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Research Article

Prevalence of Lamin A (*LMNA*) gene mutations and SNPs in Limb girdle muscular dystrophy patients in Indian populations

¹ N.Gayathri and ²Dr.Veena.K.Parnaik

¹ Assistant professor, Department of Biotechnology, Srimad Andavan arts and Science College, Trichy-5.

² Scientist G, Centre for Cellular and Molecular Biology (CCMB).Hyderabad-500007

Abstract

Lamin proteins A and C are major structural and functional components of the nuclear lamina. Mutations in *LMNA* gene leading to Limb girdle muscular dystrophy (LGMD1B) show an autosomal dominant pattern of inheritance and are characterized by proximal muscular dystrophy with muscle weakness that is greater in the legs than in the arms. The aim of this study was to perform a mutational analysis of *LMNA* gene in limb girdle muscular dystrophy patients and their close relatives and to estimate frequencies of the novel and reported mutations and SNPs in *LMNA* gene in Indian population. After the genomic DNA extraction, PCR has been done with 12 exon specific primers following purification of the PCR product and dye terminator cycle sequencing. The result of the study shows that around four single single nucleotide polymorphisms were detected in *LMNA* gene from 34 patients and 34 control samples, who were the close relatives of the patients. Two SNPs (c.639+56G>T AND c.639+73 C>T) were found in intron 3 in the same control sample no.13.SNP in exon 5(c.861T>C) was found in three samples of which one was found to be patient sample and other two were control samples. One patient sample showed a SNP (3'UTRc.79G>C) in 3'UTR.As observed from lamin A/C SNP database These SNPs have been previously reported as synonymous single nucleotide polymorphism (sSNP) and not as *LMNA* gene mutation. There is no *LMNA* gene mutation among the LGMD patient samples from the present study. Thus the present study shows no *LMNA* gene mutation

among the LGMD patient samples. However, large population-based screening of *LMNA* gene mutations is important in further characterizing the genetic epidemiology of *LMNA*.

Key words-*LaminA/C, LMNA gene, Limb girdle muscular dystrophy, mutation, SNP*

Introduction

Lamins are the major structural components of the nuclear lamina that lines the nucleoplasmic face of the inner nuclear membrane, and are also present interior of the nucleus as constituents of the nucleoskeletal framework(7)(4). The nuclear lamina plays an important role in maintaining the integrity of the nuclear envelope and provides anchorage to the chromatin. Vertebrate lamins are broadly classified as A and B type lamins. A-type lamins, A, C, C2 are differentially spliced product of Lamin A (*LMNA*) gene (3) (6). Genetic studies have linked several *LMNA* mutations to different genetic disorders mainly affecting skeletal and cardiac muscles as well as adipose tissue and peripheral neurons leading to Autosomal dominant Emery Dreiffus muscular dystrophy, Limb girdle muscular dystrophy, Dunnigan-type familial partial lipodystrophy and peripheral neuropathy and they are commonly termed as laminopathies(8). Among the laminopathies Limb girdle muscular dystrophy (LGMD1B) is relatively common. Limb girdle muscular dystrophy constitutes a diverse group of genetically determined, progressive disorder of muscles, in which the pelvic or shoulder musculature is primarily involved (1). Generally limb girdle muscular dystrophy is caused by mutation in many genes which are normally involved in the functioning of skeletal muscles (2). There are atleast 15 different types of LGMD each having different range of symptoms(5). LGMD1B is the subtype which is caused by mutation in *LMNA* gene(9). Thus *LMNA* mutations are well established as one of the cause of limb girdle muscular dystrophy, although the frequency has not been examined in patients in Indian population. The aim of this study was to perform a mutational analysis of *LMNA* gene in limb girdle muscular dystrophy patients and their close relatives and to estimate frequencies of the novel and reported mutations and SNPs in *LMNA* gene in Indian population.

2. Materials and Methods

List of chemicals and reagents

Agarose(Sigma).Ethidium bromide(sigma),Bromophenol blue, Xylene cyanol, glycerol, EDTA, Tris base, boric acid, sucrose, sodium hydroxide, SDS, Sodium perchlorate, Magnesium chloride,Tritonx100,Sodium chloride, chloroform, isoamy lalcohol, isopropanol,, phenol, sodium acetate, DNTPs (Bioserve), TaqPolymerase(Bioserve), kit-Exo-sapIT(USB),Bigdye and Buffer(Applied biosystem).

Extraction of Genomic DNA

Four volumes of red cell lysis buffer(320mM Sucrose,5mM MgCl₂,1% Triton X100,10mM Tris Hcl(pH-8) was added to blood sample, mixed gently till the solution becomes clear and centrifuged at 2500 rpm for 5 min. Nuclear lysis buffer(1/2th the volume of blood)contain 400mM Tris cl(pH-8),60mM EDTA,180mM NaCl,1%SDS was added to the pellet and mixed gently till the solution become viscous and it was followed by adding 5M Na per chlorate(1/4th volume of reagent B).Equal volume of chloroform was added and centrifuged at 2500 rpm for 5 min. Two volume of isopropanol was added to the upper clear aqueous phase to precipitate the DNA. The precipitated DNA was added to the upper clear aqueous phase to precipitate the DNA. The precipitated DNA was removed and washed twice with 70% ethanol.DNA was suspended in 100 µl of TE buffer after decanting and air drying the ethanol. This was checked on a 0.6% agarose gel

Agarose gel electrophoresis of DNA

DNA was resolved according to size on a 0.6% agarose gel made in 0.5x TBE buffer. Appropriate amount of 6x loading dye were added to the sample, the sample was loaded and was run at 5V/cm. The DNA was visualized by adding 0.5µg/ml of ethidium bromide in the agarose gel.

Quantification and dilution of DNA sample

Isolated DNA samples were quantified by spectrophotometric method, measuring O.D at 260 and 280 nm wavelength using nanodrop (Thermoscientific,USA) and then diluted accordingly to 40ng/µl

Plolymerase chain reaction

For the PCR amplification of the desired exons(exons1-12 of the LMNA gene)of the DNA samples, about 40ng of the sample was taken,1pm forward primer and 1pm of reverse primer,1X PCR buffer,5mMDNTPS and 0.5U / μ l Taq polymerase was added and made up to 10 μ L with water. This was subjected to the conditions as in Table 1 on a MJ research Peltier Thermal cycler PTC -200.The resultant products were taken and run on 1% agarose gel to check them and were stored at 4°C

Purification of PCR product

Prior to the sequencing of PCR products from above mentioned rections, the PCR samples were cleaned up by using EXO-SAP-it, which is a combination of Exonuclease-1, Shrimp alkaline phosphates to remove excess primer and DNTPs About 5 μ l of the post PCR reaction product was mixed with 1ml of EXOSAP –IT and incubate at 37°C for 15 min followed by inactivation at 80°C for 15 min. this product was used for the DNA sequencing and was stored at 4°C until required

Sequencing PCR amplification (dye terminator cycle sequencing)

In the course of a PCR reaction the product is exponentially accumulated. Sequencing reation is very similar but straight line (linear reaction, since only one primer is used, Instead of yielding in a number of nanomole, sequencing products are yielding in femtomol range. The sequencing PCR reaction utilized primer concentration of 1pm, 60ng of template DNA (Purified PCR product, Termination ready reaction kit -BIG dye and buffer from applied biosystem were combined in a 1:8 ratio and make up the reaction for 5 μ l.This mixture was subjected to the conditions as in Table 2 for sequencing PCR amplification.

Purification and precipitation of sequencing PCR reaction product

For processing, a mixture of 100% alcohol and 3Msodium acetate (pH 5.2) was prepared in the ratio of 25:1 .25 μ l of this was added to each well and the plate was left in the dark for 30 min. It was then centrifuged at 4000rpm for 20 min at 4°C. The plate was centrifuged for 12 min at 4000 rpm and the supernatant was discarded. The plate was then inverted and given a mild spin at 300 rpm to ensure the complete removal of the supernatant. The palate was air dried until the smell of alcohol could no longer be detected and 10 μ l of a 1:1 ratio of formamide and water was added to each well

Automated DNA sequencing and analyzing

This plate was now placed in the ABI PRISM 3730X DNA sequencer to undergo automated direct sequencing. The chromatograms produced were analyzed using the auto assembler programme against human LMNA reference sequence NG-008692 available at NCBI gene bank database.

3. Result

Genomic DNA samples was isolated from 34 patients and 34 controls who were their close relatives of the patients.12 exons of *LMNA* gene were amplified by using seven set of specific primer for all 64 samples. Purified PCR products were sequenced by both the forward and reverse primer and analyzed by capillary electrophoresis on ABI Prism 3730 DNA sequencer software (Gene codes, Ann Arbor). Four Single nucleotide Polymorphisms were detected in LMNA gene from the present study is mentioned in Table 3. Two SNPs (c.639+56G>T AND c.639+73 C>T were found in intron 3 in the same control.SNP in exon 5(c.861T>C) was found in three samples of which one was found to be patient sample and other two were control samples. One patient sample showed a SNP (3'UTRc.79G>C) in 3'UTR.As observed from lamin A/C SNP database (<http://www.dmd.nl/lmna-seqvar.html>).These SNPs have been previously reported as synonymous single nucleotide polymorphism (sSNP) and not as LMNA gene mutation. There is no LMNA gene mutation among the LGMD patient samples from the present study.

Table-1: Conditions used for PCR amplification

Process	Temperature/time	cycles
Initial denaturation	4 min at 94	1
denaturation	1 min at 94	35
Primer annealing	45 sec at 65	
extension	1min 30 Sec at 72	
Final extension	10 min at 72	1

Table-2: Conditions used for sequencing PCR amplification

Process	Temperature/time	cycles
Initial denaturation	42min at 96	1
denaturation	15 sec at 96	25
Primer annealing	10 sec at 50	
extension	4min at 60	
No Final extension required		

Table-3: Polymorphism identified in the present study

Sample No.	Position	Nucleotide change	Aminoacid change(a)	Mutation(a)
13(c*)	Intron3	c.639+56G>T	No	No
13(c*)	Intron3	c.639+73 C>T	No	No
60(p*),20(c*),13 c*)	Exon 5	c.861T>C	No	No
60(p*),	3'UTR	c.79G>C	No	No

A=reported in Lamin A/C database (<http://www.dmd.nl/lmna-seqvar.html>)

(c*)=Healthy control, p*=LGMD patient

4. Conclusion

There are four SNPs were identified from the present study. As observed from lamin A/C SNP database, These SNPs have been previously reported as synonymous single nucleotide polymorphism (sSNP) and not as LMNA gene mutation. Thus the present study shows no LMNA gene mutation among the LGMD patient samples. However, large population –based screening of LMNA gene mutations is important in further characterizing the genetic epidemiology of LMNA.

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FUNGITOXIC PROPERTIES OF SOME LEAF EXTRACTS AGAINST *RHIZOCTONIA SOLANI*

Balamurugan, S

Botany Wing (DDE), Division of Herbal Science, Annamalai University, Annamalai Nagar – 608002,
Tamilnadu – India

E- Mail: drbalu2011@gmail.com

Abstract

The antifungal activities of aqueous and alcoholic extracts of *Citrus aurantifolia*, *Murraya koenigii*, *Lawsonia inermis*, *Oscimum sanctum*, *Datura metel*, *Adhatoda vasica* and *Nerium indicum* to determine their effects against *Rhizoctonia solani*. Out of seven plants 15% alcoholic extract of *Murraya koenigii*, and *Lawsonia inermis* were found that inhibitory for the growth of *Rhizoctonia solani*. The alcoholic extract of all the seven plants showed significant result as compared to aqueous extracts. The present study showed that extract from leaves of different plants vary in their effect on growth of *Rhizoctonia solani*. It is concluded that crude aqueous and alcoholic extract of *Murraya koenigii* and *Citrus aurantifolia* exhibit strong fungi toxicity against *Rhizoctonia solani*.

Key Words: *Rhizoctonia solani*, fungitoxicity, medicinal plants

1. INTRODUCTION

Plants are the richest source of drugs of traditional systems of medicine, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs (Hammer *et al.*, 1999). Nature has bestowed on us very rich botanical wealth and a large number of diverse types of plants grow in different parts of the country, Swaminathan (1978) found that green plants are reservoir of biotoxins and inexhaustible source of number of pesticides. Kumar *et al.*, (1995) found that in comparison to synthetic compound, the pesticidal compounds of plant origin are more effective and have little or no side effects on human beings. Similarly, Hooda and Srivastava (1998) have mentioned that natural fungicides are free from environmental toxicity as compared to synthetic compound, natural

compounds are less toxicity, easily biodegradable and more systematic (Saxena *et al.*, 2005). The extensive use of agrochemicals especially fungicides, which leads more carcinogenic risk than other pesticides which may give rise to undearable biological effects on animals and human beings (Badar *et al.*, 2012).

Gaikwad *et al.*, (2012) reported that crude extract of *Jatropha* species proved to be inhibitory against plant pathogenic fungi. Therefore, the development of biopesticides has been focused as a viable pest control strategy in recent years. One of the source of potential new pesticides in natural products produced by plants. Therefore, in recent years attention has been paid by various researchers towards the screening of some higher plants for their fungitoxic properties. Allelopathic agents encompass a wide array of chemical types, including volatile mono and ses qui terpenoids, phenyl propanoids, quinines, coumarins, flavonoids, tannins and other phenolics and cyanogenic glycosides. In the present study, the effect of aqueous and alcoholic extracts at three concentrations (5, 10 and 15%) *Citrus aurantifolia*, *Murraya koenigii*, *Lawsonia inermis*, *Oscimum sanctum*, *Datura metel*, *Adhatoda vasica* and *Nerium indicum* were used to test the antifungal properties against soil borne fungus *Rhizoctonia solani*.

2. MATERIALS AND METHODS

Isolation of *Rhizoctonia solani*

A virulent strain of *Rhizoctonia solani* was isolated from root rot infected *Lycopersicon esculentum* Mill roots were collected from Department of Plant Pathology, Faculty of Agriculture, Annamalai University, Annamalai nagar. Axenic culture of the pathogen was obtained by single hyphal tip method and maintained on Czapek dox Agar slants for further experiments (Jha, 1993).



Fig 1 Root rot of *Lycopersicon esculentum*



Fig 2 Culture of *Rhizoctonia solani*

Preparation of Aqueous and Alcoholic Extracts

The present study, seven common and easily available plants like *Citrus aurantifolia*, *Murraya koenigii*, *Lawsonia inermis*, *Oscimum sanctum*, *Datura metel*, *Adhatoda vasica* and *Nerium indicum* were selected. Their identification were confirmed using the “Flora of the presidency of Madras” Gamble, (1954). The leaves of the plants were collected separately, surface sterilized with 0.1% HgCl₂ and washed repeatedly with sterile distilled water for several times and kept for drying in hot air oven (Metalab) at 60°C temperature for 48 Hrs. After drying, the leaves were preserved separately in polythene bags at room temperature. The dried leaves of selected plants were crushed separately into fine powder with the help of electrical blender (Remi), 5, 10 and 15g each of the plants was dissolved separately in 100ml sterilized hot distilled water and filtered through Whatman No. 1 filter paper.

For alcoholic extract 5, 10 and 15grams of each shade dried medicinal plant material, were cut into small pieces and then macerated by electrical blender (1-2 mm) separately and the powder produced was blended in organic solvent i.e. alcohol (1:10 w/v). Then they were extracted under cold water conditions for 24Hrs. The resultant extract was filtered through a glass wool filter and then rinsed with a small quantity (about 30 ml) of 96% alcohol. The extracts solutions were evaporated under reduced pressure at 40°C. Subsequently, the extracts were diluted by distilled water and stored in the deep freezer at 10°C (Telang & Baig, 2010).

Evaluation of plant extracts against *Rhizoctonia solani*

The effect of plant extracts on dry weight of *Rhizoctonia solani* was determined by poison food technique as described by (Kekuda *et al.*, 2010).

3. RESULTS AND DISCUSSION

The effect of leaf extracts on mycelia dry weight at different concentrations shown in the growth of fungal pathogen decreased progressively with in concentration of leaf extracts. It was observed that at 15% concentration of leaf extract of *Citrus aurantifolia* and *Murraya koenigi* maximum reduction of fungal growth could be possible. At 15% aqueous leaf extract of *Murraya koenigii* (75mg) and *Citrus aurantifolia* (80mg), 15% alcoholic extract of *Citrus aurantifolia* (45mg) and *Osimum sanctum* (50mg) significantly reduced mycelial dry weight. The highest reduction in mycelial dry weight was obtained with alcoholic extract of *Citrus aurantiflia*. The highest reduction can be attributed to the chemical constituents like glycosides,

alkaloids and flavonoides. Similarly it is recorded earlier by Okwute, (1992). It is clear from the results presented in (Table –I) that seven medicinal plants were found to be inhibitory in more or less degree in aqueous leaf extracts.

Table – I
Effect of aqueous leaf extracts of some medicinal plants against *Rhizoctonia solani*

S. No	Plant Name	Family	Mycelial dry weight (mg) at different concentrations		
			5%	10%	15%
1	<i>Citrus aurantifolia</i>	Rutaceae	170	130	80
2	<i>Murraya koenigii</i>	Rutaceae	150	120	75
3	<i>Lawsonia inermis</i>	Lythraceae	190	140	130
4	<i>Osimum sanctum</i>	Lamiaceae	170	150	100
5	<i>Datura metel</i>	Solanaceae	180	150	110
6	<i>Adhatoda vasica</i>	Acanthaceae	200	180	140
7	<i>Nerium indicum</i>	Apocynaceae	210	170	120
8	Control		400	400	400

Table – II
Effect of alcoholic leaf extracts of some medicinal plants against *Rhizoctonia solani*

Sr. No	Plant Name	Family	Mycelial dry weight (mg) at different concentrations		
			5%	10%	15%
1	<i>Citrus aurantifolia</i>	Rutaceae	140	120	45
2	<i>Murraya koenigii</i>	Rutaceae	120	100	70
3	<i>Lawsonia inermis</i>	Lythraceae	110	90	65
4	<i>Osimum sanctum</i>	Lamiaceae	110	90	50
5	<i>Datura metel</i>	Solanaceae	140	130	100
6	<i>Adhatoda vasica</i>	Acanthaceae	150	140	100
7	<i>Nerium indicum</i>	Apocynaceae	160	135	95
8	Control		400	400	400

Leaf extracts of *Osimum sanctum* was very good activity followed by aqueous extracts of *Citrus aurantifolia*. Alcoholic extract of seven medicinal plants found inhibitory in more or less degree (Table – II) at 15% alcoholic extract of *Citrus aurantifolia* and *Osimum sanctum* found good inhibitory effect against *Rhizoctonia solani* followed by *Murraya koenigii*. Various workers have screened a large number

of plants belonging to angiosperm for their fungi toxic properties. Mostly the aqueous extracts or expressed juice of plants have been used to evaluate their fungi toxicity, however some of the workers have used organic extractives (Sawant, 1999). The present study it can be concluded that leaf extract of all the seven plants possesses significant antifungal activity. The aqueous and alcoholic leaf extract have potential for control of *Rhizoctonia solani* soil - borne fungi.

4. CONCLUSION

The results of present study clearly demonstrates that aqueous and alcoholic extracts of the above mentioned 7 medicinal plants contains antifungal constituents which can be used for the eco-friendly management of the root rot disease caused by *Rhizoctonia solani*.

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IN VITRO ANTIBACTERIAL ACTIVITY OF *ECLIPTA ALBA* (L.) HASSK.

Selvamani S. and Balamurugan.S

Department of Botany, Annamalai University, Annamalai Nagar, India

s.maniphd@yahoo.com

ABSTRACT

The antibacterial activity of *Eclipta alba* against three gram positive and five gram negative bacterial strains was investigated. The fresh whole plants were collected from Chidambaram, Tamilnadu. Petroleum ether, chloroform, ethyl acetate, acetone, methanol and aqueous extracts at different concentrations (1, 2, 5, 10 mg/ml) were used to investigate the antibacterial activity. NCCL standards were strictly followed to perform antibacterial disc susceptibility test using disc diffusion method. The extracts showed varying degree of inhibitory potential against all the tested bacteria. Methanol extract of the plant had higher inhibitory action against *Staphylococcus aureus*, *Bacillus subtilis*, *Proteus mirabilis* and *Pseudomonas fluroescens*.

Key Words: *Eclipta alba*, Antibacterial activity, Methanol and Acetone extracts

1. INTRODUCTION

In the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unnani due to the adverse effects associated with synthetic drugs. Herbal drugs play an important role in health care programs especially in developing countries. Ancient Indian literature incorporates a remarkably broad definition of medicinal plants and considers all plant parts to be potential sources of medicinal substances (Shankar *et al.*, 2003). Plants have the capacity to synthesize a diverse array of chemicals. *Eclipta alba* is used as a tonic and diuretic in hepatic and spleen enlargement. It is also catarrhal jaundice and for skin diseases (Dalal *et al.*, 2010). The alcoholic extract of the plant has shown antiviral activity against Ranikhet disease virus (Khare, 2004). The plant is commonly used in hair oil all over India for healthy

black and long hair (Roy *et al.*, 2008). The fresh juice of leaves is used for increasing appetite, improving digestion (Chery, 2007) and as a mild bowel regulator. It is commonly used in viral hepatitis to promote bile flow and protect the parenchyma (Thakur and Megni, 2005) and popularly used to enhance memory and learning (Jadhav, 2009). *Eclipta alba* has a reputation as an anti-ageing agent in Ayurveda (Thakur and Mengi, 2005). The plant is used as a general tonic for debility. The source of coumestans-type compounds used in phytopharmaceutical formulations of medicines prescribed for treatment of cirrhosis of the liver and infectious hepatitis (Wanger *et al.*, 1986, Scott, 1998, Thakur and Mengi, 2005). It is widely used in India as a cholagogue and deobstruent in hepatic enlargement, for jaundice and other ailments of the liver and gall bladder (Upadhyay *et al.*, 2001, Lal *et al.*, 2010). Vedic Guard, a polyherbal formulation is a synergistic combination of 16 medicinal plant extracts contains *Eclipta alba* as a major ingredient (Razdan *et al.*, 2008). Charaka advises taking the juice of *Eclipta alba* with honey to prevent the onset of senility, and its oil as the best medicated massage oils for rejuvenation therapies. This plant is well documented and several *in vitro* and *in vivo* studies describe its anti-ageing agent and anti-hepatotoxic properties (Saxena *et al.*, 1993). The present study evaluates the potential of *Eclipta alba* extracts for their antimicrobial activity against important human pathogens.

2. MATERIALS AND METHODS

2.1 Plant Material

The whole plant of *Eclipta alba* was collected from the different places in and around area of Annamalai University, Annamalai nagar campus Chidambaram, Tamilnadu. The plant was authenticated by Dr.V.Venkatesalu, Professor and Head, Botany Wing (DDE).Where a voucher specimen was deposited.

2.2. Extraction Procedure

The plant material was washed with water and shade dried at room temperature. The dried plant materials were ground into fine powder in an electric blender and subsequently sieved for obtaining fine powder. 30 gms of the sieved powder was weighed accurately and subjected to extraction in a soxhlet apparatus at room temperature using petroleum ether, chloroform, ethyl acetate, acetone, methanol and water successively. Before extraction with the next solvent the powder was air dried to remove the adhering solvent. The extract obtained was filtered and concentrated in rotary flash evaporator. The concentrated plant extract was used for antimicrobial assays.

2.3 Test Bacteria

A total of eight bacterial species were tested in the present study. The gram positive species were *Staphylococcus aureus*, *Bacillus subtilis* and *Bacillus cereus* and gram negative species were *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas fluroescens*, *Pseudomonas aeruginosa* and *Salmonella typhi*. These pathogenic strains were obtained from the Department of Medical Microbiology, Rajah Muthaiya Medical College & Hospital, Annamalai University, Annamalai nagar. The bacterial strains were maintained on nutrient agar slants at 4°C.

2.4 Culture Media and Inoculums Preparation

Nutrient agar (Himedia, India.) were used as the bacterial culture medium in the bacterial assays. Loops full of all the bacterial cultures were inoculated in the 50 ml of sterile nutrient agar (NA) in 100 ml conical flask at 37°C for 72 hrs.

2.5 Antibacterial Activity

The extracts obtained were screened for their antibacterial activity in comparison with standard antibiotic penicillin (10 mg/mL) *in vitro* by disc diffusion method using various bacterial strains (Bauer *et al.*, 1966). The paper discs (6 mm diameter, Whatman No. 1 filter paper) containing 1.0, 2.0, 5.0, 10.0 mg/ml plant extracts were dried and placed aseptically on the agar surface with the help of a sterile forceps and paper discs were pressed slightly with the forceps to make complete contact with the surface of the medium (Sainath *et al.*, 2009). The plates were kept at room temperature for half an hour and subsequently incubated at 37°C and observed for zone of inhibition after 24 hours. The inhibition zone around each disc was measured in millimeter and the assay was carried out three times for each extract. The results were recorded by measuring the zone of growth inhibition surrounding the disc.

3. RESULTS

Eclipta alba is small branched, annual, herbaceous plant with a long history of traditional medicines for many countries, especially tropical and subtropical regions. The herb has been known for its curative properties and utilized as antimyotoxic, analgesic, antihepatotoxic, antihæmorrhagic, antihyperglycemic, antioxidant, immunomodulatory properties and it is considered as a good rejuvenator too. The antibacterial activity of the ethanolic extract of whole plant of *Eclipta alba* was studied against both gram positive, *Staphylococcus aureus*, *Bacillus subtilis* and *Bacillus cereus* and gram negative species, *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas fluroescens*, *Pseudomonas aeruginosa* and *Salmonella typhi* at 4 different concentrations (1.0, 2.0, 5.0 and 10.0 mg/ml) and the antibacterial activity was compared with that of the standard antibiotic penicillin (10 mg/mL).

The results of antibacterial screening of petroleum ether, chloroform, ethyl acetate, acetone, methanol, and water extracts of *Eclipta alba* are presented in Table 1 and 2. The results revealed variability in inhibitory concentrations of each extract against a given bacteria. Among the various extracts used, acetone extracts of *Eclipta alba* showed the highest activity (zone of inhibition 17.4 mm) against *Proteus mirabilis*. Acetone extract was appeared to be the most effective extract. None of the water extracts showed any antibacterial activity. None of the chloroform extracts was active against any of the gram positive bacteria tested. The antibacterial activity was more prominent on the gram negative bacteria than the gram positive bacteria. The mean zone of inhibition for the positive control was penicillin.

Table - 1
Antibacterial activity of extracts of *Eclipta alba* against Gram positive bacteria

Extract	Concentration of extract (mg/mL/disc)	Zone of inhibition (mm)		
		Gram positive bacteria		
		<i>Staphylococcus aureus</i>	<i>Bacillus subtilis</i>	<i>Bacillus cereus</i>
Petroleum ether	1	—	—	—
	2	8.0 ± 0.03	—	—
	5	10.3±0.05	—	—
	10	13.2±0.02	—	—
Chloroform	1	—	—	—
	2	—	—	—
	5	—	—	—
	10	—	—	—
Ethyl acetate	1	8.4±0.04	—	—
	2	10.2±0.26	—	—
	5	11.6±0.12	10.4±0.14	—
	10	13.5±0.12	13.8±0.28	—
Acetone	1	—	7.4±0.043	—
	2	—	10.2±0.39	—
	5	7.8±0.03	13.3±0.67	—
	10	9.7±0.02	16.9±0.26	10.4±0.44 13.6±0.39
Methanol	1	8.5±0.36	—	—
	2	10.6±0.38	—	—
	5	13.8±0.02	10.7±0.45	7.5±0.48
	10	16.3±0.28	12.3±0.32	9.7±0.33
Aqueous	1	—	—	—
	2	—	—	—
	5	—	—	—
	10	—	—	—

The results are mean \pm SD ($n=8$)

Table - 2
Antibacterial activity of extracts of *Eclipta alba* against Gram negative bacteria

Extract	Concentration of extract (mg/mL/disc)	Zone of inhibition (mm)				
		Gram negative bacteria				
		<i>Escherichia coli</i>	<i>Proteus mirabilis</i>	<i>Pseudomonas fluroescens</i>	<i>Pseudomonas aeruginosa</i>	<i>Salmonella typhi</i>
Petroleum ether	1	—	7.3 \pm 9.33	—	—	7.3 \pm 0.24
	2	—	9.6 \pm 0.32	9.7 \pm 0.56	—	7.7 \pm 0.46
	5	7.6 \pm 0.22	12.3 \pm 0.57	10.4 \pm 0.46	—	8.4 \pm 0.29
	10	9.2 \pm 0.26	15.4 \pm 0.79	12.6 \pm 0.26	—	9.2 \pm 0.57
Chloroform	1	—	—	7.2 \pm 0.17	—	—
	2	—	—	8.3 \pm 0.38	—	—
	5	8.3 \pm 0.18	—	12.7 \pm 0.36	7.1 \pm 0.33	—
	10	11.3 \pm 0.57	—	14.5 \pm 0.29	7.8 \pm 0.24	7.2 \pm 0.64
Ethyl acetate	1	9.2 \pm 0.54	—	—	—	—
	2	11.2 \pm 0.43	—	—	7.2 \pm 0.26	—
	5	13.0 \pm 0.79	12.2 \pm 0.45	8.4 \pm 0.59	7.8 \pm 0.17	7.1 \pm 0.75
	10	16.2 \pm 0.24	14.5 \pm 0.54	12.3 \pm 0.36	8.5 \pm 0.58	7.3 \pm 0.23
Acetone	1	—	8.3 \pm 0.22	7.5 \pm 0.68	—	—
	2	—	12.3 \pm 0.42	9.6 \pm 0.77	9.4 \pm 0.49	7.6 \pm 0.75
	5	8.2 \pm 0.66	14.3 \pm 0.53	12.3 \pm 0.19	9.3 \pm 0.39	7.9 \pm 0.38
	10	12.1 \pm 0.78	17.4 \pm 0.35	14.5 \pm 0.33	9.8 \pm 0.58	8.4 \pm 0.52
					11.8 \pm 0.23	8.8 \pm 0.69
Methanol	1	7.3 \pm 0.49	8.4 \pm 0.22	7.3 \pm 0.24	7.2 \pm 0.32	—
	2	9.4 \pm 0.18	10.5 \pm 0.55	9.4 \pm 0.44	8.2 \pm 0.52	—
	5	12.3 \pm 0.31	13.2 \pm 0.75	11.6 \pm 0.66	8.6 \pm 0.22	7.2 \pm 0.26
	10	14.0 \pm 0.22	16.2 \pm 0.82	14.5 \pm 0.29	10.6 \pm 0.12	7.8 \pm 0.14
Aqueous	1	—	—	—	—	—
	2	—	—	—	—	—
	5	—	—	—	—	—
	10	—	—	—	—	—

The results are mean \pm SD ($n=8$)

4. DISCUSSION

In this study we have demonstrated the antibacterial activity of whole plant extract of *Eclipta alba* against a wide range of various bacterial strains which include gram positive and negative bacteria with the highest antibacterial activity being demonstrated against *Proteus mirabilis*. The antibacterial activity have been screened because of its great medicinal relevance with the recent years, infections have increased to a great extent and resistant against antibiotics, become an ever increasing therapeutic problem. The presence of antimicrobial substances in higher plants is well established as they provide a source of inspiration for novel drug compounds as plants derived medicines have made significant contribution towards human health. Continued further research and exploration of plant derived antimicrobials is needed today since such principles represent the vast untapped source for medicine.

Medicinal plants are important source for the development of potential new chemotherapeutic drugs and the *in vitro* antibacterial test form the basis. The broad spectrum antibacterial activities of the plant extract, possibly due to the identified alkaloids, further confirm its use as a health remedy in folklore medicine (Doughari *et al.*,2008). The antibacterial activity of the plants may be due to the presence of various active principles in them. Plant extracts often contains polyphenols and flavonoids which could be the antimicrobial components. The bioactivity of plants extracts is attributed to phytochemical constituents. Flavonoids are a major group of phenolic compounds reported for their antiviral (Mehrangiz *et al.*,2011), antimicrobial (Mari Lysete *et al.*,2009) and spasmolytic (Julianeli *et al.*,2011) properties. Alkaloids isolated from plants are commonly found to have antimicrobial properties (Ahamed *et al.*, 2010). The antibacterial activities of these compounds might be due to their ability to complex with bacterial cell wall and therefore, inhibiting the microbial growth.

In the present study, the inhibitory action of the extract was found to increase with an increase in concentration against all bacterial strains. Similar results were obtained by different workers in various systems (Khan *et al.*, 2012 and Elumalai *et al.*, 2011)). The inhibitory effect of the extract on the growth of microorganisms could be attributed to the presence of some phytochemicals that were found present in the plant extract. The demonstration of antibacterial activity against both gram positive and gram negative bacteria by this plant may be indicative of the presence of broad spectrum antibiotic compounds (Doughari 2006 and Pandey *et al.*, 2011). The present study justifies the claimed uses of *Eclipta alba* in the traditional system of medicine to treat various infectious diseases caused by the microbes. This study encourages the cultivation of this highly valuable medicinal plant to meet the increasing demand from traditional medicinal system.

5. CONCLUSIONS:

The present investigation showed the effectiveness of crude extract of this plant against tested bacterial strains. This study further suggests the use of whole plant extract in treating diseases caused by tested microbial organisms.

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PHYSICO-CHEMICAL STUDIES DURING THE RIPENING OF THE FRUIT OF *LYCOPERSICON* *ESCULENTUM* MILL VAR. *NAVEEN*

Balamurugan.S

Botany Wing (DDE), Division of Plant Physiology, Annamalai University,
Annamalai nagar – 608002, Tamilnadu – India
E- Mail: drbalu2011@gmail.com

Abstract

A correlative study on physico-chemical changes during fruit ripening in *Lycopersicon esculentum* has been carried out. The tomato fruit was collected at its four successive stages viz. 1. Mature green, 2. Half ripened, 3. 3/4th - ripened and 4. Fully ripened for its physico-chemical analysis. The obtained result showed that with advancement of fruit maturation the amount of pigments (total carotenoids, lycopene), total sugars, reducing sugars increase significantly. While that of physio chemical studies of weight of fruit, pulp, peel and volume of fruit decrease gradually. However TSS, titrable acidity, PH, ascorbic acid, tannins as moisture of tomato fruits could be considered as maturity indices to judge the ripening stages of tomato fruits for various value added products preparation.

Keywords: *Fruit, physico-chemical, TSS, PH*

1. INTRODUCTION

Lycopersicon esculentum Mill var. *Naveen* is one of the most important and widely cultivated vegetables in India and according to (FAD, 2001) the annual production of tomato in India was 4,500 MT, there is increasing evidence that diet can play an important role in human health by providing important substances that increase the body defence system against several diseases. Tomato is a major contribution of carotenoids (especially lycopene), phenolics, vitamin C, and small amount of vitamin E in daily diet (Khachik *et al.*, 2002). Ripening stage of fruit

affects physico-chemical parameters of fruit which ultimately affects the quality of processed product prepared from them. Hence, an experiment was undertaken to study the effect of different stages of ripening on physico-chemical parameters of tomato fruits.

2. MATERIALS AND METHODS

The present investigation was conducted at the Department of Botany, Annamalai University, Annamalainagar, India during the year 2013. Well matured fruits of uniform medium size of cv. *Naveen* were collected, washed with tap water and kept in the laboratory at an ambient temperature for ripening. *Lycopersicon esculentum* fruits of different stages of ripening viz. 1. Mature green, 2. Half ripened, 3. 3/4th - ripened and 4. Fully ripened were selected and used for physico-chemical analyses. The experiment was conducted by the following complete randomized design with 4 levels of ripening stage with 5 replications. To study the physico-chemical characteristic, 10 tomato fruits from each ripening stage were randomly selected and examined individually for various physical parameters. The average of 10 fruits has been reported for each physical parameter. For chemical analysis of tomato fruit from different ripening stages was taken for estimating various chemical parameters. Moisture and TSS were estimated by the method described by (Anon, 1975). However, reducing sugar, total sugar, titratable acidity, ascorbic acid and tannin content were estimated by the methods described by (Ranganna, 1977). The PH was measured by using standard solutions of PH 4.0 and 7.0 as reference to calibrate.

3. RESULTS AND DISCUSSION

Weight of fruit and peel, weight of pulp, volume of fruit, length and diameter and colour of fruit from mature green stage to fully ripened stage of tomato fruit. The fruit weight ratio showed decreasing trend from mature green stage to fully ripened stage. This decreasing trend obtained during ripening of tomato fruit may be attributed to loss of moisture due to respiration and transpiration during ripening process. The present study of decreasing trends in weight, volume, length and diameter of fruit are supported by (Pawar, 1988) karonda fruit. Minimum weight of peel observed at fully ripened stage (4.25 g) was the impact loss of maximum moisture from skin. However, increase in gravity of fruits from 1.02 (Mature green

stage) to 1.05 (3/4th – ripened stage) during ripening indicated that, the decrease in weight of fruit was lesser than the corresponding decreasing in its volume. Similar observations have been reported by (Joshi *et al.*, 1986) for karonda fruits. The colour of the tomato fruit changed from green (Mature green stage) to red (Fully ripened stage) during ripening (Table – I).

It is observed from (Table – II) that, all the chemical parameters studied showed significant difference with respect to ripening stage of fruit, except moisture content of fruit. Total soluble solids total and reducing sugar content of tomato fruit at different stages of ripening increased significantly from Mature green stage (18.0 °Brix, 14.40 % and 8.75%) to 3/4th – ripened stage (23.56 °Brix, 17.12% and 11.08%) with slight decline at Fully ripened stage (22.60 °Brix, 18.20% and 10.11%). An increase in TSS and sugars during ripening process in tomato fruit may probably be due to accumulation of more sugars in the fruit due to hydrolysis of starch and slight decline at fully ripened stage was due to utilization of sugars during respiration process. The results of this investigation are in agreement with the results obtained by (Raut, 1999) in sapota fruit. Decrease in acidity from mature green stage (10.20%) to fully ripened stage (0.9%) observed during ripening may be attributed to the oxidation of organic acids (Hulme, 1970). The increase in PH from 4.20 to 5.30 during ripening of tomato fruit may be attributed to the decrease in acidity during ripening. Results of the present study are supported by (Paralkar, 1985) in sapota and (Pawar, 1988) in karonda fruit.

An increase in ascorbic acid content in fruit though to be indication that the fruit still in the ripening stage, while a decrease indicates a senescent fruit (Esteves *et al.*, 1984). The presence of phenolics in the fruit cells may help to maintain the ascorbic acid content. Ascorbic acid content of tomato fruit decline throughout the ripening process from 12.60mg/100g (Fully ripened stage) due to oxidative destruction during ripening (Hulme, 1970). Identical observation during ripening were also reported by (Suryanarayana and Goud., 1984) in sapota fruit. Sharp decrease in tannins was observed during ripening of tomato fruit. This may due to the fact that tannins are hydrolysed into components like sugars, acids and other compounds during ripening and also due to its oxidation by polyphenol oxidase to form colour pigment. Similar results were reported by (Swant, 1989). The moisture content of tomato fruit decreased continuously from Mature green stage (60.80%) to Fully ripened stage (52.80%). However, the results were non significant. Decline in moisture of

tomato fruit during ripening could be attributed to the loss of moisture through respiration and transpiration. Similar findings were also reported by (Raut, 1999) in sapota fruits.

Table – I

Physical parameters of *Lycopersicon esculentum* during ripening

Ripening Stages	Weight of fruit (g)	Weight of peel (g)	Weight of pulp (g)	Volume of fruit (ml)	Specific gravity	Length of fruit	Diameter of fruit	Fruit colour
Mature green	95.23	7.26	84.41	92.51	1.02	5.54	5.53	Green
Half-ripened	92.87	8.43	81.84	88.54	1.05	5.59	5.39	Greenish yellow
3/4 th – ripened	85.62	8.74	73.34	78.09	1.05	5.43	5.32	Yellowish red
Fully ripened	60.66	4.25	54.28	59.32	1.02	4.85	4.78	Completely red
S.Em ± C.D at 1%	1.65 6.78	0.39 1.57	2.18 8.73	1.41 5.78	0.01 0.03	0.25 1.07	0.19 NS	- -

Table – II

Chemical composition of *Lycopersicon esculentum* during ripening

Ripening Stages	T.S.S (°Brix)	Total sugars (%)	Reducing sugars (%)	Titrateable Acidity (%)	pH	Ascorbic acid (mg/100g)	Tannins (%)	Moisture
Mature green	18.00	15.40	8.75	0.20	4.02	12.60	0.45	60.80
Half-ripened	22.50	16.75	9.90	0.21	5.60	15.23	0.29	74.10
3/4 th – ripened	23.65	17.12	11.07	0.13	6.20	11.96	0.18	72.55
Fully ripened	23.60	18.21	10.12	0.09	6.30	7.98	0.15	52.75
S.Em± C.D at 1%	0.42 1.67	0.23 0.94	0.07 0.26	0.01 0.05	0.07 0.30	0.18 0.67	0.02 0.08	2.21 NS

4. CONCLUSION

From the present study, it is concluded that, physical parameters viz. weight of fruit, peel and pulp, volume of fruit, specific gravity, length and diameter of fruit, fruit colour and chemical parameters viz. TSS. Total and reducing sugars, titrateable acidity, PH, ascorbic acid, tannins and moisture of fruits could be considered as maturity indices the potential to extend the shelf of tomato while retaining its nutritional quality.

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The effects of N-acetyl cysteine on busulfan induced chromosomal damage in human peripheral blood lymphocytes

Authors: ¹N.Gayathri , ²Dr.K.Premkumar

¹Assistant professor, Department of Biotechnology, Srimad Andavan arts and Science College, Trichy-5.

²Assistant Professor, Department of Biomedical science, Bharathidasan University, Trichy-24

Abstract

Busulphan, is an effective anticancerous agent used in the treatment of chronic myeloid leukemia and also clinically used in bone marrow transplantation. Previous studies have shown that chromosomal aberrations have been observed in the lymphocytes of patient after 10 years on Busulphan (BUS) treatment. These conditions are arising due to increase in the oxidative stress result by the depletion of glutathione in the system, induced by the metabolism of BUS. N-Acetyl cysteine(NAC) is a powerful antioxidant stimulate the production of GSH which may protect the body against oxidative stress.NAC are increasingly used in clinical trials as chemoprotectant against various chemotherapy agents. Presently there are no numerous studies based on the protective effect of NAC against genotoxicity induced by Busulphan. Hence the aim of the study was designed to examine the effect of NAC on BUS induced DNA damage in Human peripheral blood lymphocytes. Effect of NAC has been analyzed in following six groups.

Group 1 - Normal control, **Group 2** - BUS - 5µg/mL, **Group 3**-NAC alone 10mM,**Group 4**- NAC Pretreatment at 0hrs+ BUS, **Group 5**- NAC Pretreatment at 6 hrs+ BUS, **Group 6**- NAC Pretreatment at 12 hrs+BUS. The value of mean chromosomal aberrations per cell in BUS treated was observed to be significantly higher than normal non-treated and NAC alone treated cultures. Comparing BUS alone with NAC alone and BUS+NAC combination treated cultures, NAC alone and BUS pretreated cultures shows lower and significant aberrations. This shows the NAC protects the chromosomal damage induced by BUS. The present study concluded that NAC pretreatment alters the BUS induced chromosomal damage in human peripheral blood lymphocytes. However, further studies with different time course of NAC and Busulfan needed to be performed before a definite conclusion can be made because NAC protects the busulfan induced chromosomal damage at pretreatment of 6 hours, but there is no significant difference was observed between BUS alone treated and combine treatment of BUS and NAC at 12 hrs.

Key words: *Busulphan, N-acetylcysteine, DNA damage.*

1. Introduction

Busulphan is an effective anticancerous agent used in the treatment of chronic myeloid leukemia and also used in some conditioning regimen prior to bone marrow transplantation(5). It also used to treat certain blood disorders such as polcythemia vera and myeloid metaplasia. Busulphan is known to cause DNA damage such as breaks in DNA molecule as well as cross linking twin strands, and interfere with DNA replication and transcription of RNA. Thus it is a potential antineoplastic drug which has been in clinical use since 1959. Previous studies have shown that

chromosomal aberrations have been observed in the lymphocytes of patient after 10 years on BUS treatment (4). Several reports have shown that BUS metabolized mainly through conjugation with glutathione in the system. It results in deficiency of antioxidant status and increase in the production of free radicals and reactive oxygen species. These harmful species are known to cause oxidative damage to a number of molecules in the cells, including membranes, lipids ,protein and nucleic acids. *Invitro* studies revealed that exposure to Busulphan shows DNA damage in peripheral lymphocyte culture. These conditions are arising due to increase in the oxidative stress result by the depletion of glutathione in the system induced by the metabolism of BUS. N-Acetyl cysteine.a metabolite and N-acetyl derivative of sulfur containing amino acid cysyeine.NAC readily deacetylated in cell and act as a source of cysteine and stimulate the production of GSH which may protect the body against oxidative stess and act as a powerful antioxdan(7)t. NAC use has been proposed for the treatment of a variety of diseases sharing alterations of the redox status and GSH depletion as common pathogenic determinats(6). These applications also include use of NAC as an antidote towards the toxicity of various poisons as well as towards the toxicity of anticancer drugs such as doxorubicin, cyclophosphamide and iposphamide(1)(2)(3). During the last decade, numerous *invitro* and *invivo* studies have shown that NAC has beneficial medicinal properties including inhibition of carcinogenesis, tumorogenesis and mutagenesis. Number of studies provided evidence that NAC has antigenotoxic and anticarcinogenic properties in a variety of experimental models.NAC has been employed with a number of chemotherapy agents as a means of reducing toxicity it is often used in clinical trials as an adjunct to the therapy being tested. It has been considered as a potentially

useful agent in the chemopreventive trials against many anticancerous agents. Various studies suggested that NAC was more effective against chemotherapeutic drugs induced damage by replenishment of glutathione stores as well as scavenging ROS. Some other studies shown that there are no protective effect of NAC against chemotherapy agents induced damage. As data on the subject of chemotherapy agents with NAC are currently conflicting, this might best be avoided at this time. Presently there are no numerous studies based on protective effect of NAC against genotoxicity induced by dialkylating agent such as Busulphan. Hence the present study was designed to examine effect of NAC on BUS induced DNA damage in Human peripheral blood lymphocytes culture

2. Materials and methods

Chemicals

NAC and BUS from sigma,RPMI-1640 and fetal calf serum from invitrogen,Phosphate buffered saline,Phytohaemagglutinin,colchicines,Potassium chloride,Tryphan blue,Giemsa stain from Himedia. All other chemicals are analytical grade

Dose fixation

Concentration of drugs was chosen as per previous studies. The highest non toxic level of NAC on the growth of human lymphocytes culture had been reported as 10mM.BUS suppresses the mitotic activity of human lymphocytes in PHA culture. Increasing BUS concentration, decrease in the number of mitoses. For appropriate culturing of lymphocytes, 5µg/MI has been observed as the highest concentration of BUS

Isolation of lymphocytes and cell viability

Blood samples were collected in heparinized tubes from healthy nonsmoking volunteers between 25 and 35 years. Lymphocytes were isolated from whole blood using Ficoll-Histopaque. Blood was diluted 1:1 with phosphate buffered saline (PBS) and layered onto histopaque at a ratio of 4:3(blood+PBS:Histopaque). Blood was then centrifuged at 1500rpm for 30 min at room temperature. The lymphocyte layer was removed and washed twice in PBS at 1200rpm for 10 min each, and then washed with RPMI-1640 media. A hemocytometer was used to count the number of viable cells. Typically, each culture consisted of an initial density of 0.5×10^6 cells in 1ml culture medium. The viability of the cells were evaluated by trypan blue exclusion assay and was found to be more than 90%.

Experimental design

To 0.5 ml of the lymphocytes, 5 ml culture medium supplemented with NaHCO_3 (7.5% (w/v)), 20% FCS, 200Mm-glutamine, Pencillin 100 units/ml and streptomycin $100 \mu\text{g/ml}$ were added in a 15 ml screw cap flat bottom vials. PHA –M (0.2 ml) was added to the culture to initiate cell division. Cells were incubated at 37°C in humidified 5% CO_2 atmosphere. The following Groups were considered for the experiment.

Group1-Normal control

Group 2-BUS- $5 \mu\text{g/ml}$

Group 3-NAC alone 10 mM

Group 4- NAC Pretreatment at 0hrs+ BUS

Group 5- NAC Pretreatment at 6 hrs+ BUS

Group 6- NAC Pretreatment at 12 hrs+BUS

All the pretreatment hours was calculated from the time of colchicine addition to the samples. After treatment, cells were cultured for another 24hours. Then, cells arrested in metaphase by the addition of colchicines (0.2ml of 0.01%) and incubated for final 2hr 30min.

Chromosomal aberration test:

After 72 hr incubation, cells were carefully transferred to clean centrifuge tube and centrifuged at 1200rpm for 10min. the pellet washed twice with ice cold PBS (pH7.2). To the pellet prewarmed hypotonic solution (0.075M KCL) was added and incubated at 30mins for 37°C.After incubation, centrifuged at 1000rpm for 5min, the pellet was suspended in ice cold carnoy's fixative (methanol: acetic acid in the ratio of 3:1) and incubated at 37°C.After the incubation again centrifuged at same condition and the pellet was suspended in few drops of fresh fixative and slides has been prepared.

Slide preparation:

The cell suspension was dropped on to clean, chilled microscopic slides and dried gently over a hot plate. The slides were stained with 4% Giemsa for 10mins after two or three days.

Scoring of slides:

Randomly about 50 spread metaphases from each sample were counted. Numerical and structural aberrations were recorded.

Analysis of chromosomal damage:

In order to check whether NAC mediate any protective effect against BUS induced DNA damage, lymphocyte culture treated with BUS alone, NAC alone, simultaneous treatment of

BUS and NAC and preincubation of NAC at 6 and 12 hr prior to BUS treatment were established. Chromosomal structural aberrations were scored in Giemsa chromosomal preparation.

3. Results

From the results the Table 1 shows the effects of NAC on BUS induced chromosomal aberrations in human peripheral blood lymphocytes. The value of mean chromosomal aberrations per cell in BUS(0.11 ± 0.02) treated was observed to be significantly higher than normal non-treated and NAC alone treated cultures(0.02 ± 0.01 and 0.07 ± 0.02). Comparing BUS alone with NAC alone and BUS+NAC combination treated cultures, NAC and BUS pretreated cultures shows lower and significant aberrations. This shows the NAC protects the chromosomal damage induced by BUS. However, NAC protects the busulfan induced chromosomal damage for period of 6 hour pretreatment, but there is no significant difference was observed between BUS alone treated and combine treatment of BUS and NAC at 12 hrs(0.10 ± 0.0).

4. Conclusion

The present study concluded that NAC pretreatment alters the BUS induced chromosomal damage in human peripheral blood lymphocytes. However, further studies with different time course of NAC and Busulfan needed to be performed before a definite conclusion can be made because NAC protects the busulfan induced chromosomal damage for period of 6 hour pretreatment, but there is no significant difference was observed between BUS alone treated and combine treatment of BUS and NAC at 12 hrs

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Table1: Effect of NAC on bus –induced chromosomal aberrations in human peripheral blood lymphocytes.

Samples	Treatment	Total chromosomal aberration						CAs/cell (Mean±SD)
		C'	C''	G	Frag	Mins	Others	
1	Control	4.5	4	1	3	1.5	1	0.2±0.01
2	BUS	4	8.6	5	5	3	6.6	0.11±0.02(a)***
3	NAC0hrs	7.3	5.3	1.5	1.3	3	2.5	0.07±0.02(a)**
4	BUS+NAC0hrs	1	2.5	1.5	1.3	3	2.5	0.04 ±0.02(a)***
5	BUS+NAC6hrs	1	4.3	2.5	2.6	4.6	4.5	0.05±0.01(b)**
6	BUS+NAC12hrs	4	9.3	1.5	2.0	2.5	10.0	0.10 ±0.0(b)NS

G:chromatid and chromosome gaps,C':Chromatid break;C'':Chromosome break;Frag:acentric fragments;Mins:Minutes;All data are expressed as mean ±SD(N=4).Comparison were made (a)sample 1vs.2 and 3;(b)samples 2vs 3-6.Statistical dignificane: ***P<0.001;NS-Non significant;One way Anova-Turkey test in Graph-pad prism Ver 5.01.



STOCHASTIC PROCESSES IN DISCRETE TIME

Dr.A.Rameshkumar¹ & R.Palanikumar²

¹Head, Department of Mathematics, Srimad Andavan Arts and Science College, T.V.Kovil, Trichy – 5.

Email: rameshmaths@ymail.com.

²Assistant Professor, Department of Mathematics, Srimad Andavan Arts and Science College, T.V.Kovil, Trichy – 5. Email: palanirkumar@yahoo.co.in.

ABSTRACT

In financial econometrics, we seek to formulate mathematical models relationships between different variables or variables in different moments and different places. Because the economy and financial markets are artifacts subject to change, econometric models are not unique representations valid throughout time; they must adapt to the changing environment.

Keywords: ARMA model, GARCH model

MSC 2010: 60 GXX

1. Introduction

Financial econometrics uses both continuous- and discrete-time models. The former are used, for example in derivatives modeling where both the underlying and the derivative price are represented by stochastic differential equations. In order to solve stochastic differential equations with computerized numerical methods, derivatives are replaced with finite differences ^[2]. This process of discretization of time yields discrete-time models. However, in econometrics, discrete-time models are not necessarily the result of discretization of continuous-time models. There are two types of discrete-time models: static and dynamic. Static models involve different variables at the same time ^[4]. The well-known capital asset pricing model is an example of a static model.

Dynamic models involve one or more variables at two or more moments. Momentum model is an example of dynamic models. In a dynamic model, the mathematical relationship between variables at different times is called the Data Generating Process (DGP). If we know the DGP, we can simulate the process recursively, starting from the initial conditions.

2. Time Series Models

Assume that the series of interest has been generated by a stochastic process, $\{y_t\}$. That is, each element in that series, y_1, y_2, \dots, y_T , is drawn randomly from a probability distribution. For concreteness, y_t could be asset return. The focus is usually on the first two moments of y_t 's distributions (means, variances, and covariance). The stochastic process, $\{y_t\}$, can be described by the joint (T-dimensional) probability distribution with mean, variances, and autocovariances given by

$$\text{Mean} = E[y_t] = \mu_t$$

$$\text{var}(y_t) = E[(y_t - \mu_t)^2] = \sigma^2$$

$$\text{cov}(y_t, y_s) = E[(y_t - \mu_t)(y_s - \mu_s)] = \gamma(t, s)$$

The time series observed in practice is a particular realization (sample) of the stochastic process (population). We know how to fit a probability distribution to a sample of data, such as y_t and we are able to examine the goodness of fit ^[5]. This approach is denoted as fitting the unconditional distribution and assumes that y_t are independent variables. The independence assumption can be tested (at least the weaker version of uncorrelated observations) and is found to be violated by most samples of financial returns. Stochastic processes recognize explicitly that there is a time evolution of the random variable (for e.g., return) and, thus, represent a conditional approach to financial modeling. We will consider the two main classes of conditional discrete time-series models: Conditional models for the mean, Autoregressive Moving Average Models (ARMA). Conditional models for the variance, Generalized Autoregressive Conditional Heteroskedasticity Models (GARCH).

3. Stationarity

Stationarity refers to the stability of the statistical properties of the process through time. A time series $\{y_t\}$ is called stationary if it has statistical properties similar

to those of the “time-shifted” series $\{y_t + h\}$ for each integer h . The time-invariant features of the time series can be captured in a model. Stationarity is defined in two formulations: a stronger and a weaker version.

a) Strict Stationarity

The joint and conditional distributions of the process are unchanged if displaced in time. That is, the PDF of $y_{t_1}, y_{t_2}, \dots, y_{t_k}$ is identical to that of $y_{t_1} + h, y_{t_2} + h, \dots, y_{t_k} + h$, for any positive h and t .

In practice, more common to use is a weaker definition of stationarity.

b) Weak Stationarity (Covariance Stationarity)

A time series is weakly stationary if its mean, variance, and autocovariance are independent of time ^[7].

That is, it holds that

$$E(y_t) = \mu \text{ is independent of } t$$

$$\text{var}(y_t) = E(y_t - \mu)^2 = \sigma^2 \text{ is independent of } t$$

$$\text{cov}(y_t, y_{t+h}) = \gamma(h), \quad h = \dots, -2, -1, 0, 1, 2, \dots,$$

Thus, the autocovariance depends on the time gap (lag), h , but not on t and $\gamma(h) = \gamma(-h)$.

4. Autoregressive Process [AR(1) Process]

Consider the following model, called autoregressive process of order 1 (AR (1) process):

$$y_t = a_0 + a_1 y_{t-1} + \epsilon_t.$$

The parameter a_0 is a real number, while a_1 measures the impact of the previous observation and lies in the interval $[-1, 1]$ ^[9]. (Values outside of this interval would signify an explosive process and are not of practical interest.)

A process with a_1 equal to ± 1 has distinctly different characteristics from a process with $|a_1| < 1$. The former is called random walk and is a nonstationary process—a concept we will define shortly.

The AR(1) process is stationary if $|a_1| < 1$.

The mean and variance of the AR(1) process are calculated as

$$E(y_t) = a_0 + a_1 E(y_{t-1}) + E(\epsilon_t) \Rightarrow E(y_t) = \frac{a_0}{1 - a_1}$$

$$\text{var}(y_t) = a_1^2 \text{var}(y_{t-1}) + \sigma^2 \Rightarrow \text{var}(y_t) = \frac{\sigma^2}{1 - a_1^2}$$

where we implicitly use the fact that y_t is stationary.

The mean and the variance above are called unconditional or long-term because no assumptions are made about possible additional knowledge about the process^[10].

Sometimes, it may be more relevant to consider the conditional mean and variance.

Suppose a daily return series y_0, \dots, y_t has been observed and one wants to get information about tomorrow's return, y_{t+1} . An appropriate approach would be to consider the expectation of y_{t+1} given the information until today^[3].

The information available at time t forms an information set and is usually denoted by \mathfrak{I}_t . Then,

$$E(y_{t+1} | \mathfrak{I}_t) = a_0 + a_1 y_t$$

$$\text{var}(y_t | \mathfrak{I}_t) = \sigma^2.$$

The dynamics of a general AR(n) process is given by

$$y_t = a_0 + \sum_{i=1}^p a_i y_{t-i} + \epsilon_t$$

An AR(p) process is useful to incorporate possible dependencies of the current return on previous returns.

A time series process y_t can be modeled as a weighted average of the noise terms (the random shocks to the system)^[1].

5. Moving Average Process (MA)

A moving average process of order q (MA(q) process) is written as

$$y_t = \theta_0 + \sum_{i=1}^q \theta_i \epsilon_{t-i} + \epsilon_t$$

The unconditional mean and variance can be shown to not depend on the index t :

$$E(y_t) = \theta_0 \quad \text{and} \quad \text{var}(y_t) = \sigma^2 \left(1 + \sum_{i=1}^q \theta_i^2 \right)$$

The conditional mean changes through time, while the conditional variance remains constant, as with an AR process:

$$E(y_{t+1} | \mathfrak{I}_t) = \theta_0 + \sum_{i=1}^q \theta_i \epsilon_{t-i} \quad \text{and} \quad \text{var}(y_{t+1} | \mathfrak{I}_t) = \sigma^2$$

6. Autoregressive Moving Average Process (ARMA)

The AR and MA processes can be regarded as special cases of a mixed Autoregressive moving average process (ARMA(p,q)) given by

$$y_t = a_0 + \sum_{i=1}^p a_i y_{t-i} + \sum_{i=1}^q \theta_i \epsilon_{t-i} + \epsilon_t$$

The advantage of an ARMA process relative to AR and MA processes is that the former models are more parsimonious.

ARMA processes can also include current or lagged, exogenously determined variables. Such processes are denoted by ARMAX processes.

Denote the exogenous variable by x_t . An ARMAX process has the form

$$y_t = a_0 + \sum_{i=1}^p a_i y_{t-i} + \sum_{i=1}^q \theta_i \epsilon_{t-i} + \sum_{i=1}^d X_{t-i} + \epsilon_t$$

In asset return models, x_t could represent macroeconomic factor or business data.

7. Autocorrelation Function (ACF)

One way to measure the dependence between past and current realizations of a process is provided by the autocorrelation function (ACF). It is denoted by ρ and defined by:

$$\rho(h) = \text{Corr}(y_t, y_{t-h}) = \frac{\text{Cov}(y_t, y_{t-h})}{\text{var}(y_t)}$$

The ACF gives insight into the properties of the process that may have generated the data. For instance, for an AR(1) process, the ACF has the simple form

$$\rho(h) = a_1 \rho(h-1) = a_1^h \text{ where the last equality follows from } \rho(0) = 1$$

This implies that the influence of any observation decreases as the time lag increases. The closer $|a_1|$ is to 1, the more slowly the influence becomes negligible.

The exponential decay of the ACF is characteristic of AR processes in general [6].

It can be shown that the ACF of an MA(q) process vanishes for lags greater than q. For example, for an MA(1) process, we have:

$$\rho(h) = \begin{cases} \frac{\theta_1}{1 + \theta_1^2}, h = \pm 1 \\ 0, |h| > 1 \end{cases}$$

Thus, the MA(q) process has no memory beyond q lags.

This fact can be used to identify the order of the MA process when modeling data in practice

In practice, since we do not know the data-generating process, we also have no knowledge of the population ACF and PACF. Instead, we rely in our analysis on their sample counterparts [8].

Given the sample y_1, \dots, y_T , the sample ACF (SACF) denoted by $\hat{\rho}(h)$ is expressed as

$$\hat{\rho}(h) = \frac{\sum_{i=1}^T (y_i - \hat{\mu})(y_{i-h} - \hat{\mu})}{\sum_{i=1}^T (y_i - \hat{\mu})^2}$$

where $\hat{\mu}$ is the sample mean.

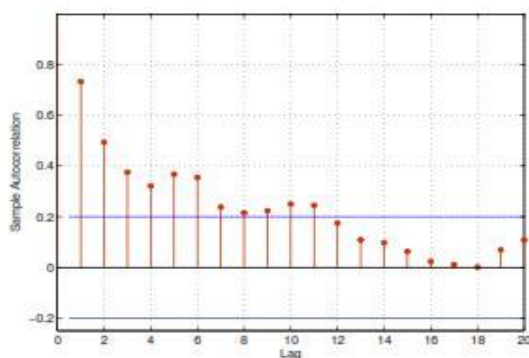
For visual inspection of the SACF, a correlogram a plot of $\hat{\rho}(h)$ versus h —is used. The pattern of the SACF is compared to that of the ACF of an MA or AR process to determine whether the data may have come from either one.

Suppose we suspect an MA(q) process generated the observed data. As discussed, its ACF cuts off after lag q .

In practice, we will not observe that the autocorrelations $\hat{\rho}(h + i)$, $i=1, 2, \dots$ will be exactly zero, because they are estimates from given data sample and not theoretical values.

To assess whether or not the deviations from zero are statistically significant, we can build a confidence interval. That interval's boundaries are well approximated by $\pm 2\sqrt{T}$

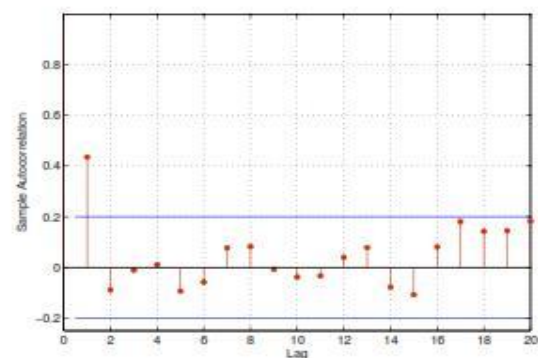
Sample Autocorrelation Function



Sample ACF of AR(1) process

$$y_t = 0.01 + 0.8y_{t-1} + \epsilon_t.$$

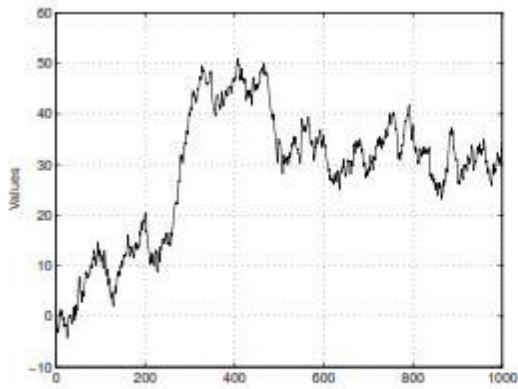
Decays exponentially.



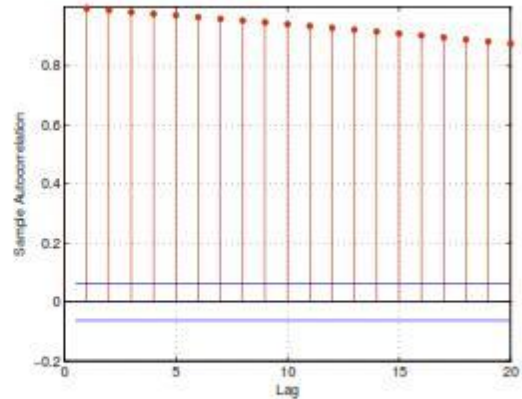
Sample ACF of MA(1) process

$$y_t = 0.01 + 0.8\epsilon_{t-1} + \epsilon_t.$$

Cuts off at lag 1.



Sample path of a random walk.



Sample ACF of a random walk.

- The random walk's mean and variance vary with time.
- The sample autocorrelations decay extremely slowly.

Consider a GARCH(1,1) model for y_t :¹

$$y_t = \epsilon_t$$

$$\epsilon_t = \sigma_t \eta_t, \quad \eta_t \stackrel{iid}{\sim} N(0, 1)$$

$$h_t = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 - 1$$

The first equation may be extended by including a (conditional) mean term μ_t . It can have, for example, an ARMA(1,1) structure:

$$\mu_t = a_0 + a_1 y_{t-1} + \theta_1 \epsilon_{t-1}.$$

Then, $\epsilon_t = y_t - \mu_t$ represents a shock in the asset return process.

The random variable, η_t , is an innovation term which is typically assumed to be i.i.d. with mean zero and unit variance.

If $\eta_t \sim N(0, 1)$, the random variable ϵ_t is conditionally normal. A more heavy-tailed distribution, such as Student's t could be used as well.

The GARCH(1,1) model relates the conditional variance σ^2 to a linear function of last period's squared error and conditional variance.

For the variance process to be well-defined, restrictions on the equation's parameter are necessary: $\alpha_0 > 0$, $\alpha_1 \geq 0$, $\beta_1 \geq 0$, and $\alpha_1 + \beta_1 < 1$.

The sum $\alpha_1 + \beta_1$ measures the persistence of the conditional variance to shocks.

The closer the sum is to 1, the larger the persistence. In empirical applications, the estimated persistence is found to be generally close to 1, although it tends to be lower in GARCH models with non-Gaussian disturbances.

The conditional variance of ϵ_t is equal to $\alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2$ (time-varying)

The unconditional variance can be shown to be $\alpha_0 / (1 - \alpha_1 - \beta_1)$ (constant through time).

The main obstacle for estimating GARCH models is that the conditional variance σ_t is an unobserved variable, which must be explicitly estimated, along with the parameters of the model.

The lack of independence in the time series means that the joint density function is expressed as the product of conditional PDFs. For instance, the log-likelihood of the GARCH(1,1) process is

$$\log f(\epsilon_T, \dots, \epsilon_1 | \epsilon_0) = \sum_{t=1}^T \log f(\epsilon_t | \mathfrak{I}_{t-1}) = -\frac{T}{2} \log 2\pi - \frac{1}{2} \sum_{t=1}^T \log \sigma_t^2 - \frac{1}{2} \sum_{t=1}^T \frac{\epsilon_t^2}{\sigma_t^2}$$

Numerical maximization yields the maximum likelihood estimate of the parameters.

The conditional mean of the data needs to be modeled well, so that the residuals obtained from it satisfy the assumption for the white-noise sequence $\{\epsilon_t\}$ which enters the conditional variance.

A joint ARMA(1,1)-GARCH(1,1) model is written as

$$y_t = a_0 + a_1 y_{t-1} + b_t \epsilon_{t-1} + \epsilon_t$$

$$\epsilon_t = \sigma \eta_t, \quad \sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2$$

where η_t is i.i.d., with zero mean and variance one.

The parameters of the model can be jointly estimated Maximum likelihood (ML) estimation. Alternatively, a two-step procedure can be adopted: Estimate the parameters of the conditional mean (first equation). From the residuals of the first model, estimate the parameters of the GARCH model. The latter is sometimes referred to as GARCH estimation after linear (ARMA) filtering.

8. Conclusion

The economy and financial markets are artifacts subject to change, econometric models are not unique representations valid throughout time, they must adapt to the changing environment financial econometrics uses discrete –time models. The two most prominent representatives of the models in **Auto Regressive Moving Average (ARMA)** and **Generalised Autoregressive Conditional hetroskedasticity (GARCH)**.

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CASE STUDY: geNEXT ATM

¹G.Uma, ²S.Seethalakshmi, ³J.Gayathri, ⁴M.Subhashini

^{1,2,3,&4}Asst.Professors, Department of Computer Science, Srimad Andavan Arts and Science College, Trichy-05.

Abstract

With the birth of Automated Teller Machine, banking has become lot easier though it cannot be used by visually challenged person on his own. Automated Teller Machine today use no more than an access card and a PIN for identity verification. The recent progress in facial recognition has made great effort in improving the usage of Automated Teller Machine for any human without need of a card. This research looked into development of a system that integrates facial recognition technology and Hand geometry technique for the use of visually challenged person. If this technology becomes widely used, visually challenged person can use Automated Teller Machine for his transactions by himself.

Index Terms— Face recognition, digital camera, 3D mirror, Authentication, Automated Teller Machine.

1. INTRODUCTION

ATM has made banking very easy. Especially withdrawal of cash without visiting a bank, anytime and anywhere. Technological advancement nowadays have increased the processing speed of Automated Teller Machine's. This type of Automated Teller Machine's are used by normal human. Here we are putting forth the concept of secured and authorized Automated Teller Machine's for visually challenged people.

Visually challenged Automated Teller Machine's does not require an Automated Teller Machine card for authorization. The authorization is carried out by face recognition and hand geometry techniques. After authentication a head jack will guide the visually challenged person to do the transactions. When they remove their head jack the account will be automatically closed.

2. FACE RECOGNITION

It will be convenient for a visually challenged person to use Automated Teller Machine for his transactions. All he needs is to walk into the Automated Teller Machine, its digital camera is ON 24-hours a day and its computer will automatically initiate a face recognition procedure whenever the person stands in front of the Automated Teller Machine.

The digital camera captures the image and compares it with the registered images in the database.(Fig1.1) If the image matches with the database,the customer is requested to place his hands on a 3D mirror. (Fig 1.2) The system takes the picture of the hand using the 3D mirror and compares it with the registered images in the database.

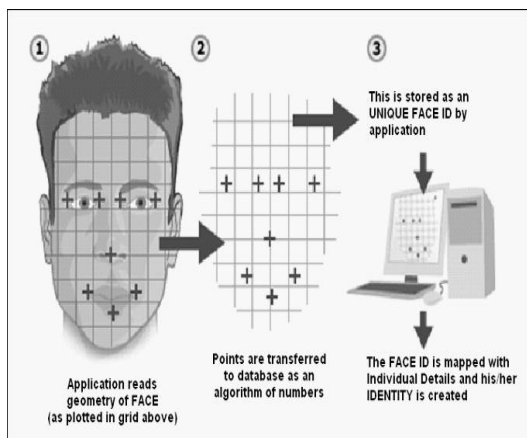


Fig.1.1 Face Recognition



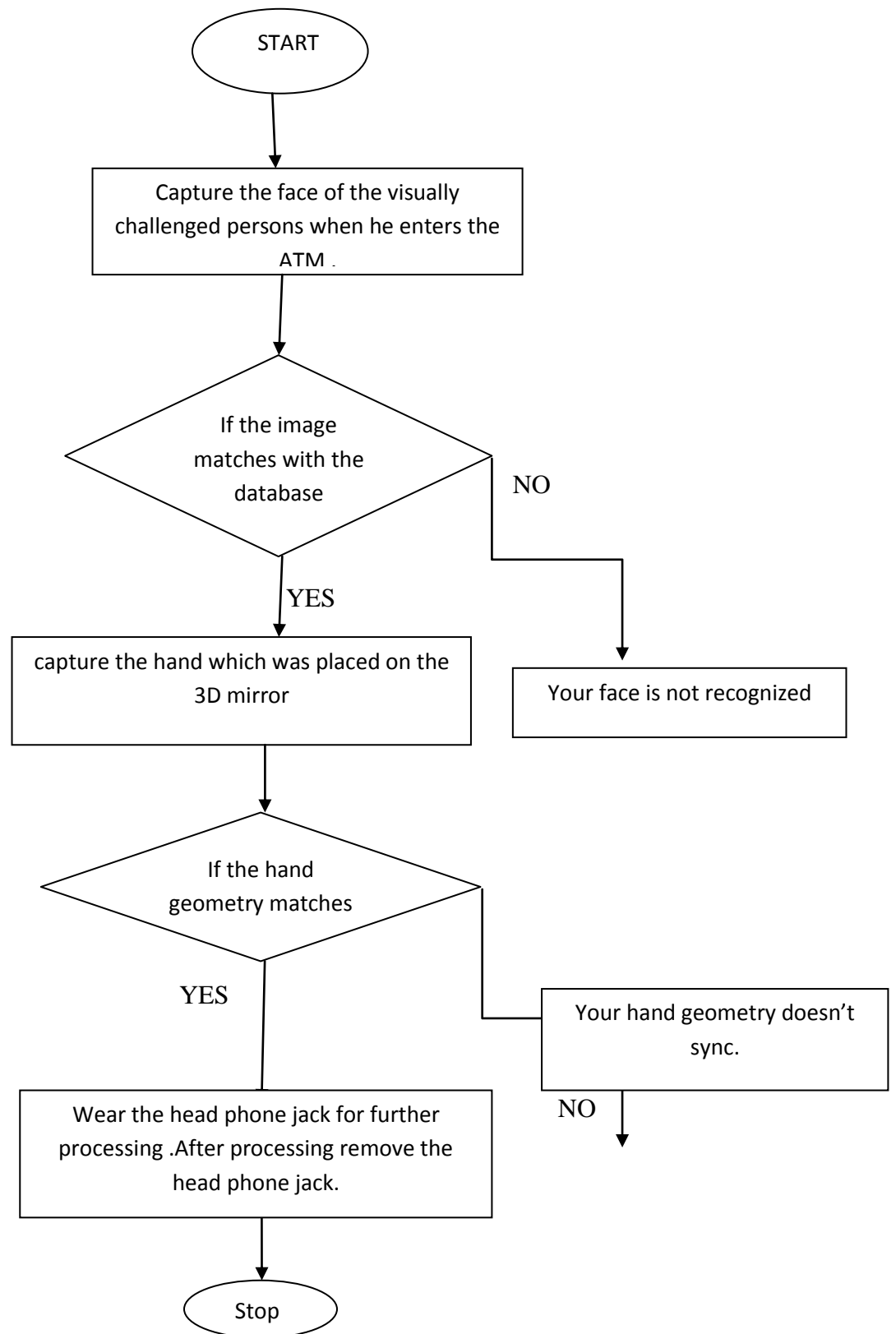
Fig 1.2 Hand Geomentry

If the image matches with the database, the customer is authenticated to proceed with his transaction and he is requested to wear the HeadJack for security purposes.

3. DUAL AUTHENTICATION

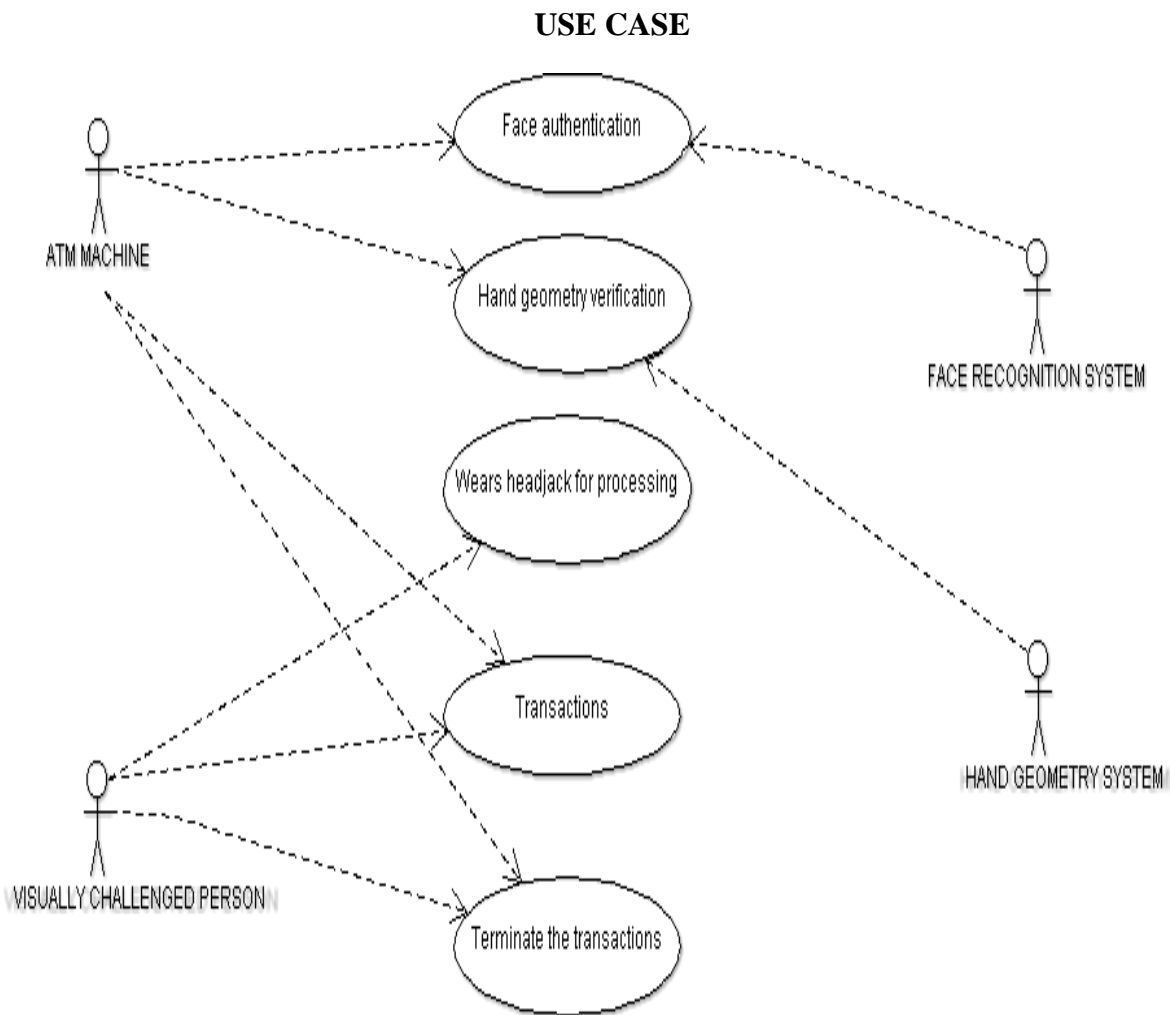
Usually ATM works on two factor authentication requiring something for you have and something you know or you are. To use an ATM,it is required to have a card that has to be authenticated by a PIN, as a second factor authentication. As for as visually challenged person is concerned, he cannot use this two-factor authentication. By capturing the face of the person and also dually authenticating using Hand geometry procedure using 3D mirror this can be achieved. To enhance higher security, we use combination of face recognition and hand geometry system. The moment the person is authenticated, to avoid eaves dropping, the person is insisted to wear a headphone jack which makes the system more secure, so that he make all his transaction given through the HeadJack. The removal of HeadJack makes the transaction to terminate.

4. FLOWCHART



5. USE CASE DIAGRAM

A **use case diagram** at its simplest is a representation of a user's interaction with the system and depicting the specifications of a usecase. A use case diagram can portray the different types of users of a system and the various ways that they interact with the system. This type of diagram is typically used in conjunction with the textual use case and will often be accompanied by other types of diagrams as well.



6. FACE RECOGNITION PROCEDURE

Face Recognition analysis the characteristics of person's face image input through a digital camera. Based on the input image the system measures overall face structure including the distances between eyes and ears. We use three kinds of features. The value of two rectangle feature is the difference between the sum of pixels within two rectangular regions. The regions have same size and shape that are horizontally and vertically adjacent.(Fig 2.1 & Fig 2.2)

The Three rectangle feature computes the sum within two outside rectangles subtracted from the sum in a center rectangle(Fig 2.3).finally the four rectangle feature computes the difference between the adjacent pairs of rectangles (Fig 2.4)

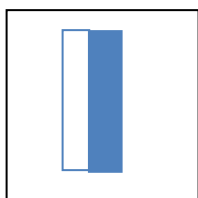


Fig 2.1

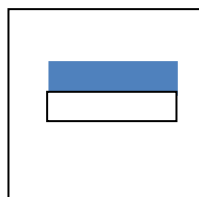


Fig 2.2

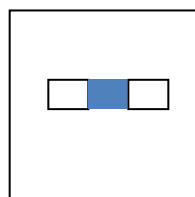


Fig 2.3

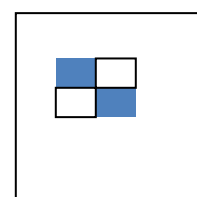


Fig 2.4

The distance between is calculated using Euclidean distance formula,

$$D = \sqrt{\sum_{i=1}^n (x_i + y_i)^2}$$

The sum of pixels within rectangle fig 2.4 can be computed as,

The value of the image at location 1 is sum of the pixels in rectangle A1. The value at location 2 is A1 + B1, the value at location 3 is A1 + C1 and at location 4 is A1 + B1 + C1 + D1. The sum within D can be calculated as 4 + 1 - (2 + 3).fig(3.1)

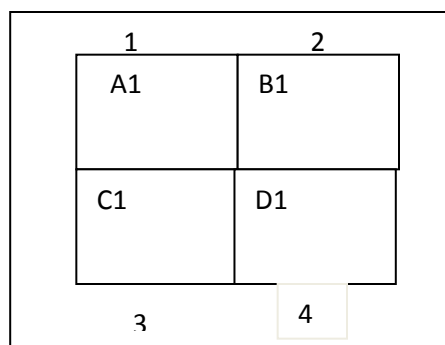


Fig 3.1 Sum of Pixels

7. SEQUENCE DIAGRAM

A **sequence diagram** is an interaction diagram shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development.

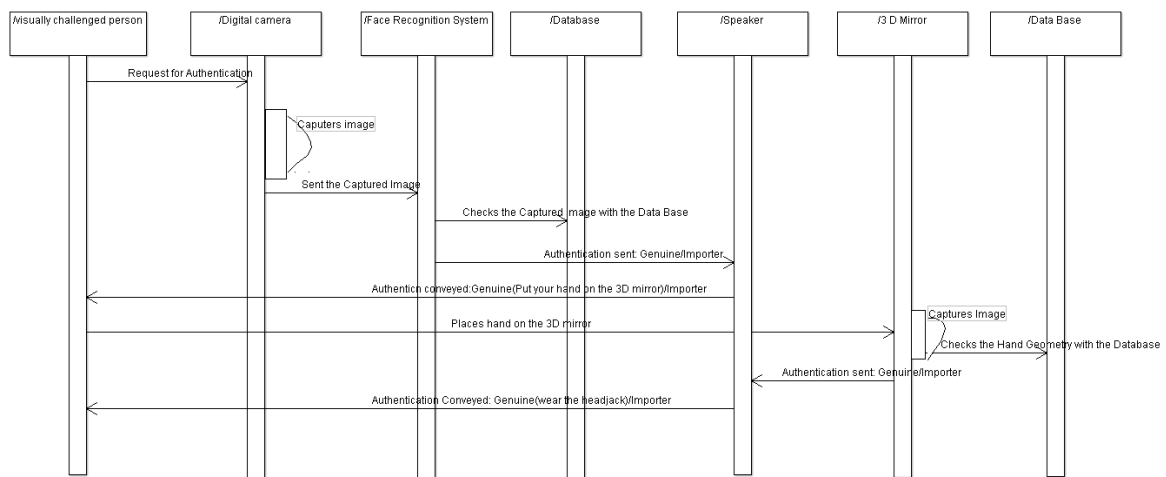


Fig 4. Sequence Diagram of geNext ATM.

8. CONCLUSION AND FUTURE ENHANCEMENT

We thus develop an ATM model for visually challenged person that is more reliable by providing security in dual authentication way. By authenticating dually we make the ATM highly secured. We deliver a practical- workable solution which fulfills the requirements of visually challenged person. We a societal responsibility by avoiding cash-card transactions. To attain more trust and loyalty and reduction of financial losses, we putforth an idea of using sensors by sensing the unwanted entries apart from that particular visually challenged person.

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GRAPHENE IN NANO ELECTRONIC ERA - Review

Dr.A.Sinthiya

*Department of Physics, Srimad Andavan Arts and Science College (Autonomous),
Trichy-05, Tamil Nadu, India.*

Abstract

Two-dimensional materials are attractive for use in next – generation nano electronic devices. The mobility of charge carrier in the graphene is about ten times faster than other existing semiconductor materials during switching operation in the electronic devices. As hot electrons in graphene can drive currents, multiple hot-carrier generation makes graphene a promising material for highly efficient broadband extraction of light energy into electronic degrees of freedom enables very efficient optoelectronic devices. To realize the full potential of these materials, atomic scale control over the contacts to graphene and graphene of a device is most required in this new nano-electronic era.

Keywords: *Graphene, semiconductors, monocrystalline graphitic films, optoelectronic materials.*

1. Introduction

The year 2014 is the beginning for rise of graphene as an electronic switch in nano-electronic era. Two-dimensional materials are attractive for use in next – generation nano electronic devices. Because, compared to one dimensional materials it is easy to fabricate complex structures from them.[1] The most widely studied two dimensional material is a pure single atomic layer of carbon atoms called graphene, with

sp^2 bonding configuration in a honeycomb structure, forms one atomic layer of thick sheet. The mobility of charge carrier in the graphene is about ten times faster than other existing semiconductor materials during switching operation in the electronic devices.

Carbon nanomaterials such as carbon nanotube and graphene have very interesting physical and electronic properties . Scientist all over the world are excited about the new opportunities to explore new physics in ways not possible before[2]. Unlike CNTs, which require a different set of processing techniques from silicon, graphene shared the same set of processing techniques currently used for silicon. The difference being that silicon becomes pretty useless at the nanometer scale. Molybdenite does not have to stand in competition with graphene, but could complement graphene in applications that require thin transparent semiconductors, such as optoelectronic and energy harvesting.[1]

Recently IBM demonstrated the world's first graphene based integrated circuit receiver front end for wireless communication. The circuit consists of a two-stage amplifier and a down converter operating at 4.3GHz [3]. A wafer-scale graphene circuit was demonstrated by Yu-Ming Lin et al., in which all circuit components including graphene field effect transistor and inductor were monolithically integrated on single silicon carbide wafer[4][5]. Their results open up the possibilities of achieving practical graphene technology and performance. The IBM has decided that with graphene replacing silicon in the chip of the future.[5]

The international Technology roadmap for semiconductors(ITRS) predicts that by 2015, copper based via that connect the silicon surface to a chips wiring and connect one layer of wiring to another simply will not be able to do the job anymore. That day is a little over a year away-practically tomorrow in technological innovation terms. As a result, there is a bit of a scramble to find alternatives – not just for via but all sorts of interconnects used in integrated circuits.[6]. This will significantly simplify the ICs fabrication process of graphene based nanoelectronic devices.

Chemically forming atomic – scale bonds between graphene and a gold substrate improves the reliability of molecular devices where the electronic function is governed by a single molecule. A single chemical bond forms an electronically transparent contact with the graphene nanoribbon-without affecting its overall electronic structure. This may be the key to using graphene nanostructures in future electronic devices as the contact does not change the intrinsic ribbon properties[7]. Joost Vander Lit et al., showed the contacting an atomically well-defined graphene nanoribbon to a metallic lead by a chemical bond via only one atom significantly influences the charge transport through the graphene nanoribbons but it does not affect its electronic structure . Specifically they found that creating well defined contacts can suppress inelastic transport channels [8].

K.S Novoselov et al., describe monocrystalline graphitic films, which are a few atoms thick. The films are found to be a two-dimensional semimetal with a tiny overlap between valence and conductance bands, and they exhibit a strong ambipolar electric field effect [9]. The new technique can identify a single foreign molecule on graphene. This is critically important in electronic applications where a single foreign molecules in graphene can corrupt its electrical properties. Being an atomically thin material, graphene is known to be extremely susceptible to its environment , including defects and phonons in the substrate on which it is placed as well as gas molecules that surround it. The results of Y.Sano et al., demonstrates that terahertz emission serves as a local probe for monitoring adsorption and desorption processes on graphene films and devices, suggesting a novel two dimensional sensor for detecting local chemical reactions [10].

Seung Min Song et al., reports that the pristine graphene has stronger adhesion and a higher hole concentration when the dielectric constant of the underlying oxide is higher. The results provide understanding on the interaction of graphene and oxides which is essential for successful realization of graphene- based electronic device [12]. However pristine graphene does not have a band gap, a property that is essential for many applications including transistors [1]. A new type of solid – state molecular junction is introduced by Tao Li et al., which employs reduced graphene oxide as a transparent top

contact that permits a self assembled molecular monolayer to be photo switched in situ, while simultaneously enabling charge-transport measurements across the molecules. The sandwich-like structures ability to operate by light impulses that turn the molecular transistor on and off is enabled by graphene's translucent qualities [11].

After the first years of the graphene rush, graphene growth is now well controlled using various methods like epitaxial growth on silicon carbide substrate, chemical vapour deposition (CVD) or plasma techniques on metal, insulator or semiconductor substrates[13]. Hyesung Park et al., grown graphene sheets by CVD with controlled numbers of layers were used as transport electrodes in organic photovoltaic OPV devices. This work brings us one step towards the future use of graphene transport electrodes as a replacement of ITO indium-tin –oxide [14]. Yi Song et al., has shown that the chemical doping is an effective method of reducing the sheet resistance of graphene [15]. Wataru Norimatsu et al., have grown the graphene by thermal deposition of SiC and they describes, due to high quality and structural controllability, graphene on SiC{0001} surfaces will be a platform for high speed graphene device applications[16].

Nano materials of nanostripe, including quantum dots, nanowires and carbon nanotubes have offered alternatives in the solar collecting cells of PVs. But research has really only offered graphene as a replacement to ITO used in electrodes for organic solar cells. As hot electrons in graphene can drive currents, multiple hot-carrier generation makes graphene a promising material for highly efficient broadband extraction of light energy into electronic degrees of freedom, enabling high-efficiency optoelectronic applications[17].

2. Conclusion

To realize the full potential of these materials, atomic scale control over the contacts to graphene and graphene of a device is most required in this new nano-electronic era .

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Solving Unbalanced Linear Assignment Problems by Using Hungarian Method

Dr.A.Ramesh Kumar¹, S. Deepa², M.S.Ponmudi³

¹. Head, Department of Mathematics, Srimad Andavan Arts and Science College (Autonomous), T.V.Kovil, Trichy-5. E-mail ID: rameshmaths@ymail.com

². Assistant professor, Department of mathematics, Srimad Andavan Arts and Science College (Autonomous), T.V.Kovil, Trichy-5 E-mail ID: sdeepamathematics@yahoo.com

³. Assistant professor, Department of mathematics, Srimad Andavan Arts and Science College (Autonomous), T.V.Kovil, Trichy-5 E-mail ID: ponmudims@gmail.com

Abstract

Linear assignment problems are very well known linear programming problems. In a ground reality the entries of the cost matrix is not always crisp. In many application of this parameters are uncertain and these uncertain parameters are represented by interval. We propose of interval Hungarian method and interval analysis concept for solving. (Balanced or unbalanced) interval linear assignment problems

Keywords: Assignment Problems, Hungarian method, and Interval Analysis.

1. Introduction

An assignment plan is optimal if it minimizes the total cost or maximizes the profit. This type of linear assignment problems can be solved by the very well-known Hungarian method which was derived by the two mathematician D. König and E.Egerváry. Authors are proposed different methods to handle different types of assignment problems.(balanced or unbalanced) In this paper a general interval linear assignment problem is taken into consideration

with basis assumption that one person can perform one job at a time. Here the new method has been proposed to handle such type of problem. We solved one example for unbalanced problem using this proposed method. Corresponding results are computed and has been reported here.

2. Arithmetic Operations

The interval form of the parameters may be written as where is the left value [\underline{x}] and is the right value [\bar{x}] of the interval respectively. We define the centre is $m = \frac{\bar{x} + \underline{x}}{2}$ and $w = \bar{x} - \underline{x}$ is the width of the interval [\bar{x}, \underline{x}]

Let [\bar{x}, \underline{x}] and [\bar{y}, \underline{y}] be two elements then the following arithmetic are well known

$$(i) [\bar{x}, \underline{x}] + [\bar{y}, \underline{y}] = [\bar{x} + \bar{y}, \underline{x} + \underline{y}]$$

$$(ii) [\bar{x}, \underline{x}] - [\bar{y}, \underline{y}] = [\bar{x} - \bar{y}, \underline{x} - \underline{y}]$$

$$(iii) [\bar{x}, \underline{x}] \times [\bar{y}, \underline{y}] = [\min\{\bar{x}\bar{y}, \underline{x}\bar{y}, \bar{x}\underline{y}, \underline{x}\underline{y}\}, \max\{\bar{x}\bar{y}, \underline{x}\bar{y}, \bar{x}\underline{y}, \underline{x}\underline{y}\}] \text{ provide if } [\bar{y}, \underline{y}] \neq [0, 0],$$

3. Algorithm for unbalanced interval Assignment problem

Step 1: Check whether the interval of the cost matrix is balanced, if not add dummy interval of column and row, then the interval of the cost matrix is balanced

Step 2: Find out the mid values of each interval in the cost matrix.

Step 3: Subtract the interval which have smallest mid value in each row from all the entries of its row.

Step 4: Subtract the interval which have smallest mid value from those columns which have no intervals contain zero from all the entries of its column.

Step 5: Draw lines through appropriate rows and columns so that all the intervals contain zero of the cost matrix are covered and the minimum number of such lines is used.

Step 6: Test for optimality (i) If the minimum number of covering lines is equal to the order of the cost matrix, then optimality is reached. (ii) If the minimum number of covering lines is less than the order of the matrix, then go to step 6.

Step 7: Determine the smallest mid value of the intervals which are not covered by any lines subtract this entry from all un-crossed element elements and add it to the crossing having an interval contain zero. Then go to step 4.

4. Numerical Results

Example: 4.1

We take a linear assignment problem as an example problem and solved this problem by traditional Hungarian method .The assignment cost of assigning any operator to any one machine is given in the following table

Cost Matrix

	I	II	III	IV
A	18	24	28	32
B	8	13	17	19
C	10	15	19	22

Solution;

Since the interval cost matrix of Assignment Problem is not equal
(The number of rows \neq the number of columns)

Cost Matrix with interval

	I	II	III	IV
A	[17,19]	[23,25]	[27,29]	[31,33]
B	[7,9]	[12,14]	[16,18]	[18,20]
C	[9,11]	[14,16]	[18,20]	[21,23]
D	[0,0]	[0,0]	[0,0]	[0,0]

	I	II	III	IV
A	[0,0]	[6,6]	[10,10]	[14,14]
B	[0,0]	[5,5]	[9,9]	[11,11]
C	[0,0]	[5,5]	[9,9]	[12,12]
D	[0,0]	[0,0]	[0,0]	[0,0]

	I	II	III	IV
A	[0,0]	[6,6]	[10,10]	[14,14]
B	[0,0]	[5,5]	[9,9]	[11,11]
C	[0,0]	[5,5]	[9,9]	[12,12]
D	[0,0]	[0,0]	[0,0]	[0,0]

	I	II	III	IV
A	[0,0]	[1,1]	[1,1]	[5,5]
B	[0,0]	[0,0]	[0,0]	[2,2]
C	[0,0]	[0,0]	[0,0]	[3,3]
D	[0,0]	[5,5]	[0,0]	[0,0]

The Hungarian condition satisfied, we are applying the proposed interval Hungarian method and solve this problem. We get an optimal assignment as A, B, C, D machines are assign to I,II,III,IV operators respectively and the minimum assignment cost is [47,53] Now we are applying Hungarian method, then we get an optimal assignment as A, B, C, D machines are assign to II, IV, III, I operators respectively and minimum assignment cost is 50

5. Conclusions

We conclude that, in the realistic problems costs are not always in a crisp form, sometimes these parameters are uncertain which are represented by intervals. Hence we need the help of interval analysis for handling this type of data. The proposed interval Hungarian method is effective and useful in this interval context. Using this method we can solve real world linear assignment problems where entries of the cost matrix are interval form. Generalized linear assignment problems can be solved by this proposed method.

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A STUDY ON CUSTOMER SATISFACTION TOWARDS RETAIL STORES IN TIRUCHIRAPPALLI TOWN

***Ms.M.Usha Rani and ** Dr.D.Sivasubramanian**

**Research Scholar, Department of Commerce, Srimad Andavan Arts and Science College,Trichy-5.*

Abstract

Customer satisfaction is widely recognized as a key pressure in the information of customers future purchase intentions. Satisfied customers are also likely to tell others favourable experience and thus engage in positive work of mouth advertising. The present study aims to investigate customer satisfaction in the organised retail stores in the Tiruchirappalli city of Tamil Nadu state in India. The objectives are to identify the decisive factors which can help those retail stores to retain the existing customers and to study the future prospects of retail stores in Tiruchirappalli town. Customer satisfaction is a major subject in the marketing strategies. A total of 375 questionnaires have been randomly distributed to retail customers. Using descriptive statistics method cross table analysis and one way ANOVA f test in this study The result of this analysis suggests the degree of customer satisfaction in terms of services provided by the organised retail stores in Tiruchirappalli Town.

Key words: *Retailing concepts, Retail stores, Customer satisfaction*

1. Introduction

I. Retailing

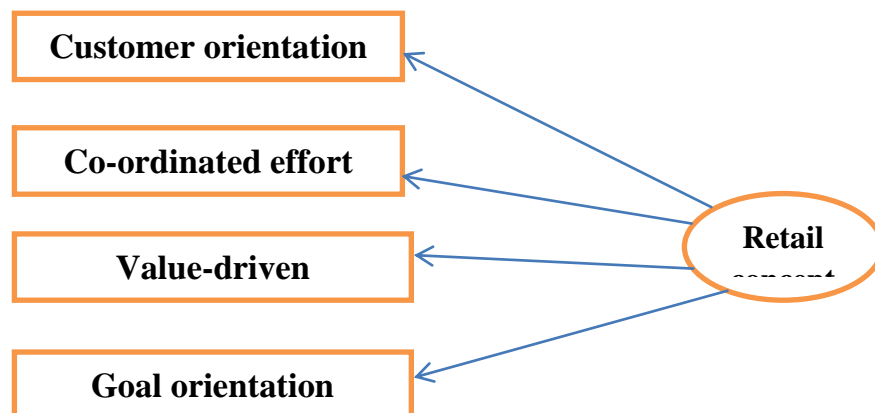
Retailing encompasses the business activities involved in selling goods and services to consumers for their personal, family or household use. It includes every sale to the final consumer – ranging from cars to apparel to meals at restaurants to movie tickets. Retailing is the last stage in the distribution process.

Retailing today is at a fascinating crossroads. On the one hand, retail sales are at their highest point in history. Wal-Mart is now the leading company in the world in terms of sales— ahead of Exxon Mobil, General Motors and other manufacturing giants. New technologies are improving retail productivity. There are lots of opportunities to start a new retail business—or work for an existing one—and to become a franchisee. Global retailing possibilities abound. On the other hand retailers face numerous challenges. Many consumers are bored with shopping or do not have much time for it. Some locales have too many stores, and retailers often spur one; another into frequent price cutting (and low profit margin). Customer service expectations are high at a time when more retailers offer self –service and automated systems at the same time, some retailers remain unsure what to do with the Web; they are still grappling with the emphasis to place on image enhancement, customer information and feedback, and sales transactions.

Retailing Concepts

Target stores have a sincere long-term desire to please customers. In doing so, it uses a customer-centered, candid approach to strategy development and implementation; it is value-driven; and it has clear goals. Together, these four principles form the retailing concept, which should be understood and applied by all retailers:

- ❖ **Customer orientation:** The retailer determines the attributes and needs of its customers and endeavour to satisfy these needs to the fullest.
- ❖ **Coordinated effort:** The retailer integrates all plans and activities to maximize efficiency.
- ❖ **Value-driven:** The retailer offers good value to customers, whether it be upscale or discounted. This means having prices appropriate for the level of products and customer service.
- ❖ **Goal orientation:** The retailer sets goals and then uses its strategy to attain them.



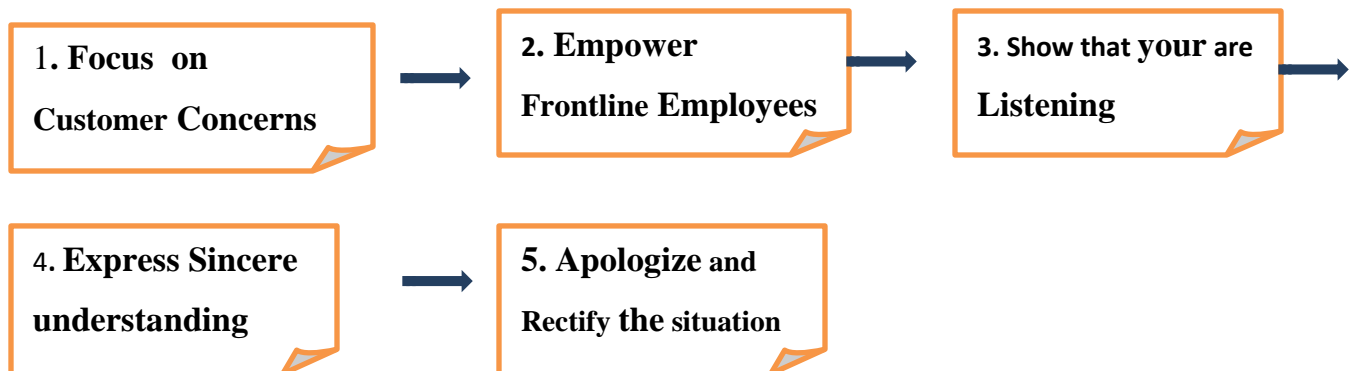
Growth Of Retail Industry In India

The Indian retail sector has been boxing with job opportunities. Some of the big players on the field like the Big Bazaar, J.C. Penny, Tesco, Shopper's top Reliance, subhiksha, I.T.C. Are all competing in the retail chain's business. The Government's nod recently, for the entry of multinational companies like Wal –Mart, etc. In the Indian retail sector has opened up a plethora of job opportunities in this field. There are numerous opportunities in this field. D apart from becoming a retail manager one can load for becoming floor managers where the job is to maintain the individual floor, inventory manager looking and managing the inventory in the store, shopping operational manager looking towards the replacement of the stock and customer service. The retailing sector in India is highly fragmented and consists predominantly of small, independent. An owner-managed e shops. There are some 12 million retail outlets in India. Besides, the country is also dotted with low-cost kiosks and pushcarts.

II. Customer Satisfaction

Customer satisfaction occurs when the value and customer service provided through a retailing experience meet or exceed consumer expectations. If the expectations of value and customer service are not met, the consumer will be dissatisfied: “Retail satisfaction consists of three categories: “ shopping systems satisfaction which includes selection and actual purchasing of products; and consumer satisfaction derived from the use of the product. Dissatisfaction with any of the three aspects could lead to customer disloyalty, decrease in sales, and erosion of the market share.”

Only “very satisfied” customers are likely to remain loyal in the long run. How well are retailers doing in customer satisfaction? Many have much work to do. The American Customer Satisfaction Index annually questions thousands of people to link customer expectations, perceiver quality, and perceived value to satisfy. Overall, retailers consistently score only about 75 on a scale of 100. Fast- food firms usually rate the lowest in the retail category (with scores around 70). To improve matters, retailers should engage in the process shown in the following figures:



1. “ Employees must view customer complaints as concerns. This will shift a negative situation into one that is positive, helpful, and productive.”
2. “ You can often prevent customers from becoming upset if you empower Frontline employees to make reasonable on-the –spot decisions.”
3. “ When a customer voices dissatisfaction, listen without interrupting. Then prove that you’ve heard him or her. That means repeating and paraphrasing.’
4. “Say, I’m sorry.” Even when you suspect the customer is wrong, it is better to give him or her the benefit of the doubt. On top of an exchange or refund, give a token of appreciation for the inconvenience.”

Most consumers do not complain when dissatisfied. They just shop elsewhere. Why don’t shoppers complain more? (1) Because most people feel complaining produces little or no positive results, they do not bother to complain. (2) Complaining is not easy. Consumers have to find the party to whom they should complain, access to that party may be restricted, and written forms may have to be completed. To obtain more feedback, retailers must make it easier for shoppers to complain, make sure shoppers believe their concerns are being addressed, and sponsor, ongoing customer satisfaction surveys. As suggested by consulting firm CustomerSat.com on its Web site, retailers should ask such questions as these and then take corrective actions:

- “Please rate our customer service.”
- “How often does our customer service exceed expectations?”
- “What do you like most about our customer service?” “What do you like

2. Objectives of the Study

- ✓ To identify decisive factors which can help these retail stores to retain the existing customers.
- ✓ To study the future prospects of retail stores in Tiruchirappalli.

3. Research Methodology

➤ Research Design :

A descriptive study was undertaken in order to know the satisfaction level of the customers towards organised retail stores in Tiruchirappalli district.

➤ Questionnaire of the study :

The questionnaire formed an integral part of this research. It was a mix of both closed ended and open-ended questions. Also questions about rating the choices of the respondent were

also included. The first part of the questionnaire was designed to obtain information about the personal details. The second part was framed by using the Likert type scale to examine the perception and satisfaction of customers regarding selected organised retail stores in Tiruchirappalli town.

➤ **Sampling techniques:**

The selection criteria were based upon the data availability, convenience and the level of participation. Hence, the investigator chose convenience sampling for this study among the various sampling methods.

➤ **Data Collection:**

This study was covered with both primary and secondary data. The primary data were collected from 375 respondents relating to the selected, organised retail stores in Tiruchirappalli town and also secondary data were collected from the magazines, Journals, News paper and websites.

➤ **Sampling Size:**

The research investigator has adopted a convenience sampling method from the collected information of 375 respondents Tiruchirappalli. The researcher was selected five organised retail stores from this District. From each retail store, 75 respondents have taken for this study is known the satisfaction level of the customers regarding these stores in Tiruchirappalli town.

4. Review of Literature

Chattopadhyaya et.al., (2010) stated that India is a home of small traditional stores (STS). They conducted the research in four cities viz., Mumbai, Kolkata, Aligarh and Vizag. The results showed that modern retailing makes rapid inroads in India, most STS outlets are resilient in terms of their service mix and remain competitive. Shoppers, even in large metro cities, are still loyal to neighborhood STS outlets.

An article published about the Retail industry in India in Economic Times (2010) stated that the retail businesses in India also need to focus on nurturing the customers base to enhance the profitability of the retail firms and contribute to their superior performance.

Kalia and Kalia (2011) opined that the share of the unorganized Kirans will come down in the future, and the share of the organised sector will go up because of its efficiency in buying and distributing, but retailers must find the USP of these sectors, because this is an extremely low margin business, and ultimately, everybody had to sell within the cost.

Malik (2012) found that the organised retailers need to enhance customer satisfaction in terms of ensuring product quality, store convenience, after sales services, availability of new products and lure buyers with attractive promotional schemes.

Personal and Demography Factor

Particulars	Tiruchirappalli	
	(n=375)	(100%)
.Age		
Upto 20yrs	57	15.2%
21 to 30yrs	163	43.5%
31 to 40yrs	128	34.1%
Above 41yrs	27	7.2%
Gender		
Male	197	52.5%
Female	178	47.5%
Educational Qualification		
School Level	37	9.9%
Graduate / Diploma	85	22.7%
Post graduate	164	43.7%
Professional	89	23.7%
Occupation		
Students	75	20.0%
House Wife	27	7.2%
Employed	256	68.3%
Business	13	3.5%
Others	4	1.1%
Family type		
Joint	161	42.9%
Nuclear	214	57.1%
Members in family		
Small (Below 3)	166	44.3%
Medium (4 to 5)	135	36.0%
Large (6 & above)	74	19.7%
Earning members in the family		
One	127	33.9%
Two	132	35.2%
Three	66	17.6%
Four and above	50	13.3%
Monthly Income		
Below Rs.10000	100	26.7%
Rs.10001 to 25000	137	36.5%
Rs.25001 to 50000	103	27.5%
Rs.50001 & above	35	9.3%

Source: Primary data

The above table shows that 43.5% of the respondents were belonged to the age group of 21-30 years; 52.5% of the respondents were male; 43.7% of the respondents had post graduate; 68.3% of the respondent were working in the various institutions. 57.1% of the respondents were belonging to nuclear family; 42.9% of the respondents were belonging to the joint family; 44.3% of the respondents are having 3 members in their family; 35.2% of the respondents were having two earning members in their family; 36.5% of the respondents had the monthly income of Rupees from 10,001- 20, 000 and 9.3% of the respondents had the monthly income above of Rs.50,000

One way ANOVA –Association between Organised Retail Stores Respondents and their Overall Customer Satisfaction in Tiruchirappalli District.

Particulars	Mean	S.D	SS	Df	MS	Statistical inference
1.Facilities						
Between Groups			67.851	4	16.963	F=.666 .616>0.05 Not significant
FSM (n=75)	30.04	6.187				
Kavery (n=75)	30.79	3.595				
Chinthamani (n=75)	30.47	4.150				
Spenser (n=75)	30.79	5.295				
Reliance mart (n=75)	31.33	5.549				
Within Groups			9417.387	370	25.452	
2.Influentia						
Between Groups			293.200	4	73.300	F=1.646 .162>0.05 Not significant
FSM (n=75)	40.17	8.462				
Kavery (n=75)	39.67	4.584				
Chinthamani (n=75)	38.99	5.554				
Spenser (n=75)	39.63	6.941				
Reliance mart (n=75)	41.61	7.141				
Within Groups			16475.733	370	44.529	
3.Ambience						
Between Groups			444.443	4	111.111	F=2.257 .063>0.05 Not significant
FSM (n=75)	33.69	7.803				
Kavery (n=75)	34.05	6.430				
Chinthamani (n=75)	34.29	6.104				
Spenser (n=75)	35.19	6.912				
Reliance mart (n=75)	36.73	7.673				
Within Groups			18215.333	370	49.231	
4.Medium used for						

advertising offers/Schemes						
Between Groups			352.784	4	88.196	F=2.376 .052>0.05 Not significant
FSM (n=75)	22.96	7.636				
Kavery (n=75)	24.60	6.609				
Chinthamani (n=75)	25.09	5.302				
Spenser (n=75)	25.68	4.992				
Reliance mart (n=75)	25.45	5.527				
Within Groups			13732.133	370	37.114	
5.Sales promotion techniques						
Between Groups			549.669	4	137.417	F=1.683 .153>0.05 Not significant
FSM (n=75)	35.03	11.510				
Kavery (n=75)	35.35	9.912				
Chinthamani (n=75)	36.60	7.543				
Spenser (n=75)	37.65	7.592				
Reliance mart (n=75)	38.08	7.932				
Within Groups			30205.440	370	81.636	
6.Store performance						
Between Groups			856.731	4	214.183	F=3.438 .009<0.05 Significant
FSM (n=75)	35.28	11.899				
Kavery (n=75)	38.48	5.401				
Chinthamani (n=75)	37.72	4.617				
Spenser (n=75)	37.96	7.223				
Reliance mart (n=75)	39.95	8.203				
Within Groups			23053.627	370	62.307	
7.Quality of staffs						
Between Groups			435.771	4	108.943	F=5.954 .000<0.05 Significant
FSM (n=75)	19.51	6.484				
Kavery (n=75)	22.20	2.726				
Chinthamani (n=75)	21.76	2.808				
Spenser (n=75)	21.81	3.924				
Reliance mart (n=75)	22.60	4.328				
Within Groups			6769.813	370	18.297	
Overall customer satisfaction						
Between Groups			14330.667	4	3582.667	F=2.522 .041<0.05 Significant
FSM (n=75)	216.68	49.137				
Kavery (n=75)	225.13	29.491				
Chinthamani (n=75)	224.92	26.607				
Spenser (n=75)	228.71	38.031				
Reliance Mart (n=75)	235.76	40.789				
Within Groups			525567.733	370	1420.453	

Inference :

From the above table, one was to be understood that there is no association between selected retail stores respondents and their overall customer satisfaction. In Tiruchirappalli district. Hence, the calculated value is lesser than the above table value ($p < 0.05$).

Research hypothesis

There is no association between selected retail stores respondents and their overall customer satisfaction in Tiruchirappalli district.

Null hypothesis

There is an association between selected retail stores respondents and their overall customer satisfaction in Tiruchirappalli district.

Statistical Test

Oneway ANOVA 'F' test was used in the above table.

Findings

The above table reveals that there is no association between selected retail stores respondents and their overall customer satisfaction in Tiruchirappalli district. Hence, the calculated value is lesser than the above table value ($p < 0.05$). So the research hypothesis is accepted and the null hypothesis is rejected.

5. Analysis and Discussion

- 43.5% of the respondents were belonged to the age group of 21-30 years;
- 52.5% of the respondents were male; 43.7% of the respondents had post graduate;
- 68.3% of the respondent were working in the various institutions.
- 57.1% of the respondents were belonging to nuclear family;
- 42.9% of the respondents were belonging to the joint family;
- 44.3% of the respondents are having 3 members in their family;
- 35.2% of the respondents were having two earning members in their family;
- 36.5% of the respondents had the monthly income of Rupees from 10,001- 20, 000
- 9.3% of the respondents had the monthly income above of Rs.50,000

6. Conclusion

Retailing is playing a vital role in our Indian economy. Retail store is b part of the retail business. Nowadays, retail stores is being a part of the human beings. It ensures the prosperity of the nation in terms of employment creation and deployment of resources. It is also increase

the standard of living of the people. They are providing lot of innovative services to their customers like all things under one roof, desired goods, affordable prices, ambience facility etc. Hence, the retail stores should adopting customer- friendly marketing strategies in terms of selling the best quality products and services continuously to the consumers.

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Parenting and Well Being Among Adolescents

¹Ms.S.Sasikala and ²Dr.A.Relton

¹ *Research Scholar, PG and Research Department of Social Work, Bishop Heber College,Trichy*

²*Associate professor and Head of the Department, PG and Research Department of Social Work, Bishop Heber College, Trich.*

1. Introduction

Adolescence is defined as the period of life between 10 and 19 years of age and traditionally adolescence (From Latin “Adolescent” means “to grow into maturity”) is viewed as beginning with onset of puberty, when sexual maturity or the ability to reproduce is attained. Adolescent period starts with puberty which is surrounded by first menstruation in girls and ejaculation in boys which signals the biological change. The biological changes further lead to physiological, sexual and psychosocial changes. Most of the people see this change as a biological process but it is much social and psychological as well. Generally adolescence is believed to be a period of great stress and storm as rapid physical as well as mental changes occur during this period. Adolescence is a time of change, exploration, exuberance, and youthful searching. It can also be a time of worry and problems, especially in today’s world. It might even be fair to describe adolescence as “the best of times, the worst of times” (Coon, 1992,)

2. Well being of adolescence

Well being is a general term for the condition of an individual or group, for example their social, economic, psychological, spiritual or medical state. Well being refers to the harmonious functioning of the physical as well as psychological aspects of the personality, giving satisfaction to the self and benefit to the society (Siwach, 2000). It is probably one of the most important aspects of adolescence and state of general well being can be attained in terms of healthy body with healthy mind.

Parents are the chief architects in shaping the personality of an individual .The amount of parental interest; encouragement is obviously a crucial factor in the child progress. Educators,

Sociologist and Psychologist all agree that the family has the most significant influence on the development of the child and adolescence.

This article focuses on various reviews in which the primary focus was the impact /influence of parenting on the well being of adolescence. It has two sections; first one shows the impact of parenting and academic achievement, second one focus on the Influence of parenting on the mental Health of adolescence.

3. Parental Involvement in Adolescents Academic Achievement

Educational performance gets affected by a number of factors such as intelligence, achievement, motivation, home environment, school environment, interest and resources. The most significant influence on child is his or her parents. Psychologists and educationists are of the opinion that child rearing practices have the direct bearing on the educational performance of children.

Parental involvement is one of great significance in developing psychological as well as academic behavior of the child .It is the participation of parents in every facet of children's education and development from birth to adulthood, recognizing that parents are the primary influence in children's lives (PTA,Connecticut,2008).

For children aged 9 about 75% of parents reported high or moderate involvement, but when children reach age 14, parental involvement dropped to 44% and continued to drop with age(U.S department of education,2003)

Studies show that high parental involvement leads to high achievement and low parental involvement leads to low achievement (Ahuja and Goyal 2005). Parental involvement is much more likely to promote adolescent school success when it occurs in the context of an authoritative home environment (Steinberg et al. 1992). Parental acceptance and encouragement are positively related with academic school success and competence (Lakshmi and Arora 2006). Wang (2006) found that children with uninvolved parents were less likely to complete academic work than those with involved parents.

Adolescents tend to be affected positively when a relationship is sustained between their home and school environments. Involvement at home especially parents discussing school activities and helping children plan their programs, has the strongest impact on AA (Sui-Chu & Willms, 1996; Van Voorhis, 2003).

Researchers have also found that parent-child discussion about school helps improve AA and reduce problematic behavior (Epstein & Sheldon, 2002; McNeal, 1999; Sheldon & Epstein, 2005).

Here are few research studies which focus how parenting style and practices affect the academic performance of adolescence.

Kang *et al.* (1997) carried out a comparative study on “parent-child relationships of high and low achievers”. Results of the study indicated that parents of high achievers were more loving, trusted, shared more tolerance toward them as compared to parents of low achievers. Parents of low achievers were found to be less accepting, less encouraging and little democratic. Similarly Choudhary and Muni (1995) reported that parental support had positive effect on their childrens academic performance. They carried out a study on “Role of parental support in children’s need satisfaction; and academic achievement”.

Suman *et al.* (2003) conducted a study on “parent-child relationship and academic motivation” on a sample of 219 9th standard students with a mean age of 13.9 years. Results of the study revealed that achievement motivation was higher when adolescents perceived their parents as loving and demanding.

Kaushik, N., & Rani, S. (2005) conducted a comparative study to explore the impact of home environment and parent child relationship on achievement motivation of adolescents. The study was conducted on boys and girls (100 each in the age range of 14-16 years).The results indicated that home environment and parent child relationship affect the achievement motivation of the adolescents irrespective of their gender.

Shubhangi Kamble (2009) analyzed the influence of parental relationship and self concept on academic achievement of PUC students, and found that that parent child relationship and self concept influenced academic achievement of the students. It was observed that boys perceived their fathers to be more demanding, neglecting, rejecting and showed more object and symbolic punishment which might be due to their strictness, controlling behaviour and less interaction with children .These results implies the need to develop good father child relationship. It is very important that father should express his love, concern towards children by involving, spending more time and interacting with them, so that boys can feel free to exchange their ideas, view and feelings with father. The socio-economic status also influenced academic achievement. Hence, there is a need to guide under privileged students and their parents to facilitate better academic performance.

Jeynes W H (2001) has undertaken a Meta analysis including 52 studies, to determine the influence of parental involvement on the educational outcomes of urban secondary school children. The results indicate that the influence of parental involvement overall is significant for secondary school children.

M. Sarada Devi and Kavita Kiran (2002) found that there was close association between family factors and scholastic backwardness. Large family size, low educational status of parents, low parental involvement and low parental encouragement were found to be the major family factors associated with scholastic backwardness. Similar result was found in a study done by Devi and Kiran (2002). They studied factors associated with scholastic backwardness of secondary school children. 100 low achievers from secondary schools of Hyderabad city were included in the study. The results reported that low parental involvement and parental encouragement were found to be detrimental academic achievement.

Lakshmi and Minakshi (2006) studied perceived parental behavior as related to students academic school success and competence on a sample comprised of 500 high school students consisting 250 male and 250 female students of Varanasi city. Results of the study revealed that parental acceptance and encouragement scores were positively related with academic success. The results indicated that parents who were perceived as being more acceptant and using less restrictive and hostile psychological control tended to have adolescents with higher academic success and competence.

Murphy (2009) carried out the study to examine relationship of parental encouragement, independent learning and achievement. A national sample of tenth grade 15,362 students from the national educational longitudinal study 2002 was used. The findings indicated that parental encouragement had positive and significant relationship with academic achievement. Results also revealed that parental control was negatively associated with achievement measures. It was also found that parental actions associated with authoritative parenting style were positively related with academic achievement.

Different parenting styles are associated with different patterns of adolescent development. Many studies suggest that an authoritative style, which is responsive, warm, and firm but democratic, is associated with more positive educational outcomes than an authoritarian style, which is characterized by strictness and unilateral parental decision making (Steinberg, Bradford, & Dornbusch, 1996).

Monika Seth (2013) research was focused on the impact of Authoritative parenting style of educational performance of learners at high school level. It indicates that Authoritative parenting style has positive impact on all subjects at high school level.

These literatures strongly support the importance of parenting for the educational performance of adolescence. They should be aware about it and it is the role of the mental health professionals and school counselors to educate them and make them to participate in the welfare of their wards.

4. Impact of Parenting on Mental Health of Adolescents

The nature of the parent–youth relationship is not only important for individual student outcomes such as academic achievement, but also for participation in out-of-school time activities that can benefit youth academically, socially, and emotionally..

Mental Health is “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.”(WHO)

Therefore mental health can be defined in terms of sub dimensions like: Emotional stability, Overall adjustment, Autonomy, Security insecurity, Self concept and Intelligence.

The importance of good parent-child relation in the healthy development of individuals in later life has been well documented in literature. Parents play a key-role in providing a sound mental health for their children.

Warm, responsive parenting in adolescence is related to school success and positive social and emotional outcomes (Mandara, 2006). Adolescents with supportive parents exhibit higher rates of self-reliance, identity formation, school performance, and positive career-planning aspirations, as well as lower rates of depression and delinquency (Simpson, 2001). Youth who share trusting relationships with their parents—characterized by mutual and sustained bonds and open communication—have higher achievement and better physical health and are more likely to disclose information to their parents that will keep them out of trouble (Pong, Hao, & Gardner, 2005).

Numerous investigators have demonstrated relationships between adolescents' self-esteem and their perception of their parents' supporting and controlling behaviour (Openshaw, Thomas, and Rollins, 1981; Barber and Thomas, 1986; Felson and Zielinski, 1989; Barber, 1990). All of these studies have found that parental supportive behaviour is positively related to self-esteem and various types of negative controlling behaviours have been found to be negatively related to self-esteem.

Perceived maternal and parental involvement contributes positively to the psychological wellbeing of adolescents (Flouri and Buchanan, 2003). Jain (1998) stated that findings of the studies with adolescent females (N = 260) showed the influence of perceived parental acceptance on their mental health. The study revealed less accepted girls to be more emotionally unstable, timid, apprehensive and tense.

Steinberg (2001) conducted a literature review to answer two questions: *Is adolescence a time of parent-child conflict*, and *how do variations in the parent-child relationship affect the developing adolescent?* The findings noted that day-to-day conflicts over what psychologists considered normal issues were not relevant to adolescents but did cause worry for parents. Furthermore, parents' actions were found to be important even when children reached adolescence, with the authoritative parenting style being related to the developmental outcomes of self-reliance, achievement motivation, pro-social behavior, self-control, cheerfulness, and social confidence. Steinberg noted that this information is not beneficial unless parents are educated about the findings.

Waheeda Matheen (2011) studied the dynamics of parent child relationship and emotional maturity of the young girls. The sample was drawn from city college students in the age group of 19-22. The findings show that there is alarming presence of extremely unstable emotional maturity in the sample. The implication would be to refer them for more screening of emotional disturbances and parent training appears imperative, to enhance their relationships with their children, thereby improving the emotional maturity of the sample

Finkenauer (2002) conducted a cross-sectional study to examine the links between secrecy and psychological well-being and emotional autonomy among 227 younger (12-13 years) and older (16-18 years) adolescents. Results showed that keeping secrets from parents is associated with physical and psychological disadvantages in adolescence. Confirming the prediction, however, secrecy was also related to adolescent's emotional autonomy..

Doyle and Markiewicz's (2005) study of 175 adolescents suggested that parenting does affect adolescents' ability to adjust. Greater levels of psychological control were found to increase adolescents' ability to internalize problems. Further, parental warmth was found to foretell an increase in adolescents' self-esteem while also foreshadowing a decrease in adolescents' ability to externalize problems.

Silman (2006) revealed that greater parental involvement, greater parent monitoring and better parent child communication results in fewer adolescent behaviour problems. Labella (2007) reported that although teenagers will make their own choices, a good home can increase the odds that kids will avoid many of the pitfalls of adolescence.

Tinkew et al. (2006) used data from the National Longitudinal Study of Youth 1997, Rounds 1 to 3 (N=5,345), among adolescents in intact families and found father-child relationship and father's parenting styles as predictors of first delinquency and substance use. Discrete time logistic regressions indicate that a more positive father-child relationship predicts a reduced risk

of engagement in multiple first risky behaviours. Having a father with an authoritarian parenting style is associated with an increased risk of engaging in delinquent activity and substance use. Two-way interaction models further indicate that the negative effect of authoritarian parenting is reduced when fathers have a positive relationship with their adolescent. Permissive parenting also predicts less risky behavior when the father-child relationship is positive. The positive influence of the father-child relationship on risk behaviours is stronger for male than for female adolescents.

Sibnath Deb, Kerryann Walsh(2010) study to understand better anxiety among adolescents in Kolkata city, India. Specifically, the study compared anxiety across gender, school type, socio-economic background and mothers' employment status. The study also examined adolescents' perceptions of quality time with their parents. A group of 460 adolescents (220 boys and 240 girls), aged 13-17 years were recruited to participate in the study via a multi-stage sampling technique. Results show that anxiety was prevalent in the sample with 20.1% of boys and 17.9% of girls found to be suffering from high anxiety. More boys were anxious than girls ($p < 0.01$). . Adolescents with working mothers were found to be more anxious ($p < 0.01$). Results also show that a substantial proportion of the adolescents perceived they did not receive quality time from fathers (32.1%) and mothers (21.3%). A large number of them also did not feel comfortable to share their personal issues with their parents (60.0% for fathers and 40.0% for mothers).

Brinda B. Sharma (2013) investigated the correlations that exist among family relationships and mental health status among adolescents. This study was carried out on 100 randomly sampled adolescents of Dibrugarh, Assam. The sample comprised of a mixed group of students from high and low socio-economic status. .. Parental acceptance also differed significantly for boys and girls. High to above-average level of parental avoidance was seen among adolescents from high-socio economic background. Variance in paternal avoidance was indicated for boys and girls. The level of parental concentration was average for both groups. However there is a difference in Mothers' concentration towards boys and girls.

Reetinder Brar (2013) *studied the relationship between Academic stress, Coping strategies and Parental attachment of Adolescents. The sample size consisted of 700 (345 boys and 355 girls) adolescents (age 17+ to 18 years) selected randomly. All the adolescents belonged to science stream. The results showed that there was significant relationship between variables of Coping Strategies and Parental Attachment with Academic Stress. It was also seen that Coping Strategies and Parental attachment were significant predictors of Academic stress of adolescents.*

Gayathri Rao and Ankur Madan (2013) examined the attachment styles of 95 adolescents varying from 14 to 17 years of age, from reputed English medium schools all over Bangalore. They were given the Inventory of Parent and Peer Attachment and then categorized into those

who use Facebook for more than 7-8 hours a day and those who don't. Five securely attached adolescents and five insecurely attached adolescents with heavy Facebook use were selected randomly and were interviewed to investigate the reasons for Facebook use. Results indicated that there existed substantial differences in the reasons for Facebook use by those securely and insecurely attached adolescents. They also believed that their need for affection and their need to belong, was met by the use of Facebook, which otherwise would not have been possible. Popularity rated high as a consequence of using Facebook and the effects of peer pressure were not undermined. Securely attached adolescents on the other hand, did not view privacy and independence as big issues revolving solely around Facebook use. They also enjoyed the presence of their family members on Facebook along with them. Popularity still scored high as a result of Facebook use, as so did the need to fit in and belong. On the whole there came to light differences that existed between the securely and insecurely attached adolescents on the reasons for Facebook use.

Anita Bhat and Vijayalaxmi Aminabhavi(2011) Attempted to study the impact of home environment on the psychosocial competence of adolescents. Data were collected from 100 adolescents studying in IX and X standards in English medium high schools of Dharwad. Results revealed that adolescents with high control, social isolation, deprivation of privileges and rejection at home have shown significantly lower problem solving, decision making, coping with emotion, coping with stress and overall psychosocial competence. Children with high protectiveness, punishment, conformity, reward, nurturance and permissiveness have better empathy, critical thinking, empathy, self-awareness, coping with stress, interpersonal relations and effective communication as well as overall psychosocial competence. Findings of the study reveal the significance of home environment in the development of life skills.

These Studies show a strong link between the quality of parent-teenager relationships and young people's mental health. The quality of relationship with parents is key factor for the wholesome development of an individual.

5. Conclusion

Present day society is based on competition in which everyone has the tendency to perform as perfectly as possible. So here motivation, involvement and support of parents make him more confident and optimistic. Therefore it can be summed up that home environment including parental encouragement, involvement, parental interest, behaviour, parental aspirations, parenting skills and parenting styles have direct influence on the well being of Adolescence. School counselors should be appointed to carry out programmes for the parents as well as students for their well being.

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Research Article

HR ROLE IN JOB SATISFACTION OF PROFESSIONAL STAFF IN CONSTRUCTION INDUSTRIES

¹Dr.R.S.BALAKUMAR, ²Ms.B.VIDYA, ³S.RAGHAVAN

¹ Director, Christhu Raj Institute of Management,Trichy.

balakumar_trichy@yahoo.com

² Research Scholar, Department of Business Administration,Srimad Andavan Arts and Science college,Trichy.

vidyasenthilkumar@rediffmail.com

³ Research Scholar, Department of Business Administration, Srimad Andavan Arts and Science college,Trichy.

sraswinsundar@yahoo.co.in

Abstract

The aim of this research is to investigate the effect of contractors' human resource (HR) practices on job satisfaction of their professional staff. The specific objectives are to: determine the effectiveness of contractors' HR practices; find out the level of job satisfaction that professional staffs who work for contractors have; and study the relationship between HR practices and job satisfaction.

Keywords- *Effective HR practices, Contractor's professionals, Job satisfaction, Human resource management.*

1. Introduction

Human Resource (HR) policies and practices affect labour productivity (Patel and Cardon, 2010), assembly plant productivity (Macduffie, 1995), steel plant productivity (Ichniowski and Shaw, 1999), and employee turnover (Arthur, 1994). Although improvements were made over the years, little is known about the current HR practices of contractors in Singapore, and more needs to be done to find out about these practices.

The aim of this research is to investigate the effect of contractors' HR practices on job satisfaction of their professional staff. The specific objectives are to:

- determine the effectiveness of HR practices adopted by contractors;

- find out the level of job satisfaction that professional staff who work for contractors have; and
- study the relationship between HR practices and job satisfaction.

This research focuses on current HR practices on professional workers adopted by contractors in Singapore. The job satisfaction levels of professionals who work for contractors are also studied. The study does not include construction professionals in consultancy firms, nor contractors' semi- and unskilled workers.

2. Literature Review

The repertoire of management practices include: decision making, planning, organizing, leading and controlling (DuBrin and Ireland, 1993). Management practices could also be categorized into: shop floor management, monitoring, targets and incentives (Bloom et al., 2005). Under organizing, managers need to consider staffing issues, and human resource management (HRM) comes into play. Studies have found that HR practices affect firms' performance in several ways.

Macduffie (1995) established the concept of HR bundle or system, and showed that HR practices affect firm-level performance not individually but as interrelated elements. In addition, HR bundles contribute most to assembly plant productivity and quality when they are integrated with manufacturing policies. Guest et al. (2004) proposed the different methods by which bundles might be identified using factor analysis and regression, and came up with a parsimonious set of HR practices for adoption by policy-makers. Arthur (1994) established that steel mills that adopt commitment based HR systems yielded higher productivity, lower scrap rates and lower employee turnover than those with control based HR systems. Ichniowski and Shaw (1999) found that HRM practices that are comprehensive significantly improve productivity of workers in steel production lines. The comprehensive practices include problem-solving teams, extensive orientation, training throughout employees' careers, extensive information sharing and rotation across jobs, employment security, and profit sharing. HR practices that emphasize group culture have also been found to increase labor productivity (Patel and Cordon, 2010). HRM involves finding out two needs – what people want from their work and what an organization wants from its employees, and then trying to match these two sets of needs (Tan and Torrington, 2004). There is a growing emphasis on effective HRM, as people should no longer be treated as a “cost”, but as a company's greatest “asset” and central source of competitive advantage (Druker and White, 1997). In order to retain these assets, it is necessary for employees to experience job satisfaction. This means that HRM must be given a more strategic role in organizations (Martell and Carroll, 1995). Job satisfaction is an affective (that is, emotional) reaction to one's job, resulting from the incumbent's comparison of actual outcomes with those that are desired (expected, deserved, and so on.)” (Weiss, 2002). This definition is similar to one given by Locke

(1969), where he suggested that job satisfaction is the “pleasurable emotional state resulting from the appraisal of one’s job as achieving or facilitating one’s job values”. Job satisfaction is in fact one’s attitude towards the job, and this attitude can be greatly influenced by HR practices in the firm.

3. Recruitment methods:

Effective recruitment methods are necessary to attract, and more importantly, to retain a quality workforce in an organization and this can be achieved if the recruitment process can be made more objective and formal (Wood and Manwaring, 1984). The construction industry tends to have its own recruitment practice. Due to the nature and structure of construction work, informal recruitment methods has been the dominant approach (Lockyer and Scholarios, 2007), i.e. because construction is project based, managers are rarely held accountable to formal recruitment procedures as the recruits may only be with the firm till the end of a project, and as such, do not pose much of a concern to the firm. Such informality may also be one of the reasons why the construction industry is mainly made up of a male-dominated workforce (Agapiou, 2002).

4. Training and Development:

Training is needed to meet the challenges inherent in twenty-first century work careers and organizations, where employees are required to continuously update their knowledge and skills, and where organizations needs to invest highly in the development of their human capital (Ilgen and Pulakos, 1999). One of the most influential training and development models is be Goldstein’s instructional system design (ISD) model (Chen and Klimoski, 2007). The ISD model suggests that effective training programs should progress from needs assessment, to the development of various instructional objectives and strategies, to the implementation and then to the evaluation of training (Goldstein, 1991). Extensive orientation training throughout employees’ careers also tend to improve their productivity (Ichniowski and Shaw, 1999), the main motive of having training and development is to increase a person’s knowledge and skills. Training is systematic development of the knowledge, skills, and expertise required by a person to effectively perform a given task or job (Patrick, 2000). Training is an important function in HRM and high performance in work depends very much on the right and effective type of training (Smith and Smith, 2007). Many firms have also spent huge sums on training, believing that their employees’ performance will improve after these trainings and thereby, increase the firm’s productivity (Yamnill and McLean, 2001).

Performance evaluation/appraisal

Performance appraisal is a system that is fundamental to a number of important organizational decisions, especially, regarding pay and promotion (Wiese and Buckley, 1998). It allows both the employee and management to be aware of the employee's behaviour and accomplishments over a period of time (DeVries et al, 1981). Even though it is a necessity, managers generally dread carrying out appraisal interviews as much as appraises dislike being appraised (Tan and Torrington, 2004). The four main uses of performance appraisal are between person, within person, systems maintenance and HR practices of contractor's documentation (Cleveland et al., 1989).

Reward systems

A reward system should be a package/system that consists of rewards and benefits, such as holiday leaves, medical benefits, and transport allowance and performance bonus. The main purpose of a reward system is to reward and retain good employees, motivate them to perform at their best and attract the right applicants to the job (Tan and Torrington, 2004). An effective and good reward system is very important, because an effective pay system can increase an individual's motivation to perform, which then increases productivity and subsequently, increasing competitiveness of the firm (Lawler, 1990). These days, companies do not design pay systems only as a means to compensate for work done and reward performance, but pay systems that improve performance as well (Hurwich, 1986).

Gap in knowledge

In recent years, with the greater emphasis on human beings as a firm's greatest asset rather than cost, HRM has become important in many organizations. There are many well-established strategies and techniques to ensure that people are managed and developed to achieve the organization's goals. However, because of the complexity and dynamism of construction projects, the applicability of HRM strategies that have been applied successfully in more stable industries remains unclear (Loosemore et al., 2003). Weiss (2002) suggested that job satisfaction could lead to positive individual performance, which could translate into organization efficiency. Hitherto, not much research on HR practices of Singapore contractors was carried out. Little is known of the relationship between contractors' HR practices and job satisfaction of their professional staff. The fieldwork was thus conducted to fill these gaps in knowledge.

5. Research Method

The research approach was based on survey. It was chosen because it allows for data to be collected from large sample sizes in a short time, and a relatively large sample size was needed in this study to allow the findings to be generalizable. Another reason survey was chosen is because it allows for anonymity. Since the information required for this research is relatively sensitive, the anonymous nature of a survey allows relatively more accurate data to be collected.

The data collection instrument specially designed for this research is a structured questionnaire. Section A of the questionnaire was to find out the profile of respondents and their firms. Section B asked respondents about the HR practices of their firms. Section C was to find out the respondent's job satisfaction level in respect of current career opportunities (Y1), nature of the job (Y2) and overall working environment (Y3). Respondents were required to rate on a seven-point scale with 1 being the least satisfied and 7 being highly satisfied. Section D was to find out the HR factors contributing to job satisfaction. Respondents also rated these on the same seven-point scale. The population frame of this research comprised all professionals who work in construction firms in Singapore. The sampling frame comprised randomly chosen professionals who work for contractors that are registered with the Building and Construction Authority (BCA). A total of 130 main contractors were randomly chosen from the BCA's Directory of Registered Contractors and Licensed Builders, under the sub-category "General Building" and are of large or medium size.

Characteristics of sample

A total of 130 sets of questionnaires were sent out via e-mail to BCA's large- and medium-sized contractors, and 32 completed questionnaires were received after follow-ups and reminders. Although the response rate of 25 percent is considered relatively low, statistical analysis could still be carried out because in accordance with the generally accepted rule, central limit theorem holds true when the sample size is ≥ 30 (Ott and Longnecker, 2001).

The respondents comprise:

- . 14 (44 percent) quantity surveyors;
- . 13 (41 percent) engineers;
- . 3 (9 percent) project managers; and
- . 2 (6 percent) architects.

Their experience in the construction industry ranged from 1 year to 28 years with a mean of 6.1 years. Of the respondents, 17 (53 percent) are relatively senior (more than three years of working experience), while the remaining 15 (47 percent) are considered junior. Only six (19 percent) of the respondents are diploma holders, as compared to 26 (81 percent) who have graduated from the university with at least a bachelor's degree. Out of the 32 respondents, 20 (63 percent) of them are male. This profile indicates that the results of this research would be more applicable to male graduates working for contractors.

Factors	Mean	Value	sign	Correlation coefficient	Sign	Correlation coefficient	Sign	Correlation coefficient	Sign
Y1. Your current career opportunities	5.063	6.849	0.000	1.000	-	-	-	0.421	0.016
Y2.The nature of your job	5.125	6.122	0.000	-	0.000	1.000	0.000	0.620	0.000
Y3.The overall working environment of your firm	5.156	6.416	0.000	0.421	0.000	0.620	0.000	1.000	0.000
C1.The organizational structure of your firm	5.000	5.568	0.000	0.434	0.000	0.764	0.000	0.747	0.000
C2.Oppurtunities to attend Training and Development courses	4.875	3.768	0.001	-	0.027	0.390	0.027	0.545	0.001
C3.The to which your firm value the effort you put into your job	5.125	6.757	0.000	0.381	0.000	0.675	0.000	0.550	0.001
C4>Your base salary taking into account your experience	5.156	5.742	0.000	-	0.000	0.610	0.000	0.562	0.001
C5.The incentives added to your base salary package	4.250	0.955	0.347	-	0.017	0.419	0.017	0.593	0.000
C6.The bases which your firm uses to reward its professional staff	4.594	3.430	0.002	0.368	-	-	-	0.389	0.028
C7.Your firms methods of obtaining feedback from professional staff	4.250	1.114	0.274	-	-	-	-	-	-
C8.The number of feedback which you gave which have materialized	4.063	0.268	0.790	0.582	-	-	-	0.473	0.006
C9.The methods used in your firm to resolve conflicts	4.344	1.647	0.110	0.352	-	-	-	0.544	0.001
C10.The change for you to be involved in making crucial decisions	4.656	3.962	0.000	0.380	0.003	0.509	0.003	0.429	0.014
C11.The volume of work that is assigned to you	4.406	1.779	0.085	0.375	0.000	0.706	0.000	0.612	0.000
C12.The method adopted by your firm for performance appraisal	4.875	4.500	0.000	0.409	0.000	0.607	0.000	0.622	0.000

6. Results

Employee's job satisfaction level

In this study, an employee's job satisfaction is investigated from three aspects: Y1 – satisfaction with current career opportunities; Y2 – satisfaction with nature of their jobs; and Y3 – satisfaction with overall environment of their company. Table I shows that respondents are significantly satisfied with their jobs in these three areas, with means above 5.0 (on a seven-point scale) and significant t-values $\leq p \leq 0.0001$. The findings indicate that the HR practices of these firms are worth investigating, as their employees are reasonably satisfied with their jobs.

Table I also shows that Y3 is significantly correlated with Y1 and Y2. The results suggest that employees who are satisfied with their current career opportunities and nature of their jobs are also satisfied with the overall working environment in their firms. The implication of this finding is that contractors should provide a conducive working environment because an unsatisfactory work environment may be the root of job dissatisfaction. The finding agrees with Wright and Davis (2003) who also found that work environment has a strong influence on job satisfaction.

Effective HR practices Respondents were asked what HR practices were adopted by their firms as well as their level of satisfaction with these practices. To ascertain whether they are significantly satisfied with an HR practice, t-test was conducted and results shown in Table I (Columns 3 - 4). The t-test results show that contractors' professional staff are significantly satisfied with seven of the 12 HR practices ($p \leq 0.05$). The top three practices that they are most satisfied with are:

- (1) incentives included in pay package (C4);
- (2) individual's effort being valued (C3); and
- (3) organizational structure of the firm (C1).

The practices that they are unsatisfied with are:

- . methods used to resolve conflicts (C9);
- . methods used to reward staff (C5);
- . methods used to obtain feedback (C7) and evaluate feedback (C8); and
- . the volume of work (C11).

7. Limitations

Although a sample size of 32 respondents is considered acceptable (Ott and Longnecker, 2001) for the purpose of this research, it is relatively small when compared to the total number of professional staff working for contractors in Singapore. Therefore, the findings may not be easily generalizable. The socio-economic profile of the respondents is another limitation. Majority of the respondents have at least a university's degree (81 percent) and are men (63 percent).

Thus, the findings might not be applicable to female employees or staff with a relatively lower education level, particularly those without a university's degree. Another limitation is that the view of professional staff is contextualized to the economic situation at the time the survey was conducted, which was a period when the construction industry was just emerging from a long recession. In such an economic situation, people's expectations may not be as high as when the market is booming. When the economy improves and people may demand for better pay, better quality of life and work-life balance. Thus, the HR practices that give rise to job satisfaction may change. Therefore, the findings may only be applicable to similar economic situations. It is acknowledged that HR practices represent merely a constituent part of a broader repertoire of management practices, which could have implications on the validity and reliability of the findings presented here. Future studies could be conducted to investigate how job satisfaction is connected with broader issues such as work-life balance and socio-political considerations.

8. Conclusion and Recommendations:

It is important for contractors to create a satisfactory job environment so as to attract and retain a productive and talented workforce. This research investigated effective HR practices that may lead to job satisfaction using the questionnaire survey method. The study found that practices such as valuing employees' effort, giving an employee a chance to be involved in making crucial decisions, assigning a reasonable volume of work to an employee, adopting an appropriate method for performance appraisal and having an appropriate organizational structure are significantly correlated with job satisfaction. This study also found certain practices that contractors should pay more attention to as professional staff are not significantly satisfied with them. First, contractors are recommended to include medical benefits and meal allowances into their salary package, as healthcare benefits are the key to higher efficiency and productivity. Professional staff should also be counseled to modify their expectations. Second, contractors should also transparent in handling employees' feedback, as employees want to know why their feedbacks do not materialize. Employers could conduct a survey to find out employees' most desired method of obtaining feedback. Third, it is recommended that management staff be sent for conflict resolution courses as this would enable them to handle conflicts more tactfully and thus, raising the morale of employees. Finally, contractors should carefully assess the amount of work they have in hand before employing or dismissing employees so that staff have appropriate workload. Improvements in these areas may lead to increase in job satisfaction. With the knowledge that effective HR practices can indeed lead to job satisfaction, and a greater understanding of the different factors that can significantly affect job satisfaction, contractors in Singapore may be able to efficiently make use of their limited resources to formulate an effective set of HR practices.

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Oral Competency and Performance of L2 Learners of Engineering Students- An Analysis

¹Dr.L. Amutha and ²Dr. P. Selvakumar

¹*Assistant Professor, Department of English, Srimad Andavan Arts & Science College*
ammulekkan@yahoo.com

²*Associate Professor, International Institute of Tamil Studies, Chennai.*
pselvakumaar@gmail.com

Abstract

Among the four skills of language, speaking skill in English is given the least attention in curriculum at Schools and Universities. Teaching and learning a second language is a great confrontation to both the facilitator and the learner. This paper analysis the competency and performance level of L2 learners. It is an experimental study to discern their performance level in oral communication. It also gives the short notes on competence vs performance, sample task for testing the proficiency, research design, findings and conclusion. This paper is based on observation of Engineering students classroom experiences. The results of this experimental study will clearly reflect the practical difficulties of oral performance.

Key Words: oral competency, performance, L2 learners

1. Introduction

Oral proficiency in a second language is without question an important asset for students, both in terms of pursuing career goals, and of catching up with world's trend. English has a respectable place in the society. A person is not considered an educated if he does not have the fair knowledge of English. It has an established sociolinguistic fact that no one learns a second

language unless there is need for it. But in the present scenario, the essential for L2 learning is understood by even the uneducated parents. It results the mushrooming of English medium schools is as much an indicator of the common man's desire for good teaching of English as of quality education generally, there is a social demand for English. English medium schools have become synonymous with good teaching, better discipline, accountability, etc. Having understood this demand for English, the language holds a prime pontoon in the present day Indian socio-cultural setting and we can neglect its study only at the risk of loss to ourselves.

The main aim of undergoing this experimental test in L2 is to be able to use the language accurately, fluently and confidently in its spoken form and to improve their employability skills. The concentration is focused on the importance of oral communication skills for engineering students and on the difficulties of oral apprehension in them. It is the teachers who have the responsibility to guide and help the L2 learners to become effective speakers of the language. It is mandatory that learners should be given the opportunities to be involved in the classroom discussions. By engaging oneself into an active participation, one will be able to enhance one's mastery of the language skill.

Competence Vs Performance

The purpose of this section is to examine how the distinction between competence and performance has been addressed in the domain of language testing. Chomsky(1965) said that the distinction between them, "a linguistic theory concerned with an ideal speaker- listener, in a completely homogeneous speech community who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of language in actual performance. We thus take a fundamental distinction between competence (the speaker- hearer's knowledge of the language) and performance, the actual use of language in concrete situations"(as referred in Brown, and John William 1996).

Hymes also proposes to use 'competence' as 'the most general term for the place capabilities of a person. It is dependent on 'tacit knowledge' and 'ability for use' and the inclusion of ability for the use as part of competence allows in not only cognitive factors, but also non cognitive factors such as motivation. By 'performance' is meant actual use and actual events. So communicative competence is what enables a person to perform appropriately in speech events. It includes not only grammatical competence, which allows a person to judge whether and to what degree something is in fact done.

Interest of the Researcher

Most of the students are not 'industry ready' because they lack communication skills. (Infosys, 2011). The on-campus recruitment procedure follows the four stages: a) aptitude test, b) technical interview, c) group discussion, and d) personal interview. During the four stages the candidates' technical knowledge, analytical, verbal reasoning, critical thinking, and other interpersonal skills are assessed at each phase and the ineffective candidates are filtered out. Educational institutions which impart employability based skills to their students are successful in getting most of their students placed in top companies. Many Engineering Colleges have employed fulltime basis trainers to promote their students' interpersonal skills. Narayanan, vice chairman of Cognizant Technology Solutions and chairman of the NASSCOM, in an interview answered a question regarding the talent demand and supply gap and the role of the NASSCOM to help the industry bridge the gap: "The current situation is that, in terms of availability of talent, the numbers are good. The problem lies in the suitability of people. The industry has moved forward rapidly and technology also has changed but the educational institutions and the curriculum have not changed that much rapidly. So, we have to bridge the gap by providing additional training to the people who are coming out of colleges so that they are industry-ready." His statement clearly explicates that the faculty of English at professional colleges should undergo paradigm shift and put full a stop to mere teaching of grammar and structure; they are expected to play the role of communication and soft skills trainers.

The aim of this experimental study arose from the dissatisfaction of the researcher's observation that students completing their courses had difficulties and limitation in oral competency. Also, from listening to the teachers' remarks who said that students do not have adequate oral competency and the students themselves express their own dissatisfaction. These concepts inspired the researcher to plan for study and also carried out it to help throw some light on changing the situation and discern their difficulties in speaking English. Analyzing information from students and teachers, the researcher accepts as true that it is necessary for both the parties to modify their approaches and adapt new pedagogical style to enable oral efficiency.

Objectives

1. To identify the competency level in L2
2. To assess the performance of L2 learners with their gained competency

Research Plan

A sample 60 students were selected. Orientation class on this experimental study was conducted to explain the purpose, methodology and benefits for both the researcher as well as the participants. This study aims to explore students' oral performance in classroom interactions by using two main methods; observation and questionnaire. A sign up sheet with instructions was given which asks for personal information in order to contact them for further administration of the testing. The selected participants were given unique identification number to maintain the confidentiality of the individuals.

Provision for unique IDs

The learners' identification number is classified as follows:

(1)	<div>TUM28</div>	2)	<div>ERF47</div>
	T-Tamil medium		E-English
	U- Urban Based School		R- Rural Based School
	M-Male		F-Female
	28-Roll Number		47- Roll Number

Assessing Scale and diagnostic tool for testing

The design of rating system for the sample test is *Video Clipping*. The ACTFL proficiency guidelines are composed of ten possible levels of proficiency for speaking; Superior; advanced –high, mid, low: Intermediate- high, mid, low: Novice- high, mid, low. But to avoid too much of strain in assessing the learners' proficiency the present study goes with the view of Nic Underhill, i.e. the rating scales designed for this experiment are *Novice, Elementary, Intermediate, and Advanced*. These levels are measured using the major linguistic factors of vocabulary, grammar, descriptive language and fluency. In this experiment the marking scores could be awarded on the basis of speaking grading criteria as per American Council on the Teaching of Foreign Languages (ACTFL 1999). The range could be from 1,2,3,4, where Grade 4 is advanced- the speaker has exceptional communication skills, Grade 3 is intermediate- the

evidence of very good language proficiency, Grade 2 is elementary- the speaker makes a number of lexical or grammatical errors and the speaker may depend too much on rehearsed phrase, Grade 1 is novice- the speaker has difficulty in expressing himself in anything other than short sentences

The Sample Task- Video Clipping

In trying to teach a language in a classroom, it is forced to do without a good many of the stimuli to natural use of the language that the everyday environment and the situations of normal civilized life force on the person who learns a language naturally, living among native speakers of it. The learner joins them in their daily work and in their amusements, he establishes friendships with them and hears their expressions themselves in all the circumstances of their daily lives; gradually he joins in verbal accompaniment to their activities, and hardly notices how he is helped in doing this by his contact with concrete objects and situations. Most unsuccessful language is due to failure of the imagination: failure of teacher's imagination to realize that words alone may not suffice to carry the pupil over into the imaginary situations he is trying to bring him into, and failure of the pupil's imagination to create or picture the situation in his mind that the words are intended to build for him. Most teachers see the need for making use of visual aids in one form or another to help the pupil to imaginative experience beyond the reach of the classroom; not enough teachers realize the need of using visual aids imaginatively. That is, they use the objects and situations shown in the picture, film or other visual representation of reality as The faculty can help the learner to make the effort by reminding him of parallels in his own first-hand experience and showing him examples, until he is satisfied that the leap has been made. The objective of this test is to test the learners' descriptive language use of words and phrases or sentences, use of vocabulary for different situations. The target participants are given time to listen the video and analyze what is happening and how they are connected to make a story. They are free to include as many details and descriptions as possible. Participants are motivated to use the creativity freely. Anything which is visual or pictorial representations aid the second language learners to be more interesting. It is a substitution to the traditional picture narration. This task is chosen specifically to comfort the target participants by providing visual objects. A short and amusing film is shown. For this activity, the skills tested were vocabulary, grammar, descriptive language and fluency. The target participants are asked to narrate the following events based on the movie: theme of the movie, general description of the story, description of central character, critical thinking of the movie, and personal opinion of the movie.

Results of the Video Clipping - Table

Levels	Vocabulary	Grammar	Descriptive Language	Fluency
Advanced	0	0	0	0
Intermediate	13 (21.7%)	5 (8.3%)	12(20%)	16(26.7%)
Elementary	39 (65%)	33(55%)	28 (46.7%)	31 (51.7%)
Novice	8(13.3%)	22 (36.7%)	20(33.3%)	13 (21.7%)

A brief result of the data is given in the above table. The total number of target participants who obtain the advanced performance level for the vocabulary is none. The vocabulary is observed to be at the intermediate level, for the given 13(21.7%) participants. There are 39(65%) whose vocabulary is at the elementary level, and 8(13.3%) of them are at the novice level.

Result for grammar is that nobody's grammar is proved to be at the level of advanced. 5(8.3%) participants' grammar competency is at the intermediate level, 33(55%) of them are capable to get at the elementary level, and 22(36.7%) of them are able to get only to the novice level.

When the result for descriptive language is examined, it is identified that again no one of them is able to get to the advanced level, 12(20%) of their descriptive language skill is observed to be at the intermediate level, 28(46.7%) participants prove their competency in descriptive language to the elementary level, 20(33.3%) of them are at the novice level.

And for fluency, it is identified that the number of participants with proficiency to get to the advanced level are none, 16(26.7%) target participants are at the intermediate level, 31(51.7%) of them are at the elementary level, and 13(21.7%) of them are at the novice level.

Findings

- Vocabulary skills substitute word meaning recognition and guessing the meaning of unknown words. The proficiency in vocabulary and grammar are limited and confined which restricted their responses to simple unpredictable questions

- The recognized problems in the word formation are conversion of noun to adjectives or verb. The word translation can be described as inadequate to express anything but they tried the most elementary needs with fragment words and phrases
- Hesitations and pauses are overtaken when they attempt to answer and also search for the appropriate word transformation. In general, they appear to be confident when handling the situations. This will allow them to take action and continue to build up speaking skills.
- They perform with a number of lexical and grammatical mistakes such as tenses, subject-verb agreement, preposition, passive voice construction etc though such topics are known to them. It is also observed that though they use isolated words and fragmentary sentences, they try to deal with the language by recollecting learned words and phrases in order to explain.

Conclusion

Based on the findings, it was observed that students have basic linguistic competency. The competency may not guarantee for effective performance. Therefore for better results the students to be encouraged to practice the language for the effective performance.

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**THE BATTLE WITHIN AND WITHOUT IN THE QUEST FOR IDENTITY-
A COMPARATIVE STUDY OF MARGARET ATWOOD'S *THE EDIBLE WOMAN*
AND ANITA NAIR'S *LADIES COUPE***

¹Dr. V.Latha and ²Dr. R. Ahalya,

¹*Head, P.G & Research Department of English, Srimad Andavan Arts & Science College, Tiruchirappalli 05.*

²*Asst. Professor, Govt.Arts College, Tiruchirapalli 22*

ABSTRACT

The existential problems that afflict a woman have been a matter of concern universally and hitherto, that is before the advent of feminism and its theories, and she has been fighting a losing battle in domestic as well as social spheres. It is a reality that all the societies of the world have phallogocentric, oppressive and discriminative attitudes towards woman, relegating her to a subordinate position.

The woman today is inevitably compelled to play diverse roles both indoors and outdoors. She has learnt to carve a niche for herself in all the male - dominated spheres. Still there is something that provokes the conflict in her mind and makes her restive. Her justifiable craving for a 'tiny space' which she could claim 'her own', is still a cry in wilderness notwithstanding education and modernity. The unwritten social laws constrict her in such a way that she is a non-entity in spite of her abilities. This predicament that beleaguers the hapless woman and the need to break away from the 'tradition-ridden' society have become the clarion call of many writers, whose female protagonists show their retaliation either by questioning the institution or by aggressive violation of its prescribed norms.

So, the image of women in fiction has undergone a radical change in the last few decades. Women writers have made a foray into the traditional, stereotyped portrayals of enduring, self-

sacrificing women and have started taking up cudgels against male tyranny with astuteness. The present day conflicted female characters march in search of their identity with aplomb, no longer characterized and defined simply in terms of their victim status. In contrast to earlier novels, female characters from the 1980s onwards assert themselves and defy marriage and motherhood. Recent writers depict both the diversity of women and the diversity with each woman, rather than limiting the lives of women to one ideal. In short, the work of women writers is significant in making society aware of women's demands, and in providing a medium for self-expression and thus, rewriting the history of hierarchy. Contemporary women writers like Margaret Atwood and Anita Nair are female – oriented and their novels very often focus on the urgent need to erase the disparity in gender relations.

1. Introduction

Canada, like India has interesting parallels regarding customs, traditions and practices. Both are phallocratic in nature where sexual colonialism operates. Such a situation can offer a woman only a subaltern role. Obviously, a woman in Canada might appear to enjoy better privileges in self reliability and decision making than her Indian counterpart. But the fact remains that, each in the cultural milieu, has to surmount countless obstacles to claim her power, individuality and her own space.

Atwood's Marian(*The Edible Woman*) and Anita Nair's Akhila (*Ladies Coupe*) are pawns, not merely in the hands of fate but in the hands of other people around them. Both of them wallow in a doubt whether a woman can live alone. Both cling to the notion that their life will be improved by the arrival of a kind stranger, most likely a handsome suitor, but with a difference. They get caught in a whirlpool of changes within their 'selves' and ultimately emerge as strong individuals in search of their freedom and liberty. Marian finds a man; actually she comes across two men in her life. Her lover Peter defines Marian as "the kind of girl who wouldn't try to take over her life". Initially she finds in him a comfortable partner but very soon ends up in anorexia and stops eating. Perhaps, deep in her psyche she has the debatable question whether woman is after all edible.

Marian goes through a journey in which she sees and assesses different ways of understanding what it is meant to be a woman. She shares an apartment with Ainsley, though both of them hold different views, particularly on the issues of marriage and motherhood.

Ainsley does not want to get married but to get pregnant. Having a baby is her definition of femininity. In Clara, there is motherhood personified, an identity that Marian would like to put off for some time. She describes Clara as “a strange vegetable growth, a bulbous tuber”. When she leaves the hospital after the birth of Clara’s third baby, she feels as if she has escaped from a culvert or a cave and also feels glad that she isn’t Clara.

Unable to find a suitable definition of her identity outside of herself, Marian turns inward. She realizes that her identity and her interests can never be safe in the hands of Peter. Ultimately she attempts to rid herself of the false and empty identities that have prevailed around her by creating a cake-woman and by devouring it herself. Liberated of the false notion of having an existence in which she is some kind of appetizing food, she begins to enjoy taking food.

The Western woman is aware of her position in the society yet she demands for a new order in which men and women are equal at every level of existence. She doesn’t want to be considered a commodity and her fight is against consumerism in existence whereas the Indian woman is forever in a subservient position. The Edible Woman asserts the fact that financial independence is not real independence. The awareness of being subjugated and denied an equal role in all spheres from personal to social should come from within the self of an individual. Both Marian and Akhila introspect and this brings both intense suffering and attitudinal changes. If changes bring Marian redemption from suffering, the sufferings push Akhila in *Ladies Coupe* towards a radical change which instills in her a sense of self worth and hope and even the end is revealed as a new beginning.

Ladies Coupe has an interesting fictional strategy of a journey in a ladies compartment with six characters each having a story of her own- each story separate but illuminating the central story of Akhila who travels in the same compartment with a nagging doubt whether a woman can survive alone? Hailing from an orthodox middle class Brahmin family, Akhila is a frustrated spinster who has sacrificed her younger years looking after her mother, siblings and their offspring. When her father dies, the role of the family head is thrust on her and her own wishes and desires melt in the expectations of her relations. Women should mould and transform themselves to suit the interests of the family and Akhila is no exception. Major decisions of her life are taken by others. Fed up with the enervating multiple roles of a daughter, a sister and an aunt. She extricates herself from the inter twining filial clutches she goes on a train journey away from the family and its onus – seeking an escape from them hoping to discover her identity.

All these women have nothing in common between them except their gender. Each female is finally drawn with the choices they make and the choices that are made for them. The manner in which they share their experiences with the protagonist shows them the threshold of their self-discovery. Akhila takes a decision to reclaim her lost love and releases herself from the convention with the revelation “within me is a woman I have discovered”(LC 270)

Both Atwood and Anita Nair have given suggestive titles that have a profound bearing on the evolution and the progress of the female protagonists. The cake in the form of a woman by Atwood and the coupe specially designed for ladies by Anita Nair have deep connotations. The very act of baking the cake and eating it herself indicates Marian’s refusal to be a victim and the change in her perspective. Undertaking an independent journey by train and listening to the life stories of her co-passengers symbolizes Akhila’s intense urge to extricate herself from the suffocating filial ties and to get an answer for her ever probing question ‘can a woman live alone?’ Both Marian and Akhila emerge as strong icons of the modern woman who is resolute in crossing the barriers and breaking the boundaries.

2. Conclusion

The novels are open-ended but the underlying implication is that a new woman is born, one who wants to be noticed and heard and one who is capable of building a good life of her own.

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BIRD'S EYE VIEW OF ALLEGORICAL PLAY SANKALPA SURYODAYAM

Mr.N.Thyagavaradarajan

Research Scholar, PG & Research Department of Sanskrit, Rajah's College, Thiruvaiyaru.

Abstract

This is the quaint essence of the article given in the pages .Definition of the Sanskrit language, definition of Drama ,definition of Origin, Development of Sanskrit drama . Allegorical drama of Swami VedanthaDesika, SankalpaSuryodhayam and its essence in brief history of the author of SankalpaSuryodhayam were analyzed.

1. Introduction

Sanskrit language

Language is known as the communication of thoughts of the human being are exchanged in this form of language .Among those languages ,Sanskrit is considered as the most ancient language .Sanskrit is the name of the language that was spoken by the seers of ancient India who have expressed their knowledge ,wisdom and thoughts in that language .It is believed to be the language of the gods revealed to and spoken by the sages .It is a refined language .The language was regulated by the strict rules of grammar and was used in that refined form by the learned and highly cultured people from very early times .From 400BC, prakrit was spoken by a large section of the people became a literacy language and many works were written in that language mainly by Buddhists and Jains.

2. Origin of drama :-

Drama is originated from the Vedic period .Bharatha in his Natyasastra tells about the Vedic origin of Sanskrit Drama.According to Bharatha ,the gods approached Brahma and requested him to create an entertainment which would please their eyes and ears simultaneously .Creator Brahma , took the dialogue from the Rig Veda ,music from the Samaveda , Gestures from the Yajur Veda and the sentiments from AthrvaVeda.Thus created a fifth Veda called NatyaVedam .

Then the creator Brahma gave to Bharatha who brought it to the earth. This theory of divine origin is supported by the great poet MahaKaviKalidasa in his works. The earliest drama is formed in the MahaBhashyam, which mentions Balibhandha and Kanyabandha. Sanskrit dramas are said to have some Religious significance. Sanskrit dramas have some gestures and music to make their narration impressive. Thus, the origin of Sanskrit drama can be traced to a happy combination of Music, dance, dialogues, gestures and stories employed both in religious ceremonies and secular assemblies. This shows that the Sanskrit drama was both religious and secular in its origin and purpose. Nata, Natya, and Nataka, are derived from the root of "Nat". In Sanskrit "Nruth" means to dance.

3. Development of Drama:-

Pathanjali in his Mahabhasyam refers to two Dramas, namely, Kamsa Bhandha, Bali bhandha. Bharatha's Natyasastra refers to a dance called "Lakshmi swayamvara". Further, Bharatha classifies dramas into the nature of their plot, the length of this play, the nature of the Hero, Heroine and the sentiments. The earliest type of dramas are now available are the 13 plays of poet Bhasa. These 13 plays of Bhasa are very popular, based on the epics of the Ramayana and the Mahabharata then the Drama of MahaKavikalidasa.

Apart from such those dramas, the great poet "KavitharkikaSimham" Sri Swami Vedanta Desika's Drama and other literary works. Swami Sri Vedanta Desika's allegorical

Drama 'SankalpaSooryodhayam' is the most popular drama.

Swami Vedanta Desika and the play sankalpasoorodhayam :-

Swami Vedanta Desika's period was 1268 -1369

The author of the play Swami Desika was born at Thoopul, Kancheepuram, on Purattasi Thiruvonam day, variously addressed in veneration as Venkatanatha Thoopulpillai, Vedanta acharya, Sarvatautraswatantra and KavitharkikaSimham. Swami Desika was the incarnation of the Lord Sevenhills, and he is considered as the part of the Lord Ghantavatara {The Bell}. Even as a child, he received the blessing from NadadurAmmal. He had his early education at the feet of his maternal uncle AthreyaRamunuja {Appulav}.

On chanting the Garuda Mantra by which Lord Jayagrita the Lord of Knowledge visualised himself to Swami Desika his genius, his many splendour versatility scintillating brilliance was of such high order that, by the age of twenty, he attained 'Mastery of all vidyas and thereby acquired the intellectual equipment covering the entire range of literary, ethical logical, religious wisdom handed down from the past. He mastered the well-known branches of learning and had taught Sri Bhasya Thirty times over. He left behind him no less than one hundred and twenty six master pieces in the realms of literature and philosophy. Achutasatakam {Prakrit}

Rahasyatryasaraam {Manipravalas ,DesikaPrabhandham [tamil] } are some of them.His various works are in Tamil, Sanskrit and Prakrit established the Vishistadwaitha Philosophy on such firm and secure foundation , rendering it forever impregnable to advance attacks .

The reverence which Swami Desika has inspired in the minds of vaishnavita may be judged by the fact ,in many of the Vishnu temples his image is installed for worship and daily poojas are offered ,just like the worship to the presiding deities of the temples .

An allegorical play SankalpaSooryodhaya is an allegorical

Drama in Ten acts .Unlike the regular play with characters of Men and Women ,the special feature of the allegorical drama is the introduction of abstract qualities ,of vices and virtues 3 of the various human traits and emotions as characters .this is somewhat similar to the early English play like the Moralities.

Unlike the crude and primitive English Dramas. The allegorical Dramas in Sanskrit display a remarkable specialisation , elaboration and finesse as they followed the regular drama. Among the many such plays in Sanskrit ,Prabodhachandrodaya of Krishna Misra and Sankalpa Sooryodhaya of Swami Desika are well known prabodhachandrodaya is said to be the precursor to Sankalpasuryodhaya many of the characters have close resemblance and deals with Shanthirasa while the former brings out the essence of Advaita Philosophy SankalpaSuryodhaya undoubtedly brings out the doctrines of Vishistadvaita in dramatic form .The other highlight of SankalpaSuryodhaya is the defence and establishment of the doctrines .However both the plays are considered great in their respective way.

4. Brief explanation of Ten acts of SankalpaSuryodhayam

1. Glory of drama in prologue ,Praising of the poet ,arrival of Rama, Rathi, Viveka says Lord Narayana alone can grant Salvation through self-surrender Refutation of other philosophy.The dramatist has portrayed this conflict as between two kings on one side there is the great king viveka or Discrimination with his followers .On the other side there is another king Mahamoha or the great delusion with his followers

2. The names of the characters are very happily and appropriately chosen .The spouse of Discrimination is Sumati or good sense.The spouse of Mahamoha is Durmathi or evil sense , sumathi has two companions called sraddha {faith} vicharana {inquiry} vyavasaya { effort } is the general commanding the forces of the king viveka . As the story of Drama is centered on the salvation of the human spirit the dramatist introduces siddhanta{ right doctrine } truth/guru; Tarka { reasoning } the charioteer and Veda {Debate/discussion} the disciple . Samskara {refined culture}is the painter and drishtapratyaya { to see is to believe } is the messenger ; Bhakthi { Devotion to God } invokes the aid of Sankalpa { Divine will } and liberates Man. It shows that Human effort there must be but without the divine grace nothing can be finally achieved. This is the central prapathi or self-surrender .

3. The central figure of the play is purusha or Man . The forces mentioned above strive for his salvation .The forces enumerated below strive to drag him down . They are kama his spouse ratevasanta appeal to sensuous pleasures.Krodha, Lobha ,Darubha,Darpa have their appropriate spouses like jighamsa ,Trishna ,kuhana,ansAsuya respectively starubha ,the son of the pride prevents the approach of god .Abhinivesa has a suitable spouse in Durvasana .

4. The conflicts between the two sets of forces constitutes the movement of the play .Life is a conflict and the hero is who he comes out victorious out of this conflict and overcomes Kama by Sugupsa ,Krodha by Tithiksha, Lobha by Thushli ,Darpa by Adhikadhrishta .

5. Apart from the conflict in human life portrayed in the play there is another conflict appearing in more or less degree in every religious system and higher philosophy which is also set at rest by the play by the great and wonderful reconciliation logically and philosophically effected between the parts relatively played by the human effort on the oneside and the Divine grace on the otherside in the attaining of salvation by man .

6. Different Motifs such as Love,Heroism ,fearebe: have been enumerated by writers of literary art . The Poet-philosopher declares that there is no seivence or art .Worth its name if it is not capable of being portrayed in a drama and has striven to bring out santa or emotive peacefulness ,the highest rasa that can be depicted by any art .

*****RASO VAISAH *****

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संस्कृतस्य साहित्ये नाटकस्य महत्त्वम् एवम् उपयोगिता

Mr.J.Mohan

Research Scholar, PG & Research Department of Sanskrit, Rajah's College, Thiruvaiyaru.

सारांशः -

अत्र नाटकस्य विषये महत्त्वं उक्तं वर्ते। नाटकस्य लक्षणं तथा उत्पत्तिः, भेदाः च दर्शिताः। बहूनां कवीनां कृतयः, कृतीनां सारांशः वर्णितः। विशेषतः अत्र 'नलानन्दं' 'संकल्पसूर्योदयम्' इत्यनयोः नाटकयोः अवधानं दत्तम्। अन्ते एतेषां नाटकानां उपयोगिताऽपि वर्णिता।।

संस्कृत साहित्ये नाटकस्य महत्त्वम्

नाटकानि

काव्यं द्विविधं भवति। श्रव्यं दृश्यं च । श्रव्यकाव्यं महाकाव्य गीतिकाव्यादि भेदेन अनेकविधम्। दृश्यकाव्यं अभिनेय प्राधान्यं भवति। ' अवस्थानुकृतिः नाट्यं रूपकं तत्समारोपाद् नाटकेषु अभिनयदर्शनात् अलंकरणात् वेशभूषादि धारणात् नृत्यसंगीतलास्यविलासात् प्राकृतिकदृश्यसंयोजनात् च सर्वेषां आवालवृद्धानां रसिकानां सहजनानां च वितरां रसानुभूतिः जायते।

एवं संकल्प्य भगवान् सर्ववेदाननुस्मरन्।

नाट्यवेदं ततश्चके चतुर्वेदाङ्ग संभवम्॥

जग्राह पाठं ऋग्वेदात् सामभ्यो गीतमेव च।

यजुर्वेदात् अभिनयरसान् अथर्वणादपि॥

- | | | |
|------------------|---|---------------------|
| १. भासः | - | कर्णभारम्। |
| २. कालिदासः | - | अभिज्ञानशाकुन्दलम्। |
| ३. भवभूतिः | - | उत्तररामचरितम्। |
| ४. जीवा | - | नलानन्दम्। |
| ५. वेदान्तदेशिकः | - | संकल्पसूर्योदयः। |

नाटकोत्पत्तिः -

" In Sanskrit Drama we have an important branch of literature which had a full and varied national development quiet independent of any external influence. भरत in his नाट्यशास्त्रं tells about the vedic origin of sanskrit drama. According his account the gods approached ब्रह्म and requested him to create an entertainment which would please their eyes and ears simultaneously. Accordingly the creator took the dialogue from the Rig veda, music from the Samaveda, gestures from the Yajur veda and sentiments from the Atharva veda and thus created a fifth Veda called नाट्यवेदम्।

कर्णभारम्

Karnabharam is a one act play describing the episode of Indra begging in the disguise of a Brahmin and receiving the armour and the ear rings of कर्ण / दूतवाक्यं also a one act play deals with the episode of Lord Krishna going to the kauravas as on messenger of the pandavas seeking peace.

अभिज्ञानशाकुन्तलम्

Sakuntalam in seven acts is perhaps the last play written by Kalida. Though the plot is taken from the Mahabharata, kalidasa has introduced a major innovation in the sighthet ring (अभिज्ञान) which has transformed the whole plot. The main sentiment in the play is शृङ्गार but there is an under current of करुण beatifully portrayed from the 4th act onwards. poltical genius and dramatic skill of kalidasa have attained their perfection in this drama which has received the highest praise from all over the world. The german poet goethe speaks of शाकुन्तलं thus -

**Would'st thow the young year's blossoms
and the fruits of its decline
And all by which the soul is
charmed enraptured, feasted, fed,
would'st thow the earth and Heaven
itself in one sole norme combine,
I name thee, O sakuntala and all at once is said.**

निर्गतासु न वा कस्य कालिदास्य सूक्तिषु।
प्रीतिर्मधुरसान्द्रासु मञ्जरीष्विव जायते।।

भवभूतिः -

Bhavabhuti who was patronised by king yasovarman of Kanuj of the early 8th century A.D, is the author of three plays महावीरचरितम्, मालतीमाधवम्, उत्तररामचरितम्। Mahaviracaritam and uttararamacharitam are based on the Ramayana story while the plot of Malatimadhavam. Which is a प्रकरण is the poet's own creation. The real name of भवभूति was श्रीकण्ठः। It is said he got the title on account of that word occurring in a beautiful verse composed by him.

तपस्वी कां गतोऽवस्थामिति स्मेराननाविव।

भगवत्याः स्तनौ वन्दे भवभूतिसितावनौ।।

As the poet himself tells in the प्रस्तावना of मालतीमाधवं he was a great scholar in the vedas and sutras. His plays were enacted during the festivals in the महाकाल temple of Ujjaini.

जीवा - नलानन्दम्

नलः नाम राजा आसीत् निषधराज्ये भवति च, तस्य भार्या दमयन्ती विदर्भदेशीय भीमवर्मणः पुत्री। एकदा द्यूतक्रीडायां भार्यासाव वस्तुनः सर्वेऽपि वस्तुनः नारप्रायो नलः तां विहाय स्वयमपि राज्यादन्यत्र जगाम। दमयन्ती स्वपितृगृहे वासं कृतवती आसन्। एवं राज्यं पुनरपि स्वीकृत्य आनन्द सागरे मग्नत्वात् ग्रन्थस्य अस्य नाम नलानन्दमिति।

एवं न्यायेन राज्य विषधक्षमापति आसाद्य पुनरपि आनन्दाब्दौ निमज्ज्य सुसम्यक् राज्य परिपालनं च कृत्वा अखिलजनानां मनोरञ्जयन् समस्तैरपि विबुधजनैः बन्धुभिश्च अभिषिक्तो नलः देव्यासाकं आनन्दमनुभवन् जगदानन्दसन्दोहकन्दः पुण्यश्लोकोऽयं एकोजयति।

नलानन्दनाटकेऽस्मिन् सप्तमोऽङ्काः सन्ति। नाटकस्यास्य ग्रन्थकर्ता जीवाह्वयः भारद्वाजगोत्रोत्पन्न कोनेरिवर्यस्य सूनुर्भवति, जात्या ब्राह्मणोऽयं षोडशे शताब्दे नलानन्दं नाटकं आरचितवान् इति ज्ञायते।

संकल्पसूर्योदयम्

सर्वेषां नाटकानां अतिसमीचीनं भवति, संकल्पसूर्योदयमिति।

शृङ्गारहास्यकरुणा रौद्रवीरभयानकाः।

बीभत्साद्भुतसंज्ञौ चेत्यष्टौ नाट्ये रसाः स्मृताः।।

इत्यष्टावेव रसान् पर्यजगणत्। अपरे तु वस्तुतः शान्तरसाभाववादाभि निवेशवन्तोऽपि तदत्यन्तापलापे स्वहृदयसंवादमलभमानाश्चैवं वदन्ति। श्रव्यकाव्येषु यद्यपि कथंचित् शान्तरसनिवेशः संभवतु नाम, तथापि दृश्यकाव्येषु अभिनवप्रधानेषु सुतरां तदसंभव एव, समस्तव्यापारप्रविलयरूपस्य शमस्य सर्वथाभिनयायोगात्। अतो रूपकेषु शान्तिरसनिवेशोऽसांप्रदायिकोऽप्रामाणिकश्चेति।

अथपुंसामनादिकालप्रवाहायातरागद्वेषादिकलुषसमाक्रान्तचित्ततया शान्तरसाभिनिवेशिनां तदास्वादरसिकानां चासंभवात् शान्तरससंभव इति। वादं प्रतिवदत्ययं ग्रन्थकार वचनेन।

अथवा तादृशान् सभ्यान्मत्वा जगति दुर्लभान्।

शङ्के शान्तिरसोल्लाससमशक्यमभिमेनिरे।। इति।

अयं भावः - सत्यं तदास्वादरसिका विरला एव। न त्वत्यन्तं तेषामसंभवः।

संकल्पसूर्योदये प्रथमोऽङ्के प्रस्तावनायां नाटकप्रशंसा ३०, कविप्रशंसा-३७, विष्कम्भे कामरतिवसन्तानां संलापमुखेन कृत्स्नस्य प्रपञ्चस्य कामपरवशत्वं महामहोद्दीनत्वं च।

द्वितीयोऽङ्के प्रवेशके श्रद्धाविचारणयोः संलापमुखेन पुरुषमोहनार्थं महामोहकृतस्य बौद्धजैनादिमतप्रवीणवादि प्रोत्साहनस्य कथनं - १९५

तृतीयोऽङ्के विष्कम्भे रागद्वेषाभ्यां विरक्तेः विष्णुः भक्तेश्च निरोधस्यापक्षेपः। अन्ते रागद्वेषपराजयश्च -३३४ ,विवेकसमुतिभ्यां पुरुषस्य मोक्षोपाये प्रवर्तनम्- ३५ ।

चतुर्थोऽङ्के कामक्रोधवसन्तलोभतृष्णाभिः व्यूह्य पुरुषस्य जयायोपक्षेपः। विवेकेन व्यूहं विभिद्य तेषां विद्रावणम् -३९६।

पञ्चमोऽङ्के दम्भः, कुहना, दर्पः, असूया इत्येषां महामोहसैनिकानां स्वस्वबलप्रशंसाप्रङ्गेनेतरेषां निन्दा।

षष्ठोऽङ्के विष्कम्भे स्तम्भनाम्नः कञ्चुकिनो वाक्यात् महामोहेनापसर्पस्य प्रेषनादिकथनम् - ५२९।

सप्तमोऽङ्के विष्कम्भे विवेकाशिल्पिना संस्कारेण हृदयमण्डपे आत्मलिखितस्य विश्वचित्रस्य वर्णनम् -६०८।

अष्टमोऽङ्के विष्कम्भे अभिनिवेशदुर्वसनयोः संवादमुखेन महामोहयुद्धोत्साहस्य वर्णनम् - ६६४ । नवमोऽङ्के व्यवसायसहितेन विवेकेन पुरुषस्य समाधेः संपादनम् -७४९।

दशमोऽङ्के विष्णुभक्त्या गरुत्मतः स्तुतिः-८०८ । भगवत्संकल्पस्य प्रवेशः-८१३।

श्रद्धासहायेन पुरुषेण स्वस्य समाधिसिद्धेवचनं -८२९। पुरुषस्य निःश्रेयसलाभः- ८७७।



संस्कृतस्य वाङ्मयस्य वैशिष्ट्यम् एवं उपयोगिता

Mr.N.Thyagavaradarajan

Research Scholar, PG & Research Department of Sanskrit, Rajah's College, Thiruvaiyaru.

सारांशः

संस्कृतस्य अर्थः तावत् संयक् कृतम् संस्कृतम् इति । अस्य अनेकानि नामानि यथा- गीर्वाणी, सुरभारती इत्यादयः । अत्र चत्वारः वेदाः, वेदाङ्गाः षट्, उपनिषदः, दर्शनानि, इतिहासम्, अष्टादश पुराणानि, महाकाव्यम्, ऐतिहासिक काव्यम्, गद्यसाहित्यम् नाट्यशास्त्रम् अलङ्कारशास्त्रम्, लोक कथा, नीतिकथा, चम्पूग्रन्थाः इत्यादयः विषयाः दत्ताः सन्ति । एतेषाम् विषये अत्र संग्रहेण प्रतिपादिताः सन्ति ।

संस्कृतस्य वाङ्मयस्य वैशिष्ट्यम् एवं उपयोगिता

संस्कृतम्

संयक् कृतम् संस्कृतम् इति । को न जानाति भगवतीं सुरभारतीम् । इयमेव अमरवाणी, देवभाषा, आदिवाग्, गीर्वाणी, सुरभारती इत्यादिभिः

अनेकाभिः नामभिः प्रसिद्धा वर्तते। इयमेव हि सर्वासु भाषासु प्राचीना, सर्वासाश्च जननी वर्तते। पूर्वस्मिन् समये तु संस्कृतभाषा एव सर्वसाधारणां राष्ट्रभाषा चासीत्। सर्वसाधारणजनाः संस्कृते एव वदन्ति स्म। अतः तत्कालीनाः ग्रन्थाः संस्कृते एव लिखिताः सन्ति। पर्वसु, उत्सवेषु, विशेषसमाहोरेषु च सर्वसाधारणजनानां समक्षं संस्कृते लिखितानां वाटकानाम् अभिनयो भवति स्म। अतः प्राचीनसमयेऽपि अस्याः भाषायाः महत् महत्त्वम् आसीत् इति सिद्धयति। इयं भाषा सरसा, सरला, परिमार्जिता परिष्कृता, परिशुद्धा, व्याकरणादिदोषविरहिता च। प्राचीनभारतस्य समग्रसाहित्यस्य जीवनदायिनी, प्राणपोषिका आधारभूता संरक्षणसमन्विता इति व्यवहियते।

वैदिकवाङ्मयम् -

ऋग्वेदः, यजुर्वेदः, सामवेदः, अथर्ववेदः चत्वारो वेदाः। ऋग्वेदे १०५२२, यजुर्वेदे १९७५, सामवेदे १८७५ अथर्ववेदे ५९७७ च मन्त्राः सन्ति। चतुर्षु वेदेषु २०३४९ मन्त्राः सन्ति। चत्वारः उपवेदाः, आयुर्वेदः, धनुर्वेदः, गान्धर्ववेदः, अथर्ववेदश्च। ‘धर्मजिज्ञासमानानां प्रमाणं परमं श्रुतिः’ (मनु) धर्मत्वस्य चिन्तनावसरे श्रुतिरेव परमं प्रमाणं वर्तते। ‘वेदोऽखिलो धर्ममूलम्’ इति प्रतिपादयति वेदानां परमं प्रामाण्यम्, महत्त्वम्, सर्वातिशयं वैशिष्ट्यं च।

एतेषां चतुर्णां वेदानां व्याख्यानकारकाः यज्ञयागादि प्रतिपादकाः, ब्राह्मण ग्रन्थाः सन्ति। यथा - ऋग्वेदस्य ऐतरेयः, यजुर्वेदस्य शतपथ, सामवेदस्य

साम, ताण्ड्य, षड्विंश, अथर्ववेदस्य गोपथ ब्राह्मणग्रन्थाः सन्ति। ब्राह्मणग्रन्थेषु वैदिककर्मकाण्डस्य विशदं व्याख्यानं वर्तते। एतेषां परिशिष्टरूपेण आरण्यकग्रन्थाः सन्ति। येषु आध्यात्मिक ज्ञान- विज्ञानस्य विवेचनम् उपलभ्यते।

वेदानां शिक्षा, कल्पः, व्याकरणम्, निरुक्तम्, छन्दः, ज्योतिषम् इति इमानि षट् वेदाङ्गानि सन्ति। छन्दः पादौ तु वेदस्य, हस्तो कल्पोऽथ पठ्यते, ज्योतिषामयनं चक्षुः, निरुक्तं श्रोत्रमुच्यते। शिक्षा घ्राणं तु वेदस्य, मुखं व्याकरणं स्मृतम्, तस्मात् साङ्गमधीत्यैव, ब्रह्मलोके महीयते।। (पा.शिक्षा)

उपनिषदां महत्त्वम्

उपनिषद्यते प्राप्यते ब्रह्मात्मभावोऽनया इति उपनिषद्। आध्यात्मिकसारभूतं गुह्यतमं गूढतमं च परमतत्त्वं सरल-सरस- सुबोधशैल्या, भावप्रधानपद्धत्या कथाप्रसंग प्रश्नोत्तररीत्या च उपनिषत्सु उपलभ्यते। साम्प्रतं प्राधान्येन दशोपनिषद् एव प्राप्यन्ते पठ्यन्ते च ईश-केन- कठ - प्रश्न - मुण्डक - माण्डूक्य - तैत्तिरीय - ऐतरेय - छान्दोग्य - बृहदारण्यक - श्वेताश्वतराः। श्रीरङ्गरामानुजमुनिना एतेषां कृते व्याख्यानं कृतम्। तदनन्तरं अनेके विद्वांसः विविध व्याख्यानपूर्वकं बहुविधभाषायां व्याख्यां कृतवन्तः। उपनिषत्सु आध्यात्मिकविद्यायाः चरमोत्कर्षः सर्वातिशयः भावश्च संलक्ष्यते।

दर्शनानां गूढरहस्यम्

दृश्यते अनेन इति दर्शनम्। येन साधनेन इदं समग्रं विश्वं, वस्तुस्वरूपं, आत्परमात्मने भेदः, प्रकृतेः मूलरूपं, सृष्टेः विकासः, समग्रतत्त्वानां विवेचनम्, ज्ञान - विज्ञान वर्णनम् यथातथ्येन दृश्यते समीक्ष्यते परीक्ष्यते च तद् दर्शनम्। षड्दर्शनानि जैमिनी मुनिनाकृत पूर्वमीमांसा दर्शनम्, कणादमुनिकृत वैशेषिक दर्शनम्, गौतममुनिकृत न्यायदर्शनम्, पतञ्जलि मुनिकृत योगदर्शनम्, कापिल मुनिकृत सांख्यदर्शनम्, व्यासमुनिकृत वेदान्तदर्शनम्। इमानि षट् दर्शनानि आस्तिकदर्शनानि अभिधीयन्ते चार्वाक- बौद्ध - जैनदर्शनानि च नास्तिक दर्शनानि निर्दिष्यन्ते।

वाल्मीकेः शरणागतिशास्त्रम्

रामायणी कथा रम्या, मृदुलसरससंपूरिता, माधुर्यादि गुणगौरवगुम्फिता, जीवनपथ प्रदर्शिका, हृद्या, कस्य चेतः मनः न आकर्षति आह्लादयति च। संस्कृतसाहित्यस्य आदिकाव्यं रामायणं नितरां सुप्रसिद्धिम् अवाप। रामायणीं कथामनुसृत्य बहवः रससिद्धाः कवीश्वराः महाकाव्यानि नाटकानि च अरचयन्। सत्यमुक्तम् -

‘वाल्मीकि - गिरिसंभूता रामाम्भोनिधि सगता।

श्रीमद्रामायणीयगङ्गा पुनाति भुवनत्रयम्।।’

व्यासविरचित - महाभारतम् —

‘ भारतं पञ्चमो वेदः’ इति प्रतिपादयति महाभारतस्य वैशिष्ट्यं महत्वं च। महत्वाद् भारवत्वाच्च ‘ महाभारतम् ’ उच्यते।

त्रिभिर्वर्षैः सदोत्थाय कृष्णद्वैपायनो मुनिः।

महाभारतमाख्यानं कृतवानिदमुत्तमम्।।

महाभारतमिदं न केवलं आख्यानं अपि तु समग्रसंस्कृतवाङ्मयस्य सारभूतं सन्निदर्शनम् च वर्तते। वेदानां, वेदाङ्गानां, उपनिषदां, दर्शनग्रन्थानां च कर्तव्याकर्तव्य बोधकं ज्ञानं विस्तृतमत्र वर्णितम्। नीतिशास्त्रम्, आचारशास्त्रम्, व्यवहार शास्त्रम्, विविधकलाकौशलम्, लोकोपयोगिज्ञानं च अत्र संगृह्य प्रस्तूयते। अनेनैवोच्यते - ‘ यदिहास्ति तदन्यत्र यन्नेहास्ति न तत् क्वचित्।’

दुग्धं गीतामृतं महत् -

संसारेऽस्मिन् को न जानाति श्रीमद्भगवद्गीतायाः गुणगौरवं, महत्वं वैशिष्ट्यं च। भगवद्गीतायां आत्मतत्त्वविवेचनं, शरीर - परिवर्तनम्, मृत्योः रहस्यम्, सांख्य-योग तत्त्वानां विवेचनं, ज्ञान- कर्म- भक्ति ध्यानयोगानां निरूपणम्, सत्त्व- रज - तम त्रयाणां गुणानां वर्णनम्, दैवी आसुरी संपदश्च चित्रणं,

यज्ञ - दान - तप - कर्मादि विविध विषयाणां च प्रतिपादनं सारल्येन
अर्थभावप्राधान्येन चास्ति। सत्यमुक्तम्

‘गीता सुगीता कर्तव्या किमन्यैः शास्त्रविस्तरैः।

या स्वयं पद्मनाभस्य मुखपद्माद् विनिःसृता।।’

अष्टादशपुराणानां महत्त्वम्

भारतस्य ऐतिह्यज्ञान - विज्ञानाय, आचार -
विचारपरिज्ञानाय, विविध शास्त्राणां साररूपाय, भौगोलिक - राजनैतिक- सांस्कृतिक
- विवरण - विचेनाय, धर्मकला नीति व्यवहारादि विविध विषयाणां परिज्ञानाय
पुराणानां वैशिष्ट्यं स्वीक्रियते।

‘अष्टादशपुराणेषु व्यासस्य वचनद्वयम्।

परोपकारः पुण्याय पापाय परपीडनम्।।’

अष्टादशपुराणानि

ब्रह्माण्ड, ब्रह्मवैवर्त, मार्कण्डेय, भविष्य, वामन, ब्रह्म, विष्णु,
नारद, भागवत, गरुड, पद्म, वराह, मत्स्य, कूर्म, लिङ्ग, शिव, स्कन्द, अग्नि।

महाकाव्यम् - गीतिकाव्यम् - ऐतिहासिक काव्यं च -

‘ वाक्यं रचान्तमकं काव्यम् ‘ (सा.दर्प)

‘ शब्दार्थौ सहितौ काव्यम् ‘ (काव्यालङ्कार)

‘ काव्यं यशसेऽर्थकृते व्यवहारविदे शिवेतरक्षतये।

सद्यः परनिवृत्तये कान्तासंमिततयोपदेश युजे।।’ (काव्य)

किं काव्यम्, किमर्थं काव्यम्, कस्मै काव्यम्, केन प्रयोजनेन काव्यम् इति अनेकानां प्रश्नानां समुत्तरं स्वयमेव संस्कृतकाव्यानामध्ययनेन उपलभ्यते अत्र संस्कृत प्रमुखकाव्यानां संक्षिप्त - समुल्लेखनम्।

कविः

काव्यम्

१. अश्वघोषः	बुद्धचरितम्, सौन्दरानन्दम्
२. कालिदासः	रघुवंशम्, कुमारसंभवम्, मेघदूतं आदि
३. भारविः	किरातार्जुनीयम्
४. कुमारदासः	जानकीहरणम्
५. भट्टिः	भट्टिकाव्यम्
६. श्रीहर्षः	नैषधीय चरितम्
७. भर्तृहरिः	शतकत्रयम्
८. जयदेवः	गीतगोविन्दम्
९. कल्हणः	राजतरङ्गिणी

नाटकानि

एवं संकल्प्य भगवान् सर्ववेदाननुस्मरन्।

नाट्यवेदं ततश्चके चतुर्वेदाङ्ग संभवम् ।।

जग्राह पाठं ऋग्वेदात् सामभ्यो गीतमेव च ।

यजुर्वेदात् अभिनयात् रसान् अथर्वणादपि ।। (नाट्यशास्त्रम्)

काव्यं द्विविधं भवति - श्रव्यं दृश्यं च । श्रव्यकाव्यं - महाकाव्य-
गीतिकाव्यादि भेदेन अनेकविधम् । दृश्यकाव्यं अभिनये प्राधान्यं भवति ।
अवस्थानुकृतिर्नाट्यम्, रूपकं तत्समारोपाद् नाटकेषु अभिनयप्रदर्शनात्, अलंकरणात्,
वेशभूषादिधारणान् नृत्यसंगीतलास्यविलसात्, प्राकृतिकदृश्यसंयोजनात् च सर्वेषाम्
आवालवृद्धानां रसिकानां सहृदय जनानां च नितरां रसानुभूतिः जायते ।

लेखकः

नाटकानि

१. भासः	प्रतिमानाटकम्, कर्णभारम्
२. कालिदासः	अभिज्ञानशाकुन्तलम्, विक्रमोर्वशीयं च ।
३. शूद्रकः	मृच्छकटिकम्
४. विशाखादत्तः	मुद्राराक्षसम्
५. हर्षः	रत्नावली
६. भवभूतिः	उत्तररामचरितम्
७. भट्टनारायणः	वेणीसंहारः

गद्यसाहित्यम्

‘ गद्यं कवीनां निकषं वदन्ति ’ - इति निगदति गद्यसाहित्यस्य गौरवगाथाम्। श्रव्यकाव्यमेव पद्यगद्यमयं द्विविधं भवति । ‘वृत्तबन्धोज्झितं गद्यम् ‘ ‘अषादसन्तानो गद्यम् ‘ (काव्यादर्श) गद्ये तु प्रतिपदं प्रतिवाक्यं वा माधुर्यं रसमयम् अनेकार्थभाव प्रतिपादकं च भवति ।

लेखकः

१. सुबन्धुः
२. बाणभट्टः
३. दण्डी
४. धनपालः

गद्यरचना

- वासवदत्ता
- कादम्बरी
- दशकुमारचरितम्
- तिलकमञ्जरी

नाट्यशास्त्रम् अलङ्कारशास्त्रञ्च

१. भरतमुनिः

नाट्यशास्त्रम्

२. भामहः

काव्यालङ्कारः

३. आनन्दवर्धनः

ध्वन्यालोकः

४. राजशेखरः

काव्यमीमांसा

५. मम्मटः

काव्यप्रकाशः

६. वामनः	काव्यालङ्कार सूत्रम्
७. कुन्तराँकः	वक्रोक्ति - जीवितम्
८. विश्वनाथः	साहित्यदर्पणम्

नीतिकथा - लोककथा - चम्पूकोशाः

१. विष्णुशर्मा	पञ्चतन्त्रम्
२. नारायणः	हितोपदेशः
३. गुणाढ्यः	बृहत्कथा
४. शिवदासः	वेतालपञ्चविंशतिका
५. त्रिविक्रमभट्टः	नलचम्पूः
६. चाणक्यः	चाणक्यनीतिः
७. अमरसिंहः	अमरकोशः
८. यास्कः	निरुक्तम्
९. हलायुधः	अभिधानरत्नमाला
१०. वामनशिवराम आप्टे	संस्कृत - हिन्दी कोशः

संस्कृतस्य ध्येयवाक्यानि

संस्थानम्	सूक्तिः
१. भारत सर्वकारः	सत्यमेव जयते
२. जलसेना	शं नो वरुणः
३. दूरदर्शनम्	सत्यं शिवं सुन्दरम्
४. लोकसभा अध्यक्षः	धर्मचक्र प्रवर्तनाय
५. नभसेना	नभः स्पृशं दीप्तम्

संस्कृत साहित्यस्य उपयोगित्वम्

भारतस्य प्राचीनतमं गुणगोरवं, सांस्कृतिकस्वरूपाः आचारशास्त्रम्, ज्ञान - विज्ञान - कला - कौशलं - च परिज्ञातुम् चरित्र निर्माणाय च संस्कृतशिक्षणं हितकरं सुखकरं कल्याणकरं चास्ति।

संस्कृत साहित्यस्य वैशिष्ट्यं उपयोगित्वं च न केवलं भारतीयानां कृते अपि तु पाश्चात्य देशवासिनामपि तथैव लाभप्रदमस्ति।

‘ भारते भाति भारतम् ’।

उपसंहारः

उपर्युक्त विषयाः सर्वे संस्कृतसाहित्यस्य विषये अतीव उपयुक्ताः तथा अभिवर्धकाः च भवन्ति इति।

सहायक ग्रन्थाः

१. वेदप्रभावः
२. संस्कृतइतिहासम्
३. मनुस्मृतिः
४. उपनिषद् भाष्यम्
५. षट् दर्शन संग्रहः
६. महाभारत संग्रहः
७. चम्पूरामायण्
८. वालमीकिरामायण्
९. श्रीमद्भगवद्गीता
१०. बालनाटकानि
११. नाट्यशास्त्रम्
१२. काव्यादर्शः
- 13.History of sanskrit litreature.



BRIEF HISTORY OF DARSANA LITERATURE

Mr. J. Mohan

Research Scholar, PG & Research Department of Sanskrit, Rajah's College, Thiruvaiyaru.

Abstract

Here Nyaya System is described in detail. Sapta Padartham and Pratyaksham, Anumanam, Upamanam, Badhas are described. Nyaya and Vaisesika form a closely connected pair. Sankhya system of Kapila is described based on Vachaspathi Mishras commentary called Sankhya Tattva Kaumudi. Yoga System as per Patanjali Yoga Darshanam is also explained in the content.

1. Introduction

History of Darsana Literature

Philosophy which means love of wisdom is the science which aims at an explanation of all the phenomena of the Universe by Ultimate causes. It is called Darsanani in Sanskrit. It is concerned with the understanding of the true nature of the Supreme Being and its relation with the individual soul and the external world. The final goal of the life is the attainment of the reality which is established by philosophical discussions.

In India Philosophy also prescribes a way of life to approach the truth. Thus religion and philosophy Achar and Vichar go together. Among the four aims of Life, Moksha is the highest since there the soul is liberated from all bondages. Dharma, Artha and Kama bind the soul to the worldly affairs and cause a series of birth and deaths.

The beginning of Indian Philosophy can be found in the hymns of the Rig Veda and Atharvana Veda which speculates on the origin of the world and on the eternal principle by which it is created and maintained. The Upanishads contains the gems of all the different school of Philosophy which were later on systematised in manuals. Six orthodox systems of philosophy have been recognized. They are Nyaya, Vaisheshika, Sankhya, Yoga, Mimamsa and Vedanta. The Doctrine of transmigration and the Doctrine of Salvation which puts an end to transmigration are common to all the six systems. All are agreed that salvation is attained by knowledge but they differ in the nature of the knowledge to be acquired and in the condition of the soul after attaining Moksha.

2. Nyaya and Vaisheshika :

The two systems of Philosophy the Nyaya and Vaisheshika form a closely connected pair. Both lay stress on methodical reasoning and explain the origin of the world formed atoms. Both systems deal with the problems of psychology and aim at the salvation of the soul (Nirvyaasadhigama) which they say is attained through tattvagnanam. The Vaisheshika system is older than Nyaya Darshanam and in fact the later is only a development of the Vaisheshika Darshanam. Though the two systems developed separately Udayanacharya of the tenth century A.D wrote works on both systems and Gangesa Upadhyaya of the twelfth century AD combined the two systems into one and all, later writers followed him.

The Sage Kanada is the author of the Vaisheshika Sutras which being earlier than the Sutras of Jaimini and Badarayana must have been composed before 500 BC. The Work which is not a mere commentary of the Sutras but is an independent treatise on the Vaisheshika Systems was composed some where about 400 AD. Other early works on Vaisheshika Darshanam are the Kandha Sutra Vritti of Jayanarayana Bhatta and Vaisheshika Bhasyam of Chandrakanta Bhatta.

Sage Gotama also known as Akshapada is the author of Nyaya Sutras which must have been composed about 400 BC. Vatsyayana of the 2nd Century AD who was also called Pakshila Swami wrote the Bhasyam for Nyayasutra. Baradwaja Udayakara of the 6th Century AD wrote the Nyaya Varttika. The great Udayanacharya of the 10th Century AD is the author of

many important works. Besides his commentary on Prasastamadhabyam called Kiranavali. He wrote a commentary called Tatparya Parisuddhi on Vachaspathi misras nayaya varthiga paryatika. His great work is the nyaya kusumanjali which is the best treatise on theism. Besides these, he has also written the Atma Tattwa Vivekam on the existence of the soul, the nyaya parishtam and Lakshanavali.

Jayantha Bhattah of the early 10th century AD is the Author of the independent work on nyaya called Nyaya Manjariin which he has commented on a large number of nyaya sutras. Basarvagnaha of about the same period wrote the nyaya saraha, an independent treatise on nyaya systems. He does not accept upamanam as a pramanam. The Vaisesikas accept only two pratyaksham and anumanam while the Nyayayikas accept four pramanas Pratyaksham, anumanam, Upamanam and Sabdam.

In about 1150 AD, Gangeso upadhyaya wrote his great work, Tattwachintamani and gave a start to what is known as Navya nyaya sastram. The Tattwachintamani is divided into 4 chapters each dealing with one pramanam. Commentaries on his work grew in succeeding centuries and the navya nyayam developed and flourished till about the end of the 7th century AD in a way it eclipsed the earlier works like the sutra bashyam and its commentaries.

Among the many commentaries on Tattvachintamani written by many eminent authors like Jeyadeva otherwise called Pakshadara Mishra of the 13th Century AD. Vasudeva Sarva Bauma of the 15th Century and others the commentary called Didhiti written by Ragunatha Siromani of the 6th century AD is the most popular and important. This Didhiti along with Tattva Chintamani was again commented by many among which the commentaries of Gadhadhara and Jagadeesa known as Vadadari and Jagadeesi written in the 17th Century AD have become popular and famous. It is said that one cannot be called a pundit if had not studied atleast a portion of Gadhadhari. Again Jagadeesa and Gadhadhara have written two independent works on Sabda bodha called Sabda Sakthi Prakasika and Vyutpathi Vadaha respectively.

Side by side with these commentaries on Tattvachintamani and Didhiti where written many independent treatises useful for the beginners to get a grasp of the Nyaya and Vaisesika

systems. Nyaya Kalika, Lakshanavali, Saptha Padarthi, Tarka Basha, Tarka Kaumathi, Tarkamritham, Tarka Sangraham and Dipika are some of them. Among these, the Tarka Sangraham with the authors own commentary Dipika by Annam Bhatta of the 7th century is the most useful and popular text book for beginners. The next popular and more elaborate treatise is the Basha Parichedam of Visvanatha Panchananam of the same period. This work is also known as Karikavali to which the author himself has written a commentary Siddhanta Mukthavali.

3. Sankya

The sage Kapila is said to be the founder of the Sankya System which was earlier than Buddha. The Buddhist associate the sage with Kapilavasthu, the birth place of Buddha and Buddhism has been greatly influence by the doctrines of the Sankyas. Kapilas work is not available now and the Sankya Sutras now available are of later origin. We also do not have any work composed by Kapilas disciple Asuri or his disciple Panchasikhaha. The earliest available work giving the list of the doctrines of the sankya system in memorable versus is the sankya karika of Easwara Krishna who is assigned to the 2nd Century AD.

The teaching of Kapila is dualistic. He admits two things Prakriti and Purushaha both without beginning and end but essentially different. Kapila was the first man to draw a clear line of demarcation between the domains of matter and soul. The existence of the Supreme god who creates and rules the universe is denied by the sankyas. The evolution and diversity of the world are explained by the three constituents of matter called Sattvam, Rajas and Tamas. The name Sankya is derived from Sankyam probably due to the enumeration of the 25 tatvas. According to this system all mental operations such as perception, willing and thinking are not performed by the soul but are merely mechanical processes of the internal organs.

4. Yoga

The Yoga system is an important on the Sankya philosophy with the addition of a peculiar form of mental ascetism as the most effective means of acquiring saving knowledge. This wisdom who had its origin in the Vedas were it was known as Prana Vidhya, but this was systematised by Patanjali in yoga sutras. Control of the mind to get rid of the influence of matter is yoga and the

system gives in detail the methods of controlling the mind. Eight steps enumerated to be gone through for getting full control over the function of the mind.

Patanjali the author of Yoga Sutras is identified with the great grammarian and hence the date of the Yoga sutras has to be fixed in the 3rd century BC. Mysterious powers are said to be acquired by the practice of yoga. The yoga sutras consist of four chapters dealing with Samadhi, Sadhana, Vibuthi and Kaivalyam. Manusmrithi and many later Upanishads refer to the Yoga Doctrine. Yoga Sutra Bashyam was written by one Vyasa of the 4th century AD and that was commented by Vachaspati Mishra of the 4th Century AD in his Tattva Vaisarathi.

The yogic practices are divided into two types, 1) Raja Yoga dealing with concentration of the mind and 2) Hatha Yoga which is mainly concerned with the removal of bodily impurities which hinder mental concentration. The Hatha Yoga Pradeepika of Swatmaramayantrah deals with the later type.

5. Conclusion

The Brief History Of Darsana Literature were explained. The paper analysed the importance of sankya and yoga system. The philosophy of Nyaya and Vaiseshikam were discussed. According to this system all the mental operations such as perception, willing and thinking are not performed by the soul but are merely mechanical processes of the internal organs.



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WOMEN ENTREPRENEURS IN INDIA PRESENT CHALLENGES AND FUTURE PROSPECTS

¹ Dr.M.Pitchaimani and ² S.Kanimozhi

¹ Vice Principal, Department of Business Administration, Srimad Andavan Arts and Science College, Trichy-5.

² Assistant Professor, Department of Business Administration, Srimad Andavan Arts and Science College, Trichy-5.

ABSTRACT

Women are transforming by creating a dynamic society and inspiring the future entrepreneurs. A silent revolution is going on the right path with successful track records of innovative entrepreneurial success. It is quite evident that the number of women emerging as entrepreneurs started giving jobs to many people. Though there are many reasons for women to leave the workforce, they set new trends of leaving their jobs to be job-making entrepreneurs. Many women opt for entrepreneurship at an all-time low cost of starting a new business with the support from the government organisations, saying bye to corporate offers. The glass ceiling that once restricted a woman's professional path has paved a new route towards owning a business now. The sagacity of women helps to manage their business and balance with their family too. The freedom to put in their ideas and intuition makes women successful in their businesses. Being their own boss, large earning potential, choosing a convenient and suitable business location and working hours attract the women segment to be an entrepreneur. Nevertheless, they make their business a family asset. This paper brings out the challenges faced by multifaceted women entrepreneurs and possible outcomes for their empowerment.

Keywords: multifaceted women, women entrepreneurs, challenges, future prospects

I. INTRODUCTION

The surge in women for entrepreneurship is increasingly high as most women want to lead a balanced life of work and family. Women entrepreneurs dominate the largest share of

small businesses in our Indian economy. The number of women entrepreneurs has tripled in the last two decades owing to greater business opportunities and wider scope. They are able to manage the responsibilities and find the business opportunities which they find to have more control over their lives. A significant number of women start their businesses once their children grow up and they have sufficient time to spend qualitatively. When they hit the glass ceiling while climbing up the corporate ladder, they are disappointed and hence start a business as an alternative to utilize their wisdom and experience. Nowadays, a number of young graduates learn about starting a business and launch their businesses right after their graduation.

II. REASONS FOR WOMEN TO CONSIDER ENTREPRENEURSHIP

The steadfast growth in women entrepreneurship is just because of the freedom to put in their ideas and intuition makes women successful in their businesses. Being their own boss, large earning potential, choosing a convenient and suitable business location and working hours attract the women segment to be an entrepreneur; the passion for their own ideas and being benevolent add feathers to their cap. Recent studies shows that women start businesses as their second or third profession. They were experienced a high dissatisfaction in their previous careers and working for others that draw a very minimal monetary result and lesser job satisfaction level. These innate desires to be their own boss motivate them to start new businesses.

With the higher qualifications and hands of experience, women are ready to crack the technology and come out with latest applications of techniques in their businesses. They are not afraid of technology and they have already entered into the fields that were once male-dominated such as brewery, construction, manufacturing, design, etc. They also have the largest share in

retail industry with women-owned firms. Women entrepreneurs opt for a gender-balance and diversified workforce which acts as a strong base for their businesses. They manage to raise funds for their business start-up from savings, credit cards, Government grants and bank loans. Women have immense passion for work. They are not afraid of taking risks making monetary gains a less likely factor in their business pursuit. They possess very strong business ideas and share it with others who may benefit from their findings. Women entrepreneurs are motivated by philanthropic commitment to society. Their new venture will greatly prompt economic development in their community and generate new job openings for many people. Women are much capable of multitasking and have the tendency to share career and family life. Due to long business hours and hard work that might affect their family well-being, women might hesitate when they enter into the business for the first time. However, they are capable of managing the balance between work and family life and are successful in both with their goal-oriented approach. This flexibility in working hours rather than working for less time, give them opportunity to choose when to go on vacation, when to work and so forth. As long as the required work is done, nothing can stop them from being flexible

III. PRESENT CHALLENGES

Opportunities are tremendous and one can see women entrepreneur in almost every filed such as IT, retail, healthcare, tourism, education, service sector, etc. There are a number of management and technology women professionals who are ready to take a dip in world of business. Indian society is patriarchal and women here are considered as Homemakers rather than Business women. Their domestic duties and responsibilities are always the obstacles to their success in business enterprises. According to Census 2011, the male literacy rate is 82.14% and female literacy rate is 65.46% and it clearly shows that the overall female literacy rate is comparatively low than men irrespective of any state.

Low-level education leads to low-level self-confidence and self-reliance in women to engage in business activities. Indian society is male-dominant and men in fact discourage women and are jealous of their success in businesses. Women lack encouragement and motivation from others both from the family and society. Women encounter some major problems such as limited amount of capital available, family

responsibilities, low access to business information, non support from institutional agencies and limited access to banking facilities. The reasons for women being considered as the weaker sex are economical dependence on men, denial of the power to take decisions and freedom of expression, lack of opportunities and lack of representation in the society. Many women fear the debt associated with their startup. Lack of knowledge in information technology is a greater challenge for women who prefer IT-related business ventures. There are other thriving industries which women can consider. They need to conduct an extensive research on their preferred industry, their consumer base and competitors, and discuss with the entrepreneurs who are already successful in the business. Entrepreneurs have to learn new things throughout their business to overcome hurdles and succeed. Women tend to be afraid to travel and are less confident to travel day and night and to different geographical locations. Safety & security reasons hinder the success in business enterprises as compared to male entrepreneurs. They are handicapped by inadequate financial resources and working capital. The financial institutions and banks are incredulous about the managerial and entrepreneurial abilities of women. They are hesitant to lend money to women entrepreneurs and they provoke many terms and conditions before lending money to them. Less awareness of legal formalities, exploitation by middle men, severe competitions are some of the present challenges that women entrepreneurs face. A large number of women are not able to take advantage of Government schemes since they are not registered under MSME Act (The Micro, Small and Medium Enterprises Development Act, 2006). Also, registration of a unit under MSME is not as easy as it needs to be. Also, a large number of women are unaware of women focused financial and non-financial schemes.

IV. CURRENT STATUS OF WOMEN ENTREPRENEURSHIP IN INDIA

Women empowerment is considered indispensable for achieving the goals of sustainable and inclusive growth. The traditional male-dominated set-up is changing in modern era. The literacy and educational status of women has improved considerably in past two decades. Women entrepreneurship is growing at a jet speed with more education and Government initiatives to support entrepreneurship. However, effective steps should be taken to reach the needy to harness the economic potential of enterprising women to strengthen the nation's economy. Indian women are no more treated as beautiful models alone. They are marking an influence on the domestic and international markets thus insisting their part for globalization. In

a recent survey, it is revealed that Indian women are generating more wealth than the women in any part of the world. Entrepreneurship among women has by and large resulted in the empowerment of women. In the present socio economic context where women have to balance both family and work, entrepreneurial venture will suit them very well, temperamentally.

V. FUTURE PROSPECTS

The Government and banks are playing a vital role in helping women develop economical independence and thereby gain other missing rights. An effort to empower women is the formation of Self Help Groups (SGH) for women by the government for which banks are extending enormous support by disbursing loans. These groups have increased the level of confidence of women from the lowermost strata of the society by helping them express their ideas, their decision making skills and develop the temperament of planning and saving. More fusions will be formed among women associates that enable the establishment of women business networks to prosper in the business world. Women entrepreneurs will definitely possess 4C's – Confidence, Competence, Communication and Conceptualisation; 3P's – Passion, Persistence and Pragmatism; and 2 F's – Focused and Flexible and being competent leaders to successfully start, run and cultivate their businesses. Expecting realistically, objective approach, physical and mental stamina, learning from mistakes, comprehensive awareness, enjoying risks and challenges, good financial aptitude and honest relationship with their clients, partners and employees improve their business capabilities and reach the success ladder consistently.

VI SUCCESS SECRETS OF WOMEN ENTREPRENEURSHIP

Success is a combination of thinking right and doing right. Learning to embrace risks by getting out of the comfort zone and getting comfortable being uncomfortable are the keys to success for women entrepreneurs. By turning passions into profits make them feel confident by understanding how to utilize their time to become rich. They master their skills in a very short span of time and marketing themselves and having a group of successful entrepreneurs' with whom they would learn and share help women to stay out of fear. Not everyone will support women to enter into business. By not getting distracted by criticism and holding back hurts, women have the willpower to overcome any obstacles that try to let them down. Most successful women possess the traits such as being ambitious, open and willing to learn, cost-conscious,

valuing teamwork and loyalty, balancing work and family life, philanthropic commitment to the society.

VII. SUGGESTIONS

Government should incorporate a women's entrepreneurial dimension in the formation of all SME-related policies. This can be done by ensuring that the impact on women's entrepreneurship is taken into account at the policy stage. By periodically evaluating the impact of SME-related policies on the success of women-owned businesses and the extent to which such businesses take advantage of them, All the government bodies should induct women entrepreneurs on their boards, to generate gender sensitivity and create policies which are conducive for the growth of women entrepreneurship. Awareness should be created regarding various Government schemes for the development of women entrepreneurship, liberal credit facilities should be made available by Banks and lastly there should be growth programmes conducted for the specific target group. Multi pronged approach should be adopted to motivate women to pursue entrepreneurial activities. Concerted effort must be made to raise the level of women entrepreneurship in SSI. Social activists, NGOs, Government agencies as well as the corporate sector can and should play an active role in the transformation of women as wholesome individuals and assist in driving them to explore entrepreneurial opportunities in small scale industries.

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