world peace and overall development of society. Her main aim is to serve the poor and helpless orphans."

2. BARRIERS

1. The present system of education covers more than 25% of the total female population. The literacy rate in rural areas is worse than that of urban areas.
2. Women's status in the social field is much lesser than those of men. They always fear of physical harm, economic deprivation or social oppression. Women feel the problem of inequality.
3. A further barrier to organize is women's lack of knowledge or skills.
4. Traditional attitudes towards women, which results in lack of mobility, lack of value of women's worth, and a position of difference to male opinions compound their problems.
5. The acts of violence directed at the female consists of spousal battering and forced sex, eve-teasing or intimidation of the female in public spaces, sexual environment that restricts. Absence or insufficient dowry becomes a source of the bride maltreatment, victimization and even accidental death.
6. Female professional and skilled workers in the organized and unorganized sectors got the lower remuneration for equal work as well as occupational segmentation by gender.
7. In our society people expect women to be inferior and submissive at home, at work place to boss and to those who are powerful. If women resist or react to men's domination it will be considered to be not becoming of gentle women.
8. Some people consider women to be less efficient and less productive than men.
9. The majority of women workers had limited bargaining power due to certain social constraints.

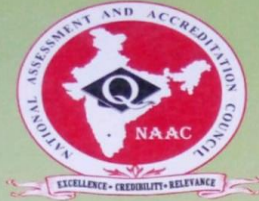
3. ROLE OF GOVERNMENT IN THE EMPOWERMENT OF WOMEN

Though Indian women achieved a lot in all fields, still she has been facing the problems of assessment, gender inequality, discriminations, etc... Therefore the constitution of India designed secure equality of sexes and non-discriminations are-

1. Equality before law and equal protection of laws (Art 14)
2. Non-discrimination on grounds of sex (Art.15).
3. Equal rights for men and women to adequate means of livelihood (Art.39 (A)).
4. Equality of opportunity in public employment (Art.16).

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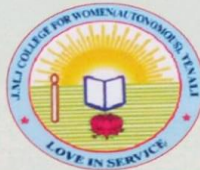
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SUGGESTIVE STRATEGIES FOR ACHIEVING TEACHER EFFECTIVENESS IN LEARNING

T. Arogyamma, H O D
Department of Economics
M. Esther Shoba
Librarian

" Education is not the Amount of information that is put in your mind and runs riot there undigested all Your life the use of Higher education is to find out how to solve the problems of life."

- Swami Vivekananda.

It is generally believed that the teacher is the nation builder. It is the teacher in the classroom who is shaping the destiny of a country as he/she has the manifold capacity to influence his/her pupils. Teaching is the noblest profession for, it involves the cultivation of selfless love and sharing and showering that love. He is the architect of happy homes, Prosperous communities and peaceful nations. He has not only equipped himself with knowledge and skills to inform and instruct, but also the vision and insight, to inspire and transform. Teachers are the second parents to every child and play a significant role in the overall growth of a child. It is believed that only teacher can make tremendous positive change among his students. They can guide right and wrong of every action being a role model. In this paper, a systematic attempt has been made to focus on charectorsties of effective teaching.

Key Words : 1. Teacher Effectiveness, 2. Quality Teaching Measures, 3. Responsibltles of teacher.

INTRODUCTION

The most accepted criterion for measuring good teaching is the amount of student learning that occurs. A teacher's effectiveness is about student learning. However, all teachers realize that what a student learns is not always within the teachers control. The literature on teaching is crammed full of well researched ways that teachers can present content and skills that will enhance the opportunities for students to learn. It is equally filled with suggestions of what not to do in the classroom. Students often have little expertise in knowing if the method selected by an individual instructor was the best teaching method " or just "a method or simply the method with which the teacher was most comfortable

Teacher also have limited control over of the most important factors that impact students learning including students attitudes , background knowledge of the course content, study and learning skills, time, students will spend on their learning their emotional readiness to learn and on. Since there is clearly a shaped responsibility between the teacher and student.

There are various feed back devices to be used to modified the teacher behavior the following are few commonly used to stimulate social skill Training, Microteaching Programme Instruction, Team Teaching, Interaction Analysis and T. Group Training.

Stimulate social skill Training: The Simulation technique is to induce certain behavior in an artificial situation. Pupil teacher has to play several roles as a teacher, as a student and as a **supervisor**. It's a feedback mechanism. It is a Socio-drama related to practice and give control over teaching variables. Important is pupil teacher is teaching in non stressful conditions.

Micro-Teaching: Micro-Teaching provides teachers with a practice setting or instruction in which the normal complexities of class room are reduced and in which the teacher gets feedback on performance.

Programmed Instruction: The method is a individualized instruction in which students are active and proceed at his own pace and provide with immediate knowledge of result. The programmed learning is a strategy in which various kinds of intellectual, ecotional and motor experience are provided to learner in a controlled situation through a variety of devices like book, teaching machines, teacher, radio, television etc.

Team Teaching: It is an Instructional situation where two or more teacher possessing complementary teaching skills cooperatively plan and implement the instruction for a single group of students using flexible scheduling and grouping techniques to meet the particular instruction.

Interaction Analysis: It is a technique for analyzing and observing the classroom behaviour. It provides the structure, component and flow of behaviour of classroom activities. It is a feedback device.

T- Group Training: It is also a feedback device. It is leaderless group of trainees numbering eight to twelve, discuss their own problems of teaching without any agenda and suggest some solutions on basis of their experiences.

Challenges faced in the Teacher Effectiveness

To make dramatic improvements in all students' preparation for college and careers, states need thoughtful, intentional human capital strategies that get the right teachers in the right places in the right subjects. The need is especially acute in states that have or plan to adopt college and career-ready academic standards and graduation requirements

Measuring Effectiveness:

States need viable approaches to measure the effectiveness of teachers. State should provide an effectiveness rating to each individual teacher, and should use those ratings to inform professional development, compensation, promotion, tenure, and dismissal. A state's 4measure must include multiple inputs, but must include "student growth." The experts and education leaders have increasingly come to see current teacher evaluation methods as inadequate, largely because they fail to differentiate between teachers withvarying levels of ffectiveness. Utilizing data about student growth as part of teacher performance measurement presents technical and political challenges.

Introducing pre-tests or interim assessments aligned to college-and career-ready standards:

States with end of course or end of grade assessments should design beginning of the year pretests to assess students' incoming knowledge, and then generate individual growth scores by comparing 5pretestand post-test results. This might seem like an additional burden, but in fact pre-assessment of individual dents is likely essential for excellent teaching. States should also consider using interim

Assessments aligned to college-and career-ready standards and assessments as a method for evaluating individual students' growth towards standards throughout the year. Such approaches may allow states to develop measures of teacher effectiveness for content areas in which year-to-year growth measures are not feasible.

Preparation:

States should rate the quality of their teacher preparation programs based on the effectiveness of the teachers that graduate from the programs. There is also a real risk that preparation program ratings should be based elusively on elementary and middle school results. Yet, states need to strengthen their preparation programs at the high school level in particular in order to meet the demands of college and career readiness. Even if high school teacher effectiveness measures are under development for the future, states need to find shorter-term ways of rating high school teacher preparation as well, such as audits of the rigor of subject matter training with reference to college- and career-ready content standards and measures of teacher content knowledge.

Performance measurement, feedback, and professional development:

It is evident that most teacher evaluation systems currently do little to differentiate teachers who are performing at different levels. Further, even as states move toward rating teachers based on the growth achieved by their students, annual test score data does not tell teachers what about their teaching produced good results, or failed to produce them. As a result, even emerging systems cannot provide meaningful feedback to teachers or serve as a basis for the selection of professional development (PD) designed to address each teacher's specific challenges. As the college- and career readiness agenda demands more from teachers, it becomes even more pressing to provide teachers with clear indications of the quality of their teaching – and the path to improvement. Even currently effective teachers may need to retool their approaches in order to teach effectively to students who, prior to the push for college and career readiness for all, may not have taken advanced coursework. Supplementing student-growth based measures of effectiveness with valid, reliable assessments of their practice is therefore an important component of evaluation, feedback, and PD (professional development) systems. In addition to devising better systems to assess teachers' needs, states also need to consider how to make high-quality, responsive PD available to teachers.

Compensation and promotion opportunities:

Retooling teacher compensation and career advancement take on more pressing importance under a college- and career-ready agenda. Particularly in the advanced levels of subjects such as science and mathematics, prospective and current teachers typically have a plethora of other employment opportunities that offer higher pay than teaching. Yet almost all teacher salary schedules reward teachers only for accumulating additional years of experience or advanced degrees of any kind (not just in high-demand subjects), neither of which appear to contribute very much to teachers' effectiveness. In a college- and career-ready reform context, school systems should work to shift compensation away from steps and lanes and instead provide the most significant rewards to teachers who take on positions in hard-to-staff schools or subjects and succeed with students in those jobs. Research suggests that in addition to higher pay opportunities, the chance to advance within a career is also a missing piece in the teaching profession that makes high-performers seek other careers. Extending the reach of the best teachers to more students is one potential way to offer top teachers further achievement opportunity and enhanced pay from existing per-pupil funding streams.

Role of a State for improving Teacher Effectiveness

States are in a strong position to play several roles in this process:

- Ø **Committing to reaching increasing portions of students with top-quintile instructors and instruction:** through various reach extension methods (both in-person and remotely with technology);

- **Accelerating progress** by creating demand for outstanding remote instruction where it can help most (e.g., by requiring or encouraging districts to offer it if they cannot fill teaching slots with effective instructors, and by requiring that remotely offered instruction meet a top-tier learning progress standard);
- **Reducing state-level policy barriers** to the use of these mechanisms (e.g., rigid seat-time requirements, upper-grade class size maximums, teacher certification requirements that would block high-quality out-of-state instructors from teaching remotely); and,
- Directing the benefits to students who need them the most by providing funding or other inducements for hard-to-staff schools in particular to make use of the emerging opportunities. Otherwise, the benefits of new technologies should tend to flow more naturally to advantaged schools and students first.

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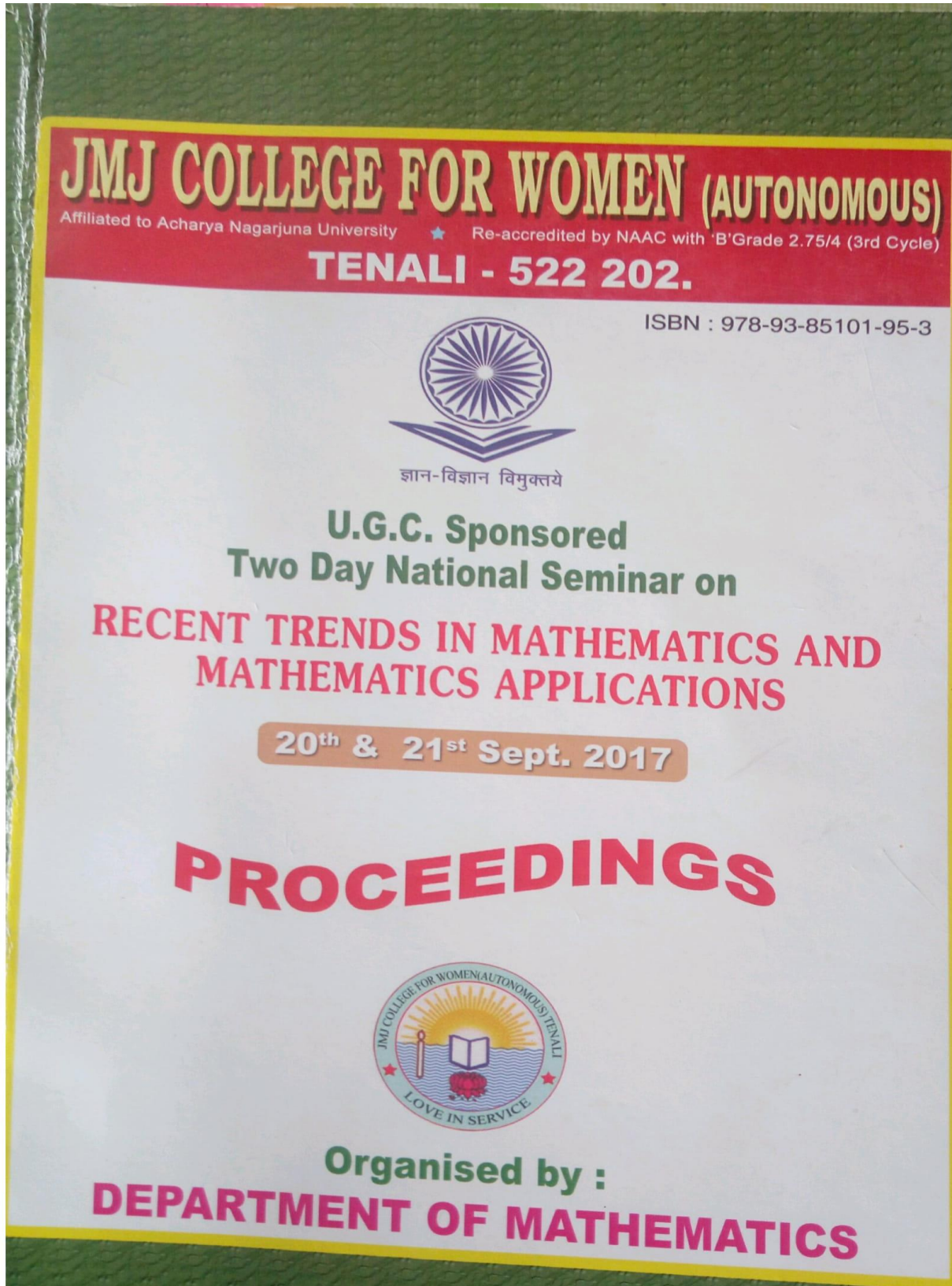
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EDUCATIONAL MATHEMATICS

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In contemporary education, mathematics education is the practice of teaching and learning mathematics, along with the associated scholarly research. Researchers in mathematics education are primarily concerned with the tools, methods and approaches that facilitate practice or the study of practice; however, mathematics education research, known on the continent of Europe as the didactics or pedagogy of mathematics, has developed into an extensive field of study, with its own concepts, theories, methods, national and international organisations, conferences and literature. This article describes some of the history, influences and recent controversies.

History

Elementary mathematics was part of the education system in most ancient civilisations, including Ancient Greece, the Roman Empire, Vedic society and ancient Egypt. In most cases, a formal education was only available to male children with a sufficiently high status, wealth or caste at the beginning of a 14th-century translation of Euclid's Elements. In Plato's division of the liberal arts into the trivium and the quadrivium, the quadrivium included the mathematical fields of arithmetic and geometry. This structure was continued in the structure of classical education that was developed in medieval Europe. Teaching of geometry was almost universally based on Euclid's Elements. Apprentices to trades such as masons, merchants and money-lenders could expect to learn such practical mathematics as was relevant to their profession.

The first mathematics textbooks to be written in English and French were published by Robert Recorde, beginning with The Grounde of Artes in 1540. However, there are many different writings on mathematics and mathematics methodology that date back to 1800 BCE. These were mostly located in Mesopotamia where the Sumerians were practicing multiplication and division. There are also artifacts demonstrating their own methodology for solving equations like the quadratic equation. After the Sumerians some of the most famous ancient works on mathematics come from Egypt in the form of the Rhind Mathematical Papyrus and the Moscow Mathematical Papyrus. The more famous Rhind Papyrus has been dated to approximately 1650 BCE but it is thought to be a copy of an even older scroll. This papyrus was essentially an early textbook for Egyptian students.

In the Renaissance, the academic status of mathematics declined, because it was strongly associated with trade and commerce. Although it continued to be taught in European universities, it was seen as subservient to the study of Natural, Metaphysical and Moral Philosophy.



This trend was somewhat reversed in the seventeenth century, with the University of Aberdeen creating a Mathematics Chair in 1613, followed by the Chair in Geometry being set up in University of Oxford in 1619 and the Lucasian Chair of Mathematics being established by the University of Cambridge in 1662. However, it was uncommon for mathematics to be taught outside of the universities. Isaac Newton, for example, received no formal mathematics teaching until he joined Trinity College, Cambridge in 1661. In the 18th and 19th centuries, the industrial revolution led to an enormous increase in urban populations. Basic numeracy skills, such as the ability to tell the time, count money and carry out simple arithmetic, became essential in this new urban lifestyle. Within the new public education systems, mathematics became a central part of the curriculum from an early age.

By the twentieth century, mathematics was part of the core curriculum in all developed countries.

During the twentieth century, mathematics education was established as an independent field of research. Here are some of the main events in this development:

In 1893, a Chair in mathematics education was created at the University of Göttingen, under the administration of Felix Klein

The International Commission on Mathematical Instruction (ICMI) was founded in 1908, and Felix Klein became the first president of the organisation

The professional periodical literature on mathematics education in the U.S.A. had generated more than 4000 articles after 1920, so in 1941 William L. Schaaf published a classified index, sorting them into their various subjects.^[1]

A renewed interest in mathematics education emerged in the 1960s, and the International Commission was revitalised

In 1968, the Shell Centre for Mathematical Education was established in Nottingham

The first International Congress on Mathematical Education (ICME) was held in Lyon in 1969. The second congress was in Exeter in 1972, and after that it has been held every four years

In the 20th century, the cultural impact of the “electronic age” (McLuhan) was also taken up by educational theory and the teaching of mathematics. While previous approach focused on “working with specialized ‘problems’ in arithmetic”, the emerging structural approach to knowledge had “small children meditating about number theory and ‘sets’.”^[2]

Objectives

Boy doing sums, Guinea-Bissau, 1974.

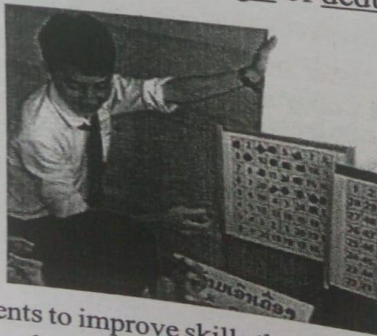
At different times and in different cultures and countries, mathematics education has attempted to achieve a variety of different objectives. These objectives have included:

- The teaching and learning of basic numeracy skills to all pupils
- The teaching of practical mathematics (arithmetic, elementary algebra, plane geometry, solid geometry, trigonometry) to most pupils, to equip them to follow a trade or craft
- The teaching of abstract mathematical concepts (such as set and function) at an early age
- The teaching of selected areas of mathematics (such as Euclidean geometry) as an example of an axiomatic system and a model of deductive reasoning
- The teaching of selected areas of mathematics (such as calculus) as an example of the intellectual achievements of the modern world
- The teaching of advanced mathematics to those pupils who wish to follow a career in Science, Technology, Engineering, and Mathematics (STEM) fields.
- The teaching of heuristics and other problem-solving strategies to solve non routine problems.

Methods

The method or methods used in any particular context are largely determined by the objectives that the relevant educational system is trying to achieve. Methods of teaching mathematics include the following :

- **Classical education:** the teaching of mathematics within the quadrivium, part of the classical education curriculum of the Middle Ages, which was typically based on Euclid's Elements taught as a paradigm of deductive reasoning.



Games can motivate students to improve skills that are usually learned by rote. In "Number Bingo," players roll 3 dice, then perform basic mathematical operations on those numbers to get a new number, which they cover on the board trying to cover 4 squares in a row. This game was played at a "Discovery Day" organized by Big Brother Mouse in Laos.



Computer-based math an approach based around use of mathematical software as the primary tool of computation.

Conventional approach: the gradual and systematic guiding through the hierarchy of mathematical notions, ideas and techniques. Starts with arithmetic and is followed by Euclidean geometry and elementary algebra taught concurrently. Requires the instructor to be well informed about elementary mathematics, since didactic and curriculum decisions are often dictated by the logic of the subject rather than pedagogical considerations. Other methods emerge by emphasizing some aspects of this approach.

Exercises: the reinforcement of mathematical skills by completing large numbers of exercises of a similar type, such as adding vulgar fractions or solving quadratic equations.

Historical method: teaching the development of mathematics within an historical, social and cultural context. Provides more human interest than the conventional approach.^[3]

Mastery: an approach in which most students are expected to achieve a high level of competence before progressing

New Math: a method of teaching mathematics which focuses on abstract concepts such as set theory, functions and bases other than ten. Adopted in the US as a response to the challenge of early Soviet technical superiority in space, it began to be challenged in the late 1960s. One of the most influential critiques of the New Math was Morris Kline's 1973 book Why Johnny Can't Add. The New Math method was the topic of one of Tom Lehrer's most popular parody songs, with his introductory remarks to the song: "...in the new approach, as you know, the important thing is to understand what you're doing, rather than to get the right answer."

Problem solving: the cultivation of mathematical ingenuity, creativity and heuristic thinking by setting students open-ended, unusual, and sometimes unsolved problems. The problems can range from simple word problems to problems from international mathematics competitions such as the International Mathematical Olympiad. Problem solving is used as a means to build new mathematical knowledge, typically by building on students' prior understandings.

Recreational mathematics: Mathematical problems that are fun can motivate students to learn mathematics and can increase enjoyment of mathematics.^[4]

Standards-based mathematics: a vision for pre-college mathematics education in the US and Canada, focused on deepening student understanding of mathematical ideas and procedures, and formalized by the National Council of Teachers of Mathematics which created the Principles and Standards for School Mathematics.

- **Relational approach:** Uses class topics to solve everyday problems and relates the topic to current events.^[5] This approach focuses on the many uses of mathematics and helps students understand why they need to know it as well as helping them to apply mathematics to real world situations outside of the classroom.
- **Rote learning:** the teaching of mathematical results, definitions and concepts by repetition and memorisation typically without meaning or supported by mathematical reasoning. A derisory term is *drill and kill*. In traditional education, rote learning is used to teach multiplication tables, definitions, formulas, and other aspects of mathematics.

Content and age levels

Different levels of mathematics are taught at different ages and in somewhat different sequences in different countries. Sometimes a class may be taught at an earlier age than typical as a special or honors class.

Elementary mathematics in most countries is taught in a similar fashion, though there are differences. In the United States fractions are typically taught starting from 1st grade, whereas in other countries they are usually taught later, since the metric system does not require young children to be familiar with them.^[citation needed] Most countries tend to cover fewer topics in greater depth than in the United States.^[6] K-12 topics include elementary arithmetic (addition, subtraction, multiplication, and division), and pre-algebra.

In most of the U.S., algebra, geometry and analysis (pre-calculus and calculus) are taught as separate courses in different years of high school. Mathematics in most other countries (and in a few U.S. states) is integrated, with topics from all branches of mathematics studied every year. Students in many countries choose an option or pre-defined course of study rather than choosing courses *à la carte* as in the United States. Students in science-oriented curricula typically study differential calculus and trigonometry at age 16–17 and integral calculus, complex numbers, analytic geometry, exponential and logarithmic functions, and infinite series in their final year of secondary school. Probability and statistics may be taught in secondary education classes.

Science and engineering students in colleges and universities may be required to take multivariable calculus, differential equations, linear algebra. Applied mathematics is also used in specific majors; for example, civil engineers may be required to study fluid mechanics,^[7] while “math for computer science” might include graph theory, permutation, probability, and proofs.^[8] Mathematics students would continue to study potentially any area.



Standards

Throughout most of history, standards for mathematics education were set locally, by individual schools or teachers, depending on the levels of achievement that were relevant to, realistic for, and considered socially appropriate for their pupils.

In modern times, there has been a move towards regional or national standards, usually under the umbrella of a wider standard school curriculum. In England, for example, standards for mathematics education are set as part of the National Curriculum for England,^[2] while Scotland maintains its own educational system. In the USA, the National Governors Association Center for Best Practices and the Council of Chief State School Officers have published the national mathematics Common Core State Standards Initiative.

Ma (2000) summarised the research of others who found, based on nationwide data, that students with higher scores on standardised mathematics tests had taken more mathematics courses in high school. This led some states to require three years of mathematics instead of two. But because this requirement was often met by taking another lower level mathematics course, the additional courses had a “diluted” effect in raising achievement levels.

In North America, the National Council of Teachers of Mathematics has published the Principles and Standards for School Mathematics, which boosted the trend towards reform mathematics. In 2006, they released *Curriculum Focal Points*, which recommend the most important mathematical topics for each grade level through grade 8. However, these standards are enforced as American states and Canadian provinces choose. A US state’s adoption of the Common Core State Standards in mathematics is at the discretion of the state, and is not mandated by the Federal Government. ^[11] “States routinely review their academic standards and may choose to change or add onto the standards to best meet the needs of their students.”

Research

“Robust, useful theories of classroom teaching do not yet exist” ^[13] However, there are useful theories on how children learn mathematics and much research has been conducted in recent decades to explore how these theories can be applied to teaching. The following results are examples of some of the current findings in the field of mathematics education:

Important result

One of the strongest results in recent research is that the most important feature in effective teaching is giving students “opportunity to learn”. Teachers can set expectations, time, kinds of tasks, questions, acceptable answers, and type of discussions that will influence students’ opportunity to learn. This must involve both skill efficiency and conceptual understanding.



Conceptual understanding

Two of the most important features of teaching in the promotion of conceptual understanding are attending explicitly to concepts and allowing students to struggle with important mathematics. Both of these features have been confirmed through a wide variety of studies. Explicit attention to concepts involves making connections between facts, procedures and ideas. (This is often seen as one of the strong points in mathematics teaching in East Asian countries, where teachers typically devote about half of their time to making connections. At the other extreme is the U.S.A., where essentially no connections are made in school classrooms.^[14]) These connections can be made through explanation of the meaning of a procedure, questions comparing strategies and solutions of problems, noticing how one problem is a special case of another, reminding students of the main point, discussing how lessons connect, and so on.

Deliberate, productive struggle with mathematical ideas refers to the fact that when students exert effort with important mathematical ideas, even if this struggle initially involves confusion and errors, the end result is greater learning. This has been shown to be true whether the struggle is due to challenging, well-implemented teaching, or due to faulty teaching the students must struggle to make sense of.

Formative assessment

Formative assessment is both the best and cheapest way to boost student achievement, student engagement and teacher professional satisfaction. Results surpass those of reducing class size or increasing teachers' content knowledge. Effective assessment is based on clarifying what students should know, creating appropriate activities to obtain the evidence needed, giving good feedback, encouraging students to take control of their learning and letting students be resources for one another.

Homework

Homework which leads students to practice past lessons or prepare future lessons are more effective than those going over today's lesson. Students benefit from feedback. Students with learning disabilities or low motivation may profit from rewards. For younger children, homework helps simple skills, but not broader measures of achievement.

Students with difficulties

Students with genuine difficulties (unrelated to motivation or past instruction) struggle with basic facts, answer impulsively, struggle with mental representations, have poor number sense and have poor short-term memory. Techniques that have been found productive for helping such students include peer-assisted learning, explicit teaching with visual aids, instruction informed by formative assessment and encouraging students to think aloud.



Algebraic reasoning

It is important for elementary school children to spend a long time learning to express algebraic properties without symbols before learning algebraic notation. When learning symbols, many students believe letters always represent unknowns and struggle with the concept of variable. They prefer arithmetic reasoning to algebraic equations for solving word problems. It takes time to move from arithmetic to algebraic generalizations to describe patterns. Students often have trouble with the minus sign and understand the equals sign to mean “the answer is....”

Methodology

As with other educational research (and the social sciences in general), mathematics education research depends on both quantitative and qualitative studies. Quantitative research includes studies that use inferential statistics to answer specific questions, such as whether a certain teaching method gives significantly better results than the status quo. The best quantitative studies involve randomized trials where students or classes are randomly assigned different methods in order to test their effects. They depend on large samples to obtain statistically significant results.

Qualitative research, such as case studies, action research, discourse analysis, and clinical interviews, depend on small but focused samples in an attempt to understand student learning and to look at how and why a given method gives the results it does. Such studies cannot conclusively establish that one method is better than another, as randomized trials can, but unless it is understood *why* treatment X is better than treatment Y, application of results of quantitative studies will often lead to “lethal mutations”^[13] of the finding in actual classrooms. Exploratory qualitative research is also useful for suggesting new hypotheses, which can eventually be tested by randomized experiments. Both qualitative and quantitative studies therefore are considered essential in education—just as in the other social sciences.^[17] Many studies are “mixed”, simultaneously combining aspects of both quantitative and qualitative research, as appropriate.

Randomized trials

There has been some controversy over the relative strengths of different types of research. Because randomized trials provide clear, objective evidence on “what works”, policy makers often take only those studies into consideration. Some scholars have pushed for more random experiments in which teaching methods are randomly assigned to classes.^{[18][19]} In other disciplines concerned with human subjects, like biomedicine, psychology, and policy evaluation, controlled, randomized experiments remain the preferred method of evaluating treatments.^{[20][21]} Educational statisticians and some mathematics educators have been working to increase the use of randomized experiments to evaluate teaching methods.^[19] On the other hand, many scholars in educational schools have argued against increasing the number of randomized experiments, often because of philosophical objections, such as the ethical difficulty of randomly assigning students to various treatments

when the effects of such treatments are not yet known to be effective,^[22] or the difficulty of assuring rigid control of the independent variable in fluid, real school settings.^[23]

In the United States, the National Mathematics Advisory Panel (NMAP) published a report in 2008 based on studies, some of which used randomized assignment of treatments to experimental units, such as classrooms or students. The NMAP report's preference for randomized experiments received criticism from some scholars.^[24] In 2010, the What Works Clearinghouse (essentially the research arm for the Department of Education) responded to ongoing controversy by extending its research base to include non-experimental studies including regression discontinuity designs and single-case studies.

Mathematics educators

The following are some of the people who have had a significant influence on the teaching of mathematics at various periods in history:

- Euclid (fl. 300 BC), Ancient Greek, author of The Elements
- Tatyana Alexeyevna Afanasyeva (1876–1964), Dutch/Russian mathematician who advocated the use of visual aids and examples for introductory courses in geometry for high school students^[26]
- Robert Lee Moore (1882–1974), American mathematician, originator of the Moore method
- George Pólya (1887–1985), Hungarian mathematician, author of How to Solve It
- Georges Cuisenaire (1891–1976), Belgian primary school teacher who invented Cuisenaire rods
- William Arthur Brownell (1895–1977), American educator who led the movement to make mathematics meaningful to children, often considered the beginning of modern mathematics education
- Hans Freudenthal (1905–1990), Dutch mathematician who had a profound impact on Dutch education and founded the Freudenthal Institute for Science and Mathematics Education in 1971
- Caleb Gattegno (1911-1988), Egyptian, Founder of the Association for Teaching Aids in Mathematics in Britain (1952) and founder of the journal Mathematics Teaching.^[27]
- Toru Kumon (1914–1995), Japanese, originator of the Kumon method, based on mastery through exercise
- Pierre van Hiele and Dina van Hiele-Geldof, Dutch educators (1930s–1950s) who proposed a theory of how children learn geometry (1957), which eventually became very influential worldwide
- Robert Parris Moses (1935–), founder of the nationwide US Algebra project
- Robert M. Gagné (1958–1980s), pioneer in mathematics education research.



Mathematics teachers

The following people all taught mathematics at some stage in their lives, although they are better known for other things:

Lewis Carroll, pen name of British author Charles Dodgson, lectured in mathematics at Christ Church, Oxford. As a mathematics educator, Dodgson defended the use of Euclid's Elements as a geometry textbook; Euclid and his Modern Rivals is a criticism of a reform movement in geometry education led by the Association for the Improvement of Geometrical Teaching.^[28]

John Dalton, British chemist and physicist, taught mathematics at schools and colleges in Manchester, Oxford and York

• Tom Lehrer, American songwriter and satirist, taught mathematics at Harvard, MIT and currently at University of California, Santa Cruz

• Brian May, rock guitarist and composer, worked briefly as a mathematics teacher before joining Queen^[29]

• Georg Joachim Rheticus, Austrian cartographer and disciple of Copernicus, taught mathematics at the University of Wittenberg

• Edmund Rich, Archbishop of Canterbury in the 13th century, lectured on mathematics at the universities of Oxford and Paris

• Éamon de Valera, a leader of Ireland's struggle for independence in the early 20th century and founder of the Fianna Fáil party, taught mathematics at schools and colleges in Dublin

• Archie Williams, American athlete and Olympic gold medalist, taught mathematics at high schools in California.


Organizations[edit]

- Advisory Committee on Mathematics Education
- American Mathematical Association of Two-Year Colleges
- Association of Teachers of Mathematics
- Mathematical Association
- National Council of Teachers of Mathematics



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Financing The Technological Innovations in India

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ABSTRACT

"Innovation distinguishes between a leader and follower" rightly said by an successful innovator who gave the tough competition to Microsoft, the technology giant, by introducing innovations in apple, Steve Jobs. Technology innovation is a major driver of economic and social changes. In every sector one examines from transportation to mass media to health care to energy generation we see clear evidence of how innovation brings about the change and helps in create economic and social value. In spite of this value the innovation process considering risky since the success rate is very low. There is real opportunity and need to rethink the innovations process to figure out how best to minimize the operational and financial risks and to maximize the likelihood of success. Clearly, the dynamics of each technology area and the factors that determines the success or failure in an innovation can vary from one field to another. Further, as future financial leaders it's very important to understand the risks and challenges confronting innovators in the different areas of technology to develop the own strategies for helping to finance technology innovations. Hence her we discussed the issues and concepts to minimize the financial risk and optimize the value creation and successful commercialization of innovation.

Keywords : *Technology Innovation, Venture capitalists, Marginal investments, commercialization, de-risk.*

Introduction

Technology innovation is the process through which new (or improved) technologies are developed and brought into widespread use. In the simplest formulation, innovation can be thought of as being composed of different phases like research, development, demonstration, and deployment, although it is abundantly clear that innovation is not a linear process - there are various interconnections and feedback loops between these stages, and often even the stages themselves cannot be trivially disaggregated. Innovation involves the involvement of a range of organizations and personnel (laboratories, firms, financing organizations, etc.), with different institutional arrangements underpinning the development and deployment of different kinds of technologies; contextual factors such as government policies also significantly shape the innovation process. Even though governments itself investing significantly in technology research and development programs and as well as demonstration and early deployment of selected innovative technologies. Still, most investments in technology innovation are targeted towards technologies with clear commercial applications and financial returns, with only marginal investments towards innovation for helping provide modern technology services to the two poor people worldwide that don't have access to innovations

of technology.

Risks with Technology innovations:

Getting an innovation off the ground is strewn with challenges and difficulties. It is more so in the case of a technology innovations as there are specific set of challenges associated with them that need to be overcome. There is always a risk of the technology idea on which the start-up is based (technology risk) will fail or not deliver to the desired level. Also, technology innovations will need more resources and infrastructure even at the early stage of development. For example, a software solutions company can start product testing or product development with very little investment and infrastructural support, whereas a material science technology innovations will need laboratory facilities to even test their idea and for product development, and these facilities are lot more capital intensive and need a much greater upfront investment .Since idea testing and product development is such an involved process in the case of technology innovations, it also extends the time-frame in which the first product/ products can reach the market.

Which means, an investor, who invests at an early stage of a technology venture, has to wait for a much longer period to see the returns materialize. From a private investor's point of view, all these factors add up

to a significant and in many cases an unacceptable level of risk. And hence, funding is that much hard to come by for an early-stage technology innovations. So, traditionally, entrepreneurs have turned to their own funds, or to the support of friends and family or to sheer ingenuity and resourcefulness to take their venture ahead. But, there are government funding sources that have been set-up to specifically support and fund technology-based innovations that could be exploited. These funds could be used right from idea validation stage to the full-scale commercialization stage. There are various needs at each stage of technology commercialization and new-venture development that need to be understood before one can fully understand and exploit the funding landscape and funding opportunities offered by the government.

Financing the technological innovations:

A technology entrepreneur in India is faced with several challenges while he sets out to create the technological innovations. Apart from identifying the right idea and the right markets and being able to recruit the right team, the most crucial challenge an entrepreneur faces is raising money for the new innovations. There are widely known sources of funding for technology innovations that one can think of, such as venture capitalists, angels, banks, and other conventional modes. But, an often-overlooked source of funding, particularly in the early stages of innovations, when private investors hesitate to invest due to the high risk of failure associated at that stage, is government funding. Through an array of programs and initiatives, the government offers funding for technology innovations, from early-stage development to full-scale commercialization, which entrepreneurs could take advantage of. There are various funding sources in the government that serve to fund the various stages of new venture development. Based on their function and utility, these funding sources have been broadly categorized into six categories:

Technology Development Funds: Technology development funds are aimed at supporting work on early stage technology idea development, validation, demonstration of proof of concept. These funds come in the form of grants or soft loans, and the funding could range from Rs. 75,000 to Rs. 10 Crore. This stage of venture creation comes with high risk, and

typically private players (VCs, Angels) and banks don't fund innovations at this stage. The wide availability of government funding will go a long way in promoting innovation and high-risk (and high-payoff) ventures. There are several seed funds connected to business incubators that offer funding at this stage, and could offer an alternate source for entrepreneurs. Some examples of such incubator-related seed funds are SINE (IIT-B), Center for Innovation and Incubation and Entrepreneurship (IIM-A) and SIDBI Innovation and Incubation Center (IIT-K).

Funds for patent protection and Technology In-

licensing: Protecting technology and know how from competitors is crucial, particularly if you want to shield yourself from your competitors, and exclude them from practicing your art. Patenting is an expensive process, in India, and more so, if international patents are to be obtained. Sometimes, filing for patents is prohibitively expensive for an entrepreneur (on average, US patent costs over \$5,000 to obtain, and additional expenditure to maintain it). Without patents, the start-up venture risks to lose its competitive edge. The funds under this category help entrepreneurs to file for patent protection. Also, in some cases, where additional licenses have to be obtained to run a business, and it is necessary to procure IP from other sources (in-licensing), it is possible using these funds.

Technology scale-up/validation/de-risking funds:

There are various risks that are associated with any early-stage technology venture such as technology risk, which is the risk that the technology might fail or might not deliver the desired product with required specifications, market acceptability risk, which is the risk that the products won't gain acceptability in the market. So, to gain wider acceptance and get funding from other sources like the VCs or angels, it is necessary to de-risk or prove that your technology works and the product is accepted in the market. Various organizations such as DSIR, NRDC, SIDBI provide funding to validate the technology and de-risk the new venture. There are specialized funds that support venture that emphasize new and renewable energy (see table).

Market entry funds: These funds support the technology entrepreneur in performing a range of market entry activities, technology up gradation, infrastructure development etc. This is the stage when

the new venture needs to boost its payroll by hiring marketing professionals and a host of other persons to expand the scale of operations. Typically, at this stage, it shouldn't be difficult to get the attention of VCs and Angels and other investors, as the venture by this stage has significantly de-risked. There are excellent networks of Angel investors in the country and VCs who could be tapped to provide funding by taking equity in the company. Grassroots innovators should definitely note the role played by National Innovation Foundation (NIF) in funding and promoting ventures in this area.

Expansion funds: At this stage, major fund infusion is needed for sustaining a new venture. Presumably, at this stage, the technology has been successfully demonstrated and there is a growing need for the product in the market. To quickly achieve economies of scale and serve the growing markets, quick and massive infusions of funds are necessary. The funding sources listed below are the ones to look to at this stage. As can be noted from the table below, these sources offer large amounts to technology start-ups. The sources range from state government ventures (KITVEN, KVCF) to VCs to central government ministries.

Organization	Scheme	Funding Amount
Department of Scientific & Industrial Research (DSIR)	Phase I: Micro Technopreneurship Support (TS)	Rs. 75,000 subject to 90% of approved project cost
Department of Science and Technology (DST)	Instrumentation Development Programme	Up to Rs 35 Lakh sanctioned in recent projects
Department of Bio-Technology (DBT)	Small Business Innovation Business Research Initiative (SBIRI) Phase 1	Upto Rs 1 Crore, upto Rs 50 Lakh as grant and rest as soft loan
Department of Bio-Technology (DBT)	Small Business Innovation Business Research Initiative (SBIRI) Phase 2	Soft Loan upto Rs 10 Crores
National Research Development Corporation (NRDC)	Support to Inventors	Rs 2 lakh
Department of Scientific & Industrial Research (DSIR)	Phase II: Supplementary TePP Fund (STF)	Rs. 7,50,000 subject to 90% of total project cost
Department of Scientific & Industrial Research (DSIR)	Phase II: Seamless Scale-up Support for TePP projects (S3T)	Rs. 45,00,000 subject to 50% of total project cost
Ministry of Micro Small Medium Enterprises (MoMSME)	Support for Entrepreneurial and Management Development of SMEs through Incubator	Rs 6.25 Lakhs
National Innovation Foundation (NIF)	Micro Venture Innovation Fund (MVIF)	up to Rs 10-15 Lakhs
Ministry of Micro Small Medium Enterprises (MoMSME)	Assistance for Grant on Patent/ GI Registration of innovations through the National Manufacturing Competitiveness Council (NMCC)	Rs 25,000 for domestic patents and Rs 2 Lakh for foreign patents
Ministry of Communication and Information technology (MIT)	Support International Patent Protection in Electronics and IT (SIP-EIT)	50% or upto Rs 15 Lakh for filling International patent

Council of Scientific & Industrial Research (CSIR)	New Millennium Indian Technology Leadership Initiative (NMITLI)	Grants for Public Institutions and Soft Loan for Private Sector Companies. Few Crore Rs.
Department of Scientific & Industrial Research (DSIR)	Phase I: TePP Project Fund (TPF)	Rs. 15,00,000 subject to 90% of total project cost
Department of Scientific & Industrial Research (DSIR)	International Technology Transfer Programme (ITTP)	Up to Rs 1 crore sanctioned in recent projects
Small Industries Development Bank of India (SIDBI)	SME Growth Fund	Rs 2 crore to Rs 25 crore
National Research Development Corporation (NRDC)	Angel Fund	Rs 10 Lakh to Rs 30 Lakh
Department of Information Technology (DIT)	Multiplier Grants Scheme	upto Rs 2 crore or upto Rs 4 crore depending on the industry, R&D lab partnership
Ministry of New and Renewable Energy	Energy Recovery from Urban Wastes	Rs 1.5 crore / MW for setting up power plants/ Other schemes available
Council of Scientific & Industrial Research (CSIR)	New Millennium Indian Technology Leadership Initiative (NMITLI)	Grants for Public Institutions and Soft Loan for Private Sector Companies. Few Crore Rs.
Small Industries Development Bank of India (SIDBI)	SME Growth Fund	Rs 2 crore to Rs 25 crore
Karnataka Information Technology Venture Capital Fund (KITVEN)	KITVEN Fund -2	Rs 1 crore to Rs 2.5 Crore
Kerala Venture Capital Fund	KVCF	Rs 25 Lakh to Rs 1.75 Crore
Ministry of Micro Small Medium Enterprises (MoMSME)	Credit Guarantee Fund Scheme for Micro and Small Enterprises	Collateral Free Credit upto Rs 50 Lakh
Ministry of Micro Small Medium Enterprises (MoMSME)	Credit Linked Capital Subsidy Scheme (CLCSS)	Loans upto Rs 1 crore, upfront capital subsidy upto 15% for technology upgradation
Venture Capitalists	1) Indian Venture Capital Association (IVCA) 2) SEBI List of VCs in India	Rs 5 crore and above
Small Industries Development Bank of India (SIDBI)	Direct Finance	Rs 10 Lakh and above
Ministry of Micro Small Medium Enterprises (MoMSME)	Marketing Assistance Scheme	Up to Rs 5 Lakh support for attending domestic and International exhibitions etc

Department of Bio-Technology (DBT)	Small Business Innovation Business Research Initiative (SBIRI) Phase 1/Phase 2	Upto Rs 1 Crore, upto Rs 50 Lakh as grant and rest as soft loan/Soft Loan upto Rs 10 Crores
National Research Development Corporation (NRDC)	Angel Fund	Rs 10 Lakh to Rs 30 Lakh
Department of Information Technology (DIT)	R&D Projects Funding	Not mentioned, Industry will get upto 50% of project cost
National Innovation Foundation (NIF)	Micro Venture Innovation Fund (MVIF)	up to Rs 10-15 Lakhs
Karnataka Information Technology Venture Capital Fund (KITVEN)	KITVEN Fund -2	Rs 1 crore to Rs 2.5 Crore
Kerala Venture Capital Fund	KVCF	Rs 25 Lakh to Rs 1.75 Crore
Angel Networks	1) Indian Angel Network 2) Mumbai Angels	Rs 50 Lakh to Rs 5 Crore
Small Industries Development Bank of India (SIDBI)	Direct Finance	Rs 10 Lakh and above

Managing Technological Innovation

Successful innovators focus on how the new product or service will affect customers. They look at the various stages of customer experience like purchase, delivery, use, maintenance and disposal. They also consider the utility of the product in terms of environmental friendliness, convenience, and simplicity and customer productivity. In other words, they orient product development activities towards the customer rather than the technology. The price chosen by the innovator has to attract and retain a sufficiently large number of customers. Innovations very often compete with other products which may look quite dissimilar but perform the same function. What is important here is how people will compare the new product with other very different-looking products and services. The price level will also depend on the ease of imitation. If the product is difficult to imitate or well protected by patents, a high price is possible.

On the other hand, if imitation is easy, a low price

becomes essential. Successful innovators understand the importance of generating positive cash flows as quickly as possible. They generate profits not by raising price but by keeping costs tightly under control, consistent with the chosen price level. They improve materials selection, simplify design processes and improve manufacturing efficiencies to cut costs. They may also consider strategic outsourcing of non core activities. Moreover, innovators compensate for their lack of technological capabilities in some areas by partnering and forming alliances. In spite of all these moves, if the price is still high and beyond the reach of target customers, they look at options such as leasing or renting the product on a time share basis, which are more appealing to customers.

Conclusion

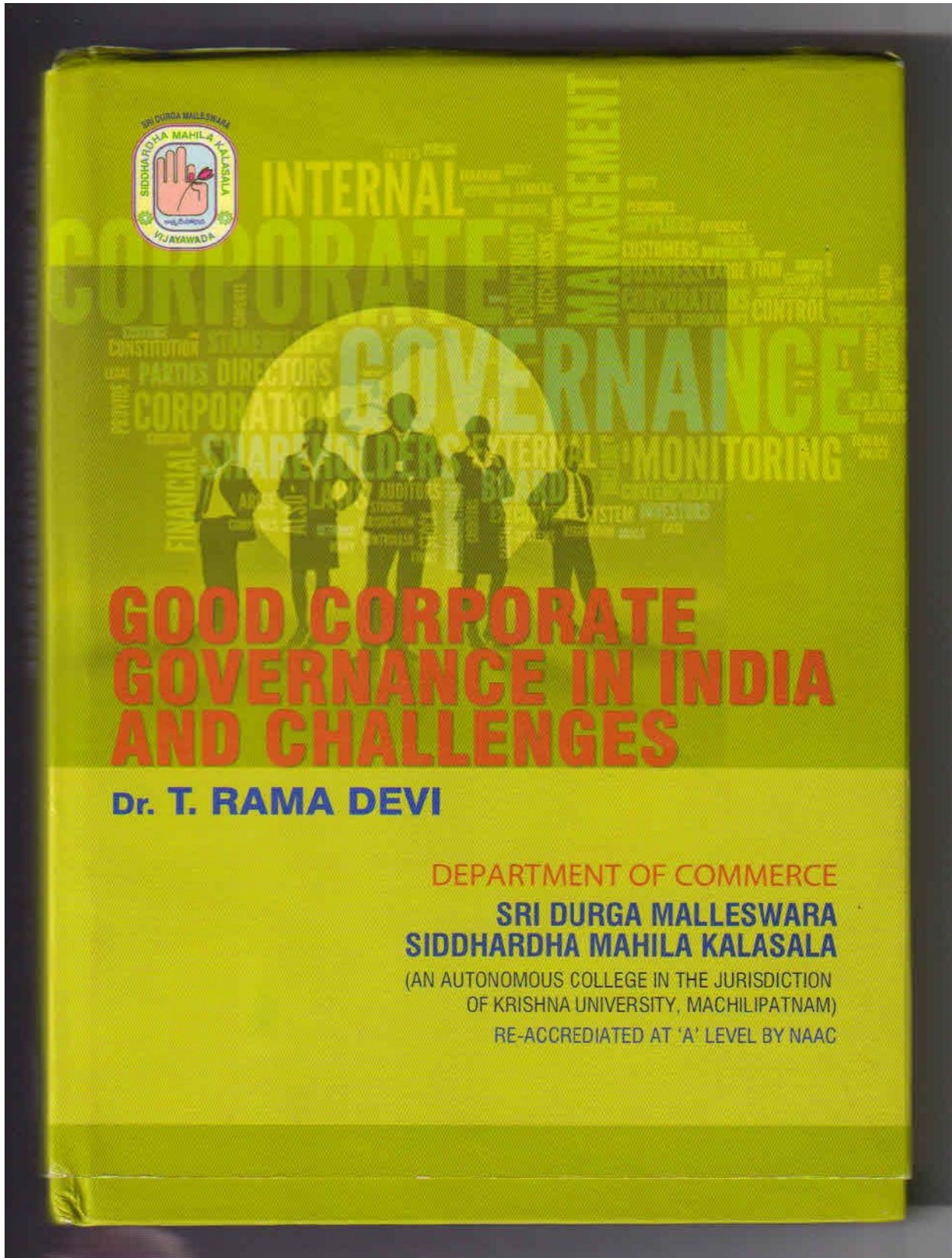
Technology entrepreneurs could enormously benefit from utilizing the funding opportunities offered by the government to run their new ventures. Government funding sources are particularly useful in the early-

stages of innovations, as private investors and VCs and angels will be wary of investing in a venture with high level of built-in risk. It might be difficult to run a new venture based on government grants and loans. But, any entrepreneur who understands the government funding landscape can use the funding sources to augment his funds and stands a much greater chance of success in running his technology innovations venture.

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GOOD CORPORATE GOVERNANCE IN INDIA AND CHALLENGES

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GOOD CORPORATE GOVERNANCE IN INDIA AND CHALLENGES

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If the world conducted its business based on the Gandhian concept of “trusteeship”, where the entrepreneurial/managerial class assumed the role of a “Trustee/Custodian” of the wealth/resources of the society and practiced business replete with ethical, moral and spiritual values, there would be no need for having laws on corporate governance, However, that not being the case; and the reality of the corporate world reflecting myriad murky tales of large scale frauds, shady accounting dealings, deliberate acts of executive irresponsibility and opaque decision making, a need arose to clearly define and lay down the parameters of accountability, control and reporting functions within organizations.

Another phenomenon that has necessitated the need for rule-making in this area has been that of globalization and the increasing flow of capital, technology and resources across geographical/political boundaries. In order that such flows remain unimpeded and there is long term appreciation and adequate returns on the capital employed, the providers of capital insist on high order of transparency in operations, efficiency in the use of capital and long-term sustainability of the organization. To add to this, the exponential growth in capital market activities has rendered the overall corporate scenario extremely complex and challenging. This has necessitated an urgent review of the system of corporate governance within all economies, with particular focus being on reporting and accountability of executive/

non-executive directors, audit committees and the relationship between stock exchanges and companies and also companies and investors.

The earliest definition of Corporate Governance stated that 'the purpose of Corporate Governance is to conduct the business in accordance with owner or shareholders' desires, which generally will be to make as much money as possible, while conforming to the basic rules of the society embodied in law and local customs' (Milton Friedman). This definition stresses the economic concept of market value maximization and champions the cause of shareholder capitalism. Over a period of time the definition of Corporate Governance has been widened to encompass the interests of not only the shareholders but also other stakeholders, e.g., customers, employees, suppliers, dealers, government, society, etc.

The modern definition of Corporate Governance as advocated by experts of the OECD, defines corporate governance as the system by which business corporations are directed and controlled. According to them the corporate governance structure specifies the distribution of rights and responsibilities among different participants in the corporation, such as, the Board, managers, shareholders and other stakeholders, and spells out the rules and procedures for making decisions on corporate affairs. By doing this, it provides the structure through which the company objectives are set and also provides the means of attaining those objectives and monitoring performance. Essentially it is "about promoting corporate fairness, transparency and accountability" (J. Wolfensohn, President, World Bank).

Corporate Governance mainly consists of two elements, viz., (1) long-term relationship, which has to deal with checks and balances, incentives of managers and communication between management and investors and (2) transactional relationship involving matters relating to disclosures and authority. This implies that corporate governance deals with laws, procedures, Practices and implicit rules that determine a company's stability to take managerial decision vis-à-vis its various constituents, particularly its shareholders, creditors, stage and employees. Corporate governance refers to an economic, legal and institutional effort that allows companies to diversify, grow, restructure and exit and do everything necessary to maximize long-term shareholder value.

CORPORATE GOVERNANCE – THE INDIAN SCENARIO

The global developments had tremendous influence in India and triggered the process of laying down the ground rules on Corporate Governance. The issue of Corporate Governance was studied in depth and dealt with by the Confederation of Indian Industries (CII), the Associated Chamber of Commerce and the securities and Exchange Board of India (SEBI).

In India, the emphasis during the early years was limited to only some of the recommendations of the Cadbury Committee – Such as the role and composition of the Audit Committees and importance of making all the necessary disclosures with annual statements of accounts, which are considered important for investors' protection. The CII was the first to come out with its version of an Audit Committee. The SEBI, as the custodian of investor interests, took the matter further. In 1999, SEBI constituted an 18-member committee, chaired by the industrialist, Mr. Kumar Mangalam Birla, on Corporate Governance, mainly with a view to protecting the investors' interests. The committee made 25 recommendations, 19 of them mandatory in the sense that these were enforceable. The listed companies were obliged to comply with these on account of the contractual obligation arising out of the listing agreement with stock Exchangers.

The mandatory recommendations of the Kumar Mangalam Committee include the constitution of Audit Committee and Remuneration Committee in all listed companies, appointment of one or more independent Directors in them, recognition of the leadership role of the Chairman of a company, enforcement of Accounting Standards, the obligation to make more disclosures in annual financial reports, effective use of the power and influence of institutional shareholders, and so on. SEBI gave effect to the kumar Mangalam Committee's recommendations by a direction to all the stock Exchanges to amend their listing agreement with various companies in accordance with the 'mandatory' part of the recommendations.

The other initiative in the area was that by the Department of Company Affairs (DCA). In May 2000, DCA invited a group of leading industrialists, professionals and academics to study and excellence in India. The Study Group in turn set up a Excellence through sound corporate governance and submitted its report in Nov 2000. The task force in its recommendations identified two classifications namely essential and desirable

with former to be introduced immediately by legislation and latter to be left to the discretion of companies and their shareholders.

Some of the recommendations of the task force were : greater role and influence for non-executive independent directors, stringent punishment for executive directors for falling to comply with listing and other requirements, imposing limitation on the nature and number of directorship of Managing and Whole-Time directors, advocating the need for the interested shareholders to abstain from voting on specified matters, tougher listing and compliance regimen through a Centralized National Listing Authority and setting Up of a Centre for Corporate Excellence, in addition to the oft repeated need to ensure proper disclosure to the shareholders and investing community and more meaningful and transparent accounting and reporting system.

DCA also appointed a High Level Committee, under the Chairmanship of Naresh Chandra (2002), former Cabinet Secretary "to examine the Auditor-Company relationship, role of independent directors, disciplinary mechanism over auditors in the light of irregularities committed by companies in India and abroad".

N.R.Narayana Murthy Committee on Corporate Governance has observed that "Corporate Governance is the acceptance by management of the inalienable rights of shareholders as the true owners of the corporation and of their own role as Trustees on behalf of the shareholders. It is about commitment to values , about ethical business conduct and about making a distinction between personal and corporate funds in the management of a company".

The Institute of Company Secretaries of India also defined the term Corporate Governance as under :

"Corporate Governance is the application of best management practices, compliance of law in true letter and spirit and adherence to ethical standards for effective management and distributions of wealth and discharge of social responsibility for sustainable development of all stakeholders".

target and milestones.

BUSINESS AND COMMUNITY OBLIGATIONS

Though basic activity of a business entity is inherently commercial yet it must also take care of community's obligations. The stakeholders must be informed about the proposed and ongoing initiatives taken to meet the community obligations.

FINANCIAL AND OPERATIONAL REPORTING

The Board require comprehensive, regular, reliable, timely, correct relevant information in a form and of a quality that is appropriate to discharge its functions of monitoring corporate performance. For this purpose, clearly defined performance measures – financial and non-financial should be prescribed which would add to the efficiency and effectiveness of the organization. The reports and information provided by the management must be a comprehensive one.

MONITORING THE BOARD PERFORMANCE

The Board must monitor and evaluate its combined performance and also that of individual Directors at periodic intervals, using key performance indicators besides peer review.

AUDIT COMMITTEES

The Audit Committee is responsible for liaison with the Management internal and statutory auditors, reviewing the adequacy of internal control and compliance with significant policies and procedures and reporting to the Board on key issues. The quality of Audit Committee significantly contributes to the Governance of the Company.

RISK MANAGEMENT

Risk is an important element of corporate functioning and Governance. There should be a clearly established process of identifying, analyzing and treating risks, which could prevent the company from effectively achieving its objectives. It also involves establishing a link between risk-returns and resource priorities.

The Board has the ultimate responsibility for identifying major risks

to the organization, setting acceptable levels of risk and ensuring that senior management take steps to detect, monitor and control these risks. The Board must satisfy itself that appropriate risk management systems and procedures are in place to identify and manage risks.

CONCLUSION

Manager is a man of knowledge as well as action. Wisdom and action are compatible. Attachment to selfish motives should be renounced but action cannot be and should not be renounced. None can remain without doing work in this world. One who renounces action but thinks about it in mind is a hypocrite.

Control senses is mind and do your duty without attachment. Sacrifice attachment to fruits and do your duty as sacrifice. Gains of activity/enterprise must be shared fairly and equably between employers or owners and employees. There is no place for exploitation in any party. Community of interest in enterprise is essential.

Be free from Desires, Ego and attachment to fruits. Seek guidance from self. Do your duty as Dharma or Sacrifice for god of Humanity.

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Professional Development of Teachers in Higher Education in India: An Overview

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Introduction

Professional development is the development of a person in his/her professional role. It includes the provision of constant learning and developing opportunities to extend and broaden the scope of professional capabilities of employees in relation to their role and responsibilities. Capabilities here refer to the combination of attributes, qualities, skills, knowledge and understanding of ethical principles that underpin the professional practices of employees which enable a person to perform to high standards in a given context and role.

"A teacher is a positive asset and precious national resource, which needs to be cherished, nurtured and developed with dynamism."

Today we live in an ever changing world where information and knowledge are a momentous force. Any improvement in Education System must start with improvement of the Teachers already in the classroom; this topic is one of real urgency. Teachers themselves need to be lifelong learners first, so that they can meet the expectations of students. For this purpose, reforms in education system from time to time can force teachers to keep pace with change and to review and renew their own knowledge, skills and vision of good teaching, ([Beaty, 1998]). In this process, the role of teachers needs to be the subject and object of reforms. Professional development of teachers is a lifelong process which begins with the initial preparation that a teacher receives and continues till retirement. Teaching experience itself leads to professional growth if a teacher examines his or her teaching systematically, [Glatthorn, 1995]. Formal experiences such as attending workshops, professional meetings, mentoring etc. and informal experiences such as reading professional publications, watching television documentaries related to an academic discipline, etc. can provide teachers the parameters of assessment, [Ganser, 2000].

Rabindranath Tagore observes that "A teacher cannot teach students unless he continues to learn".

In the present day context, teachers play multiple roles which include not only teaching, research and consultancy for students but also extension work, development of instructional material and management of institutions. It is thus necessary for teachers to update their efficiency periodically. For the development of country, it becomes imperative to have an education system

which comprises of both competitive students and competent teachers, ([Anderson, 1998]). In this world of corporate development, it is urgent to maintain the dignity of teaching as profession and provide more incentives for qualified and committed teachers.

Objectives of Professional Development of teachers:

- ☞ To enrich, elevate and empower teachers to be able to access professional and personal growth of avenues.
- ☞ To empower the teachers serving in the higher education segment.
- ☞ To meet the 21st century knowledge explosion which is taking place at a furious speed?
- ☞ To prepare competent, committed and professionally well qualified teachers who can meet the demands of the systems.
- ☞ To face the challenges of education system including higher education
- ☞ To cater to the ever changing demands of the social system.
- ☞ To add more to their knowledge base and to acquire new skills.
- ☞ To build self-confidence and subject knowledge.
- ☞ To develop positive attitude, self-confidence and proactive qualities.
- ☞ To build on the collective knowledge and experiences of employees and provide them with opportunities to acquire, practices and adopt new knowledge, thereby enhancing individual, group and organizational learning and capabilities.
- ☞ To equip teachers with the necessary skills to identify some of the challenges in their classrooms and also to find suitable solutions.
- ☞ To ensure better learning outcomes and offer opportunities for teachers to interact with teacher educator.

2. Impact of Professional Development on Teacher's Accountability

In any field professional development is the exercise to strengthen the foundation stones in a regular manner. Since our social development is in the hands of teachers it becomes imperative to pay attention to their improvement. Professional development aids teachers in building new pedagogical theories and practices. Teachers will be able to reinvent themselves and evolve as reflective professionals.

They will design new policies, programs and professional skills becoming the change catalysts. They intend to bridge the gap between "What should be" and "What is not".

They will ensure good academic performances of the students under their care.

Ignacio Estrad has said that "If a child can't learn the way we teach, may be we should teach the way they learn."

Today's learners are self-acquainted and not ready to accept blindly whatever is presented to them. Students are inquisitive and critical in their thinking. They expect absolute freedom and pleasure in learning process. So modern day teachers need to support their teaching by strong and visionary ideas to deal with students like facilitator rather than a dictator.

Professional Development and accountability go hand in hand with each other. As the policies are formulated for improving the skills and knowledge of teachers but at the same time it is expected that teacher accountability would get enhanced.

When a teacher becomes an active participant in the national policies and programmes organized

by government for his/her development, it ultimately gives rise to sense of responsibility towards the system..

Teaching style must go hand in hand with the learning style of students by understanding their psychology/behavior. A well trained teacher can kindle the natural curiosity of a student by his latest knowledge and skills.

As the teachers get opportunities to share their experiences, put forward their views and observations, it would strengthen their faith in the system they are serving to which in turn makes them more accountable to the students.

3. Impact of Professional Development of Teachers on Students

After their family members, students rely on their teachers for their overall development. School is the first interaction place of students where they come in contact with a miniature world comprising of fellow students and teachers. They start building up their skills as well as understanding other people. The guidance of a teacher plays a very important role at this stage as teachers become their main communication link. It is the teacher who can lead them to the path of creativity along with developing a positive attitude among them. A well trained teacher can better understand the multiple demands of today's students.

- ✎ He/She can set examples before students to follow.
- ✎ He/She can motivate students to come up with their views and ideas without any hesitation.
- ✎ He/She can better make the parents conversant with their child's abilities.
- ✎ He/She can very well recognize the talents of students and show them ways to nurture their qualities.

4. Existing policies for Professional development of teachers in India

After independence, the first step in this direction was setting up of the University Education Commission (1948) regarding pre-service and in-service education of teachers. Subsequently, the Secondary Education Commission (1953) appointed to examine the conditions of school education made specific suggestions about the preparation of teachers. The Review Committee on Education (1960) made major recommendations about post-graduate students in education research, education of administrator and qualification of teacher educators. The Education Commission (1964-1966) submitted a comprehensive report which serves as a basis for establishment of uniform national structure of education covering all stages and aspects of education. It emphasized the necessity of professional preparation of teachers for qualitative improvement of education.

Later the professional preparation of teachers has been recognized crucially by Kothari Commission (1964 - 1966), (see [Kothari, 1966]). The commission recommended the introduction of integrated course of general and professional education in university with greater scope for self-study and discussion and comprehensive program of internship. Based on recommendations of the commission, the National Policy on Education (NPE, 1968) was formulated. National Council for Teacher Education (NCTE) was set up in 1974 by a resolution of Govt. of India. The working of National Council of Education Research and Training (NCERT) was also reviewed. The National Commission on Teachers (1983) studied in depth the problems of teacher education and the status of teachers in society. National Policy of Education (NPE, 1986) opened new vistas in teacher education. As a consequence DIETs, CTEs, IASESs were established across the country. The need for professional development of college teachers was pointed out by the National Policy on Education in 1986. The University Grant Commission (UGC, 1987) proposed to establish Academic Staff College (ASC) throughout the country.

“Education has continued to evolve, diversify and extend its coverage since the dawn of history. Every country develops its system of education to express and promote its unique socio-cultural identity and also to meet the challenges of time” these are the words of the National Policy on Education (NPE, 1986), (see [National Policy of Education, 1986]). The Yashpal Committee Report (1993) on Learning without Burden recommended that the emphasis in these programmes should be on enabling the trainees to acquire the ability for self-learning and independent thinking. In 1998, National Council for Teacher Education (NCTE) established by Govt. of India for the maintenance of standards and improvement of quality of teacher education in the country, emphasized that every five years, the progress be reviewed. The National Curriculum Framework (NCF, 2005) presents a fresh vision and new discourse on key contemporary education issues.

During last decade, National Council of Teacher Education (NCTE) took up a joined hands with the National Assessment and Accreditation Council (NAAC) to foster quality assurance and sustenance and with Distance Education Council (DEC) to ensure integrated development of in-service teacher education under Open and Distance Learning (ODL) mode. In XIth five year plan (2002), one more dimension has been added, i.e. training in Information Technology and E-content development. In 2006, an updated and upgraded version of new National Curriculum Framework for Teacher Education (NCFTE) has been given due consideration. The UGC has extended scope of training to administrative staff of all categories in colleges and university including UGC staff in XIth plan (2007), (see [MHRD, 2007] and [UGC 2007]). At present in India the UGC has several schemes for upgrading the professional competence of teachers like National Fellowship, research associates, major and minor research projects for teachers.

The World Bank in its report has commented that “a high quality and well motivated teaching staff and a supportive professional culture are essential in building excellence” [World Bank, 1994]. Also UNESCO has endorsed the importance of teaching staff and its professional development in higher education by passing a recommendation on the topic at its General Conference in Paris in November 1997.

5. Some suggestions for the growth and Professional development of teachers

- ☞ **Framework of Policies:** The university must identify goals and priorities and develop and implement a range of strategies and programs to enhance and build the capacity, skills and professionalism of employees to enable them to contribute effectively to higher education.
- ☞ **Use of ICT in trainings:** Training courses must use ICT extensively. Teachers must shake hand with technology. The affecting factors of technology in teacher education and empowerment of teachers are the most important in technology planning, technical support and community building. Until and unless teachers are in tune with technical advancement in the concerned field they may not be in a position to discharge current information to the student community.
- ☞ **Self-motivated learning:** Teachers must be involved in self-motivated learning. The necessary skills and attitudes for learning, especially literacy and numeric skills; the confidence to learn, including a sense of engagement with the education and training system; and willingness and motivation to learn.
- ☞ **Participation in Workshops, Seminars and Conferences:** From being a person who just imparts bookish knowledge, teachers should actively involve in all educational meetings, workshops, conferences etc. Such participation provides the opportunities to the practising teachers to gain exposure to new ideas. Presenting a paper/talk in a conference involves a lot of research and organization of ideas. The teachers are

empowered after attending conferences and they can in turn induce their colleagues to follow new teaching practices.

Academic freedom: Teachers need to be given academic freedom to try and experiment different methods/approaches according to the needs of content and classroom.

Induction programmes: Academic Staff College for higher education run by universities must be designed in a way so that teachers get maximum benefit from it. All new teachers are required to participate in university induction programmes like orientation courses or refresher courses conducted by Academic Staff College considering it as training for their profession.

6. Conclusion

The government of India has a target of 21% GER (Gross Enrolment Ratio) by the end of XIIth five years plan, i.e. 2017. Teachers stand at the interface of the transmission of knowledge, skills and values to students. They will only be able to fulfil their responsibility if they are both well prepared for the profession and able to improve their contribution to it through career-long learning. Professional development of teachers is an on going process of reforms at all levels of teaching i.e. primary, secondary and higher education. Successful implementation of professional development has a significant positive effect on students' performance and learning. For reducing stagnation especially in higher education, all teachers need to refresh themselves and improve their skills by attending or participating in professional development opportunities designed to invigorate learning. One should

not rest on past laurels. Since there is always scope for growth, this leads to self-development.

Finally in the words of Dr. A.P.J. Abdul Kalam, "Teachers should be role models".

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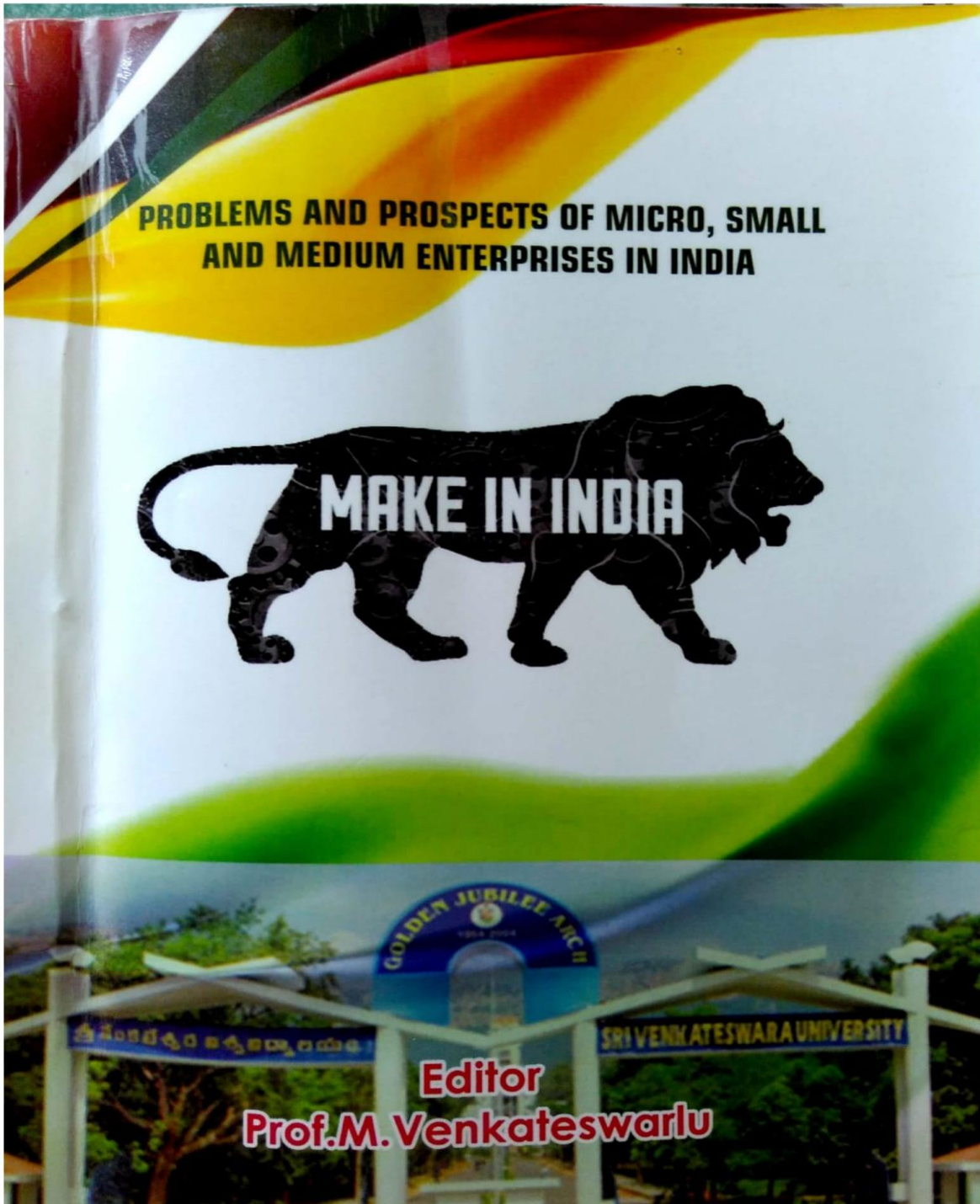
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MSME – A BOON FOR DOLDRUM ENTREPRISES IN FINANCIAL ASPECTS

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ABSTRACT

The term 'MSME' in wider sense describes small businesses in the private sector. The main parameters such as employee strength, annual sales, value of fixed assets, and loan size proxies to define the sector in the context of finance. Micro, small, and medium enterprises (MSMEs) are the drivers and engines of growth, promoting equitable socio-economic development worldwide.

Key words:

Cost of capital, Economic development, Enterprise, finance, Formal sources, Informal sources

Introduction:

MSME encouraging the small and micro enterprises by providing financial assistance both long term and short term with less cost of capital. The educated unemployed people will get financial support in establishing micro or small enterprises. The MSME gives its helping hand to the economically backward rural people to establish their own skilled enterprises. The MSME is supporting to the overall country's economic development by supporting to this sector. This paper deals with the different types of financial assistance provided by MSME to the medium and small scale enterprises. The required data to prepare this paper is based on secondary data.

Classification of MSME Sector:

Based on the size of enterprise this sector can be classified into Micro, Small and Medium based. Each of these segments are not similar, due to differences in ownership structure, area of operation, type of product or services of the industry, and the stage of development of an enterprise.

Types of Ownership Structure of Enterprises in the MSME Sector:

There are five different types of ownership structures.

- Proprietorship is the most commonly adopted ownership structure, primarily because this structure requires lower legal overheads.
- partnership,
- cooperative,
- private limited company and
- Public limited company.

Mature small, medium and new knowledge-based enterprises in the sector are mostly structured as private limited or public limited companies. The type of ownership structure of enterprises determines the form of capital whether equity or debt these enterprises can access and absorb from external sources. For example, proprietorship and partnership enterprises cannot accept any form of external equity other than owner contributions. This can specifically impact growth potential both at start-up stage as well as when the enterprise is in need of growth capital.

❖ **Overall demand for finance in MSME sector:**

The majority of finance demand from these enterprises is in the form of debt. For the purpose the enterprises may be classified into;

- Registered Enterprises
- Unregistered Enterprises
- Unorganized Enterprises

Demand by these enterprises may be in the form of

- ✓ Immediately Addressable Debt
- ✓ Immediately Addressable Equity

Debt Demand:

Financial institutions have traditionally limited their exposure to the sector due to the perception that these businesses carry high risk and high cost of delivery, and have limited access to immovable collateral.

A large number of micro services enterprises such as small retail trade and repair shops are based on the debt demand also. These enterprises prefer informal sources to the formal financial institutions due to the ease of access, speed of disbursement and need for negligible documentation. Additionally, the urgency of demand for finance often outscored the cost differential between the two sources.

Small Enterprise Segment:

Small enterprises require higher capital investments and tend to operate in value-added manufacturing and knowledge-based service industries. Entrepreneurs who run small enterprises have a relatively better knowledge of external sources of finance.

Medium Enterprise Segment:

Unlike micro and small enterprises, medium enterprises exhibit a more predictable demand for debt, and these units are able to access multiple sources of capital. Businesses in this segment are typically structured as limited companies that allow for infusion of alternative forms of capital such as equity. In addition, predictable cash flows and a formal structure, allows medium enterprises to choose formal financial institutions as their preferred financiers.

Services Sector:

Service industries such as retail trade repair and maintenance, and restaurants are typically cash businesses with shorter turnaround, because of which their overall external capital

requirements tend to be low on an average. On the other hand, there are knowledge-based services industries such as software development and management consulting within the services sector, the finance requirements of which are similar to that of manufacturing industries i.e. higher working capital and capital expenditure requirements.

❖ **Overall flow of Finance to the MSME Sector:**

Working with the assumption that all finance demand by the MSME sector is met by either formal or informal sources, the estimate for overall supply of finance to the MSME sector. This comprises

- informal finance,
- self-finance and
- Finance from the formal financial sector.

Informal sources and self-finance together make up most of the finance channeled into the sector.

Formal sources of finance, i.e. banks and non-banking institutions, and commercial banks are the largest formal sources of finance, primarily providing debt capital to the MSMEs.

Informal sources include both institutional sources such as moneylenders and chit funds, and non-institutional sources such as family, friends, and family business.

Institutional and Non-institutional Informal Sources of Finance to MSME sector:

An institutional informal source such as registered trade credit, chit funds and moneylenders is also having a share of finance into the MSME sector. Unlike in the case of non-institutional informal sources, transactions with institutional informal sources are bound by legal contracts.

- Institutional informal sources also provide financing in the form of debt on the basis of mutually agreed terms of repayment or transactions that are documented in the contract. Repayment cycles are typically in the form of bullet payments as well as daily, weekly or monthly installments of interest.
- Trade-credit is also plays a major role in providing the working capital finance in the MSME sector being longer debt cycles often offset any advantage that such financing has to offer.
- As with other informal sources of finance, institutional informal sources typically do not insist on any immovable collateral. Inclusion of individuals in such community-based finance institutions is based on referrals, and personal reputation is used in lieu of collateral.
- Enterprises also avail finance from community institutions such as chit funds. Chit funds offer flexible repayment options and on-demand finance with limited or no collateral.
- Although the cost of funds from informal sources tends to be high, timely disbursement and shorter turnaround times make them more attractive sources of finance, particularly for micro and small enterprises.

↓ **Formal Sources of Finance to MSME sector:**

The MSME sector receives debt from banking and non-banking institutions. Banks and government financing agencies constitute the largest share of formal debt to the MSME sector, where large banks are down-scaling to serve the Small and Medium Enterprise (SME) market. In India large banks have been the largest formal source of finance to MSMEs for decades.

▪ **Scheduled Commercial Banks:**

Public Banks have a better access to MSMEs, and take the lead in lending to the sector as compared to private and foreign Banks. In order to manage cost of transactions, banks prefer to finance mature small enterprises that have larger credit requirement as compared to micro enterprises.

▪ **Small Banks:**

Small banks such as RRBs, UCBs and government financial institutions such as SFC and SIDCs have extensive potential for outreach.

Debt Flow by Enterprise Size:

The current flow of debt finance is uniformly distributed across micro, small and medium enterprises. From RBI and other financial institutions, debt channeled to micro, small and medium enterprise segments.

Equity Finance Flows to the MSME Sector

Equity finance flows are also directed to the MSME sector by way of equity financing. Most of the enterprises in the sector are proprietorships and partnerships that do not allow for infusion of equity. In addition, equity investors require a high level of operational and financial transparency. However, there are several legal challenges that constrain the small and micro enterprises from getting equity capital. Consequently, it is primarily the mature small and medium enterprises that are the beneficiaries of equity capital financing. SIDBI Venture Capital Limited, along with a few private equity firms, is currently leading the supply of equity capital to the sector.

Conclusion

The supply of formal finance to the MSME sector has multiple challenges on both the supply and demand side such as limited access to collateral, limited capacity of the entrepreneurs etc. The supply-side is constrained by internal institutional challenges such as limited branch outreach and external operating environment challenges such as changes in macroeconomic scenario.

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THE NEED OF WOMEN PARTICIPATION IN MICRO, SMALL AND MEDIUM ENTERPRISES (MSMEs)

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Introduction

Today women can actively contribute to the promotion of economic development in different capacities, namely house – wife, mother, labourer, officer, scientist, executive etc., with the spread of education, training and development and technology, their mobility has been increased and they are coming out of their shells to do different works to raise the living standards of their families and better status in the society.

The present level of employment does not yield adequate income for the survival of their family. So it is necessary to create new employment avenues for higher income generation. The service sector has enormous potential for high income generating activities, which is suitable for women. Women are engaged in a wide variety of activities especially in the organized and unorganized sector.

Women entrepreneurs always display an innate capacity to calculate and shoulder risks, with a problem – solving approach, they have a very high degree of achievement motivation, women also do not lag behind men in projecting positive image of their talents and achievements. The other characteristics of women entrepreneurs can be listed as ability to think independently, imagination and creative ability.

Any woman or group of women which innovates, imitates or adapts an economic activity may be called women entrepreneurship.

According to the government of India, a women entrepreneur is defined as “an enterprise owned and controlled by a woman and having a minimum financial interest of 51 percent of the capital and giving at least 51 percent of the employment generated in the enterprise of women”.

Micro, Medium and small enterprises programmes built on the unique ideas and skills of women entrepreneurs would be encouraged by providing business assistance and small amounts of credit to support the development or start-up of a small business. Micro, Medium and small enterprise is a proven way to earn extra income to supplement household income. Micro, Medium and small enterprise provides the opportunity for individuals to develop their talents and skills and use them to improve their financial well-being. The sector is one of the most important vehicles through which low-income people can escape poverty with limited skills and education to compete for formal sector jobs, and women find economic opportunities in Micro, Small and Medium Enterprises as business owners and employees.

Women's Participation in MSMEs

In recent years the entrepreneurship has gained wide popularity around the globe. Women are becoming entrepreneurs at a more than proportionate rate compared to men. The total number of women enterprises in the total MSMEs sector is estimated at 10,63,721(10.11%). The estimated number of enterprises actually managed by women is 9,95,141(9.46%).

The total number of female employees in the MSMEs sector is estimated at 33,17,496. About 57.62% of the female employees are employed in the MSMEs units located in the states of Tamil Nadu, Kerala, Karnataka, West Bengal and Andhra Pradesh, while Kerala is having the highest female employment rate, 37% in proportion to the total female employment in the states. The overall female employment rate to the total employment in India varies at 13.31%.

The creation of employment opportunities through self – employment schemes is to be achieved by providing a package of financial assistance in the form of bank credit and subsidy provided by the government. The government schemes envisage provision of training appropriate to the activity sought to be undertaken by the prospective beneficiary. A large number of persons are expected to avail of the benefit of self-employment schemes to generate income.

These schemes for providing self-employment are:

- Sampoorna Gramin Rozgar Yojana
- Swarnajayanthi Gram Swarozgar Yojana
- Jawahar Gram Samridhi Yojana
- Employment Assurance Scheme
- National Social Assistance Programme.

Government has been implementing various programmes which support women to take up new ventures and start self-employment, which has been categorized under four heads.

1. Empowering Strategies

Indira Mahila Yojana (IMY), Mahila Samridhi Yojana (MSY), The Rural Women's Development and Empowerment Project (RWDEP) now called as swashakti project, Development of Women and Children in Rural Areas (DWCRA)

2. Employment and Income Generation

Training of Rural youth for self employment (TRYSEM), Swayansidha, Swalamban, Support for training and Employment Programme (STEP), Condensed Courses of Education and Vocational Training (CCEVT), Swarnajayanthi Gram Swarozgar Yojna (SGSY), Women's vocational Training Programme (WUTP), Jawahar Rozgar Yojna (JRY), Trade Related Entrepreneurship Assistance and Development (TREAD).

3. Welfare and Support Services

Hostels for Working Women (HWW), Short stay Homes (SSH), Swadhar, Crèches / Day care Centers for the Children of working and ailing mothers.

4. Other Enabling Measures

Rashtriya Mahila Kosh (RMK), A national level mechanism to meet micro – credit needs of poor and asset less women in the informal sector. Also Known as the National Credit Fund for women (NCFW).

Role of Non – Governmental Organization (NGOS) in Rural Women Development

The Major NGOs in Rural Women Development are: Bihar Rural livelihood Promotion Project (BRLP), National Alliance of young Entrepreneurs (NAYE), World Assembly of small and Medium Entrepreneurs (WASME), Self Employment Women's Association (SEWA) of Ahmadabad, Association of Women Entrepreneurs of Karnataka, Rural Development and self Employment Training Institute based in Karnataka.

Financial Institutions

There are a good number of financial Institutions that Support women to start any new Enterprises. Some of them are:

Rashtriya Mahila Kosh (RMK), National Bank for Agricultural and Rural Development (NABARD), Small Industries Development Bank of India (SIDBI), Access to Credit through "Development Bank for women Entrepreneurs" in Small scale and tiny sectors.

Schemes for Development and Promotion of Women Entrepreneurs

1. Trade Related Entrepreneurship Assistance and Development (TREAD).
2. Micro and Small Enterprises Cluster development Programme.
3. Credit guarantee fund Scheme for Micro and Small Enterprise.
4. Support for Entrepreneurial and managerial development.

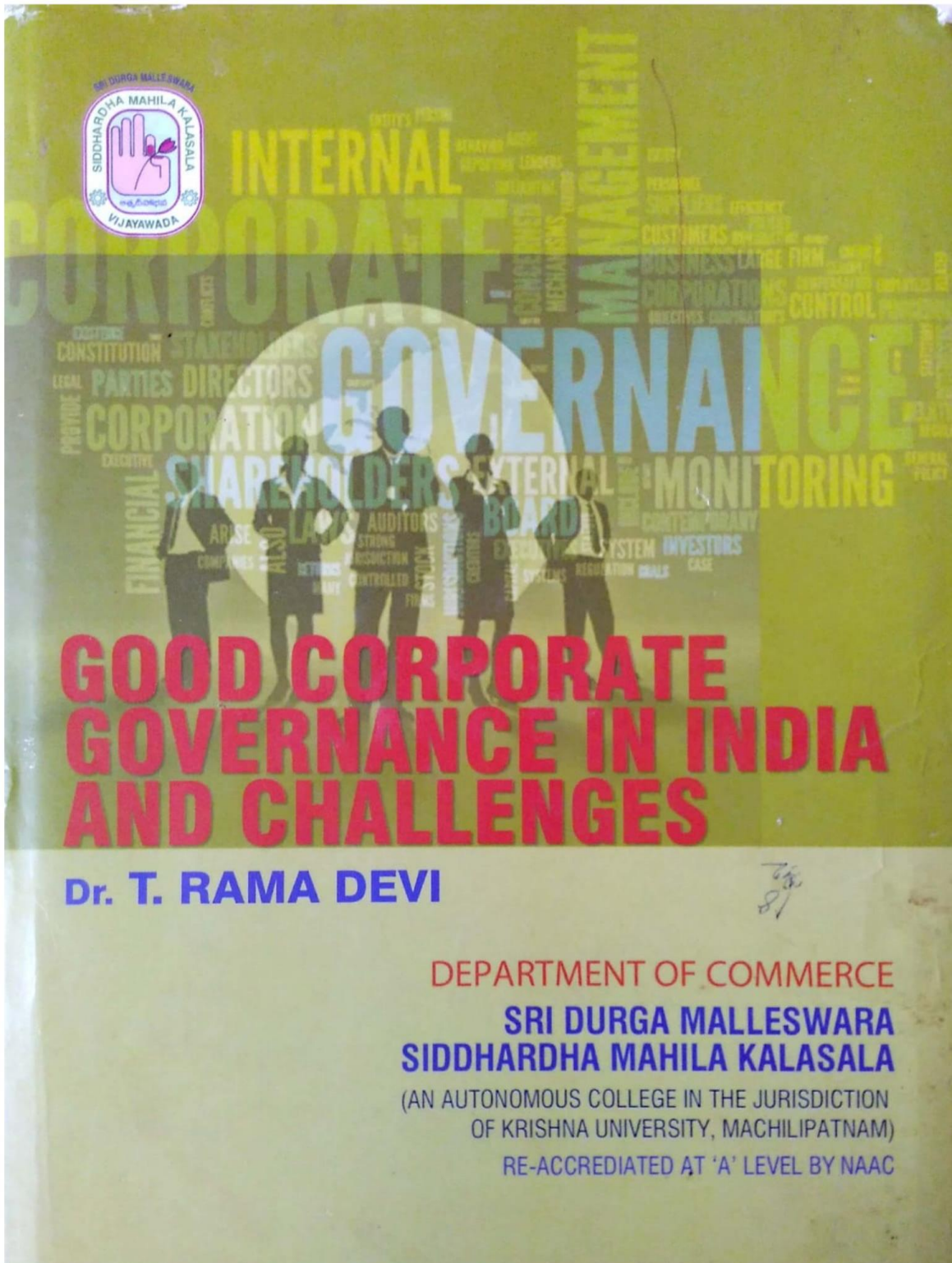
Conclusion

Micro, Small and Medium enterprises Programmes are often touted as a strategy for the "Empowerment" of women. Women – owned business make up one of the fastest growing segments of Enterprises. The MSMEs is one of the most important vehicles through which low – income people can escape poverty with limited skills and Education. As Micro – Entrepreneurs, women not only make a huge contribution to national income but they also create reliable social safety nets of their families and communities. Indian Society needs to bring about an attitudinal change in regard to the role of women as Entrepreneurial talents.

Micro, Small and Medium Enterprises (MSMEs) are not only playing crucial role in Providing large employment opportunities at Comparatively lower capital cost than large industries but also helping in industrialization of usual and backward areas.

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CORPORATE GOVERNANCE IN INDIA – EVOLUTION AND CHALLENGES

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INTRODUCTION

Corporate governance has been a central issue in developing countries long before the recent spate of corporate scandals in advanced economies made headlines. Indeed corporate governance and economic development are intrinsically linked. Effective corporate governance systems promote the development of strong financial systems – irrespective of whether they are largely bank-based or market-based – which, in turn, have an unmistakably positive effect on economic growth and poverty reduction.

There are several channels through which the causality works. Effective corporate governance enhances access to external financing by firms, leading to greater investment, as well as higher growth and employment. The proportion of private credit to GDP in countries in the highest quartile of creditor right enactment and enforcement is more than double that in the countries in the lowest quartile. As for equity financing, the ratio of stock market capitalization to GDP in the countries in the highest quartile of shareholder right enactment and enforcement is about four times as large as that for countries in the lowest quartile. Poor corporate governance also hinders the creation and development of new firms.

Good corporate governance also lowers of the cost of capital by reducing risk and creates higher firm valuation once again boosting real investments. There is a variation of a factor of 8 in the "control premium" (transaction price of shares in block transfers signifying control transfer less the ordinary share price) between countries with the highest level of equity rights protection and those with the lowest.

Effective corporate governance mechanisms ensure better resource allocation and management raising the return to capital. The return on assets (ROA) is about twice as high in the countries with the highest level of equity rights protection as in countries with the lowest protection. Good corporate governance can significantly reduce the risk of nation-wide financial crises. There is a strong inverse relationship between the quality of corporate governance and currency depreciation. Indeed poor transparency and corporate governance norms are believed to be the key reasons behind the Asian Crisis of 1997. Such financial crises have massive economic and social costs and can set a country several years back in its path to development.

Finally, good corporate governance can remove mistrust between different stakeholders, reduce legal costs and improve social and labor relationships and external economies like environmental protection.

CENTRAL ISSUES IN CORPORATE GOVERNANCE

The basic power structure of the joint-stock company form of business, in principle, is as follows. The numerous shareholders who contribute to the capital of the company are the actual owners of business. They elect a Board of Directors to monitor the running of the company on their behalf. The Board, in turn, appoints a team of managers who actually handle the day-to-day functioning of the company and report periodically to the Board. Thus managers are the agents of shareholders and function with the objective of maximizing shareholders' wealth. Even if this power pattern held in reality, it would still be a challenge for the Board to effectively monitor management. The central issue is the nature of the contract between shareholder representatives and managers telling the latter what to do with the funds contributed by the former. The main challenge comes from the fact that such contracts are necessarily "incomplete". It is not possible for

the Board to fully instruct management on the desired course of action under every possible business situation. The list of possible situations is infinitely long. Consequently, no contract can be written between representatives of shareholders and the management that specifies the right course of action in every situation, so that the management can be held for violation of such a contract in the event it does something else under the circumstances. Because of this "incomplete contracts" situation, some "residual powers" over the funds of the company must be vested with either the financiers or the management. Clearly the former does not have the expertise or the inclination to run the business in the situations unspecified in the contract, so these residual powers must go to management. The efficient limits to these powers constitute much of the subject of corporate governance.

LEGAL ENVIRONMENT, OWNERSHIP PATTERNS AND CORPORATE GOVERNANCE

The legal system of a country plays a crucial role in creating an effective corporate governance mechanism in a country and protecting the rights of investors and creditors. The legal environment encompasses two important aspects – the protection offered in the laws (de jure protection) and to what extent the laws are enforced in real life (de facto protection). Both these aspects play important roles in determining the nature of corporate governance in the country in question.

Recent research has forcefully connected the origins of the legal system of a country to the very structure of its financial and economic architecture arguing that the connection works through the protection given to external financiers of companies – creditors and shareholders. Legal systems in most countries have their roots in one of the four distinct legal systems – the English common law, French civil law, German civ law and Scandinavian civil law. The Indian legal system is obviously built on the English common law system. Researchers have used two indices for all these countries – a shareholder rights index ranging from 0 (lowest) to 6 (highest) and a rule of law index ranging 0 (lowest) to 10 (highest) – to measure the effective protection of shareholder rights provided in the different countries studied. The first index captures the extent to which the written law protected shareholders while the latter reflects to what extent the law is enforced in

reality.

The Rule of law index is another story. Here the Scandinavian-origin countries have an average score of 10 – the maximum possible – followed by the German-origin countries (8.68), English-origin countries (6.46) and French-origin countries (6.05). Most advanced countries have very high scores on this index while developing countries typically have low scores. India, for instance has a score of 4.17 on this index – ranking 41st out of 49 countries studied – ahead only of Nigeria, Sri Lanka, Pakistan, Zimbabwe, Colombia, Indonesia, Peru and Philippines. Thus it appears that Indian laws provide great protection of shareholders' rights on paper while the application and enforcement of those laws are lamentable.

The primary difference between the legal systems in advanced countries and those in developing countries lies in enforcement rather than in the nature of laws- in- books. Enforcement of laws play a much more important role than the quality of the laws on books in determining events like CEO turnover and developing security markets by eliminating insider trading. In an environment marked by weak enforcement of property rights and contracts, entrepreneurs and managers find it difficult to signal their commitment to the potential investors, leading to limited external financing and ownership concentration. This particularly hurts the development of new firms and the small and medium enterprises (SMEs). In such a situation many of the standard methods of corporate governance – market for corporate controls, board activity, proxy fights and executive compensation – lose their effectiveness. Large block-holding emerges as the most important corporate governance mechanism with some potential roles for bank monitoring, shareholder activism, employee monitoring and social control.

CORPORATE GOVERNANCE IN INDIA – A BACKGROUND

The beginning of corporate developments in India were marked by the managing agency system that contributed to the birth of dispersed equity ownership but also gave rise to the practice of management enjoying control rights disproportionately greater than their stock ownership. The turn towards socialism in the decades after independence marked by the 1951 Industries (Development and Regulation) Act as well as the 1956 Industrial

Policy Resolution put in place a regime and culture of licensing, protection and widespread red-tape that bred corruption and stilted the growth of the corporate sector. The situation grew from bad to worse in the following decades and corruption, nepotism and inefficiency became the hallmarks of the Indian corporate sector. Exorbitant tax rates encouraged creative accounting practices and complicated emolument structures to beat the system.

In the absence of a developed stock market, the three all-India development finance institutions (DFIs)— the Industrial Finance Corporation of India, the Industrial Development Bank of India and the Industrial Credit and Investment Corporation of India together with the state financial corporations became the main providers of long-term credit to companies. Along with the government owned mutual fund, the Unit Trust of India, they also held large blocks of shares in the companies they lent to and invariably had representations in their boards. In this respect, the corporate governance system resembled the bank-based German model where these institutions could have played a big role in keeping their clients on the right track. Unfortunately, they were themselves evaluated on the quantity rather than quality of their lending and thus had little incentive for either proper credit appraisal or effective follow-up and monitoring. Their nominee directors routinely served as rubber-stamps of the management of the day. With their support, promoters of businesses in India could actually enjoy managerial control with very little equity investment of their own. Borrowers therefore routinely recouped their investment in a short period and then had little incentive to either repay the loans or run the business. Frequently they bled the company with impunity, siphoning off funds with the DFI nominee directors mute spectators in their boards.

CHANGES SINCE LIBERALIZATION

The years since liberalization have witnessed wide-ranging changes in both laws and regulations driving corporate governance as well as general consciousness about it. Perhaps the single most important development in the field of corporate governance and investor protection in India has been the establishment of the Securities and Exchange Board of India (SEBI) in 1992 and its gradual empowerment since then. Established primarily to regulate and monitor stock trading, it has played a crucial role in establishing

the basic minimum ground rules of corporate conduct in the country. Concerns about corporate governance in India were, however, largely triggered by a spate of crises in the early 90's – the Harshad Mehta stock market scam of 1992 followed by incidents of companies allotting preferential shares to their promoters at deeply discounted prices as well as those of companies simply disappearing with investors' money.

These concerns about corporate governance stemming from the corporate scandals as well as opening up to the forces of competition and globalization gave rise to several investigations into the ways to fix the corporate governance situation in India. One of the first among such endeavors was the CII Code for Desirable Corporate Governance developed by a committee chaired by Rahul Bajaj. The committee was formed in 1996 and submitted its code in April 1998. Later SEBI constituted two committees to look into the issue of corporate governance – the first chaired by Kumar Mangalam Birla that submitted its report in early 2000 and the second by Narayana. Murthy three years later. Table 1 provides a comparative view of the recommendations of these important efforts at improving corporate governance in India. The SEBI committee recommendations have had the maximum impact on changing the corporate governance Committee on International Financial Standards and Codes also submitted its own recommendations in 2001.

CORPORATE GOVERNANCE OF BANKS

Nowhere is proper corporate governance more crucial than for banks and financial institutions. Given the pivotal role that banks play in the financial and economic system of a developing country, bank failure owing to unethical or incompetent management action poses a threat not just to the shareholders but to the depositing public and the economy at large. Two main features set banks apart from other business – the level of opaqueness in their functioning and the relatively greater role of government and regulatory agencies in their activities.

The opaqueness in banking creates considerable information asymmetries between the “insiders” – management – and “outsiders” – owners and creditors. The very nature of the business makes it extremely easy and tempting for...

effectively monitor the functioning of bank management. Existence of explicit or implicit deposit insurance also reduces the interest of depositors in monitoring bank management activities.

It is partly for these reasons that prudential norms of banking and close monitoring by the central bank of commercial bank activities are essential for smooth functioning of the banking sector. Government control or monitoring of banks, on the other hand, brings in its wake, the possibility of corruption and diversion of credit of political purposes which may, in the long run, jeopardize the financial health of the bank as well as the economy itself. The reforms have marked a shift from hands-on government control interference to market forces as the dominant paradigm of corporate governance in Indian banks.

CONCLUSION

With the recent spate of corporate scandals and the subsequent interest in corporate governance, a plethora of corporate governance norms and standards have sprouted around the globe. The Sarbanes-Oxley legislation in the USA, the Cadbury Committee recommendations for European companies and the OECD principles of corporate governance are perhaps the best known among these. But developing countries have not fallen behind either. Well over a hundred different codes and norms have been identified in recent surveys and the number is steadily increasing. India has been no exception to the rule. Several committees and groups have looked into this issue that undoubtedly deserves all the attention it can get.

In the last few years the thinking on the topic in India has gradually crystallized into the development of norms for listed companies. The problem for private companies, that form a vast majority of Indian corporate entities, remains largely unaddressed. The agency problem is likely to be less marked there as ownership and control are generally not separated. Minority shareholder exploitation, however, can very well be an important issue in many cases.

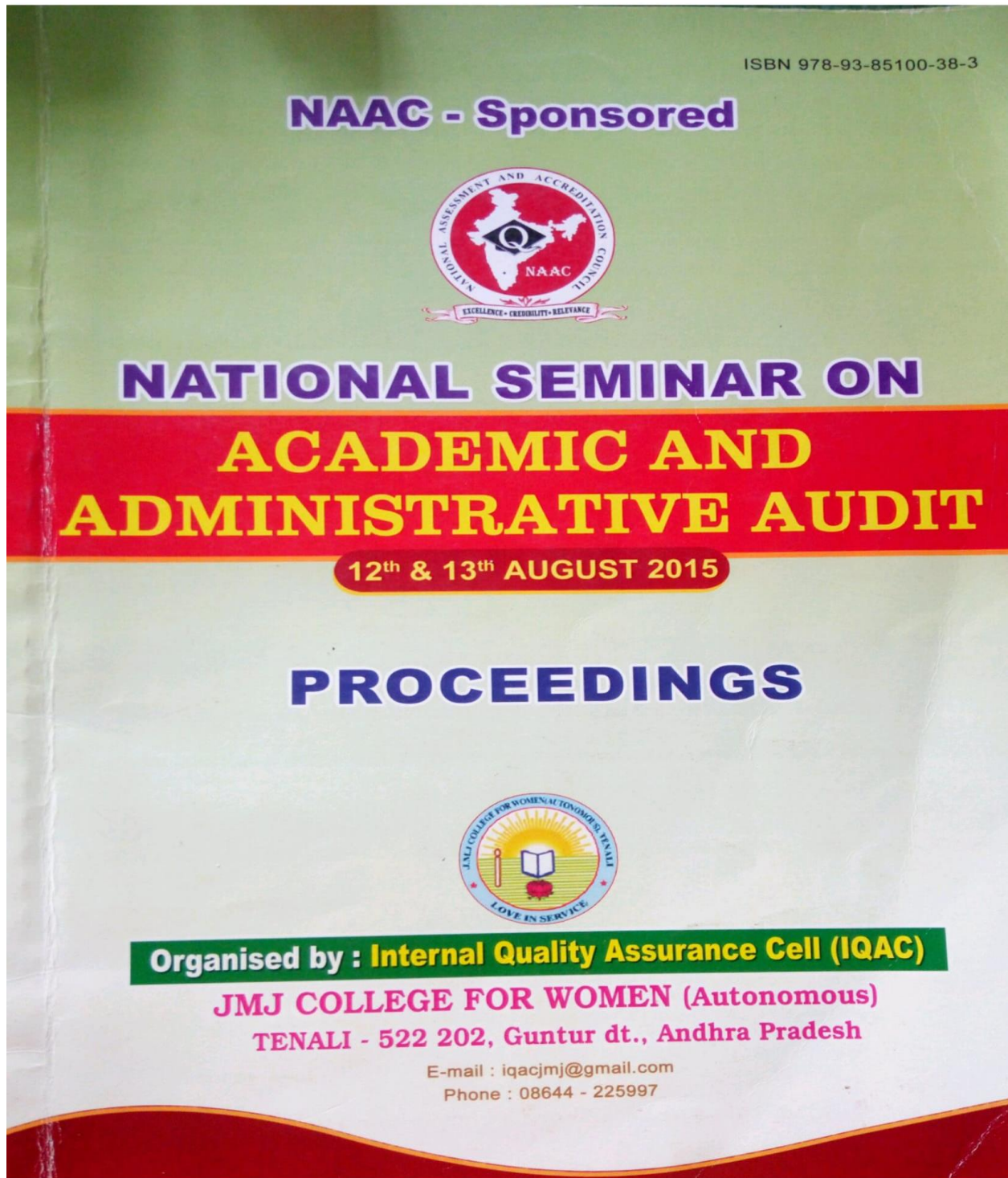
Development of norms and guidelines are an important first step in a serious effort to improve corporate governance. The bigger challenge in India, however, lies in the proper implementation of those rules at the ground

level. More and more it appears that outside agencies like analysts and stock markets (particularly foreign markets for companies making GDR issues) have the most influence on the actions of managers in the leading companies of the country. But their influence is restricted to the few top (albeit largest) companies. More needs to be done to ensure adequate corporate governance in the average Indian company.

Even the most prudent norms can be hoodwinked in a system plagued with widespread corruption. Nevertheless, with industry organizations and chambers of commerce themselves pushing for an improved corporate governance system, the future of corporate governance in India promise to be distinctly better than the past.

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USE OF ICT IN TEACHING AND LEARNING

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ICT is an acronym for "Information and Communication Technologies". It refers to technologies that enable us to access the information through communication Medias. It is of Information technology, but basically focuses on communication technologies including telephone, Television, Internet, wireless networks, mobile phones, and other communication tools. We can communicate in real-time with others all over the world using these technologies as Messaging, Internet Telephony and Video conferencing, social networking websites like Facebook, Twitter, LinkedIn, Google etc allows users from all over the world to stay in contact and communicate on a regular basis. ICT has facilitated not only classroom teaching but also online learning and E-learning.

ICT has opened new avenues, like, Online learning, e-learning, Virtual University, e-teaching, e-education, e-journal, etc. Third Generation Mobiles are also part of ICT. Mobile is used in imparting information fast and cost effective. It provides e-mail facility also. One can access it anywhere. It will be cost effective. The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to access maximum senses to get the information. It has broken the monotony and provided variety in teaching – learning situation.

Teaching at School as well as Higher Education, mostly, concentrates on giving information which is not the sole objective of Teaching. Along with giving information, the other objectives are:

Developing understanding and application of the concepts

Developing learner-centered learning

Make active, exploratory, inquiry-based learning

Encourage collaborative work among learners and teachers

Developing expression power

Developing reasoning and thinking power

Development of judgment and decision making ability

Improving comprehension, speed and vocabulary

Developing self-concept and value clarification

Developing proper study habits

Developing tolerance and ambiguity, risk taking capacity, scientific temper, etc.

The introduction of Information and Communication technologies in education represents an important part of the strategy adopted by various institutions to improve the quality of learning and teaching across the education and training system. The policy intention is to focus on learning and teaching for a new generation of young people who are growing up in a digital world and are comfortable with technology. The use of ICT is to extend and enrich educational experiences beyond the curriculum. The objective is to build digital and information literacy so that all learners become confident and competent in using technology to contribute to an innovative and developing society. E-learning is about learning and teaching philosophies and methodologies within the context of outcomes-based education, using ICT in the learning environment. Using these

emerging technologies as we have become a “global citizen”, we are communicating with the people across the globe just like our next door neighbour face to face. So in a similar way this technology can be efficiently used in teaching learning process where it is the significance of face to face communication and sharing information efficiently. ICT promotes collaborative learning a general move towards greater learner autonomy. The teacher can never be replaced by any technology, because the technology is a tool to transmit knowledge, it does not generate it. The teacher decides the learning experiences and provides them using the tool. So the role of the teacher is very important.

A role of the teacher shifts from leader to facilitator and creator. The most effective uses of ICT are those in which the teacher, aided by ICTs, can challenge pupils understanding and thinking, either through whole class discussions and individual/small group work using ICTs. ICT are seen as important tools to enable and support the move from tradition ‘teacher-centric’ teaching styles to more ‘learnercentric’ methods. ICTs can be used to reinforce existing pedagogical practices as well as to change the way teachers and students interact. ICT promotes collaborative learning by virtual class, and social networking.

Computer technology has provided teachers and learners with unlimited opportunities to transform the teaching and learning process creating an environment by the simplest uses to the most sophisticated. Only a teacher, live in a classroom, can bring about this inspiration. One of the most popular forms of ICT is Internet- gives access to an exponentially growing storehouse of information sources, almost unlimited networks of people and computers, and unprecedented learning and research opportunities, The Internet is a network of networks, providing opportunities for inquiry based learning where teachers and students are able to access some of the world’s largest information archives. Students and teachers are able to connect with each other, learn flexibly, and collaborate with others around the world. Generally speaking geographical distance is no longer a barrier, and the age of the ‘borderless’ provision of education upon us. Teaching strategies and resources can be shared through communication with other educators and may be integrated across the curriculum. The Internet provides a wealth of information to the extent that it is now impossible to comprehensively track the amount of information available. The internet can be an excellent way to adapt information to meet the characteristics of human information processing. On INTERNET many websites are available freely which may be utilized by teachers and students for understanding different concepts, improving vocabulary, developing Reasoning & Thinking, etc. ICT can help in preparing students for SAT, GRE, TOEFL, etc

With the present infrastructure, class size, availability of teachers, quality of teachers, training of teachers, etc., it is difficult to achieve all the objectives. Further, most of the teachers use Lecture Method which does not have potentiality of achieving majority of above mentioned objectives. The objectives are multidimensional in nature, so for their achievement multiple methods should be used in an integrated fashion. At present ICT may be of some use. It is a well known fact that not a single teacher is capable of giving up to date and complete information in his own subject. The ICT can fill this gap because it can provide access to different sources of information. It will provide correct information as comprehensive as possible in different formats with different examples. ICT provides Online interaction facility. Students and teachers can exchange their ideas and views, and get clarification on any topic from different experts, practitioners, etc. It helps learners to broaden the information base. ICT provides variety in the presentation of content which helps learners in concentration, better understanding, and long retention of information which is not possible otherwise. The learners can get opportunity to work on any live project with learners and experts from other countries. The super highway and cyber space also help in qualitative improvement of Teaching – Learning Process. ICT provides flexibility to learners which are denied by the traditional process and method. Flexibility is a must for mastery learning and quality learning.

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THE INTEGRATION OF ICT INTO CLASSROOM TEACHING

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INTRODUCTION

The use of information and communication technology (ICT) such as Internet applications, CD-ROMs, video technology and various computer attachments and software programs have caused many changes in society. These changes have not just been of a technical nature but more importantly of a structural nature. Many of the major institutions of our society have changed and the way we live our daily lives have been impacted. However, the impact on education may just beginning to be felt as teachers integrate this new technology into their teaching. In the early stages of the use of ICT in teaching, looking at the experiences of teachers at a high school in the forefront provides some clues as to what possibilities and problems may be presented with this new technology. The purpose of this study is to answer the following research questions: 1) How does the use of ICT change the work of teachers?, and 2) What problems or concerns do teachers identify in relation to the introduction of ICT?

METHODS

A qualitative case study research method was chosen because it would provide thick and rich descriptions of how these changes are being experienced by teachers. In the early stages of the use of a new technology it is useful to use an open ended research method which allows unexpected findings to emerge that might otherwise be missed. The school has 38 teachers and offers grade 10-12 to 650 students. With the permission of the School Board and Principal, a written request to conduct interviews was made directly to all teachers at the school. Thirteen teachers, from various subject areas, responded to the request and interviews were conducted in person at the school at a time suitable to the participants. The semi-structured interviews lasted from 45 minutes to one hour. All interviews were transcribed verbatim by the researcher, then coded by categories used in the interview protocols and other categories which were added as a result of information raised during the interviews.

FINDINGS

CHANGING TEACHING

Teachers could give many different and specific examples of how technology had changed their work. A number of things were being done with Web sites, from giving students notes which one teacher described as a "low end thing," to getting students to create their own Web pages. One teacher was using a Web site to enhance an actual field trip. The Web site introduces students to the animals and tells them what they are going to be doing while on the field trip. It shows them techniques they can use to analyze the ecosystem and record the data. The prior preparation through the Web site helps students benefit from the actual field trip.

Several teachers mentioned that they used Power Point and other computer programs to improve their presentation of material to class. Teachers explained that technology enabled teachers to deliver more material to students and it also eliminated several basic problems such as; poor hand writing, poor artistic skill, contrast, lighting, and visibility. Another teacher makes extensive use of software programs to help teach physics. The students go into the laboratory and collect their data using the computer. Then they use word processing programs along with Excel to do graphs and presentations. The software allows the students to collect different kinds of data using various attachments that are plugged into the computer. Using computer technology,

students have more time to explore beyond the mechanics of counting dots and setting up the experiment. It actually lets them look at it and understand the concepts better. Another teacher made the point that resource-based teaching or resource-based learning is almost becoming "seamless, almost natural" in everything that teachers do because information is becoming easier to access.

Changing the Teaching / Learning Relationship

Teachers reported that the relationship between teacher and learner is sometimes reversed with regards to information technology. Many teachers mentioned that they had students show them how to use technology. One teacher commented that when students could help teachers, it gave the students a big confidence boost. Some teachers went as far as to use terms like "co-learners" to describe the new relationship between teacher and student. Teachers also saw the potential for technology to be isolating and realized that classroom and other activities had to be arranged in a way that reduce the likelihood of isolation. Another point made, was that in some ways the use of new technology may be increasing socialization in some ways. People may be able to find someone who has interests similar to their own to converse with, through the Internet. One teacher put forth the idea that the use of technology in the classroom will mean the Arts and Music as areas where students interact, will increase in importance to increase socialization.

Administration and Expanding Professional Networks

The use of information technology has changed school administration in several ways. One teacher explained that when she started teaching six years ago, it was not expected that teachers know how to type their own test. Now teachers are expected to know how to use word processors and have their tests done in a proper format. Several teachers noted that there is a move toward recording grades and attendance electronically. Teachers are expected to check their e-mail, and a lot of things that used to be done at a staff meeting are now done via e-mail. Also, e-mail is becoming an important communication tool between parents and teachers. In addition most of the teachers use e-mail to keep in touch with other teachers and friends.

Concerns Teachers have about the use of Technology

While recognizing that there were some concerns and problems with integrating the use of information and communication technology, teachers thought it was beneficial to the educational process and should be continued. Several concerns emerged from the interviews.

Maintenance. The problem most often noted by teachers was the maintenance of the equipment needed to operate a technologically enhanced school.

Inequalities. Another frequently mentioned problem was the disparities between students who have access to computers at home and those who do not.

Need for training. Teachers provided evidence of the importance of the efforts in-school to promote professional development in integrating information technology into classroom teaching. The professional development days held and the flexible mentor type training available at the school was viewed as being very important by the teachers interviewed.

Information Overload. Teachers recognized that sometimes students are overwhelmed with the amount of information available and with the task of filtering through the information.

Pace of Change and Stress. Teachers have a hard time keeping up with the pace of change.

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One teacher said, "People are stressed. Families are stressed", and she felt this level of stress is being transferred to young students.

Plagiarism. One teacher raised the problem of increased plagiarism because technology was making it easy to reproduce and revise someone else's work. She said, "there is a lot of cutting and pasting going on."

Business Involvement. Another emerging issue, is the possible loss of control of the education process to business partners. Balancing the interests of these partners and that of the students might be an increasingly challenging role for administrators as business involvement in education becomes more common.

Teachers' Time. Teachers stated that information technology was placing more demands on their time. Teachers noted that extra time was needed to learn new software and also to create new things for teaching because greater expectations were being placed on them.

DISCUSSION

The use of ICT is changing teaching in several ways. With ICT, teachers are able to create their own material and thus have more control over the material used in the classroom than they have had in the past. Rather than deskilling teachers as some scholars claim, it seems that technology is requiring teachers to be more creative in customizing their own material. Also, using Web pages to enhance an activity demonstrates that technology can be used to complement other aspects of good teaching rather than replace them. It is evident that involving students in the creation of useful material as a part of a learning exercise is a way to make school more meaningful for students. While the use of Power Point presentations have been criticized by some, teachers at this school provide examples of how it helps them with their teaching. The use of peripheral devices on computers to help with physics experiments again shows how ICT can be used to aid the learning process and help students focus on higher level concepts rather than

LESSMEANING FULTASKS

The changes caused by the introduction of information technology into learning environments, are not without some potential problems which must be considered by administrators. The information from this school indicates that some fundamental rethinking of the education process may be necessary because of the use of ICT. This will also put pressure on the school system to restructure the way education is organized.

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USE OF ICT IN TEACHING AND LEARNING

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IT was limited only to the textual mode of transmission of information with ease and fast. But the information not only in textual form but in audio, video or any other media is also to be transmitted to the users. Thus, the ICT = IT + Other media. It has opened new avenues, like, Online learning, e-learning, Virtual University, e-coaching, e-education, e-journal, etc. Third Generation Mobiles are also part of ICT. Mobile is being used in imparting information fast and cost effective. It provides e-mail facility also. One can access it anywhere. It will be cost effective. The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to use maximum senses to get the information. It has broken the monotony and provided variety in the teaching – learning situation. The ICT being latest, it can be used both at school and higher education levels in the following areas:

- Teaching
- Diagnostic Testing
- Remedial Teaching
- Evaluation
- Psychological Testing
- Development of Virtual Laboratory
- Online Tutoring
- Development of Reasoning & Thinking
- Instructional Material Development

USE OF ICT IN DIAGNOSTIC TESTING

The common observation is that the quality of teaching in the classroom is on the decline. More and more students are depending on the private tutorial classes. The private tuition also has become a business. This phenomenon is not only in India but in other countries too. There are about 800 students from USA who have enrolled themselves for Private tuition in Mathematics. It means tuitions are also being outsourced. This is being done through the use of ICT. There are students who fail to understand certain concepts or retain certain information. This can be assessed by introducing the diagnosis in the process of teaching – learning. This is the age of technology. These difficulties can be easily over come with the help of ICT. Sansanwal (2005) developed Computer Based Diagnostic Testing in Mathematics and Sansanwal and Lulla (2007) developed Computer Based Diagnostic Testing in Chemistry. Both these were tried out in CBSE affiliated schools situated in Indore. These developed Computer Based Diagnostic Tests work well and helped the teachers as well as students in identifying the gray area of each and every student. This can be put on the website of the school and the student can access it from home also. The student progress can be monitored and his performance can be improved. This will develop confidence in students and may change their attitude towards the subject. Further, the following are the main advantages of Computer Based Diagnostic Test.

- They do not require any special setting or arrangement. The only requirement is computer systems and software.
- The student can use it even from home if made available on school website.
- They do not need any special assistance from teacher. Unlike the paper-pencil test, it does not require paper setting and paper correction on the part of the teacher.
- It saves time on the part of the teacher and students.
- The feedback is given immediately after the test is over, which gives an intrinsic reinforcement to the student.
- The student finds it more interesting and motivating as compared to the paper-pencil diagnostic test.
- It can be updated from time to time.
- It is economical in terms of money as it requires only one time investment.

USE OF ICT IN REMEDIAL TEACHING

When the ICT is used for diagnosis purpose, the next step is to organize Remedial Teaching programme. The Remedial Teaching can be done by the teacher if some common mistakes are identified. It may not be feasible to organize Remedial programme for individual students. At a certain point, the ICT can be used for giving individual Remedial Programme. It may be Online or Offline. The instructional material if designed specifically for meeting the individual needs of students and uploaded on the School website and then the ICT can be used for providing Remedial Teaching Programme.

USE OF ICT IN EVALUATION

When the paper pencil tests are conducted for evaluating the academic performance of students. These tests are conducted in the group setting. The content coverage is poor and students do not use them at their own. These tests are evaluated by the teachers and they may not give feedback immediately to each and every student. It may be due to this that students are unable to know their weakness and do not make any attempt to improve upon them. The ICT can be made use in the evaluation. One such attempt has been made by Sansanwal and Dahiya (2006) who developed Computer Based Test in Research Methodology and Statistics. It has been titled as 'Self your Understanding: Research Methods and Statistics'. This test can be used by individual student to evaluate his learning. The student can instantaneously get the feedback about the status of his understanding. If the answer is wrong, he even can get the correct answer. It goes a long way in improving the learning and teacher has no role to play in it. It is left up to students to use it. Such tests can be uploaded on the website for wider use. The students from other institutes can also make use of it.

USE OF ICT IN ONLINE TUTORING

The digital technology has broken the boundaries between countries. Human beings do not feel any type of restriction in communicating with people all over the globe. The access has become

easy. It is a well known fact that all students do not understand all subjects to the same extent. Some students find subjects, like, Mathematics, Physics, English, Chemistry, Accountancy, etc. difficult. All educational institutions do have well equipped laboratories and qualified & competent Faculty. Consequently students do feel the need of academic support out of the school. Therefore, students go for tuition. These days students from USA & other countries are enrolled in private tuition classes in India. That is they are being taught Online. This has become possible only due to ICT. In Online tutoring the student stays at his home. He logs in to his tutor through the use of Internet and software. He can see the teacher who is in India and the teacher can see the student who is in USA. The student asks the question and teacher replies it by writing on soft board or using power point presentation. This interaction is normally one to one. It has made the academic life of many students easy. This is how the manpower available in India can be made use of other countries.

USE OF ICT IN DEVELOPING INSTRUCTIONAL MATERIAL

At present there is a shortage of qualified and competent teachers in all most all subjects at all levels. Not only this, even the instructional material available in the print form is not of quality. This is because many authors have written on those topics that they have never read and / or done research. Sometime the information given in the books is also wrong. The book reading is not very enjoyable and does not help students in understanding the concepts and retaining the information. There are many teachers who are well known for the specific subject. Their lectures should be digitalized and made available to all the users. It will enhance the quality of instruction in the classrooms. The teacher can use them in the classrooms and can organize discussion after it wherein the new points can be added both by the teacher as well as students. It will make the teaching effective, participatory and enjoyable.

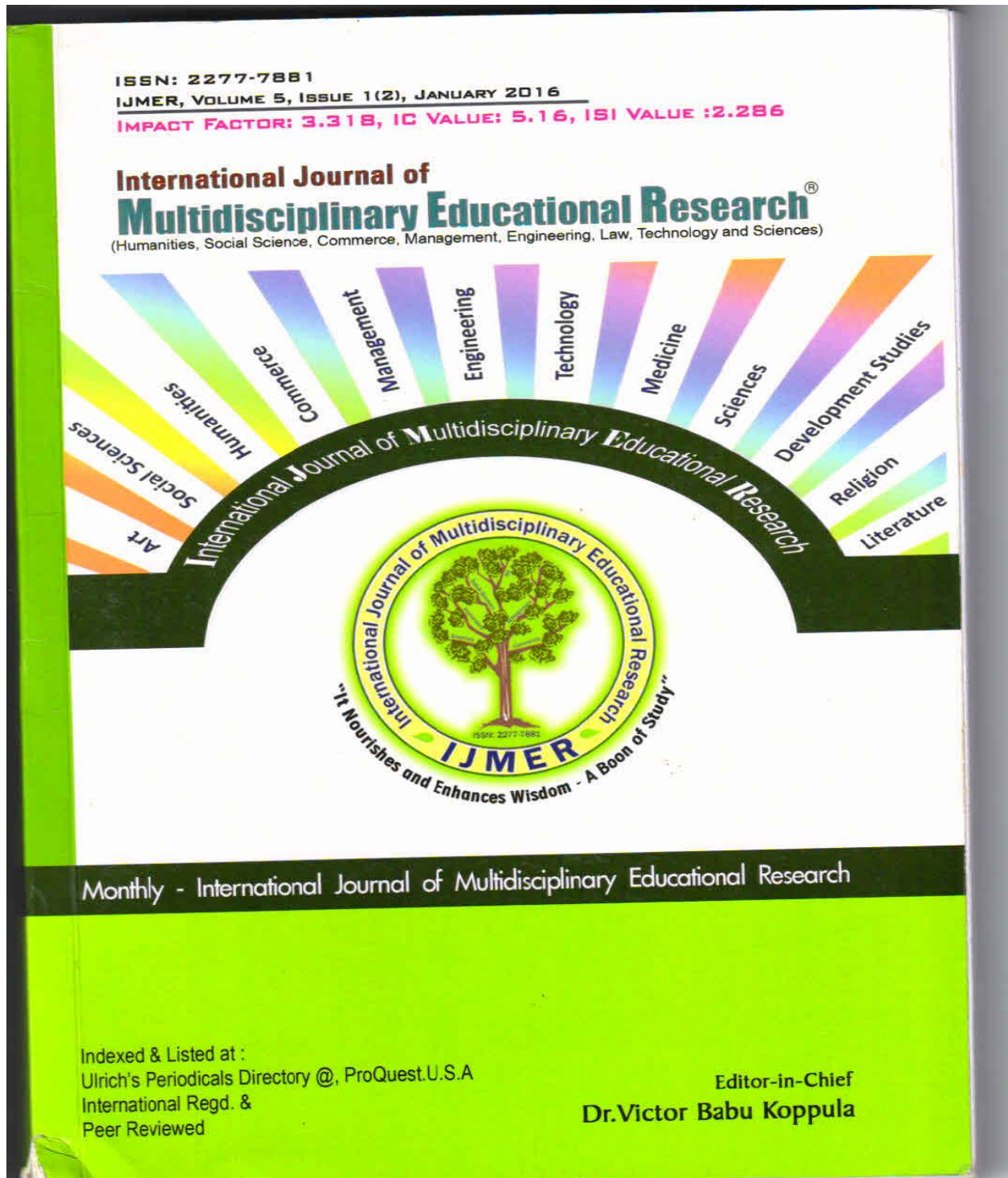
Another form of digitalized lectures is e – content. The CEC is making efforts to develop e – content material in different subjects for the benefit of diverse users. The competent teachers can develop e – content in their own areas of specialization. This has lots of potentiality to bring quality in teacher education. The ICT can be used in developing Instructional Material and e-Content.

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AN EFFICIENT WEB PREPROCESSING METHODS

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INTRODUCTION

With the rapid development of Internet, web-sites and web applications are getting more and more important in people's daily life. Web log mining is the technology to find out the hidden user patterns by analysis the information that include in web logs. So that capability, structure and individual functions can be optimized and provided by using this statistics.

There are three ways to record user visit information: Web Server, Web Proxy Server and User Client. In the web server logs, one web-site's visit information of multi users is recorded. In the web proxy server logs, multi web-sites' visit information of multi users is recorded. In the client logs, multi website's visit information of one user is recorded.

During above three logs, the first and the second ones are recorded automatically, and the third one should be recorded by appropriate software. Generally speaking, web server log has the highest structured form. We pay special attention to the web server logs, through the research and analysis of web server logs; the pages which are outlying, but related actually are discovered in order to optimize web-sites structure in a more reasonable way. And these mining statistics are finally used to establish fast and direct information channels.

World Wide Web is a global village and rich source of information. Day by day number of web sites and its users are



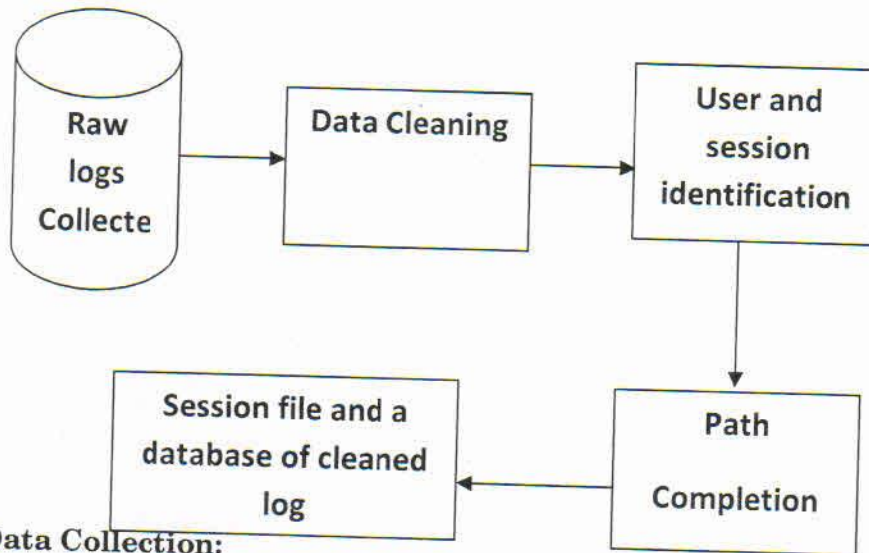
increasing rapidly. While surfing the web sites, users' interactions with web sites are recorded in web log file.

Web mining involves a wide range of applications which aim to discover and extract knowledge from data. Web mining also provides an important mechanism to make data access more efficient and adequate to users. In web usage (log files) mining, for instance, the main task is to discover the activities (preferences) of the users while they are browsing and navigating through the web. The goal of understanding the preferences of the users is to enhance the quality of the service and to personalize this service. In this area of data mining, several techniques can be applied such as classification and clustering. The main aim of clustering algorithms, for instance, is to use attribute information to group instances (records) that have similar attribute values.

Web usage mining is the automatic discovery of user access patterns from Web servers. Organizations collect large volumes of data in their daily operations, generated automatically by Web servers and collected in server access logs.

Data Preprocessing Steps:

Data preprocessing is a significant step in web usage mining which often consumes more time and effort. This starts with data preparation stage where the original data will be integrated and transformed into a suitable form on which specific data mining operations can be applied. It's shown below.



Data Collection:

There are three main sources to get the raw web log file such as

- 1) Client Log File
- 2) Proxy Log File
- 3) Server Log File.

Client log files are most authentic and accurate to depict the user behavior but it is difficult task to modify the browser for each client and requires users' essence and collaboration as well. It is in the form of one-to-many relationships of client and web sites visited by that particular user. Proxy log file is also used to capture user access data.

Proxy server log files are most complex and more vulnerable to user access data in log file. To unleash the true picture of user behavior is difficult. Same IP address is used by many users but on the other hand we can have unique user login. Proxy server is in many-to-many relationships. One user can access many sites and many users can visit one site. To capture the real user and users' browsing behavior is difficult.



Server log files are in relationship of many to one. Many users may visit one web site and user behavior about that particular web site can be captured accordingly. In this survey, we observed that most of the researcher considered web server log file as most reliable and accurate for WUM process.

If at all there are multiple weblog files, they should be converted into a joint weblog file. This joint file will undergo further operations. In this paper a server log file of 7.8 MB is considered for the purpose of analysis.

Data Cleaning:

The first step of preprocessing is data cleaning. It is usually site specific, and involves tasks such as, removing extraneous references to embedded objects that may not be important for the purpose of analysis, including references to style files, graphics, or sound files as shown in Table 1. The cleansing process also may involve the removal of at least some of the data fields (e.g. number of bytes transferred or version of 11 protocol used, etc.) that may not provide useful information in the analysis or data mining tasks.

User Identification

The task of User Identification is, to identify who access web site and which pages are accessed. The analysis of Web usage does not require knowledge about a user's identity. However, it is necessary to distinguish among different users. Since a user may visit a site more than once, the server logs record multiple sessions for each user. The user activity record is used to refer to the sequence of logged activities belonging to the same user.

Session Ordering

Sessionization is the process of segmenting the user activity record of each user into sessions, each representing a single visit to the site. Web



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VIRTUAL REALITY

F. Amul Mary, MCA, Lecturer in Computer Science, JMJ College for Women (A), Andhra Pradesh, Tenali

Abstract: *Virtual reality is an artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment. On a computer, virtual reality is primarily experienced through two of the five senses: Sight and Sound. Seeing is believing. The promise of virtual reality has always been enormous. The definition of virtual reality comes, naturally, from the definitions for both 'virtual' and 'reality'. The definition of 'virtual' is near and reality is what we experience as human beings. So the term 'virtual reality' basically means 'near-reality'. Virtual reality is the term used to describe a three-dimensional, computer generated environment which can be explored and interacted with by a person.*

The simplest form of virtual reality is a 3D image that can be explored interactively at a personal computer. More sophisticated efforts involve such approaches as wrap-around display screens, actual rooms augmented with wearable computers, and haptics devices that let you feel the display images.

3D image creation can be viewed as a three-phase process of Tessellation, Geometry and Rendering. In tessellation phase, models are created of individual objects using linked points that are made into a number of individual polygons (tiles). In geometry phase, the polygons are transformed in various ways and lighting effects are applied. In rendering phase, the transformed images are rendered into objects with very fine detail.

Haptics (pronounced HAP-tiks) is the science of applying touch (tactile) sensation and control to interaction with computer applications. Virtual Reality the human is completely isolated from the outside world and he is placed an entirely computer generated world. This paper presents Historical overview of virtual reality, Virtual Reality Modelling Language, Products for creating virtual reality effects and 3D effects, Types of VR, followed by applications of this technology in various Sectors.

Keywords: *3D Image- Tessellation- Geometry - Rendering-Simulation - Virtual Reality.*

Historical Overview of VR:

Virtual Reality had its crude beginnings. A definition of virtual reality has always been difficult to formulate — the concept of an alternative existence has been pawed at for centuries — but the closest modern ancestor came to life in the fifties, when a handful of visionaries saw the possibility for watching things on a screen that never ends, but the technology wasn't yet good enough to justify the idea. The promise of the idea was shrouded, concealed under clunky visuals. But the concept was worth pursuing, and others did (especially the military, who have used virtual reality technology for war simulation for years). The utopian ideals of a VR universe were revisited by a small crew of inventors in the late '80s and early '90s. At the time the personal computer was exploding, and VR acolytes

found a curious population eager to see what the technology had to offer.

Not enough, it turned out. Though a true believer could immerse him or herself in the rough built digital landscape, the chasm between that crude digital experience and the powerful subtlety of real life was too great. The vision simply did not match the means. In the mid-'90s, VR as an industry basically closed up shop. Though still used in the science those eager to bring VR to the masses found themselves overshadowed by a glitzier, more promising technological revolution: the internet.

Then, two years ago, Palmer Luckey, a kid born during the waning days of VR's late-20th century golden era, put the pieces together using improved technology. He raised some money and soon developed the Oculus Rift, his own version of

clunky headset. The graphics were still basic but the experience was, surprisingly, lifelike. For the first time ever, one could casually wander through a comically realistic rendering of Jerry Seinfeld's apartment. Or hack a zombie to death. It didn't really matter what you did inside the goggles, really, just the act of immersion was a wing. Imagine 10 years ago trying to envision the way we use cellphones today. It's impossible. That's the promise VR has today. VR at its best shouldn't replace real life, just modify it, giving us access to so much just out of reach physically, economically. If you can dream it, VR can make it. It's a medium for progress, not the progress itself. In celebration of the rise of VR still to come. Born of technology, virtual reality at its core is an organic experience. Yes, it's man meets machine, but what happens is strictly within the mind.

Virtual Reality Modeling Language

VRML (Virtual Reality Modeling Language) is a language for describing three-dimensional (3-D) image sequences and possible user interactions to go with them. Using VRML, we can build a sequence of visual images into Web settings with which a user can interact by viewing, moving, rotating, and interacting with an apparently 3-D scene. For example, you can view a room and use controls to move the room as you would experience it if you were walking through it in real space.

Virtual reality can be divided into:

- The simulation of a real environment for training and education.
- The development of an imagined environment for a game or interactive story.

Popular products for creating virtual reality effects

Popular products for creating virtual reality effects on personal computers include Bryce, Extreme 3D, Ray Dream Studio, TrueSpace, 3D Studio MAX, and Visual Reality. The Virtual Reality Modelling Language (VRML) allows the creator to specify images and the rules for their display and interaction using textual language statements.

Products for creating 3-D effects

Popular products for creating 3-D effects include Extreme 3D, Light Wave 3D, Ray Dream Studio, 3D Studio MAX, Softimage 3D, and Visual Reality. The Virtual Reality Modelling Language (VRML) allows the creator to specify images and the rules for their display and interaction using textual language statements.

Types of Virtual Reality Systems:

Non-Immersive (Desktop) Systems: Non-immersive systems, as the name suggests, are the least immersive implementation of VR techniques. Using the desktop system, the virtual environment (VE) is viewed through a portal or window by utilizing a standard high resolution monitor.

Semi-Immersive Projection Systems: They are relatively new implementation of VR technology and borrow considerably from technologies developed in the flight simulation field. A semi-immersive system will comprise a relatively high performance graphics computing system which can be coupled with either a large screen projector system, multiple television projection system.

Fully Immersive Head-Mounted Display Systems: All fully immersive systems will give a sense of presence that cannot be equaled by the other approaches discussed earlier, but the sense of immersion depends on several parameters including the field of view of the HMD, the resolution, the update rate, and contrast and illumination of the display.

Applications of Virtual Reality Systems:

Virtual reality is considered to have wide ranging benefits for the healthcare sector. But, it can be used in other sectors like Education, Engineering, Entertainment, Construction and Military.

Virtual Reality in Healthcare

1. Human simulation software

One example of this is the HumanSim system which enables doctors, nurses and other medical personnel to interact with others in an interactive environment. They engage in training scenarios in which they have to interact with a patient but within a 3D environment only. This is an

immersive experience which measures the participant's emotions via a series of sensors.

2. Virtual reality diagnostics

Virtual reality is often used as a diagnostic tool in that it enables doctors to arrive at a diagnosis in conjunction with other methods such as MRI scans. This removes the need for invasive procedures or surgery.

3. Virtual robotic surgery

A popular use of this technology is in robotic surgery. This is where surgery is performed by means of a robotic device – controlled by a human surgeon, which reduces time and risk of complications. Virtual reality has been also been used for training purposes and, in the field of remote telesurgery in which surgery is performed by the surgeon at a separate location to the patient.

Virtual Reality and Education

1. Collaboration in virtual reality classroom fosters social integration of learners

Virtual reality technology is apt to students with different needs and learning styles, according to the teachers at pilot schools. Also it gives a lot of opportunities for group work and peer teaching.

2. Not possible in reality is possible in virtual reality

Virtual immersive environment lets students experience any sphere of professional and life application yet at the learning stage.

3. Virtual game-based experience increases students motivation

Students need inspiration and encouragement to keep exploring the potential of education for their own capabilities. Engagement that virtual reality can produce will eventually veer student's desire for exploration more toward intellect and away from play.

4. Virtual reality introduces new approach to rewards

Assessment of academic achievements and students' progress reports have been used in education for centuries. However, virtual reality is going to transform the traditional concept of incentives in the learning process.

5. Virtual platforms and headsets are the new tools for inspiring creative learning

Virtual reality technology creates the world of imagination, which is capable of breaking the boundaries in traditional education. However, its adoption requires not only time and effort, but thoroughly elaborated methods to adjust the technology for the learning purposes.

Virtual Reality in Engineering

1. Virtual reality and the design cycle

Virtual reality can be used from the start of the design lifecycle. That is the initial concept through to the build and implementation stages. This is reviewed at stages to check for faults, structural weaknesses and other design issues.

2. Virtual reality and rail construction

Virtual reality engineering is employed by Balfour Beatty Rail, a rail infrastructure contractor who includes this as part of their design process. It is used for planning, prototyping and construction purposes, and helps with project realisation.

3. Virtual reality and car design

Car manufacturers use virtual reality for prototyping purposes during the design process. This enables them to produce several versions which are then tested and changed as per the results. This removes the need to build a physical prototype and speeds up the development stage. The result is a cost effective streamlined process.

Virtual Reality in Entertainment:

The entertainment industry is one of the most enthusiastic advocates of virtual reality, most noticeably in games and virtual worlds. But other equally popular areas include:

- Virtual Museums, e.g. interactive exhibitions.
- Galleries.
- Theatre, e.g. interactive performances.
- Virtual theme parks.
- Discovery centres.

Many of these areas fall into the category 'edutainment' in which the aim is to educate as well as entertain.

Virtual Reality in Construction

Virtual reality can be extremely useful in the construction industry, which is often known as having a very high amount of inefficiency and low profit margins. Using a virtual environment, an organisation can not only render the resulting structure in 3D but also experience them as they would in the real world.

1. Viability

One important factor that needs to be thoroughly tested is the viability of an architectural design. For many years, human judgement and scale models were the only methods to determine whether a structure was viable or not. As we know, human judgement can be highly, and sometimes intentionally, erroneous and scale models cannot fully simulate the environment the structure must withstand.

2. Virtually Exploring the Design

Not only can the viability of a building be tested before it's built, construction workers and employees can actually explore it. Feedback about a design from this is phenomenal, being able to pick up even small details such as whether a worker can fit in within a space.

3. Simulated Construction

Furthermore, the construction of a building can be simulated in virtual reality as it would in its normal environment. This allows an organisation to fine-tune construction processes for maximum efficiency and a minimum amount of change.

Virtual Reality in Military: This includes all three services (army, navy and air force) – where it is used for training purposes. This is particularly useful for

training soldiers for combat situations or other dangerous settings where they have to learn how to react in an appropriate manner. A virtual reality simulation enables them to do so but without the risk of death or a serious injury. They can re-enact a particular scenario, for example engagement with an enemy in an environment in which they experience this but without the real world risks. This has proven to be safer and less costly than traditional training methods.

Military uses of virtual reality

- Flight simulation
- Battlefield simulation
- Medic training (battlefield)
- Vehicle simulation
- Virtual boot camp

Conclusion:

"What is real? How do you define real? If you're talking about what you can hear, what you can smell, taste and feel, then real is simply electrical signals interpreted by your brain" Says Morpheus. Everything we experience in life can be reduced to electrical activity stimulating our brains as our sensory organs deliver information about the external world. This interpretation is what we consider to be "reality." In this sense, **the brain is reality.** Everything you see, hear, feel, taste and smell is an interpretation of what's *outside*, and created entirely *inside* your head. We tend to believe that this interpretation matches very closely to the external world. Virtual Reality is a way for humans to visualize, manipulate and interact with computers and extremely complex data.

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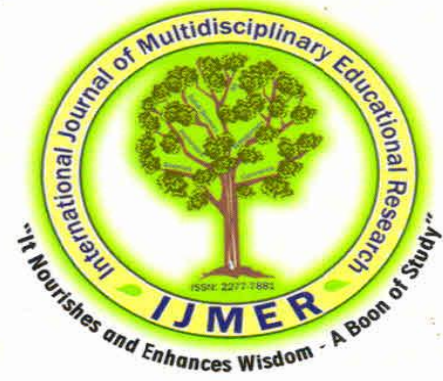
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AN EFFICIENT WEB PREPROCESSING METHODS

F. Amul Mary

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JMJ College for Women (A)
Andhra Pradesh, Tenali

INTRODUCTION

With the rapid development of Internet, web-sites and web applications are getting more and more important in people's daily life. Web log mining is the technology to find out the hidden user patterns by analysis the information that include in web logs. So that capability, structure and individual functions can be optimized and provided by using this statistics.

There are three ways to record user visit information: Web Server, Web Proxy Server and User Client. In the web server logs, one web-site's visit information of multi users is recorded. In the web proxy server logs, multi web-sites' visit information of multi users is recorded. In the client logs, multi website's visit information of one user is recorded.

During above three logs, the first and the second ones are recorded automatically, and the third one should be recorded by appropriate software. Generally speaking, web server log has the highest structured form. We pay special attention to the web server logs, through the research and analysis of web server logs; the pages which are outlying, but related actually are discovered in order to optimize web-sites structure in a more reasonable way. And these mining statistics are finally used to establish fast and direct information channels.

World Wide Web is a global village and rich source of information. Day by day number of web sites and its users are



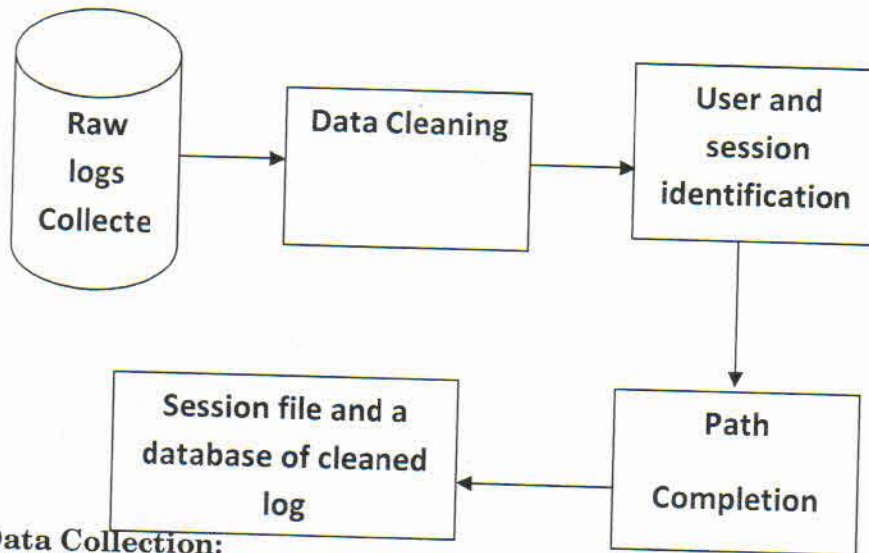
increasing rapidly. While surfing the web sites, users' interactions with web sites are recorded in web log file.

Web mining involves a wide range of applications which aim to discover and extract knowledge from data. Web mining also provides an important mechanism to make data access more efficient and adequate to users. In web usage (log files) mining, for instance, the main task is to discover the activities (preferences) of the users while they are browsing and navigating through the web. The goal of understanding the preferences of the users is to enhance the quality of the service and to personalize this service. In this area of data mining, several techniques can be applied such as classification and clustering. The main aim of clustering algorithms, for instance, is to use attribute information to group instances (records) that have similar attribute values.

Web usage mining is the automatic discovery of user access patterns from Web servers. Organizations collect large volumes of data in their daily operations, generated automatically by Web servers and collected in server access logs.

Data Preprocessing Steps:

Data preprocessing is a significant step in web usage mining which often consumes more time and effort. This starts with data preparation stage where the original data will be integrated and transformed into a suitable form on which specific data mining operations can be applied. It's shown below.



Data Collection:

There are three main sources to get the raw web log file such as

- 1) Client Log File
- 2) Proxy Log File
- 3) Server Log File.

Client log files are most authentic and accurate to depict the user behavior but it is difficult task to modify the browser for each client and requires users' essence and collaboration as well. It is in the form of one-to-many relationships of client and web sites visited by that particular user. Proxy log file is also used to capture user access data.

Proxy server log files are most complex and more vulnerable to user access data in log file. To unleash the true picture of user behavior is difficult. Same IP address is used by many users but on the other hand we can have unique user login. Proxy server is in many-to-many relationships. One user can access many sites and many users can visit one site. To capture the real user and users' browsing behavior is difficult.



Server log files are in relationship of many to one. Many users may visit one web site and user behavior about that particular web site can be captured accordingly. In this survey, we observed that most of the researcher considered web server log file as most reliable and accurate for WUM process.

If at all there are multiple weblog files, they should be converted into a joint weblog file. This joint file will undergo further operations. In this paper a server log file of 7.8 MB is considered for the purpose of analysis.

Data Cleaning:

The first step of preprocessing is data cleaning. It is usually site specific, and involves tasks such as, removing extraneous references to embedded objects that may not be important for the purpose of analysis, including references to style files, graphics, or sound files as shown in Table 1. The cleansing process also may involve the removal of at least some of the data fields (e.g. number of bytes transferred or version of 11 protocol used, etc.) that may not provide useful information in the analysis or data mining tasks.

User Identification

The task of User Identification is, to identify who access web site and which pages are accessed. The analysis of Web usage does not require knowledge about a user's identity. However, it is necessary to distinguish among different users. Since a user may visit a site more than once, the server logs record multiple sessions for each user. The user activity record is used to refer to the sequence of logged activities belonging to the same user.

Session Ordering

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sites without the benefit of additional authentication information from users and without mechanisms such as embedded session ids must rely on heuristic methods for Sessionization. The goal of a Sessionization heuristic is to reconstruct, from the click stream data, the actual sequence of actions performed by one user during one visit to the site.

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DEPARTMENT OF PHYSICAL EDUCATION

50.Published a paper titled “*EFFECT OF LOW MEDIUM AND HIGH INTENSITY PLYOMETRIC TRAINING ON SELECTED PHYSIOLOGICAL VARIABLES ON COLLEGE MEN STUDENTS*” in the National Seminar Book titled Fitness & Wellness Through Sports with ISBN 2455-0418



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EFFECT OF LOW, MEDIUM AND HIGH INTENSITY PLYOMETRIC TRAINING ON SELECTED PHYSIOLOGICAL VARIABLES ON COLLEGE MEN STUDENTS

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INTRODUCTION

The science of sports training is a recent to the field of sports science. The sports science disciplines have improved at a very fast pace in the past few decades. The knowledge gained by these disciplines has to be understood by the coaches and trainers to apply it correctly to the training process. But majority of the coaches do not have sufficient scientific background and training to make full and effective use of the knowledge acquired by the sports science disciplines. This creates a gap between scientists and coaches. The science of training with its workers having sufficient background of science and sports are able to fill this gap and can become mediator between the scientists and the coaches.

According to Hardayal Singh (1991), Sports Training is a pedagogical process based on scientific principles, aiming at preparing sportsmen for higher performance in sports competition.

PHYSIOLOGY

Physiology is the science of functioning of all the organs and systems of an organism. For the physiological system of the body to be fit, they must function well enough to support to specific activity that the individual is performing more over different activities make different demands upon the organism with respect to circulatory, respiratory, metabolic and neurologic process which are specific to the activity.

In physiology, one learn how the organs, systems, tissues, cells and molecules within cells work and how their functions are put together to maintain the internal environment. Physiology is the science dealing with the study of human body functions. Exercise physiology is the study of how body's structures and functions are changed as a result of exercise. It applies the concept of exercise physiology to training the athlete and enhancing the athlete's sports performance (Ajmer Singh, 2005).

Breath Holding Time

Breath holding time is defined as the duration of time through which one can hold his / her breath without inhaling and exhaling after a deep inhalation.

There are two types of breath holding time:

- ✓ Positive Breath holding time
- ✓ Negative Breath holding time

Endurance type of training will improve the breath holding time. Breath holding time also plays a vital role in the sports performance (P.J. Strukic, 1981).

STATEMENT OF THE PROBLEM

The purpose of this study was to find out the effect of low, medium and high intensity on plyometric training on selected physiological variables (Breath holding time) of college men students.

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LIMITATIONS

- I. Heredity, which contributes to both physical and mental efficiency, will not be controlled.
- II. Diet of the subject, general activity, motivation of the subjects is beyond the control of the researcher.
- III. Practice sessions are not taken in to consideration.
- IV. Academic pressure, like coaching class is not taken in to consideration.
- V. Certain factors like food habits, life style, daily routine, climatic conditions and the environmental factors which may have an effect on this study were not taken into consideration while interpreting the results.

DELIMITATIONS

The study was delimited among college men students randomly selected from different colleges in Guntur, Andhra Pradesh.

This research conducted among 80 college men students in the age group of 19 to 25 years.

The intensities of plyometric training selected were, low intensity, medium intensity and high intensity plyometric exercises.

This study was delimited to the following physiological variable.

Physiological Variables--: Breathing Hold Time

METHODOLOGY

The selection of subjects, selection of variables, orientation of subjects, reliability of instruments, competency of tester, reliability of data, test administration, experimental design and the statistical procedure used have been explained.

SELECTION OF SUBJECTS

To facilitate the study, 80 male students from the different colleges of Guntur, Andhra Pradesh were randomly selected as subjects and their age ranged between 19-25 years. The varied intensities selected for the study were, low intensity, medium intensity and high intensity. The subjects were divided into four groups namely low intensity Plyometric training group (LPTG), Medium intensity Plyometric training group (MPTG), High intensity Plyometric training (HPTG) and control group (CG), on random basis.

Before the commencement of the training, purpose of the study and method of performing varied intensities of Plyometric training exercises were explained to the subjects for their cooperation and to avoid injuries.

SELECTION OF VARIABLES

The researcher reviewed the various scientific literatures pertaining to varied intensities of Plyometric training on selected physiological, psychological variables (**Breath holding time**) from books, journals, and research papers. Taking into consideration, the feasibility and availability of instruments the following variables were selected.

DEPENDENT VARIABLES--:Physiological Variables

1. Breathing Hold Time
2. Independent variables
 - A. Low Intensity Plyometric Training (LPTG) for 12 weeks
 - B. Medium Intensity Plyometric Training (MPTG) for 12 weeks
 - C. High Intensity Plyometric Training (HPTG) for 12 weeks

EXPERIMENTAL DESIGN

The study was formulated as a true random group design consisting of a pre-test and post test. The subjects (N=80) were randomly assigned to four equal groups of twenty male students. The groups were



designed as experimental group I = low intensity plyometric training group (LPTG), experimental group II = medium intensity plyometric training group (MPTG), experimental group III = high intensity plyometric training group (HPTG) and control group (CG) respectively. Pre test was conducted for all the 50 subjects on selected physiological variables (such as breath holding time). The experimental groups (low, medium and high intensity plyometric training) participated in respective training for a period of twelve weeks. The control group did not participate in any of the training programmes. The post test was conducted on the above said dependent variables after an experimental period for all the four groups. The differences between initial and final mean scores of the groups was the effect of respective experimental treatment on the subjects. The differences in the mean scores were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was used to test the hypothesis of the study.

Breath Holding Time

Breath holding time is defined as the duration of time through which one can hold his breath without the study of all living things (Laurence E. Morehouse and Augustus L. Miller, 1967).

RESULTS ON BREATH HOLDING TIME

The descriptive statistics comparing the initial and final means of physiological variable Breath Holding Time due to low intensity plyometrics, medium intensity plyometrics, high intensity plyometrics and control groups of college men students is presented in Table I.

Descriptive Statistics on Low Intensity Plyometrics, Medium Intensity Plyometrics, High Intensity Plyometrics and Control Groups

Groups	Test	Mean	Standard Deviation	RANGE	
				Min.	Max.
Low intensity plyometrics	Initial	43.3	8.53	28.00	58.00
	Final	52.70	7.97	39.00	65.00
	Adjusted Mean	51.59			
Medium intensity plyometrics	Initial	42.8	8.19	0.00	57.00
	Final	50.90	8.80	35.00	65.00
	Adjusted Mean	50.26			
High Intensity Plyometrics	Initial	40.15	8.03	28.00	58.00
	Final	49.80	7.40	39.00	65.00
	Adjusted Mean	51.60			
Control Group	Initial	42.15	2.96	37.00	48.00
	Final	41.30	2.47	38.00	48.00
	Adjusted Mean	41.25			

Table I shows that pre-test mean on Breath Holding Time of low intensity plyometrics group was 43.3 with standard deviation ± 8.53 pre-test mean of medium intensity plyometrics training group was 42.8 with standard deviation ± 8.19 . The pre-test mean of high intensity plyometrics group was 40.15 with standard deviation ± 8.03 , the pre-test mean of control group was 42.15 with standard deviation ± 2.96 . The descriptive statistics on post-test mean on Breath Holding Time of low intensity plyometrics group was 52.70 with standard deviation ± 7.97

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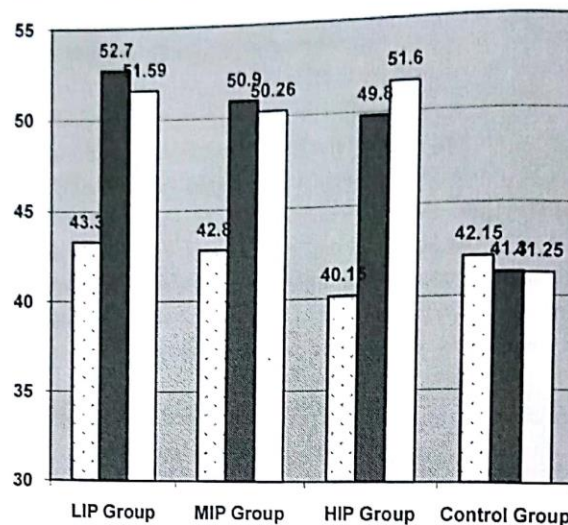
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post-test mean of medium intensity plyometrics training group was 50.90 with standard deviation on ± 8.80 . The post-test mean of high intensity plyometrics group was 49.80 with standard deviation on ± 8.80 , the post-test mean of control group was 41.30 with standard deviation on ± 2.47 . The adjusted mean on Breath Holding Time on low intensity plyometrics group was 51.59, medium intensity plyometrics training group was 50.26, high intensity plyometrics group was 51.60 and control group was 41.25, as shown in Table I. The obtained mean values on the experimental and control groups were presented in Figure-1.

BAR DIAGRAM SHOWING PRE, POST AND ADJUSTED MEANS ON BREATH HOLDING TIME



LIP: Low Intensity Plyometrics

MIP: Medium Intensity Plyometrics

HIP: High Intensity Plyometrics

The results on descriptive statistics proved that physiological variable Breath Holding Time was improved. And to test statistical significance of the differences, the obtained data on Breath Holding Time using ANCOVA was presented in Table II.

COMPUTATION OF ANALYSIS OF COVARIANCE DUE TO LOW, MEDIUM AND HIGH INTENSITY PLYOMETRICS AND CONTROL GROUP ON BREATH HOLDING TIME

	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre-Test Mean	Between	114.70	3	38.23	0.72
	Within	4050.5	76	53.3	
Post-Test Mean	Between	1536.15	3	512.05	10.15*
	Within	3833.40	76	50.44	
Adjusted Post-Test Mean	Between	1492.33	3	497.44	94.09*
	Within	396.51	75	5.29	

Required $F_{(0.05), (df 3, 75)} = 2.77$

* Significant at 0.05 level of confidence

As shown in Table II, the obtained F-ratio of 0.72 on pre-test means of the groups was not significant at 0.05 level as the obtained F-value was less than the required table F-value of 2.77 to be significant at 0.05 level. This

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shows that there was no significant difference in means of the groups at initial stage. The results presented in Table II, the obtained F-ratio of 10.15 on post-test means of the groups was significant at 0.05 level as the obtained F-value was greater than the required table F-value of 2.77 to be significant at 0.05 level. This shows that there was significant difference in means of the groups at initial stage. Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and analysis of covariance was done. The obtained F-value on adjusted means was 94.09. The obtained F-value was greater than the required value of 2.77 and hence, it was accepted that there were significant differences among the adjusted means on the Breath Holding Time of the subjects. Since significant improvements were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table III. Multiple Comparisons between Low Intensity, Medium intensity, High Intensity Plyometrics and Control Groups and Scheffe's Post Hoc

Analysis on Breath Holding Time

Low intensity plyometrics Group	Medium intensity plyometrics Group	High Intensity Plyometrics Group	Control Group	Mean Difference	C.I.
51.59	50.26			1.34	2.08
51.59		51.60		0.01	2.08
51.59			41.25	10.34*	2.08
	50.26	51.60		1.34	2.08
	50.26		41.25	9.00*	2.08
		51.60	41.25	10.34*	2.08

* Significant at 0.05 level.

The post-hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence, the required confidence interval was 2.08. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Low intensity plyometrics Vs. Control Groups (MD: 10.34). Medium intensity plyometrics Vs. Control Groups (MD: 9.00). High Intensity plyometrics Vs. Control Groups (MD: 10.34). The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level. Low intensity plyometrics Vs. Medium intensity plyometrics Groups (MD: 1.34) Low intensity plyometrics Vs. High Intensity Plyometrics Groups (MD: 0.01). Medium intensity plyometrics Vs. High Intensity Plyometrics Group (MD: -1.34).

DISCUSSIONS ON RESULTS

Discussion on the Results on Physiological Variables

Plyometrics is a common training methodology used by competitive athletes to develop speed and power. Jumping, bounding, skipping, throwing, or basically any recoil movement which ballistically stretches muscles are characteristic of plyometric drills and are characteristic of motions found in virtually every sport. The acquisition of a more rapid and forceful contraction is the fundamental basis for engaging in plyometrics training. As with most forms of exercises there are varying degrees of difficulty or intensity. And these intensities play vital role in modifying the effects on the players' physiological variables, such as, breath holding time.

The results presented in Table- I proved there were mean differences due to low, medium and high intensity plyometric training among college men students on breath holding time. Table II proved that these differences were significant at 0.05 level as the obtained F-value on adjusted means was greater than the required table F-value to be significant. Table III proved those low, medium and high intensities of plyometric



groups significantly better than control group. However, comparing between treatment groups, there were no significant differences.

Athletes devote a lot of time to the weight room during the off-season and pre-season for the purpose of developing a strength base. This has been recommended not only for the rigors of sport (Ebben, W.P. 1998), but also for safe engagement in plyometric drills. The ballistic nature of plyometric drills can be quite taxing on the musculoskeletal system. Muscles used during plyometrics are rapidly lengthened and shortened leading to another name for plyometric drills: stretch-shortening cycle (SSC) exercises (Wilson, G.J., Elliott, B.C. and Wood, G.A. 1991).

The findings of this study are in agreement with the theoretical foundations of the above studies, as it was found that different intensities of plyometric training has different effects on selected physiological variables of college men students.

DISCUSSIONS ON HYPOTHESES

1. It is hypothesised that there will be significant differences due to low, medium and intensity of plyometric training on selected physiological variables, breath-holding time among college men students.
2. It is hypothesised that comparing among the treatment groups, there will be significant differences on selected physiological variables among college men students.
3. The results on physiological variables, breath holding time, presented in Tables II proved that there was significant differences due to low, medium and high intensity. Plyometric training comparing to control group on breath holding time, as the obtained F-values were greater than the required table F-value to be significant at 0.05 level. The formulated hypothesis No. 1 that there will be significant differences due to low, medium and intensity of plyometric training on selected physiological variables, breath holding time, among college men students was accepted at 0.05 level.
4. The post-hoc analysis results on physiological variables, Tables 4.6, on breath holding time, proved that there was no significant differences among treatment groups on Breath holding time the formulated hypothesis that comparing among the treatment groups, there will be significant differences on selected physiological variables among college men students was rejected at 0.05 level. However, as for vital capacity, it was found that high intensity plyometric training was found to be better than low intensity plyometric training and the formulated hypothesis No. 3 was accepted at 0.05 level to this extent.

CONCLUSIONS

It was concluded that low, medium and high intensity plyometric training significantly altered physiological variables, breath holding time of the college men students. And it was also found there was no significant difference between treatment groups.

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