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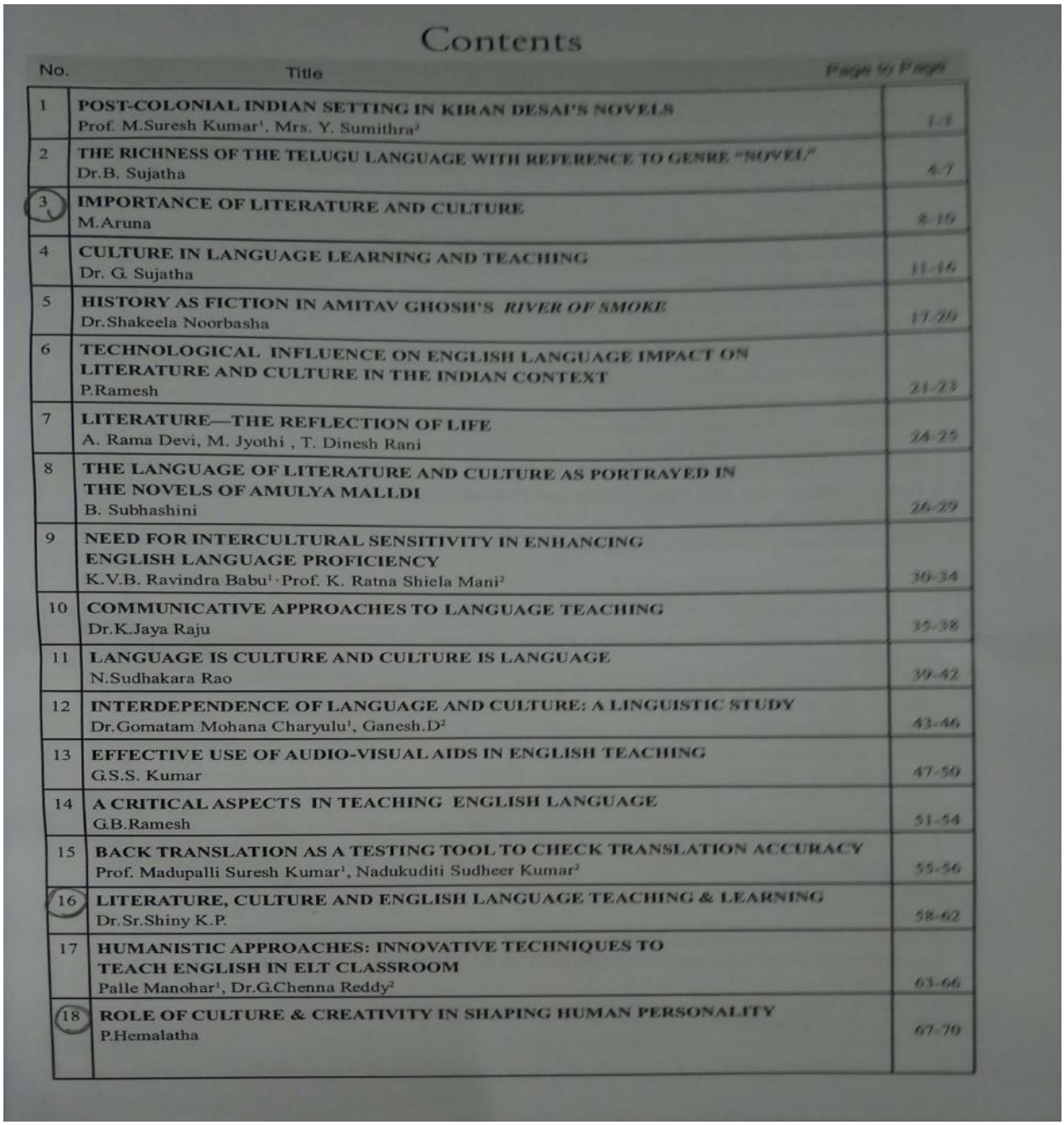

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LITERATURE, CULTURE AND ENGLISH LANGUAGE TEACHING & LEARNING

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ABSTRACT

Literature is a good source for English language learners to know the culture and beliefs of various people. Literature, Language and Culture are inter-connected and are mutually dependent in social life. Culture can be incorporated while teaching literature in second language teaching and short stories are the best vehicles to teach culture. Literary works is included in the course material of the language classroom to enable the learners to understand the culture of the target community better and to practice the target language in different aspects. Culture plays a very important role in language teaching because some of the words in the foreign language refer to specific meanings in a particular society, which may not be understood by the members of other cultures unless the cultural context is explained. Literature cannot be taught and understood without understanding the cultural context in which it is used. Culture provides adequate and authentic materials and it also provides interesting practical situations in teaching learning process. And this type of teaching learning process enable the learners to attain proficiency in English language as the learners spent much time in reading, listening and analyzing. There is an increasing need in incorporating cultural components in English as second language textbooks in the present as well as in the future under the phenomena called globalization as the English language is the tool for international communication mainly for business and politics. This paper discusses the importance of teaching culture through literature in English language classroom to know the societal values, beliefs and cultural elements of different communities. A few implications are also provided to the language teachers and policy makers.

Keywords: *Literature, Culture, English Language, Language Teaching,Learning.*

INTRODUCTION

Teaching culture through literature is important in the language classroom as societal values, beliefs, cultural elements and attitudes are incorporated into communicative approach. It also increases the effectiveness of English language teaching and learning. The main aim of language teaching is to enhance linguistic abilities of the learners along with cultural competence which can be together called as intercultural competence. In present day language classrooms, teachers are expected to include cultural components in teaching because of paradigm shift in language teaching with a different outlook on culture. This outlook emerges from social sciences i.e culture as a broad term that embraces in it many aspects of a society like arts, food, environment, customs and traditions, religious practices, ethics, morals and manners. Consequently, culture includes everything that man has either acquired or learnt in his individual and social life. Anthropologist like Ward H. Goodenough believes that "Culture is an idealized cognitive system- a system of knowledge, beliefs, and values that exist in the minds of individual members of society" (Qtd. in Casson 17). Culture provides adequate and authentic materials and also interesting practical situations in teaching learning process. According to Krasner, linguistic competence alone is not enough for learners of a language to be competent in that language but they also should know the cultural background to learn better.

LANGUAGE AND LITERATURE

Literature is rooted in language and language gets life through Literature. So Literature and language are closely interconnected. According to Lazar (1993), Literature should be used in the classroom and must encourage the students to learn as it is a motivating stimulus for language acquisition; students enjoy it and also improve their communication skills. Literature, a convenient source of content for a course in foreign language, provides motivating materials for language teaching. Carter and Long (1991) equally agree that Literature is a legitimate and valuable resource for language teaching. Valdes (1986) opines that it is simply accepted as given that Literature is a viable component of second language programs at the appropriate level and that one of the major functions of Literature is to serve as a medium to transmit the culture of the people who speak the language in which it is written. It means, when one teaches literature in the language classroom, he/she is teaching language for communication in various contexts and situations.

LANGUAGE AND CULTURE

In the present industry world, employees must communicate with people from different cultural and linguistic backgrounds every day. While communicating, intonation, the use of non-verbal cues and inference play a large role in conveying information, and preferences around these communication methods differ widely by culture. Brooks (1986) argues that physically and mentally everyone is the same, while the interactions between persons or groups vary widely from place to place. Hantrais (1989) puts forth the idea that culture is the beliefs and practices governing the life of a society for which a particular language is the vehicle of expression. Therefore, everyone's views are dependent on the culture which has influenced them, as well as being described using the language which has been shaped by that culture. The understanding of a culture and its people can be enhanced by the knowledge of their language. This brings us to an interesting point brought up by Emmitt and Pollock (1997), who argue that even though people are brought up under similar behavioural backgrounds or cultural situations but however speak different languages, their world view may be very different. Language is rooted in culture and culture is reflected and passed on by language from one generation to the next (Emmitt & Pollock 1997). From this, one can see that learning of a new language involves the learning of a new culture (Allwright & Bailey 1991). Consequently, teachers of a language are also teachers of culture (Byram 1989).

LITERATURE AS A RESOURCE FOR LANGUAGE TEACHING

Literary texts may be used in the language classroom as a resource for language development. McKay (2001) argues that using literature in the language classroom provides three major advantages for learners:

- It demonstrates the importance of authors' choice of form to achieve specific communicative goals,
- It is an ideal resource for integrating the four skills- reading, writing, listening and speaking,
- It raises cross-cultural awareness.

In addition to the advantages mentioned above, Lazar (1993, p.14) explains the following benefits of using literature in the language classroom for the learners:

- It is very motivating
- It provides authentic material
- It has general educational value
- It is found in many syllabi
- It enables students to understand another culture
- It is a stimulus for language acquisition
- It develops students' interpretative abilities
- It is highly valued and has a high status
- It expands students' language awareness
- It encourages students to talk about their opinions and feelings

CULTURE AS A SOURCE FOR ENGLISH LANGUAGE TEACHING

Language competence does not only include the knowledge of grammatical principles and sentence construction, but also knowledge of the norms that link language to social and cognitive context. Many teachers and students seem to overlook the fact that knowledge of grammatical systems has to be complemented with culture-specific meanings. It is therefore essential for language teachers to approach language learning with this in mind, as the understanding of this relationship is central to the acquisition of linguistic and cultural competency. It is impossible to teach a language without its culture for culture is the necessary context for language use (Stern, 1992, p.205). Claire Kramsch remarks that it is important to be aware that culture in language learning is not an expendable fifth skill; it is present within writing, reading, listening and speaking. She emphasizes the role of context and the circumstances in which language can be used accurately and appropriately. (c.f. Kramsch 1). Culture offers various authentic materials to enhance the dynamics of a class in particular for the undergraduate students. The structure of a language can determine the way in which speakers of that language view the world. The meanings of a particular language can also represent the culture of a particular social group. It is impossible to understand a culture without having some form of understanding of its language. When people learn another language, it helps them to learn about the world. Learning a language is therefore learning the behaviour of a given society and its cultural customs. Language is a product of the thoughts and behaviour of a society.

Language and culture have a function of communication as they both carry meanings. On the one hand, language carries syntactic, semantic and pragmatic meanings for language users to communicate (Brooks, 1997). On the other hand, culture carries meanings and cultural meanings are expressed through patterns of behaviour i.e. language. In order to communicate successfully across languages and cultures, one must understand culturally different norms of interaction and people's values and thoughts (Saville-Troike, 2003).

IMPLICATIONS FOR LANGUAGE TEACHING

1. Teachers must instruct the students on the cultural background of language usage. If one teaches language without teaching about the culture in which it operates, the students are learning empty or meaningless symbols or they may attach the incorrect meaning to what is being taught. The students, when using the learnt language, may use the language inappropriately or within the wrong cultural context, thus defeating the purpose of learning a language.
2. Language teachers must realize that the meaning of the text is bound in cultural context. So the teachers not only explain the meaning of the language used, but the cultural context in which it is placed as well. Often meanings are lost because of cultural boundaries which do not allow such ideas to persist. Language teachers must remember that people from different cultures learn things in different ways.

IMPLICATIONS FOR LANGUAGE POLICY

Policies for language teaching must encompass cultural values from the societies from which the languages are derived as well as being taught. In other words, when making policies regarding language teaching, one must consider the cultural ideologies of all and every student, the teacher, as well as the culture in which the target language is being taught. Language teaching policies formed with the cultural characteristics of both teacher and student in mind will not be prone to make assumptions about the appropriateness of students' behaviour based on the policy maker's own cultural values (Englebert 2004) but will increase cultural awareness. When creating policies, one must consider the cultural meanings of teaching materials used.

IMPLICATIONS FOR TEACHING LITERATURE

1. An English language teacher needs to be competent in both Literature and Language inorder to attain proficiency in English language. The Literature teacher should encourage the learners to master the language skills prescribed in the literary texts and the language teacher should use excerpts from the prescribed literary texts to illustrate various language components. Thus, the success or failure of the learners in English Language classroom would be a collective responsibility of both the language and literature teacher.
2. Literature provides various activities to stimulate critical and aesthetic responses such as reading, listening and viewing, discussing, writing and performing. Literature transports learners to other places and other times and exposes them to real-life values. The close study of literary language can reveal the infinite variety of expression available in English, which in turn can sensitize learners to its nuances, its beauty, its wit and its sounds. The literature teacher can show the learners how writing entails making choices to create an impact on the reader and through this, the study of the forms and structures of language such as vocabulary, grammar and syntax is transformed from being a series of exercises into something living and relevant to the learner's need to communicate effectively in a complex world.

CONCLUSION

There is a close association between Literature, Culture and Language. It is impossible for one to teach language without teaching literature and culture of the given society. Literature is an agent for language development and improvement. As a teacher of language, one must be culturally aware, considerate of the students' culture, and inform students of cultural differences thus promoting understanding. Literature is used in English Language teaching to broaden students' horizons by giving them knowledge of the classics of literature, to improve students' general cultural awareness, to stimulate students' creative and literary imagination and to develop their appreciation of literature. Literary texts offer a rich source of linguistic input and can help learners to practice the four language skills i.e. listening, speaking, reading and writing in addition to exemplifying grammatical structures and presenting new vocabulary. Culture is a product of the human mind and it is defined, propagated and sustained through language and literature. In other words, language gives full expression to people's values and norms. Thus, it is important to integrate literature and culture in language teaching as it provides authentic materials and factual situations for language teaching and learning.

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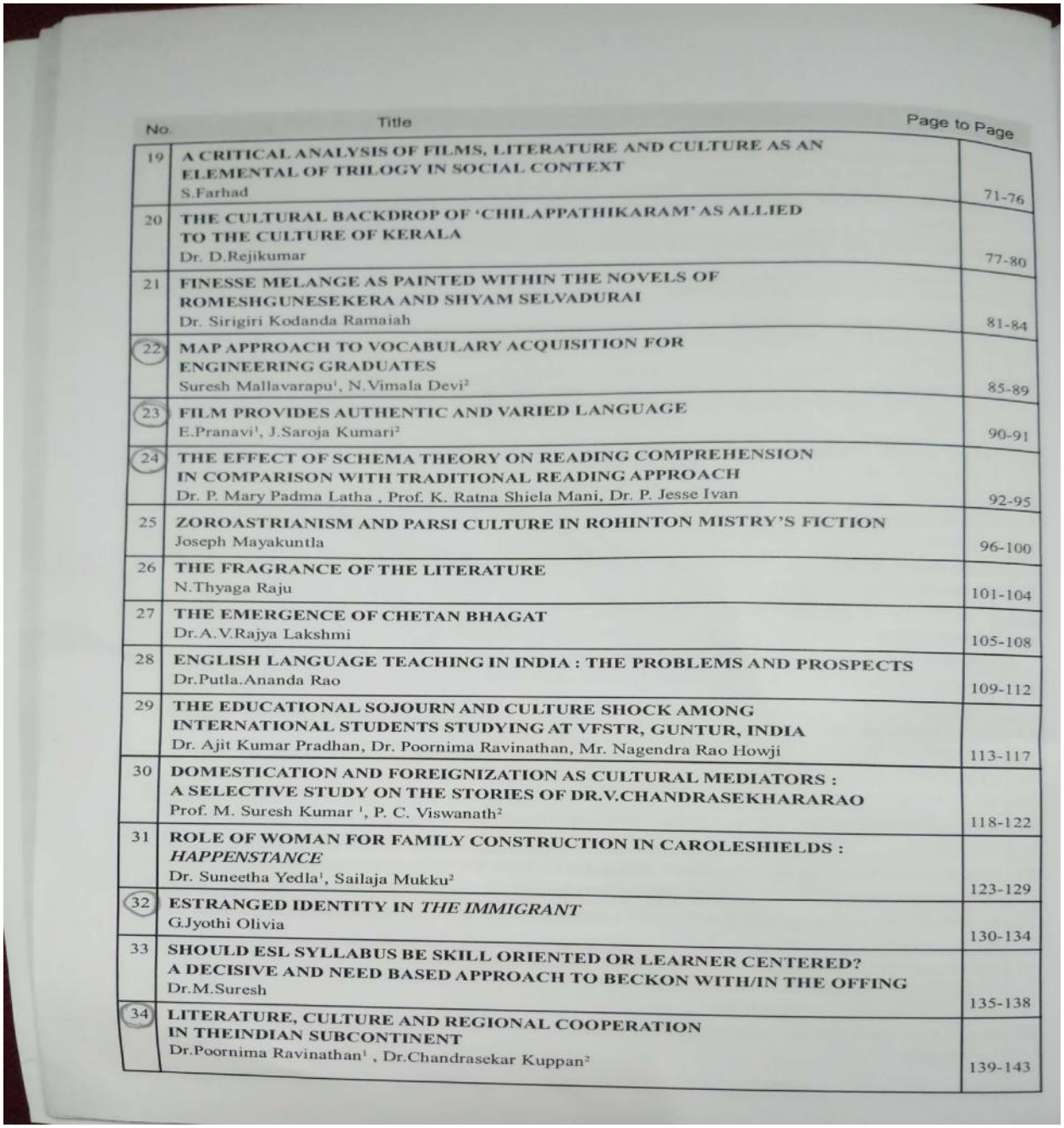

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MAP APPROACH TO VOCABULARY ACQUISITION FOR ENGINEER... GRADUATES

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ABSTRACT

It is the greatest challenge for the teachers of second language to ... students feel at ease while expressing their ideas and feelings. Many people ... English vocabulary through a blend of methods – by reading books, reading ... news paper and watching movies in English. Apart from these playing ... vocabulary activities is a valuable part of learning English language. By ... variety of vocabulary learning activities is in an exciting, immersive format, ... can engage students and help them achieve their vocabulary goals. Students ... aspire to go abroad are obliged to take the test of English as a foreign lang... Implementation of MAP activities (Mobilize, Accelerate and Procure) in voca... helps the students of Engineering to build vocabulary skills to get high-stake... vocabulary-rich examinations such as the GRE, TOFEL and IELTS. A strong knowledg... English vocabulary is understandably important in scoring well on the GRE, TOFEL ... IELTS. So this paper deals with advices to improve vocabulary skills.

Keywords: *MAP –Vocabulary learning Strategies- Cultural Environment.*

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NEED OF ENGLISH COMMUNICATION SKILLS IN INDIA

English has its one of a kind significance in our nation. It has assumed a vital job in building current India. At present, it is one of the significant dialects utilized for correspondence on the planet. In our nation we have individuals living in various states talking distinctive dialects. Be that as it may, here English assumes a fundamental job of a scaffold. It helps distinctive locals of various provincial tongues to impart one another. English is a dialect which joins us with the outside world. The possibilities of work for a man knowing about English are brilliant in each nation.

In India, individuals going from North to South for instructor or business generally impart in English dialect, and it is one reason that it has turned into a connection dialect. Remembering this, the parliament has likewise perceived English as an official dialect notwithstanding Hindi. Every one of the actualities of history and improvements in present day India underline the proceeded with significance of learning English notwithstanding vernaculars. We should make the best utilization of English to create ourselves socially and socially so we can contend with the best in the realm of psyche, and matter. English dialect is our easy route window to the world.

In India, the official dialect in corporate world is English. A man can make fast walks in the administration stepping stool just in the event that he can communicate in English smoothly. In the event that one needs to work with multinational organizations, there organizations will keep running with the exchange with different nations. English is the basic dialect for correspondence.

ADVICE HOW TO IMPROVE SPECIFIC VOCABULARY

The vast majority of the understudies of Engineering wrap up that scholastic or particular vocabulary is conceivably the best test for acing English for Specific Purposes. The activities described may help the students to improve their specific vocabulary by:

- Allocating a particular vocabulary opening toward the finish of every scholarly session.
- Teaching understudies to examine word reference sections with an emphasis on historical underpinnings and levels of custom.
- Selecting perusing, composing and oral practice materials from fitting sources, for example, News papers, Magazines for outlining scholarly and particular vocabulary recreations.
- Providing understudies with models of good practice to copy – this requires the capacity to utilize an extensive variety of particular vocabulary to bestow the learning in understudies.

The following are some suggestive MAP Activities to improve specific English vocabulary to the students of Engineering.

ACTIVITY 1: BRAIN STORMING POLY-SEMOUS VOCABULARY

Polysemy is the relationship of single word with at least two particular implications. A polyseme is a word or expression with numerous implications. "Polysemy" originates from the Greek for "some signs.

For instance: There is a three letter word that maybe has a greater number of implications than some other English three-letter word i.e. 'FIX'. It has numerous implications, for example, append, Arrange Get prepared (sustenance or beverages) repair, rebuff, set right (the hair).

PROCEDURE

- Select a few polysemous words which are useful to understudies in particular reason.
- Ask understudies to work in sets or gatherings.
- Give each match or gathering a couple of words to chip away at.
- Ask them to utilize their lexicons to discover whatever number faculties of each word as could be expected under the circumstances.

ACTIVITY 2: BREAKING HEADLINES

Numerous course book perusing errands begin with requesting that understudies take a gander at the title of the piece and anticipate what they will peruse from it. This is considerably more troublesome with a daily paper article in light of the

fact that the feature is frequently the most troublesome piece of the article to comprehend, and the equivalent is in any event as valid for understudies perusing alone. For understudies who previously read the news a considerable amount, feature words can likewise be hard to use in regular discourse or even be best stayed away from. The action intends to show them the words they will regularly run over and demonstrate them if and how that vocabulary can be utilized in their own composition and discourse.One of the best approaches to construct vocabulary is to peruse books or Newspaper chatter segments. This isn't generally as hard as it sounds, and it is significantly more viable than some other strategy in light of the fact that enhancing the vocabulary while having a fabulous time, while perusing fascinating bit of books or news papers. Slice the features which give off an impression of being foggy to make the understudies immaculate in polysemous words.

PROCEDURE

- Put one of the features on the board and request that understudies work in sets utilizing their word references to discover why it is clever.
- Give each combine or gathering another feature to chip away at.
- Ask understudies to clarify the two implications of each feature. (On the off chance that the class is monolingual, request that they make an interpretation of the features into the two conceivable translation).

1. **Police begin campaign to run down jaywalkers**
2. **Safety experts say school bus passengers should be belted**
3. **Drunk gets nine months in violin case**
4. **Girl hit by car in hospital**

ACTIVITY 3: VOCABULARY GROUP -LABEL

List-group-label is a form of semantic mapping. The strategy encourages students to improve their vocabulary and categorization skills and learn to organize concepts. Categorizing listed words, through grouping and labeling, helps students organize new concepts in relation to previously learned concepts.

- It helps students organize understanding of specific vocabulary concepts.
- It builds on students' prior knowledge about a topic.
- It actively engages students in learning new vocabulary and content by activating their critical thinking skills.
- It teaches categorizing and labeling skills.

PROCEDURE

- Select a main concept in a reading selection.
- List: Have students brainstorm all the words they think relate to the topic.
  - Visually display student responses.
  - At this point do not critique students' responses. Some words may not reflect the main concept, but hopefully students will realize this as they begin grouping the words in the next step.
- **Group**: Divide your class into small groups. Each group will work to cluster the class list of words into subcategories. As groups of words emerge, challenge your students to explain their reasoning for placing words together or discarding them.
- **Label**: Invite students to suggest a title or label for the groups of words they have formed. These labels should relate to their reasoning for the grouping.

ACTIVITY 4: VOCABULARY WORD WALLS

A word divider is an accumulation of words which are shown in extensive unmistakable letters on a divider, announcement board, or other presentation surface in a classroom. The word divider is intended to be an intelligent device for understudies and contains a variety of words that can be utilized amid composing and perusing.

- They provide a permanent model for high frequency words
- They help students see patterns and relationship in words, thus building phonics and spelling skills
- They provide reference support for children during reading and writing activities.

PROCEDURE

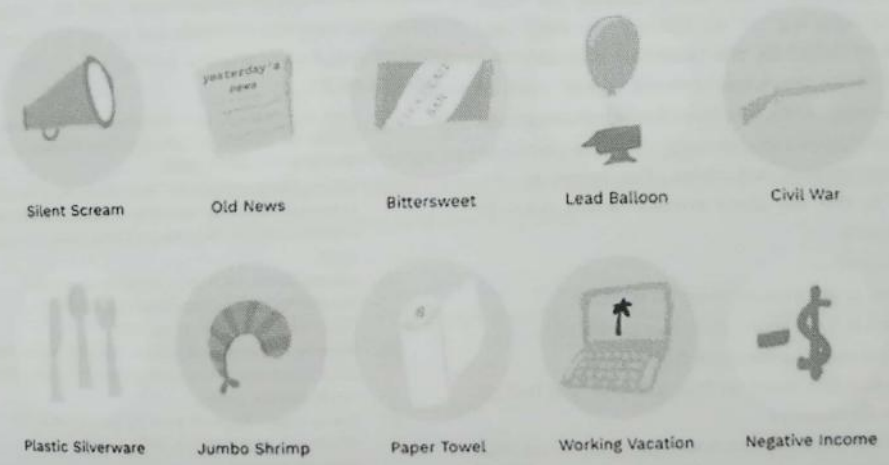
- Make words accessible by putting them where every student can see them. They should be written in large black letters using a variety of background colors to distinguish easily confused words.
- Teachers and students should work together to determine which words should go on the word wall. Try to include words that children use most commonly in their writing. Words should be added gradually — a general guideline is five words per week.
- Use the word wall daily to practice words, incorporating a variety of activities such as chanting, snapping, cheering, clapping, tracing, word guessing games as well as writing them.
- Provide enough practice so that words are read and spelled automatically and make sure that words from the wall are always spelled correctly in the children's daily writing.
- New information should be added on a regular basis.

ACTIVITY 5: TECHNICAL OXYMORON WORDS

A confusing expression is an interesting expression containing words that appear to negate one another. It's frequently alluded to as a logical inconsistency in wording. Likewise with other logical gadgets, confusing expressions are utilized for an assortment of purposes. Here and there they're utilized to make a tad of show for the peruser; now and again they're utilized to make a man stop and think, regardless of whether that is to chuckle or to ponder.

A typical ironic expression is the expression "a similar distinction." This expression qualifies as a confusing expression on the grounds that the words "same" and "contrast" have direct inverse implications. Uniting them into one expression delivers a verbally bewildering, yet captivating, impact.

Awfully Good Examples of Oxymorons



- Act naturally
- Alone together
- Amazingly awful
- Bittersweet
- Clearly confused
- Dark light
- Deafening silence
- Definitely maybe
- Farewell reception
- Sweet sorrow
- True myth

ACTIVITY 6: HOT VOCABULARY SEAT

This action can be utilized in general class movement. On the off chance that you show understudies who can work autonomously, you may utilize it as a little gathering or match movement once understudies know about the action's principles.

In this movement, one understudy is chosen to go to the front of the class and take the "last place anyone would want to be." The last place anyone would want to be is found a couple of feet before a writing slate, whiteboard, or graph. The understudy sits in a seat confronting his or her cohorts and with his or her back to the board or graph. The understudy likewise ought to have a reasonable perspective of the class word divider. The instructor or a colleague chooses a word from the word divider (or from understudies' spelling or vocabulary records) and composes that word on the board or diagram. The understudy in the last place anyone would want to be can't see the word, yet it is his/her business to figure the word by making inquiries that assistance to limit the conceivable outcomes. For instance, the understudy in the last place anyone would want to be might inquire

- Is it a noun?
- Does it have fewer than 10 letters?
- Does it have more than two syllables?
- Is the vowel *a* found in the word?
- Would this word be found in the first half of the dictionary?

As the student narrows down the word, the questions might get more specific. For example, if the students gets a positive response to the question *Is it an animal?*, then the follow-up questions might include *Is it bigger than a fox?* or *Does this animal live in the rain forest?* If the clues help the student narrow down the word to a handful of possibilities, the student might ask questions to narrow down those possibilities, such as *Does the word mean the same thing as [a definition of the word]?* or *Does the word rhyme with [another word]?*

Keep a tally of the number of questions/clues it takes for the student to guess the word.

CONCLUSION

On the entire, the activity based approach was associate ready tool to reinforce the language skills of the scholars and created easier for thanks to attain the objectives of second acquisition. The ultimate insight that the investigator eventually was the immediate would like for applying activities to English Teaching so as to form a true state of affairs wherever one will learn a language with real urge and interest. Though in several aspects English differs from the regional language (Telugu), the teacher would achieve success in teaching English by making English atmosphere within the category space with the ready facilitate of activity based mostly approach.

As results of the activities, students are going to be ready to describe the method of learning core vocabulary. By continuation that activity with a range of targeted vocabulary words, supported pragmatic operate students are going to be ready to outline specific Vocabulary words.

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ESTRANGED IDENTITY IN *THE IMMIGRANT*

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ABSTRACT

Indian literature in English has journeyed a long way to achieve its glory and grandeur through its various forms like poetry, prose, drama and fiction. In the realm of fiction literature has heralded a new era and has earned many laurels. The genre of fiction encompasses the entire gamut of life and society, its expressions, beliefs, and aspirations. The fictions treatment of life and its problem are realistic. It is realism that distinguishes novel from the earlier prose romances. The novel does not provide escape from life and its problem, but rather a better understanding of them.it also reflects the very spirit of the age in which it is written. Women writers in India are moving forward with their strong and sure strides matching the pace of the world. They are bursting out in full bloom spreading their own individual fragrances. They are recognized for their originality, versatility and the indigenous flavor of the rich soil that they bring out to the world.

Keywords: *Immigrants- Quest for Identity- Adjustment- Post colonial world.*

INTRODUCTION

Manju Kapur's *The Immigrant* (2008) deals with the cultural conflict and the havoc that western culture is creating on the lives of Indian Immigrants by tearing them apart between traditional and western norms. She is one of the most accomplished and highly acclaimed contemporary Indian English Women Novelists. The main content of the paper refers to marital bliss and women's role at home, particularly in the culture where Individualism and prated are often considered as alien ideas. Contemporary women authors are now communicating themselves candidly and courageously on multiple themes without adhering feminist perspectives.

Immigrants are usually caught between the traditional culture and the cultures of the alien land. *The Immigrant*, by Manju Kapur as the title suggests, divides its fictional locals between India and Canada in the vexed context of globalization with far greater emphasis than any earlier Kapur's novel. However, the conflict between western and eastern cultures, the twisting of family cords when people leave for a foreign country and India's unvarying class system in contrast to the more slacken social customs of the west. Different from its predecessors, the novel is only to a limited extent set in India. The major characters, Nina and Ananda are both NRI (Non-resident Indians) engaged to new lifestyles in Canada in the seventies.

The novel begins with the descriptions of Nina's mundane life that appears to have forgone all the chances of spousal bliss. The conventional notion that a girl's ultimate goal is to marry someone subdues her line of thought and prepares her to feel empty. Though thirty she didn't accept for any "*humdrum marriage*" (3). Nina's search and longing ends with the introduction of Ananda made to her, a Canada based Dentist. Their steady living for each other and their resolution to marry brings change in Nina's life. It is an opportunity for Nina as she has almost lost her hope. She gains totally a new identity by marrying Ananda, who is an expatriate. Thus the story is concerned with the Indian couple - Nina and Ananda, the difficulties that are associated with their arranged marriage, and Nina's conversion into the role of an immigrant. Primarily the paper is constructed on the idea of migration through arranged marriage. It also explores common th like multinational habitus, cultural predicam selfhood and patriarchy. The paper extends a the spaces of the host nation, Canada and the land, India.

The migration strategy and custom clim in Canada at that period of story setting, indicative of a proliferating Indian immigr category. It was almost over a decade from 1960s t early 1970s that immigrants from non-European nations were licensed to migrate under the 'skilled *worker class - an immigrant class based on the point system according to one's skill set*' (Walton –Roberts However, Nina's case is different as she migrates to Canada under the category of 'family reunification' class' because of her marriage to Canadian Indian born husband. Immediately after she leaves India to meet her husband Ananda in Halifax, consequently begins her life as an immigrant in Canada.

The word 'immigrant' represents an unstable migrant. The moment she gets down the flight at the Toronto Airport, she faces the discomfiture of being 'othered'. By sending a note she conveys her misery to her husband. "*They stopped me at Toronto...They kept asking me questions... They were treating me like a criminal... they wouldn't treat a European or American like that... They did it because we are third world*" (109).

Nina's journey across the spaces shown in the paper is that of striving for realizing her selfhood as a woman and as an immigrant in Canada. Ananda's journey is quite similar to that of self - discovery especially when he attempts to find a solution to his overhasty ejaculation. The paper ends with the note of Ananda discovering a solution to his sexual worries and Nina detecting her new identity by moving around as an immigrant in Canada. Nina in due course finds out about Ananda's disloyalty and decides to go away from married life and begins her life afresh in the province of New Brunswick. It is primarily interested in disclosing the problems of the newly emerging women and their identity. The major female characters in this paper denounce the male domination and the marginalization of woman. Nina too contributed her part in that way over here.

The paper promoted this viewpoint that a

woman is never considered as an independent person as she has always been assigned to a inferior and marginal position in our society.

> Man can think of himself without woman. She cannot think of herself without man and she is simply what man decrees... she appears essentially to the male as a sexual being. For him she is sex... absolute sex, no less. She is defined and differentiates with reference to man and not he with reference to her; she is the incidental the inessential as opposed to the essential (1952:1-2).

Nina migrates to Halifax in Canada, which is a small east coast city with a lesser Indian immigrant population instead of the big metropolitan cities like Toronto, Montreal and Vancouver. If she has to relocate to any other city her lifestyle and identity would have been shaped up in a different manner. Since there were habitual Indian communities in these cities, maybe she would have sustained on her Indian traditions, food and clothes more intensely being contended to be Indian in the midst of Indian community while experiencing indistinguishable adjustment issues in Canada. Or it may be because many of these communities are not belonging to the same social class as her, she is not in a position to relate and thus feel detached and moderate to her fellow immigrants.

Two important aspects that can be observed in Nina's case here, that is prior to her arrival and after her arrival in Canada. One is her clothes and the other is that she is a vegetarian. Coincidently both these aspects find their way of change when there is a shift in Nina's transnational habitus towards a complete western way of living. She reaches Canada with her traditional wear, saris and salwar khameez, etc. The fact that she wears these clothes for her daily as well as social occasion gives much distress to Ananda. She strictly follows her Indian habitus thinking that by wearing such traditional clothes one can continue to be an integral part of one's own identity here it is of an Indian woman. Not a word of appreciation from her own husband, but everyone else in the story commends her traditional attire as 'exotic and beautiful' and a most suitable complement to her may be exotic 'Indian' feature and looks.

The references to clothing are countless all over the novel, consequently designating an important sign of identity for Nina, how it associates her to India and how she is recognized by others.

> *She took out her saris and stroked the intricate woven surfaces. Benarasi, Kanjeevaram. Orissa patola, Gujarati patola Bandhani; she had fancied carrying all parts of India to Canada in her clothes. She spread the brightest one on the bed, and gazed at the magic of the green, yellow and red Gujarati weave* (112).

When it comes to food habitus Nina is shocked to know that Ananda has changed into non-vegetarian leaving back Indian cuisine back to India itself. After her arrival at Halifax, *"She thought of the recipes her mother had anxiously written for her"* (112), that is of no use to her in Canada. Nina thinks that vegetarianism is the essential element of their culture and supposes that food binds them to the memories they have about India. The author also gives much importance to this. The process of cooking and eating the Indian food in the novel exemplifies the model consumption of that which Indians prefer to have.

> *Turmeric...red chillie.. onions and garlic... releasing sweet sharp smells... cumin and coriander... these smells and imagined sights travelled across the world from north India to western Canada to kick her sharply in the stomach* (139)

The sense and feeling of immigrant has a deep impact on Nina's psyche. She feels that Indians leaving the country as immigrants slowly because *"they are not among one those who fled persecution, destitution, famine slavery and death threats"* (120). The paper disclosed the pungent surveying of the various dilemmas of the Indian immigrants is commendable. She opines:

> Certain Indians become immigrants slowly.....immigrants are always in two minds. Outwardly they adjust well. Educated and English speaking, they allow misleading assumptions about a heart that is divided. In the new country they work lengthy hours to

gain entrance into the system, into society, into establishing a healthy bank account. ... As far as citizenship is concerned, a divided heart means that the immigrant clings to his status Feeling that to give up his passport is the final break in the weakened chain that binds him to his motherland. ...Forget the smells, sights, sounds you were used to, forget them or you will not survive. There is new stuff around, make it your own; you have to (121).

To adjust to the new environment she further complaints -*"Forget the smells, sights, sounds you were used to, forget them or you will not survive. There is new stuff around, make it your own, you have to"* (121). Arriving at alien land as an immigrant and as a wife becomes more difficult for Nina to manage the situation. Alienation and insecurity surrounds her. Consciousness of immigrant haunts her. Nina explains the situation:

> The immigrant who comes as a wife has a more difficult time. If work exists for her, it is in the future, and after much finding of feet. At present all she is, is a wife, and wife is alone for many, many hours. There will come a day when even books are powerless to distract. When the house and its conveniences can no longer completely charm or compensate. Then she realizes she is an immigrant for life. (121-122).

To overcome such situation she starts thinking of doing job. Though she was teaching in Delhi University the qualifications was not sufficient to teach at Canada. She joins Library School so that she can do job in Canada. Slowly and slowly Nina starts enjoying life in Canada. She starts changing her food and dress habit and confined to those which can suit Canadian life style. She realizes that it is in her control to keep herself happy. It is on her own that she can find the answers to her selfhood.

Consequently Nina freed herself from the patriarchal restrictions; she faced through the various processes in her life in Canada and changed her identity: the ability to choose her own career through education, the ability to decide whether she wants to have children, her sexual freedom, her change in dress and image, and eventually her decision to leave her husband.

The immigrant's psyche indulges in a continuous interaction with the traditional culture of the native home and the adopted culture of an alien land. It ushers a reconstruction in the inherited custom and culture of 'the immigrant'. Cultural diversity which the immigrants are concerned with is primarily dealt with in this paper. Immigration necessitates them to embrace the contrasting culture of an unknown land snapping down the native boundaries. Moving to a new country no more causes separation but may be perceived as rebirth and reinvention in a new place, city, and country noticeable for their new culture. The belongings of the past never be discarded but continues to stay even when someone approaches it to explicate and consider the alien experience.

Twenty first century is witnessing the influential role of Globalization. In the recent times every concept or idea is judged and appreciated for its universal value on the global platform. Migration of the people to a foreign country is easy because of eased transportation but the conditions are hard to adjust, far from one's native land. The home and identity are two important things every individual's life. Though people are living in an alien culture, they are very much connected to their roots and to their respective native lands. They keep a separate space for their native-land in their minds. These people are not ready to compromise on their own customs and traditions. Indians are there in all over the world like, USA, UK, Canada, Australia, South Africa, West Indies, etc. These Indians, who are living outside India, have established mini India in their home. They follow simultaneously the Indian calendar to celebrate all Indian festivals and partake in cultural practices. Bill Ashcroft and others comment on this diaspora: "*Diaspora, the voluntary or forcible movement of peoples from their homelands into new regions, is a central historical fact of colonization*" (2004:68-69).

Thus, This paper dares to break certain conventional attitudes that are never questioned in our society. The last three decades witnessed Indian women writers-novelists and poets, who are writing

n English as well as regional languages, have shown a tremendous courage in dealing with the formerly prohibited and forbidden topic of female sexuality. Through many twists and turns which explore this space and reveals the myriad impediments that are firmly rooted in the family system, such as uprising against the age-old tradition, the search for selfhood, woman's rights and the politics of marriage. Nina's decision to forge an identity of her own away from her husband reminds us of the protagonist's words in Kamala Das's - *"I Shall Someday Leave: I shall someday leave, leave the cocoon you built around me with morning tea, Love words flung from doorways and of course Your tired lust"* (150)

Her realization that *"when one was reinventing oneself, anywhere could be home"* (334).empowers her and we see in her a newly gained confidence, courage and identity. Viewed from the angles of the gyno critics the narrative of the novel is authentically feminine.

Like Showalter, the renowned feminist author Helen Cixous also subscribes to the view that writing is of the body and that a woman doesn't write like a man, because she speaks with the body. She advocates: *"woman must write herself: must write about women and bring women to writing"* (320). Kapur has indeed, written with her – 'self'.

The Post-Independence era has witnessed the emergence of a large number of novelists whose works offer - interesting insights into the many ways in which the standard authentic notion of language has been subverted (Ashcroft, et. al, 2004:68-69).

CONCLUSION

The present day multicultural societies are a result of extensive Diaspora that has taken place over the last 200 years and now more so with the advent of globalization. Immigration of the Indians to US, England, Canada and Australia in the 20th century was mainly a personal choice either for academic pursuit or for economic gain but their acceptance in the alien lands has not come without contestations. The inhabitants of these countries have always reacted differently toward these immigrants, isolating them and resisting their assimilation into the main stream. The immigrants have always faced a close contesting culture which has always been followed by their attempts to adjust or engross, either to be known by a separate identity as a racial group or be assimilated.

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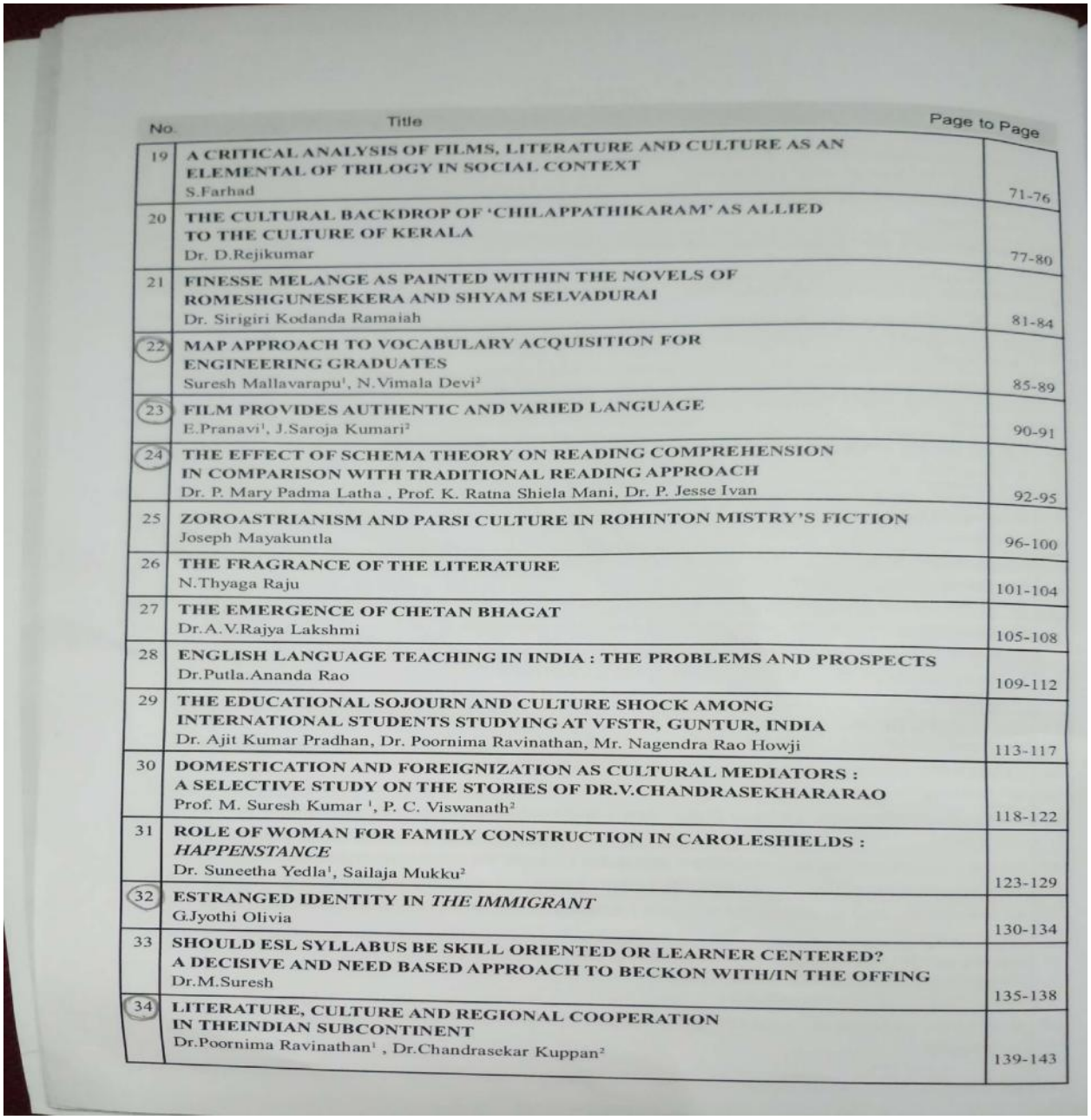

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FILM PROVIDES AUTHENTIC AND VARIED LANGUAGE

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ABSTRACT

"Art is not a mirror held up to society, but a hammer with which to shape it."

-Leon Trotsky.

CINEMA and LITERATURE are connected and related to each other but still they are different in their own ways. It has always been one of the most fascinating forms of knowledge which has made great impact on human psyche.

From the early magical experiments till the recent release of Ron Howard's Angels & Demons the relationship between cinema and literature has always been closely intertwined. It has proved on the whole a successful symbiosis, a relationship that remains to this day as inextricable as it is fruitful. Some half century ago, even one French film critic proposed the question as to whether the cinema was capable of surviving without the twin crutches of literature and theatre and the answer was "no". Cinema is a nascent art, and as such, it has sought in its most vulnerable years succour from the previous generations of theatre and literature. This Borgesian library traversing ages, cultures and continents, written in a thousand languages, incorporating multitudinous philosophies and wildly incompatible theologies is the rich and fertile soil in which cinema has firmly planted its roots and has ever since flourished because it has recourse to the literature of millennia. Cinema has been a thousand years in the making. Language teachers have been using films in their classes for decades, and there are a number of reasons why film is an excellent teaching and learning tool.

Keywords: *Film as Language learning tool- Motivation- Culture- Second Language.*

LEARNING FROM FILMS IS MOTIVATING AND ENJOYABLE

Motivation is one of the most important factors in determining successful second-language acquisition. Films and TV shows are an integral part of students' lives so it makes perfect sense to bring them into the language classroom. Film, as a motivator, also makes the language learning process more entertaining and enjoyable.

Another benefit of using film is that it provides a source of authentic and varied language. Film provides students with examples of English used in 'real' situations outside the classroom, particularly interactive language – the language of real-life conversation. Film exposes students to natural expressions and the natural flow of speech. If they are not living in an English-speaking environment, perhaps only film and television can provide learners with this real-life language input.

FILM GIVES A VISUAL CONTEXT

The visuality of film makes it an invaluable language teaching tool, enabling learners to understand more by interpreting the language in a full visual context. Film assists the learners' comprehension by enabling them to listen to language exchanges and see such visual supports as facial expressions and gestures simultaneously. These visual clues support the verbal message and provide a focus of attention.

VARIETY AND FLEXIBILITY

Film can be used to develop all four LSRW communicative skills. For example, a whole film or sequence can be used to practise listening and reading, and as a model for speaking and writing. Film can be used among the students for discussions, debates on social issues, role plays, reconstructing a dialogue or summarising. Given the benefits of using film in the language learning classroom, it is not surprising that many teachers are keen to use film with their students, and an increasing number of them are successfully integrating film into the language-learning syllabus. Until quite recently it was difficult to find pedagogically sound film material to help students improve their language through watching film, and teachers had to spend many hours creating their own materials. However, with the advent of the internet there is now a wealth of online resources for both language teachers and their students. With so many resources, it's sometimes difficult for teachers to see the wood for the trees.

LESSON PLANS

One can find many websites and blogs which provide detailed and well-structured lesson plans based on film and television clips, short films and viral videos, which save the busy teacher a lot of time. These lesson plans engage the student in a challenging, imaginative study of contemporary debates which are shown in films. They create fascinating fields of study and explore the brain of the students.

HOW CINEMA AND LITERATURE ARE RELATED

It is said that if you're going to see a movie based on a book you think is worth reading, read the book first, you can never read the book with the same imaginative responsiveness to the author once you have seen the movie.

Cinema is also used in a response to poetry. The tapes and films were chosen out of the American experimental tradition to exemplify various techniques of marrying the two arts. Poetry as the art of utterance and cinema the art of showing, both whole on their own, don't easily make a good couple. But these film and video makers have taken up the challenge anyway by responding to the spirit and the letter of the poet, creating an original cinematic writing. Cinema and language meet head on, not unified as in conventional film, but remaining distinct and dancing, stepping on toes, wooing each other with the charms of mouth and eye and mind. You'll see images' own syntax shuffled, blended, chafing and dovetailing with language; you'll hear and read poets' work while seeing and hearing filmmakers'.

CONCLUSION

In the beginning stages, literature and films both provide good thoughts and Religious beliefs. Later stage, Film became fully commercial and Literature is hanging between good thoughts and commercial elements.

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Completely Semiprime Fuzzy Ideal And Fuzzy Filters Of PO Semigroup

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Abstract:*In this paper we define completely semi prime fuzzy ideal, fuzzy d-system and semiprime fuzzy ideal of a po semigroup next prove that every completely prime fuzzy ideal of a po semigroup S is a completely semiprime fuzzy ideal of S and then establish the relation between completely semiprime fuzzy and fuzzy d-system. Next define the fuzzy n-system and prove the relation between fuzzy m-system and fuzzy n-system and also prove the relation between semiprime fuzzy ideal. In the next section, fuzzy left(right) filter, fuzzy filter of PO semigroup are defined. Next prove that f is fuzzy left(right) filter of S iff f ' is completely prime fuzzy right(left) ideal of S, relation between fuzzy filter and prime fuzzy ideal of S. Also define fuzzy filter of S generated by generated by f and prove tht fuzzy filter of S generated by f is the intersection of all fuzzy filters of S containing f.*

Keywords: *Completely semiprime fuzzy ideal, Semiprime fuzzy ideal, fuzzy d-system, fuzzy n-system, fuzzy filter and fuzzy bi-filter of a po semigroup*

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I. Introduction

The algebraic theory of semigroups was studied by CLIFFORD [1, 2], PETRICH [3] and LJAPIN [4].The ideal theory of semigroups was developed by ANJANEYULU A [5].

Many researchers have been extending the concepts and results of abstract algebra. As we know, in paper[6,7], P.M.Padmalatha et al introduced the concept of completely prime po ideals, prime po ideals and po filters of partially ordered semigroups(po semigroups), in that define m-system and n-system of po semigroup.

L A ZADEH[8] introduced the notion of fuzzy subset of a set in 1965.Since then, a series of research on fuzzy sets results fuzzy logic, fuzzy set theory, fuzzy algebra etc. A ROSENFELD [9] is the father of fuzzy abstract algebra. N Kuroki developed fuzzy ideal theory of semigroups. N Kehayopulu and M Tsingelis[10] introduced the notion of fuzzy ideals in partially ordered semigroups (po semigroups). Xiang-Yun Xie,, Jian Tang[11] introduced ordered fuzzy point, fuzzy left(right) ideal of an ordered semigroup and completely semiprime fuzzy ideal of ordered semigroup. J. N. Mordeson et al[12] proved relations between fuzzy points of semi group. In Paper [13] defined fuzzy filters and fuzzy bi-filters of an ordered semigroup. In Paper[14] establish the relation between Prime fuzzy ideal and fuzzy m-system of S.

II. Preliminaries

Definition 2.1: [6] A semigroup S with an ordered relation $\leq$ is said to be **posemigroup** if S is a partially ordered set such that $a \leq b \Rightarrow ax \leq bx, xa \leq xb$ for all $a, b, x \in S$.

Definition2.2: A function f from S to the closed interval [0,1] is called a **fuzzy subset** of S.

The po semigroup S itself is a fuzzy subset of S such that S(x)=1, $\forall x \in S$. It is denoted by S or 1.

Definition2.3: Let A be a non-empty subset of S. We denote $\mathbf{f_A}$**, the characteristic mapping** of A. i.e., The mapping of S into [0,1] defined by

$f_A(x)=\begin{cases}1 & \text{if } x \in A\\ 0 & \text{if } x \notin A\end{cases}$ Then f_A is a fuzzy subset of S.

Definition 2.4: Let f and g be two fuzzy subsets of po semigroup S. Then **the inclusion relation** $f \subseteq g$ is defined by $f(x) \leq g(x)$, $\forall x \in S$.

Definition 2.5: Let $(S, \leq)$ be a po semigroup and f,g be two fuzzy subsets of S. For $x \in S$ the**product fog** is

defined by $(fog)(x) = \begin{cases} \vee_{x \leq yz} f(y) \wedge g(z) & \text{if } x \leq yz \text{ exists} \\ 0 & \text{otherwise} \end{cases}$

Definition2.6:[11]Let S be a posemigroup. A fuzzy subset f of S is called a **fuzzy left ideal** of S if (i) $x \leq y$ then $f(x) \geq f(y)$ (ii) $f(xy) \geq f(y)$, $\forall\, x,y \in S$.

Definition2.7: [11]Let S be a posemigroup. A fuzzy subset f of S is called a **fuzzy right ideal** of S if (i) $x \leq y$ then $f(x) \geq f(y)$ (ii) $f(xy) \geq f(x)$, $\forall\, x,y \in S$.

Definition2.8:[11]Let S be a posemigroup. A fuzzy subset f of S is called a **fuzzy ideal**of S if (i) $x \leq y$ then $f(x) \geq f(y)$ (ii) $f(xy) \geq f(y)$, $f(xy) \geq f(x)$, $\forall\, x,y \in S$.

Definition2.9: Let S be a po semigroup, $a \in S$and $\lambda \in (0,1]$. An ordered fuzzy point a_λ of S defined by $a_\lambda(x) = \begin{cases} \lambda \text{ if } x \in (a] \\ 0 \text{ if } x \notin (a] \end{cases}$

clearly a_λ is a fuzzy subset of S. For every fuzzy subset f of S, we also denote $a_\lambda \subseteq f$ by $a_\lambda \in f$

Definition 2.10: A fuzzy ideal f of a po semigroup S is called completely prime fuzzy idealif$\forall$ two ordered fuzzy points x_t, y_r of S ($\forall t, r \in (0,1]$) such that $x_t o y_r \subseteq f$ then $x_t \subseteq f$ or $y_r \subseteq f$.

Definition 2.11: Let S be a po semigroup. A fuzzy ideal f of S is said to be prime fuzzy ideal if $\forall$ 2 fuzzy ideals g and h of S, $goh \subseteq f$ then either $g \subseteq$ for $h \subseteq f$.

Definition 2.12: Let f be a fuzzy subset of a po semigroup S. f is said to be fuzzy m-system of S provided if $f(x) > t_1, f(y) > t_2 \Rightarrow \exists c, s \in s \ni f(c) > t_1 \vee t_2$and $c \leq xsy$.

III. Completely Semiprime Fuzzyideals And Semiprime Fuzzy Ideals

Definition 3.1: A fuzzy ideal f of a po semigroup S is said to be a completely semi prime fuzzy idealif for any fuzzy point a_t of S such that $a_t^n \subseteq f$ for some $n \in N$ then $a_t \subseteq f$where $t \in (0,1]$.

Theorem 3.2: Let f be a fuzzy ideal of a po semigroup S.f is completely semiprime fuzzy ideal iff for any ordered fuzzy point a_t of S such that $a_t^2 \subseteq f \Rightarrow a_t \subseteq f$.

Proof: Suppose f is completely semiprime fuzzy ideal then clearly if $a_t^2 \subseteq f \Rightarrow a_t \subseteq f$.

Conversely suppose that $a_t^2 \subseteq f \Rightarrow a_t \subseteq f$.

We prove this by induction on n. This is true for $n = 2$.

Assume that this is true for $n = k$.

$\Rightarrow a_t^{k-1} o a_t^{k+1} \subseteq sof \subseteq f \Rightarrow a_t^{2k} \subseteq f \Rightarrow (a_t^k)^2 \subseteq f \Rightarrow a_t^k \subseteq f \Rightarrow a_t \subseteq f$ by inductive hypothesis. Therefore f is completely semiprime fuzzy ideal.

Theorem 3.3: If f is completely semiprime fuzzy ideal of a po semigroup S then for $x \in S$ for every $\lambda_1, \lambda_2 \in (0,1](i)x_{\lambda_1} o x_{\lambda_2} \subseteq f \Rightarrow x_{\lambda_1} o x_{\lambda_2} o S \subseteq f$

(ii) $x_{\lambda_1} o S o x_{\lambda_2} \subseteq f$ (iii) $S o x_{\lambda_1} o x_{\lambda_2} \subseteq f$.

Proof: Let f be completely semiprime fuzzy ideal of a po semigroup S

Suppose $x_{\lambda_1} o x_{\lambda_2} \subseteq f$.

Consider $(x_{\lambda_1} o x_{\lambda_2} o S)^2 = (x_{\lambda_1} o x_{\lambda_2} o S) o (x_{\lambda_1} o x_{\lambda_2} o S)$

$= (x_{\lambda_1} o x_{\lambda_2} o S) o (x_{\lambda_1} o x_{\lambda_2}) o S$

$\subseteq SofoS \subseteq f$

$\Rightarrow (x_{\lambda_1} o x_{\lambda_2} o S)^2 \subseteq f \Rightarrow (x_{\lambda_1} o x_{\lambda_2} o S) \subseteq f$ since f is completely semiprime fuzzy ideal.

Consider $(x_{\lambda_2} o x_{\lambda_1})^2 = (x_{\lambda_2} o x_{\lambda_1}) o (x_{\lambda_2} o x_{\lambda_1}) = x_{\lambda_2} o (x_{\lambda_1} o x_{\lambda_2}) o x_{\lambda_1} \subseteq SofoS \subseteq f$

$\Rightarrow x_{\lambda_2} o x_{\lambda_1} \subseteq f$

Consider $(x_{\lambda_1} o\, S\, o x_{\lambda_2})^2 = (x_{\lambda_1} o\, S\, o x_{\lambda_2}) o (x_{\lambda_1} o\, S\, o\, x_{\lambda_2})$

$= x_{\lambda_1} o\, S\, o (x_{\lambda_2} o\, x_{\lambda_1}) o\, S\, o\, x_{\lambda_2} \subseteq SofoS \subseteq f$

therefore $x_{\lambda_1} o S o x_{\lambda_2} \subseteq f$ since f is completely semiprime fuzzy ideal.

Consider $(So\, x_{\lambda_1} o\, x_{\lambda_2})^2 = (So\, x_{\lambda_1}\, o x_{\lambda_2}) o (S\, o\, x_{\lambda_1}\, o\, x_{\lambda_2})$

$= So(x_{\lambda_1} o x_{\lambda_2} o S) o\, x_{\lambda_1}\, o\, x_{\lambda_2} \subseteq SofoS \subseteq f$

Therefore $So x_{\lambda_1} o x_{\lambda_2} \subseteq f$ since f is completely semiprime fuzzy ideal.

Corollary 3.4: Let f be a fuzzy ideal of a po semigroup S. If f is completely semiprime then for every two ordered fuzzy points x_t, y_r of S such that $x_t o y_r \subseteq f$ then $< x_t > o < y_r > \subseteq f$where$t, r \in (0,1]$.

Theorem 3.5: Every completely prime fuzzy ideal of a po semigroup S is a completely semiprime fuzzy ideal of S.

Proof: Let f be completely prime fuzzy ideal of a po semigroup S and a_t be any ordered fuzzy point of S such that $a_t^2 \subseteq f \Rightarrow a_t o a_t \subseteq f \Rightarrow a_t \subseteq f$.

Therefore f is completely semiprime fuzzy ideal.

Theorem 3.6: Let f be prime fuzzy ideal of a po semigroup S. If f is completely semiprime ideal of S then f is completely prime fuzzy ideal.

Proof: Let f be completely semiprime fuzzy ideal of S.
Let $x_t o y_r \subseteq f \Rightarrow < x_t > o < y_r > \subseteq f$ by corollary 3.4
$\Rightarrow x_t \subseteq f$ or $y_r \subseteq f$ since f is prime fuzzy ideal.
Therefore f is completely prime fuzzy ideal.
Theorem 3.7: The nonempty intersection of any family of completely prime fuzzy ideals of a po semigroup S is a completely semiprime fuzzy ideal of S.
Proof: By[5.6 ,14], intersection of family of fuzzy ideals of a po semigroup is a fuzzy ideal.
Let $\{f_\alpha\}$ be an arbitrary family of completely prime fuzzy ideals of S such that $\cap f_\alpha \neq \emptyset$.
Clearly $\cap f_\alpha$ is a fuzzy ideal.
Let $x_\lambda^2 \in \cap f_\alpha \Rightarrow x_\lambda^2 \in f_\alpha$ for eachα.
$\Rightarrow x_\lambda \in f_\alpha$ for each α,since f_α is completely prime fuzzy ideal.
Therefore $\cap f_\alpha$ is completely semiprime fuzzy ideal of S.
Definition 3.8: A fuzzy subset f of S is said to be a fuzzy d-systemof Sif $x_t \subseteq f \Rightarrow x_t^n \subseteq f$ for every $n \in N$ and $t \in (0,1]$.
Theorem 3.9:Let f be fuzzy ideal of a po semigroup S.f is completely semiprime fuzzy ideal iff $1 - f$ is a fuzzy d-system of S if $1 - f \neq \emptyset$.
Proof: Suppose that f is a completely semiprime fuzzy ideal of S.
Let $x_t \subseteq 1 - f \Rightarrow x_t \not\subseteq f \Rightarrow f(x) < t$
If possible suppose $x_t^n \not\subseteq 1 - f \Rightarrow x_t^n \subseteq f$ for every $n \in N \Rightarrow x_t^2 \subseteq f \Rightarrow x_t \subseteq f$ which is contradiction.
Therefore $x_t^n \subseteq 1 - f \Rightarrow 1 - f$ is a fuzzy d-system.
Conversely suppose $1 - f$ is fuzzy d-system of S.
Let $x_t^2 \subseteq f$ .Suppose $x_t \not\subseteq f \Rightarrow x_t \subseteq 1 - f \Rightarrow x_t^n \subseteq 1 - f$ for every $n \in N$
$\Rightarrow x_t^2 \subseteq 1 - f \Rightarrow x_t^2 \not\subseteq f$, which is contradiction.
Therefore $x_t \subseteq f \Rightarrow f$ is completely semiprime fuzzy ideal.
Definition 3.10: A fuzzy ideal f of a po semigroup S is said to besemiprimeif g is a fuzzy ideal of S and $g^n \subseteq f$ for some natural number n then $g \subseteq f$.
Theorem 3.11: A fuzzy ideal f of a po semigroup S is semiprime iff g is fuzzy ideal of S such that $g^2 \subseteq f$ then $g \subseteq f$

Proof:Suppose f is semiprime fuzzy ideal.
If $g^2 \subseteq f \Rightarrow g \subseteq f$.
Conversely suppose that if $g^2 \subseteq f$ then $g \subseteq f$. We prove that if $g^n \subseteq f$ for some natural number n then $g \subseteq f$ by using induction on n.
Since if $g^2 \subseteq f$ then $g \subseteq f$, it is true for $n = 2$.
Assume that $g^k \subseteq f$ forsome $k \in N, 1 \leq k \leq n \Rightarrow g \subseteq f$.
Now assume $g^{k+1} \subseteq f \Rightarrow g^{k+1} o g^{k+1} \subseteq f$ since f is fuzzy ideal
$\Rightarrow g^{2k} \subseteq f \Rightarrow (g^k)^2 \subseteq f \Rightarrow g^k \subseteq f \Rightarrow g \subseteq f$.
By induction, f is semiprime fuzzy ideal.
Theorem 3.12: Everyprime fuzzy ideal of a po semigroup S is semiprime fuzzy ideal.
Proof: Let f be prime fuzzy ideal of a po semigroup S.
Let $g^2 \subseteq f$ where g is a fuzzy ideal $\Rightarrow g \subseteq f$ since f is prime fuzzy ideal.
Therefore f is semiprime fuzzy ideal.
Theorem 3.13: If f is a fuzzy ideal of a po semigroup S then the following are equivalent.
(a) f is a semiprime fuzzy ideal.
(b) For an ordered fuzzy point $a_t, < a_t >^2 \subseteq f \Rightarrow a_t \subseteq f$.
(c) For any $a_t, Soa_toSoa_toS \subseteq f \Rightarrow a_t \subseteq f$.
Proof:(a) $\Rightarrow$ (b) is obvious.

(b) $\Rightarrow$ (c):Let a_t be a fuzzy point of S such that $Soa_toSoa_toS \subseteq f$.
Here $< a_t >= (a_t \cup a_toS \cup Soa_t \cup Soa_toS)$
$\Rightarrow < a_t >^2 = (a_t \cup a_toS \cup Soa_t \cup Soa_toS) o (a_t \cup a_toS \cup Soa_t \cup Soa_toS)$
$\subseteq So(a_t \cup a_toS \cup Soa_t \cup Soa_toS) \subseteq Soa_t \cup Soa_toS \subseteq Soa_toSoa_toS \subseteq f$
$\Rightarrow < a_t >^2 \subseteq f$ From (b),$a_t \subseteq f$

(c) $\Rightarrow$ (a):
For any a_t, if $Soa_toSoa_toS \subseteq f$ then $a_t \subseteq f$.
Let g be any fuzzy po ideal of S such that $g^2 \subseteq f$.

Suppose if possible $g \not\subseteq f \Rightarrow$ there exists a fuzzy point $a_t \subseteq g$ and $a_t \not\subseteq f$.
Since $a_t \subseteq g$. Now $a_t o S o a_t o S \subseteq g^2 \subseteq f \Rightarrow a_t \subseteq f$, Which is a contradiction.
$\Rightarrow g \subseteq f$. Therefore f is a semiprime fuzzy ideal of S.
Theorem 3.14: Every completely semiprime fuzzy ideal of a po semigroup S is a semiprime fuzzy ideal of S.
Proof: Suppose that f is completely semiprime fuzzy ideal of S.
Let a_t be any ordered fuzzy point of S such that $< a_t >^n \subseteq f$ forsome $n \in N$.
Now $a_t o a_t o a_t \ldots . o a_t$(n times)$\subseteq < a_t{}^n > \subseteq < a_t >^n \subseteq f$
$\Rightarrow a_t{}^n \subseteq f \Rightarrow a_t \subseteq f \Rightarrow < a_t > \subseteq f$ by theorem 3.13.
Therefore f is a semiprime fuzzy ideal of S.
Theorem 3.15: Let S be a commutative po semigroup and f be a fuzzy ideal of S. Then f is completely semiprime fuzzy ideal iff f is semiprime fuzzy ideal.
Proof: Suppose f is completely semiprime fuzzy ideal. By theorem 3.14,f is a semiprime fuzzy ideal of S.
Conversely, suppose that f is semiprime fuzzy ideal of S.
Let a_t be any ordered fuzzy point of S, $a_t{}^n \subseteq f$ for some $n \in N$.
Now $a_t{}^n \subseteq f \Rightarrow < a_t >^n \subseteq f \Rightarrow < a_t > \subseteq f$ since f is semiprime fuzzy ideal $\Rightarrow a_t \subseteq f$
Therefore f is completely semiprime fuzzy ideal of S.
Theorem 3.16: The non-empty intersection of arbitrary family of prime fuzzy ideals of a po semigroup S is a semiprime fuzzy ideal.
Proof: Let $\{f_\alpha\}$ be an arbitrary family of prime fuzzy ideals of S such that $\cap f_\alpha \neq \emptyset$.
Clearly $\cap f_\alpha$ is a fuzzy ideal by [4.9 ,14].
Let a_t be any ordered fuzzy point of S such that $< a_t{}^2 > \subseteq \cap f_\alpha \Rightarrow < a_t{}^2 > \subseteq f_\alpha$ for each α
$\Rightarrow < a_t > \subseteq f_\alpha$ for each $\alpha \Rightarrow < a_t > \subseteq \cap f_\alpha$
Therefore intersection of arbitrary family of prime fuzzy ideals of a po semigroup S is a semiprime fuzzy ideal.
Definition 3.17: Let f be a fuzzy subset of a po semigroup S.f is said to be fuzzy n-system of S provided if $f(x) > t \Rightarrow \exists\, c \in S, s \in S \ni f(c) > t$ and $c \leq xsx$ where $x \in S$ and $t \in (0,1]$.
Theorem 3.18: Every fuzzy m-system of a po semigroup S is a fuzzy n-system.
Proof: Let f be a fuzzy m-system of a po semigroup S.
Let $f(x) > t$ for some $x \in S$ and $t \in (0,1]$.
Since $f(x) > t$ and f is fuzzy m-system of S.
$\Rightarrow \exists\, c \in S, s \in S \ni f(c) > t \vee t = t$ and $c \leq xsx$
$\Rightarrow f(c) > t$ and $c \leq xsx$ whenever $f(x) > t$
$\Rightarrow$ f is fuzzy n-system of S. Therefore every fuzzy m-system is a fuzzy n-system.
Corollary 3.19: Let f be a semiprime fuzzy ideal of a po semigroup S. If $x_r o S o x_r \subseteq f$ for some ordered fuzzy point x_r of S then$x_r \subseteq f$
Proof: Let f be semiprime fuzzy ideal of S. Let $x_r o S o x_r \subseteq f$
Consider $(Sox_r oS)^2 = (Sox_r oS)o(Sox_r oS) \subseteq So(x_r oSox_r)oS \subseteq SofoS \subseteq f$
$\Rightarrow (Sox_r oS)^2 \subseteq f$ and f is a semiprime fuzzy ideal of S.
$\Rightarrow (Sox_r oS) \subseteq f$. By[3.6,11], $(x_r)^3 \subseteq Sox_r oS \subseteq f \Rightarrow x_r \subseteq f$
Theorem 3.20: Let f be a fuzzy ideal of a po semigroup S. If f is semiprime fuzzy ideal iff $1 - f$ is a fuzzy n-system if $1 - f \neq \emptyset$
Proof: Let f be a semiprime fuzzy ideal of S.
Let $(1 - f)(x) > t \Rightarrow f(x) < 1 - t \Rightarrow x_{1-t} \not\subseteq f$
From corollary 3.19, $x_{1-t} o S o x_{1-t} \not\subseteq f$ since f is semiprime fuzzy ideal.

$$\Rightarrow (xsx)_{1-t} \not\subseteq f \Rightarrow f(xsx) < 1 - t \Rightarrow (1 - f)(xsx) > t$$

$\Rightarrow 1 - f$ is a fuzzy n-system.
Conversely, suppose that $1 - f$ is fuzzy n-system and $1 - f \neq \emptyset$
Let g be fuzzy ideal of S such that $g^2 \subseteq f$.
Suppose $g \not\subseteq f \Rightarrow$ there exist an ordered fuzzy point $x_\lambda \ni x_\lambda \subseteq g$ and $x_\lambda \not\subseteq f$

$$\Rightarrow f(x) < \lambda \Rightarrow (1 - f)(x) > 1 - \lambda$$

$\Rightarrow$ there exists $c, s \in S$ such that $(1 - f)(c) > 1 - \lambda$ and $c \leq xsx \Rightarrow f(c) < \lambda$
Since $c \leq xsx \Rightarrow f(c) \geq f(xsx) \Rightarrow f(xsx) < \lambda$
But $x_\lambda \subseteq g$, By[7.6.1(3),12], $x_\lambda o x_\lambda \subseteq gog = g^2 \subseteq f$
$\Rightarrow (x_\lambda o x_\lambda)(t) \leq f(t) \Rightarrow f(t) \geq \lambda$ for every $t \in S$.
But $xsx \in S \Rightarrow f(xsx) \geq \lambda$ which is contradiction. Thereforeg $\subseteq$ f.
$\Rightarrow$ f is semiprime fuzzy ideal of S.
Theorem 3.21: If f is a fuzzy n-system of a po semigroup S and $f(x) > t$ forsome $x \in S$ then there exists a subset M of S such that f is fuzzy m-system on M.

Proof: Define $c_1 = x$ since $f(c_1) > t$ then there exists $c_2 \in S, s_1 \in S$ such that $f(c_2) > t$ and $c_2 \leq c_1 s_1 c_1$ since f is fuzzy n-system.
since $f(c_2) > t$ then there exists $c_3 \in S, s_2 \in S$ such that $f(c_3) > t$ and $c_3 \leq c_2 s_2 c_2$ and so on
In general, if c_i has been defined, choose c_{i+1} as $c_{i+1} \in S, s_i \in S$ such that $f(c_{i+1}) > t$ and $c_{i+1} \leq c_i s_i c_i$.
Construct $M = \{c_1, c_2, \ldots \ldots c_i, c_{i+1}, \ldots \ldots .\}$
clearly M is a subset of S. Let $c_i, c_j \in M$ for $i \leq j \Rightarrow f(c_i) > t, f(c_j) > t$ and also clearly $c_{j+1} \in M \Rightarrow$ f is a fuzzy m-system on M.

IV. Fuzzy Filters Of Po Semigroup

Definition 4.1: A po sub semigroup F of a po semigroup S is said to be **po left filter of S** if $(a)a, b \in S, ab \in F \Rightarrow a \in F(b)a, b \in S, a \leq b$ and $a \in F \Rightarrow b \in F$.
Note 4.2: A po subsemigroup F of a po semigroup S is a **po left filter of S** iff $(a)a, b \in S, ab \in F \Rightarrow a \in F(b)(F] \subseteq F$.
Definition 4.3: Let S be a po semigroup. A fuzzy subsemigroup f of S is called a **fuzzy left filter** of S if
$(a)x \leq y \Rightarrow f(x) \leq f(y)(b)f(xy) \leq f(x), \forall x, y \in S$.
Theorem 4.4:[13]Let S be a po semigroup and A be a non-empty subset of S. Then A is a po left filter of S iff the characteristic function f_A is a fuzzy left filter of S.
Theorem 4.5: The non-empty intersection of two fuzzy left filters of a po semigroup**S** is also a fuzzy left filter of S.
Proof: Let f, g be two fuzzy left filters of po semigroup S. Let $x \leq y$,
Consider $(f \cap g)(x) = f(x) \wedge g(x) \leq f(y) \wedge g(y) = (f \cap g)(y) \Rightarrow (f \cap g)(x) \leq (f \cap g)(y)$.
Consider $(f \cap g)(xy) = f(xy) \wedge g(xy) \leq f(x) \wedge g(x) = (f \cap g)(x)$.
Therefore $f \cap g$ is a fuzzy left filter of **S.**
Theorem 4.6: The non-empty intersection of a family of fuzzy left filters of a po semigroup **S** is also a fuzzy left filter of S.
Proof: Let $\{f_\alpha\}_{\alpha \in \Delta}$ be a family of fuzzy left filters of a po semigroup **S** and let $F = \bigcap_{\alpha \in \Delta} f_\alpha = f_1 \cap f_2 \cap \ldots$.
Let $x, y \in S$ such that $x \leq y$.
Consider $F(x) = \bigcap_{\alpha \in \Delta} f_\alpha(x) = f_1(x) \wedge f_2(x) \wedge f_3(x) \wedge \ldots \ldots \ldots$

$$\leq f_1(y) \wedge f_2(y) \wedge f_3(y) \wedge \ldots \ldots$$
$$= \bigcap_{\alpha \in \Delta} f_\alpha(y) = F(y)$$

$\Rightarrow F(x) \leq F(y)$.
Consider $F(xy) = \bigcap_{\alpha \in \Delta} f_\alpha(xy) = f_1(xy) \wedge f_2(xy) \wedge f_3(xy) \wedge \ldots \ldots \ldots$

$$\leq f_1(x) \wedge f_2(x) \wedge f_3(x) \wedge \ldots \ldots$$
$$= \bigcap_{\alpha \in \Delta} f_\alpha(x) = F(x)$$

$\Rightarrow F(xy) \leq F(x)$.
Therefore Fis a fuzzy left filter of S.
Theorem 4.7: Let S be a po semigroup. A fuzzy subsemigroup f of S is a fuzzy leftfilter of S iff $f' = (=1\text{-}f)$ is a completely prime fuzzy right ideal of S.
Proof: Let f be a fuzzy left filter of S.
Let $x, y \in S$ such that $x \leq y \Rightarrow f(x) \leq f(y) \Rightarrow f'(x) \geq f'(y)$.
Consider $f'(xy) = 1 - f(xy) \geq 1 - f(x) = f'(x) \Rightarrow f'(xy) \geq f'(x)$.
$\Rightarrow$ $f'$is a fuzzy right ideal of S.
Let x_t, y_r be two ordered fuzzy points such that $t, r \in (0,1]$
suppose $x_t o\, y_r \subseteq f'$. Let $x_t \not\subseteq f'$ and $y_r \not\subseteq f' \Rightarrow x_t \supset 1 - f$ and $y_r \supset 1 - f$
$\Rightarrow 1 - x_t \subseteq f$ and $1 - y_r \subseteq f \Rightarrow (1 - x_t) \vee (1 - y_r) \subseteq f \Rightarrow 1 - (x_t \wedge y_r) \subseteq f$
But$(x_t\, o\, y_r) \subseteq f' = 1 - f \Rightarrow 1 - (x_t o\, y_r) \supset f$
$\Rightarrow f \subset 1 - (x_t\, o\, y_r) \subseteq 1 - (x_t \wedge y_r)$which gives a contradiction.
Therefore either $x_t \subseteq f'$or $y_r \subseteq f'$.
$\Rightarrow f'$ is a completely prime fuzzy right ideal of S.
Conversely assume that f' is a completely prime fuzzy right ideal of S.
Let $x \leq y$ then $f'(x) \geq f'(y) \Rightarrow f(x) \leq f(y)$
Since$f'(xy) \geq f'(x) \Rightarrow f(xy) \leq f(x)$.
Therefore f is a fuzzy left filter of S.
Corollary 4.8: Let S be a po semigroup and f is a fuzzy left filter of S. Then $f'(= 1 - f)$ is a prime fuzzy right ideal of S if $f' \neq \emptyset$.
Proof: By Theorem 4.7,f' is a completely prime fuzzy right ideal of S.

[6.12, p-3**] Every completely prime fuzzy ideal of S is a prime fuzzy ideal of S.
Therefore if f is a fuzzy left filter of S then f′ is a prime fuzzy right ideal of S.
Definition 4.9:[13]Let S be a po semigroup. A fuzzy subsemigroup f of S is called a **fuzzy right filter** of S if (a) $x \leq y \Rightarrow f(x) \leq f(y)$ (b) $f(xy) \leq f(y), \forall x, y \in S$.
Theorem 4.10:[13] Let S be a po semigroup and A be a non-empty subset of S.Then A is a po right filter of S iff the characteristic function f_A is a fuzzy right filter of S.
Theorem 4.11: The non-empty intersection of two fuzzy right filters of a po semigroup **S** is also a fuzzy right filter of S.
Proof: Let f, g be two fuzzyright filters of po semigroup S. Let $x \leq y$,
Consider$(f \cap g)(x) = f(x) \wedge g(x) \leq f(y) \wedge g(y) = (f \cap g)(y) \Rightarrow (f \cap g)(x) \leq (f \cap g)(y)$.
Consider$(f \cap g)(xy) = f(xy) \wedge g(xy) \leq f(y) \wedge g(y) = (f \cap g)(y)$.
Therefore $f \cap g$ is a fuzzy right filter of **S.**
Theorem 4.12: The non-empty intersection of a family of fuzzy right filters of a po semigroup **S** is also a fuzzy right filter of S.
Proof: Let $\{f_\alpha\}_{\alpha\in\Delta}$ be a family of fuzzy right filters of a po semigroup **S** and let $F = \bigcap_{\alpha\in\Delta} f_\alpha = f_1 \cap f_2 \cap \ldots$
Let $x, y \in S$ such that $x \leq y$.
Consider $F(x) = \bigcap_{\alpha\in\Delta} f_\alpha(x) = f_1(x) \wedge f_2(x) \wedge f_3(x) \wedge \ldots\ldots$
$\leq f_1(y) \wedge f_2(y) \wedge f_3(y) \wedge \ldots \ldots$
$= \bigcap_{\alpha\in\Delta} f_\alpha(y) = F(y)$
$\Rightarrow F(x) \leq F(y)$
Consider $F(xy) = \bigcap_{\alpha\in\Delta} f_\alpha(xy) = f_1(xy) \wedge f_2(xy) \wedge f_3(xy) \wedge \ldots\ldots$
$\leq f_1(y) \wedge f_2(y) \wedge f_3(y) \wedge \ldots \ldots$
$= \bigcap_{\alpha\in\Delta} f_\alpha(y) = F(y)$
$\Rightarrow F(xy) \leq F(y)$.
Therefore Fis a fuzzy right filter of S.
Theorem 4.13: Let S be a po semigroup. A fuzzy subsemigroup f of S is a fuzzy right filter of S iff f'(=1-f) is a completely prime fuzzy left ideal of S.
Proof: Let f be a fuzzy right filter of S.
Let $x, y \in S$ such that $x \leq y \Rightarrow f(x) \leq f(y) \Rightarrow f'(x) \geq f'(y)$.
Consider $f'(xy) = 1 - f(xy) \geq 1 - f(y) = f'(y) \Rightarrow f'(xy) \geq f'(y)$.
$\Rightarrow$ $f'$is a fuzzy left ideal of S.
Let x_t, y_r be two ordered fuzzy points such that $t, r \in (0,1]$
suppose $x_t \circ y_r \subseteq f'$. Let $x_t \not\subseteq f'$ and $y_r \not\subseteq f' \Rightarrow x_t \supset 1 - f$ and $y_r \supset 1 - f$
$\Rightarrow 1 - x_t \subseteq f$and $1 - y_r \subseteq f \Rightarrow (1 - x_t) \vee (1 - y_r) \subseteq f \Rightarrow 1 - (x_t \wedge y_r) \subseteq f$
But $(x_t \circ y_r) \subseteq f' = 1 - f \Rightarrow 1 - (x_t \circ y_r) \supset f$
$\Rightarrow f \subset 1 - (x_t \circ y_r) \subseteq 1 - (x_t \wedge y_r)$which gives a contradiction.
Therefore either $x_t \subseteq f'$ or $y_r \subseteq f'$.
$\Rightarrow$ f′ is a completely prime fuzzy left ideal of S.
Conversely assume that f′ is a completely prime fuzzy left ideal of S.
Let $x \leq y$ then $f'(x) \geq f'(y) \Rightarrow f(x) \leq f(y)$
Since$f'(xy) \geq f'(y) \Rightarrow f(xy) \leq f(y)$.
Therefore f is a fuzzy right filter of S.
Corollary 4.14: Let S be a po semigroup and f is a fuzzy right filter of S. Then $f'(= 1 - f)$ is a primefuzzy left ideal of S if $f' \neq \emptyset$.
Proof: By Theorem 4.13,f′ is a completely prime fuzzy left ideal of S.
By [6.12, 14] Every completely prime fuzzy ideal of S is a prime fuzzy ideal of S.
Therefore if f is a fuzzy left filter of S then f′ is a prime fuzzy left ideal of S.
Definition 4.15: Let S be a po semigroup. A fuzzy subsemigroup f of S is called a **fuzzy filter** of S if
(a) $x \leq y \Rightarrow f(x) \leq f(y)$ (b) $f(xy) \leq f(x) \wedge f(y), \forall x, y \in S$.
Theorem 4.16:[13] Let S be a po semigroup and A be a non-empty subset of S.Then A is a po filter of S iff the characteristic function f_A is a fuzzy filter of S.
Note 4.17: A fuzzy subsemigroup f of a po semigroup S is a fuzzy filter of S iff f is a fuzzy left filter, fuzzy right filter of S.
Definition 4.18: A fuzzy filter f of a po semigroup S is said to be **proper fuzzy filter** if $f \neq S$.
Theorem 4.19: The non-empty intersection of two fuzzy filters of a po semigroup S is also a fuzzy filter of S.
Proof: Let f, g be two fuzzy filters of po semigroup S. Let $x \leq y$,
Consider $(f \cap g)(x) = f(x) \wedge g(x) \leq f(y) \wedge g(y) = (f \cap g)(y)$

$\Rightarrow (f \cap g)(x) \leq (f \cap g)(y)$

Consider $(f \cap g)(xy) = f(xy) \wedge g(xy) = f(x) \wedge f(y) \wedge g(x) \wedge g(y)$

$= f(x) \wedge g(x) \wedge f(y) \wedge g(y)$

$= (f \cap g)(x) \wedge (f \cap g)(y)$.

Therefore $f \cap g$ is a fuzzy filter of **S.**

Theorem 4.20: The non-empty intersection of a family of fuzzy filters of a po semigroup S is also a fuzzy filter of S.

Proof: Let $\{f_\alpha\}_{\alpha \in \Delta}$ be a family of fuzzy filters of a po semigroup **S** and let $F = \bigcap_{\alpha \in \Delta} f_\alpha = f_1 \cap f_2 \cap \ldots$

Let $x, y \in S$ such that $x \leq y$.

Consider $F(x) = \bigcap_{\alpha \in \Delta} f_\alpha(x) = f_1(x) \wedge f_2(x) \wedge f_3(x) \wedge \ldots \ldots$

$\leq f_1(y) \wedge f_2(y) \wedge f_3(y) \wedge \ldots \ldots$

$= \bigcap_{\alpha \in \Delta} f_\alpha(y) = F(y)$

$\Rightarrow F(x) \leq F(y)$.

Consider $F(xy) = \bigcap_{\alpha \in \Delta} f_\alpha(xy) = f_1(xy) \wedge f_2(xy) \wedge f_3(xy) \wedge \ldots \ldots$

$= f_1(x) \wedge f_1(y) \wedge f_2(x) \wedge f_2(y) \wedge f_3(x) \wedge f_3(y) \wedge \ldots \ldots$

$= (f_1(x) \wedge f_2(x) \wedge f_3(x) \wedge \ldots \ldots) \wedge (f_1(y) \wedge f_2(y) \wedge f_3(y) \wedge \ldots \ldots)$

$= \bigcap_{\alpha \in \Delta} f_\alpha(x) \wedge \bigcap_{\alpha \in \Delta} f_\alpha(y) = F(x) \wedge F(y)$

$\Rightarrow F(xy) = F(x) \wedge F(y)$.

Therefore the nonempty intersection of fuzzy filters of a po semigroup S is a fuzzy filter of S.

Theorem 4.21: Let S be a po semigroup. A fuzzy subsemigroup f of S is a fuzzy filter of S iff f'(=1-f) is a completely prime fuzzy ideal of S.

Proof: Let f be a fuzzy filter of S.

Let $x, y \in S$ such that $x \leq y \Rightarrow f(x) \leq f(y) \Rightarrow f'(x) \geq f'(y)$.

Consider $f'(xy) = 1 - f(xy) \geq \big(1 - f(x)\big) \wedge (1 - f(y)) = f'(x) \wedge f'(y)$.

$\Rightarrow$ $f'$is a fuzzy ideal of S.

Let x_t, y_r be two ordered fuzzy points such that $t, r \in (0,1]$

suppose $x_t o\, y_r \subseteq f'$. Let $x_t \nsubseteq f'$ and $y_r \nsubseteq f' \Rightarrow x_t \supset 1 - f$ and $y_r \supset 1 - f$

$\Rightarrow 1 - x_t \subseteq f$ and $1 - y_r \subseteq f \Rightarrow (1 - x_t) \vee (1 - y_r) \subseteq f \Rightarrow 1 - (x_t \wedge y_r) \subseteq f$

But $(x_t o y_r) \subseteq f' = 1 - f \Rightarrow 1 - (x_t o y_r) \supset f$

$\Rightarrow f \subset 1 - (x_t o y_r) \subseteq 1 - (x_t \wedge y_r)$, which is a contradiction

Therefore either $x_t \subseteq f'$ or $y_r \subseteq f'$.

$\Rightarrow$ f' is a completely prime fuzzy ideal of S.

Conversely assume that f' is a completely prime fuzzy ideal of S.

Let $x \leq y$ then $f'(x) \geq f'(y) \Rightarrow f(x) \leq f(y)$

Since $f'(xy) \geq f'(x)$ and $f'(xy) \geq f'(y) \Rightarrow f(xy) \leq f(x)$ and $f(xy) \leq f(y)$

$\Rightarrow f(xy) \leq f(x) \wedge f(y)$.

Therefore f is a fuzzy filter of S.

Corollary 4.22: Let S be a po semigroup. If f is a fuzzy filter then $f'(= 1 - f)$ is a prime fuzzy ideal of S if $f' \neq \emptyset$.

Proof: Let f be a fuzzy filter of S.

Bycor 4.8 and cor 4.14, f' is a prime fuzzy ideal of S.

Corollary 4.23: Let f be a fuzzy subset of a commutative po semigroup S is a filter iff $f'(= 1 - f)$ is a prime fuzzy ideal of S.

Proof: Let f be a fuzzy filter of commutative po semigroup S.

By cor 4.22,f' is a prime fuzzy ideal of S.

conversely, assume that f' is a prime fuzzy ideal of S.

By[6.12,14], f' is completely prime fuzzy ideal of S.

By theorem 4.21, f is a fuzzy filter of S.

Theorem 4.24: Every fuzzy filter f of a po semigroup S is a fuzzy m-system of S.

Proof: Letf be a fuzzy filter of S.

By cor 4.22, f' is a prime fuzzy ideal of S.

By [6.15, 14]$f = (f')'$is fuzzy m-system of S

Corollary 4.25: Let S be a po semigroup. If f is a fuzzy filter of S then $f'(= 1 - f)$ is a completely semiprimefuzzy ideal of S.

Proof: Let f be a fuzzy filter of S.

By Theorem 4.21, f' is a completely prime fuzzy ideal of S.

By Theorem 3.5,f' is a completely semiprime fuzzy ideal of S.

Corollary 4.26: Every fuzzy filter f of a po semigroup S is a fuzzy d-system of S.
Proof: Suppose that f is a fuzzy filter of a po semigroup S.
By Cor 4.25,f' is a completely semiprime fuzzy ideal of S.
ByTh 3.9,$(f')' = f$ is a fuzzy d-system of S.
Corollary 4.27: let S be a po semigroup. If f is fuzzy filter of S then $f'(= 1 - f)$ is a semi prime fuzzy ideal of S.
Proof: Let f be a fuzzy filter of po semigroup S.
By Th 4.21, f' is a completely prime fuzzy ideal of S.
By Th 3.5,f' is completely semi prime fuzzy ideal of S.
By Th 3.15, f' is semiprime fuzzy ideal of S.
Corollary 4.28: Every fuzzy filter f of a po semigroup S is a po semigroup S is a fuzzy n-system of S.
Proof: Let f be a fuzzy filter of po semigroup S.
By Cor 4.27,f' is semiprime fuzzy ideal of S.
By Th 3.20,$(f')' = f$ is a fuzzy n-system of S.
Definition 4.29: Let S be a po semigroup and f be a fuzzy subset of S. The smallest fuzzy left filter of S containing f is called a **fuzzy left filter of S generated by f** and is denoted by $< f_l >$.
Theorem 4.30: The fuzzy left filter of a po semigroup S generated by f is the intersection of all fuzzy left filters of S containing f.
Proof: Let Δbe the set of all fuzzy left filters of S containing f.
Since S itself is a fuzzy left filter of S containing f, $S \in \Delta$ so $\Delta \neq \emptyset$.
Let$F^* = \bigcap_{g\in\Delta} g$, where g is the fuzzy left filter of S containing f.
since $f \subseteq g, \forall g \in \Delta \Rightarrow f \subseteq F^* \Rightarrow F^* \neq \emptyset$
By Th 3.6, F^* is the fuzzy left filter of S .
Let K be another fuzzy left filter of S containing f, clearly $f \subseteq K$ and K is the fuzzy left filter of S.
$\Rightarrow K \in \Delta \Rightarrow F^* \subseteq K$. Therefore F^* is the smallest fuzzy left filter of S containing f.
Hence F^* is the fuzzy left filter of S generated byf.
Definition 4.31: Let S be a po semigroup and f be a fuzzy subset of S. The smallest fuzzy right filter of S containing f is called a **fuzzy right filter of S generated by f** and is denoted by $< f_r >$.
Theorem 4.32: The fuzzy right filter of a po semigroup S generated by f is the intersection of all fuzzy right filters of S containing f.
Proof: Let Δ be the set of all fuzzy right filters of S containing f.
Since S itself is a fuzzy right filter of S containing f, $S \in \Delta$ so $\Delta \neq \emptyset$.
Let$F^* = \bigcap_{g\in\Delta} g$, where g is the fuzzy right filter of S containing f.
since $f \subseteq g, \forall g \in \Delta \Rightarrow f \subseteq F^* \Rightarrow F^* \neq \emptyset$
By Th 3.12, F^* is the fuzzy right filter of S .
Let K be another fuzzy right filter of S containing f, clearly $f \subseteq K$ and K is the fuzzy right filter of S.
$\Rightarrow K \in \Delta \Rightarrow F^* \subseteq K$. Therefore F^* is the smallest fuzzy right filter of S containing f.
Hence F^* is the fuzzy right filter of S generated byf.
Definition 4.33: Let S be a po semigroup and f be a fuzzy subset of S. The smallest fuzzy filter of S containing f is called a **fuzzy filter of S generated by f** and is denoted by$< f >$.
Theorem4.34: The fuzzy filter of a po semigroup S generated by f is the intersection of all fuzzy filters of S containing f.
Proof: Let Δ be the set of all fuzzy filters of S containing f.
Since S itself is a fuzzy filter of S containing f, $S \in \Delta$ so $\Delta \neq \emptyset$.
Let$F^* = \bigcap_{g\in\Delta} g$, where g is the fuzzy filter of S containing f.
since $f \subseteq g, \forall g \in \Delta \Rightarrow f \subseteq F^* \Rightarrow F^* \neq \emptyset$
By Th 4.20, F^* is the fuzzy filter of S .
Let K be another fuzzy filter of S containing f, clearly $f \subseteq K$ and K is the fuzzy filter of S.
$\Rightarrow K \in \Delta \Rightarrow F^* \subseteq K$. Therefore F^* is the smallest fuzzy filter of S containing f.
Hence F^* is the fuzzy filter of S generated by f.
Definition 4.35: Let S be a po semigroup. A subsemigroup A of S is called a **Bi-filter** of S if
(a) $a \in A, a \leq b \in S \Rightarrow b \in A$(b) $a, b, c \in S$ and $abc \in A \Rightarrow a \in A$ and $c \in A$.
Definition 4.36: Let S be a po semigroup. A fuzzy subsemigroup f of S is called **fuzzy bi-filter** of S if
(a) $x \leq y$ then $(x) \leq f(y)$(b) $f(xyz) \leq f(x) \wedge f(z)$.
Theorem 4.37: Let S be a po semigroup and A be a non-empty subset of S. If A is a bi-filter of S iff the characteristic function f_A of A is a fuzzy bi-filter of S.
Proof: Let A be a bi-filter of S. Let $x, y \in A$ then $\in A \Rightarrow f_A(xy) = f_A(x) \wedge f_A(y)$.

If $x, y \notin A$ then $f_A(xy) \geq f_A(x) \wedge f_A(y)$.
If $x \in A$and $y \notin A$ then $f_A(xy) \geq 0 = f_A(x) \wedge f_A(y)$.
By summarizing all these $f_A(xy) \geq f_A(x) \wedge f_A(y)$.
Let $x, y \in S$ such that $x \leq y$.
If $x \in A$ then $y \in A \Rightarrow f_A(x) = f_A(y)$.If $x \notin A$ then $f_A(x) = 0 \leq f_A(y)$.
Therefore$f_A(x) \leq f_A(y)$.
Letx, y, $z \in S$, If$xyz \in A$ then $x \in A$ and $z \in A \Rightarrow f_A(xyz) = 1 = f_A(x) \wedge f_A(z)$.
If $xyz \notin A$then$f_A(xyz) = 0 \leq f_A(x) \wedge f_A(z)$.
Therefore$f_A(xyz) \leq f_A(x) \wedge f_A(z)$.
$\Rightarrow f_A$is fuzzy bi-filter of S.
Conversely assume that $f_A$is fuzzy bi-filter of S. Let $x, y \in A \Rightarrow f_A(x) = 1$ and$f_A(y) = 1$.
Since $f_A(xy) \geq f_A(x) \wedge f_A(y)$ and $f_A(x) \wedge f_A(y) = 1 \Rightarrow xy \in A$.
Let $x \in A$ and $x \leq y$ then $f_A(x) = 1$ and $f_A(x) \leq f_A(y) \Rightarrow f_A(y) = 1 \Rightarrow y \in A$.
Let $x, y, z \in S$ and $xyz \in A \Rightarrow f_A(xyz) \geq f_A(x) \wedge f_A(z)$
$\Rightarrow 1 \geq f_A(x) \wedge f_A(z) \Rightarrow f_A(x) \wedge f_A(z) = 1 \Rightarrow f_A(x) = 1$ and $f_A(z) = 1$.
$\Rightarrow a \in A$ and $c \in A \Rightarrow f_A$ is fuzzy bi-filter of S.

Theorem4.38: The non-empty intersection of fuzzy bi-filters of a po semigroup S is also a fuzzy bi-filter of S.

Proof: Let f, g be two fuzzy bi-filter of S.
Consider $(f \cap g)(xy) = f(xy) \wedge g(xy) \geq f(x) \wedge f(y) \wedge g(x) \wedge g(y) = (f \cap g)(x) \wedge (f \cap g)(y) \Rightarrow (f \cap g)(xy) \geq (f \cap g)(x) \wedge (f \cap g)(y)$.
Let $x \leq y \Rightarrow f(x) \leq f(y)$ and $g(x) \leq g(y)$ since f, g are bi-filters of S.
consider $(f \cap g)(x) = f(x) \wedge g(x) \leq f(y) \wedge g(y) \leq (f \cap g)(y)$
consider $(f \cap g)(xyz) = f(xyz) \wedge g(xyz) \leq f(x) \wedge f(z) \wedge g(x) \wedge g(z)$
$\leq (f \cap g)(x) \wedge (f \cap g)(z)$
$\Rightarrow f \cap g$ is also fuzzy bi-filter of S.

Theorem 4.39: The non-empty intersection of family of fuzzy bi-filters of S is also a fuzzy bi-filter of S.

Proof: Let $f_1, f_2, \ldots \ldots f_n$ be two fuzzy bi-filter of S.
Consider $(f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(xy) = f_1(xy) \wedge f_2(xy) \wedge \ldots \ldots \wedge f_n(xy)$
$\geq f_1(x) \wedge f_1(y) \wedge f_2(x) \wedge f_2(y) \wedge \ldots \ldots \ldots f_n(x) \wedge f_n(y)$
$= (f_1 \cap f_2 \cap \ldots . \cap f_n)(x) \wedge (f_1 \cap f_2 \cap \ldots . \cap f_n)(y)$
Let $x \leq y \Rightarrow f_1(x) \leq f_1(y), f_2(x) \leq f_2(y), \ldots \ldots \ldots, f_n(x) \leq f_n(y)$
consider $(f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(x) = f_1(x) \wedge f_2(x) \wedge \ldots \ldots \wedge f_n(x)$
$\leq f_1(y) \wedge f_2(y) \wedge \ldots \ldots \wedge f_n(y)$
$= (f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(y)$
consider $(f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(xyz) = f_1(xyz) \wedge f_2(xyz) \wedge \ldots \ldots \wedge f_n(xyz)$
$\leq f_1(x) \wedge f_1(z) \wedge f_2(x) \wedge f_2(z) \wedge \ldots \ldots \ldots f_n(x) \wedge f_n(z)$
$= (f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(x) \wedge (f_1 \cap f_2 \cap \ldots \ldots \cap f_n)(z)$
$\Rightarrow f_1 \cap f_2 \cap \ldots \ldots \cap f_n$ is fuzzy bi-filter of S

V. Conclusion

The purpose of this paper ischaracterize completely semiprime fuzzy ideals,semipeime fuzzy ideals and fuzzy filters of po semigroup, establish the relation between fuzzy filter and fuzzy n-system of a po semigroup S.

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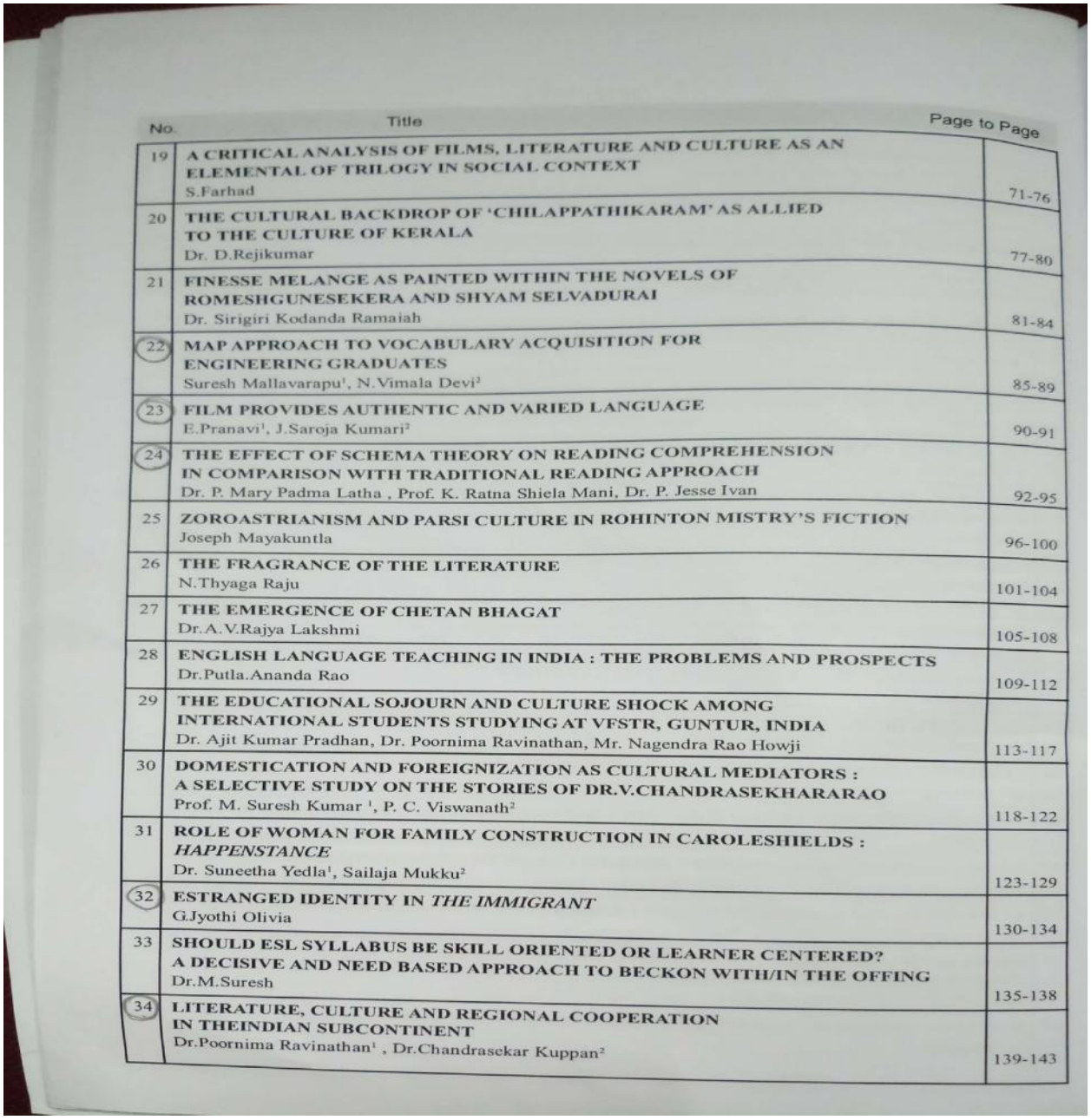

Reading is the most difficult of all the Language Skills to acquire. It becomes very important at a higher level of language instruction. Though it has been given significant importance in Engineering curriculum in the recent years, it has not yet received proper attention in teaching programmes. As reading is a recognized objective among most language teachers for the assessment of comprehension ability of learners, it should be emphasized in the classroom. Reading requires the learners to assimilate the ideas of the writer in a sequential form. It also necessitates the leaner's ability to use decoding skills with accurate structure and appropriate vocabulary. Reading comprehension measures the learner's ability to understand different perspectives of writers on various issues, command of the language and knowledge of the use of different structures of sentences. Therefore it is considered to be the most complex of all.

It is found that the reading comprehension skill of 1st year Engineering students in the colleges affiliated to Jawaharlal Nehru Technological University Kakinada (JNTUK) is poor and need improvement. Therefore, the study has been taken up to critically evaluate the component of reading during second year course of the Engineering study. As a teacher of English, the researcher realized that there is a need for the improvement of teaching and learning process of reading skill in Engineering students. Though the teachers and the students are well aware of the practical value and importance of the reading skill to acquire knowledge, proper approach is not followed. In real time, the majority of the English teachers are using traditional reading approach (bottom-up) in the class rooms to teach reading texts. Since the reading comprehension ability of the students to learn with this approach is poor, this approach is not producing desirable results in classrooms.

Therefore, with a view to introducing a suitable method for improving learners' reading comprehension, and having studied previous studies on various reading methods, the researcher felt that schema theory would help the learners to improve their reading comprehension. Hence schema theory (top-down) is applied in the present study and the results are compared with traditional reading approach (bottom-up).

OBJECTIVES

1. To know the opinions of teachers about English proficiency level of I-B.Tech students and importance of English language to them.
2. To find out the proficiency level of students in reading comprehension.
3. To find out the effect of schema theory (top-down) in comparison with traditional reading approach (bottom-up).
4. To find out whether there is any relationship between pre-reading scores and post-reading scores of experimental group that followed schema theory.
5. To verify how far the schema theory is appropriate for I-B.Tech students affiliated to JNTUK in comparison with traditional reading approach (bottom-up).

REVIEW OF LITERATURE

After making a considerable review of literature on various studies in teaching reading comprehension to second language learners, it is understood that substantial research has been carried out in different types of reading methods across the world. In particular, the previous studies reveal that traditional reading approach (bottom-up) makes the reader passive, interactive model allows the reader to be interactive, and schema theory (top-down) continuously connects background knowledge of the reader to the content of the reading text. The important aspect of schema theory is how knowledge is acquired, processed, and retrieved. Schema is the technical term used by cognitive scientists to describe how people process, organize, and store information in their heads.Research on the schema theory had great impact on understanding reading comprehension in the second language. Theresearch in this area seems to agree that when learners are familiar with the topic of the text they are reading (i.e., possess content schema), they are in a better position to comprehend their assigned reading text successfully. A few research studies are available to the best of the researcher's knowledge in comparing the effectiveness of schema theory (top-down) with traditional reading approach (bottom-up). Since, no study seems to have been conducted comparing the

results of schema theory (top-down) with traditional reading approach (bottom-up), the study is conducted on this reading method while comparing its results with traditional reading approach.

METHODOLOGY

The study proceeded through administration of tools like questionnaires, comprehension tests and pre-reading and post-reading tests to a sample of teachers and students at Engineering level in the colleges affiliated to Jawaharlal Nehru Technological University, Kakinada. In the Stage-I of the study, a sample of sixty teachers working at Engineering colleges affiliated to the university and students studying at Engineering colleges affiliated to the university are taken to draw the opinion of teachers and students on the prescribed English text books. In the Stage-II, a sample of sixty students studying in various engineering colleges affiliated to JNTUK is taken to find out the present level of engineering students' reading comprehension. In the main study, a sample of one hundred and twenty students is taken from Sri Sarathi Institute of Engineering and Technology, Nuzvid.

PROCEEDURE

The research study is carried out in three stages.

The Stage-I : It has two parts namely Part-1 and Part-2. Part-1 gathers information from English teachers who are working at different Engineering colleges affiliated JNTUK, Kakinada. It explores English proficiency level of 1st year Engineering students' and finds out teachers' views on prescribed English text books. In a similar way, Part-2 also collects information from 1st year Engineering students who are studying at different engineering colleges affiliated to JNTUK, Kakinada on the importance of English language in their professional career and their views on English text books. Questionnaires are prepared on the Likert Five point scale with 20 statements to elicit the views of English teachers and students.

Stage-II: It is conducted to estimate the reading comprehension level of 1st year Engineering students. Hence a reading text is taken from semester-1 English Text. The comprehension test with 20 questions is administered. The result of the test has revealed that the reading comprehension level of seco students is poor and needs improvement.

Stage III: Since it is an experimental study before the main research plan i.e Stage-IV, a sample of two lessons from the prescribed text book for Semester-1 are taken for Stage-III and administered on eight students of two sections. Section-1 students are taught with the help of pre reading activities (schema theory) and Section-2 students are taught with the traditional reading approach. The pre-reading test scores of Section-1 students are compared with their post-reading tests so as to find the relationship between pre-reading and post-reading tests. After teaching reading text to Section-2 students with tradition reading approach (bottom-up), a post-reading test is given to them with the same questions given for Section-1. Finally, the answer scripts for the post-reading tests of both sections are evaluated and compared the results of each other so as to find out which reading method is effective to understand the given reading texts. Based on the result, Stage-IV is conducted.

Stage-IV (Main study): Based on the positive results found in the Stage-III for Schema Theory, Stage-IV (Main study) is carried out. It is comprised of ten reading comprehension proficiency tests. Out of the ten, five tests are conducted in Semester-1 and other five tests are in Semester-2. The total 120 strength of Electronics and Communication Engineering (ECE) branch students are divided into experimental group and control group with sixty students for each group. To examine the variation in the results of tests, as in the Stage-III, Schema theory (Top-down) is applied on the experimental group participants and Traditional reading approach (bottom-up) is applied on control group participants. The pre-reading test scores of experimental group are compared with their post-reading tests so as to find the relationship between pre-reading and post-reading tests and to determine the effectiveness of the method for improving reading comprehension skill.

RESEARCH TOOLS USED FOR THE STUDY

1. Conventional Tools : Likert Five Point Scale Questionnaire, Reading comprehension test and Proficiency tests.

DEPARTMENT OF ZOOLOGY

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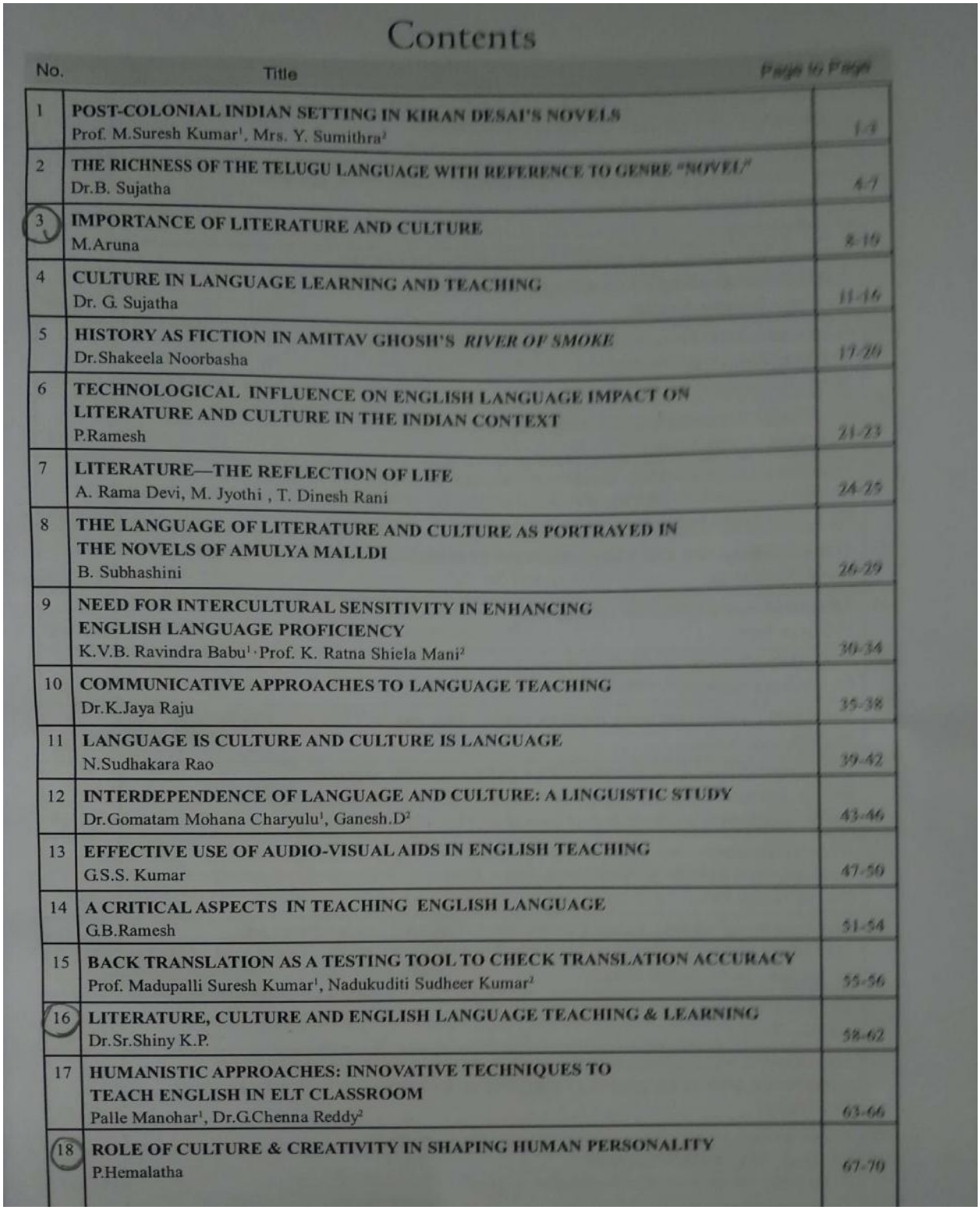

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IMPORTANCE OF LITERATURE AND CULTURE

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ABSTRACT

Culture is a wider concept than literature, so in this context it will be considered in terms of its relationship with literature, i.e. as a combination of literature and culture. Thus in the teaching of culture literature plays different roles: it serves either as illustration or a starting point for the study and mediation of cultural phenomena. It is understood as part of a specific foreign civilization, thus by learning about the social, historical, linguistic and other cultural implementations in literary texts specifics of the foreign culture are being mediated. Literature is important. Because Expanding horizons, Building critical thinking skills, A leap into the past, Appreciation for other cultures and beliefs, Better writing skills, Addressing humanity, Teaching, learning and assessment. Finally, the paper makes a plea that the multiplicity of cultures and plurality of norms of verbal and non-verbal behaviour necessitate training in intercultural communication and thus literature can be used as a rich resource to develop the ability to communicate appropriately in alien cultural settings.

Keywords: *Literature, Horizons, Historical, Culture.*

'Why Literature is important in our lives'. There are many limitations on the extent of a mans lifetime experience such as time, geography and point of view. Literature serves as a method of transcending such barriers. Literature is derived from the Latin term littera which means letter, any printed matter written in a book, a magazine, or a pamphlet, a faithful reproduction of man's manifold experiences blended in to harmonious expression. Literature is very important today because it enable the people to know the history of a nation's spirit; people must read its literature. To understand the real spirit of a nation, one must trace the little rills as they course along down the ages, broadening and deepening into the great ocean of thought which men at the present source are presently exploring. It also enable to express of one's feelings according to him, may be through love, sorrow, happiness, hatred, anger, contempt or revenge.

Literature is one way for us to hear the voices of the past and work with the present. It is the way for the present to connect to the possible future. We learn about history we didn't experience. the customs we are not familiar with or that read to what we do now, it unlocks the culture of the time period, and in a way can give wisdom to the modern society about life, allow us to interpret our own life and emotions and we find ways to relate to the story so we in turn can reflect. Literature is the most invisible with the five senses and the most visible with feelings, Literature is always realistic, and it is about life. It is life when we get involved in it even it is legendary, unbelievable, and whatever it talks about, it is life because it is created and produced by people from their life. Literature and culture play within political and social history (anticipation, reaction, engagement, detachment, imaginary spaces / times) and how this contributes to a deeper understanding of different contexts of communication in contemporary society (e.g. cultural background of political events or social development), making connections between literary, cultural and media developments, producing a systematically developed (oral or written) presentation in the foreign language about an experience (reading a literary text, watching a theatre play, a movie, TV-programme, etc.), making use of the meta-language of analysis within a given (multiple) theoretical framework

7 REASONS WHY LITERATURE IS SO IMPORTANT

It is believed that literature gives us great knowledge. There is a belief in the society that Science graduates get good jobs and literature students do not get good jobs. Somewhere along the line, the world has come to think that literature is insignificant.In fact, literature serves as a gateway to learning of the past and expanding my knowledge and understanding of the world. Here are just a few reasons why literature is important.

1. Expanding horizons: Literature opens our eyes and makes us see the wild and wide world. It helps us realize the wide world outside, surrounding us. With this, we begin to learn, ask questions, and build our intuitions and instincts. We expand our minds.

2. Building critical thinking skills: It improves our critical thinking. When we read, we learn to look between the lines. We are taught to find symbols, make connections, find themes, learn about characters. Reading expands these skills, and we begin to look at a sentence with a larger sense of detail and depth and realize the importance of hidden meanings so that we may come to a conclusion.

3. A Leap into the Past: History and literature are interdependent on each other. History is not just about power struggles, wars, names, and dates. It is about people who are products of their time, with their own lives. Today the world is nothing like it was in the 15th century; people have changed largely. Without literature, we would not know about our past, our families, the people who came before and walked on the same ground as us.

4. Appreciation for other Cultures and Beliefs. We can get a view of the inside looking out, a personal view and insight into the minds and reasoning of someone else. We can learn, understand, and appreciate many cultures.

5. Better Writing Skills: Literature improves our writing skills.How did this person imagine and write this? Well, many of those authors, poets, or playwrights used literature to expand their writing.

6. Addressing Humanity: Poetry makes a man a better man. Infact, all literature, whether it be poems, essays, novels, or short stories, helps us address human nature and conditions which affect all people.

We need literature in order to connect with our own humanity.

CONCLUSION

The fields of literature and culture are particularly suited to the use of innovative pedagogy, though in most courses traditional approaches still prevail. Nevertheless, there is evidence that new approaches are been used such as using e-learning and e-platforms, various types of group work and group assignments, project work, field-work, study visits, presentations in different media, autonomous learning and cross-curricular learning – in short, the whole range of learner-centered teaching and learning methods. There is strong emphasis on the fostering of self-evaluation and reflection by students as well as on the development of key skills alongside the development of subject-specific literary and culture competences. These might include: close reading of a variety of texts, intercultural skills such as empathy, contextualization, differentiation, linguistic competence in the target language which supports engagement with the study of literature and culture

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Research Article

EFFECT OF CADMIUM ON ENZYMATIC PARAMETERS OF FRESHWATER CATFISH, *HETEROPNEUSTES FOSSILIS*

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ABSTRACT

Quantitative assessment of enzymes is a reliable indicator of stress imposed on the organism by environmental pollutants such as heavy metals. The activities of Acetylcholinesterase (AChE), alkaline phosphatase (ALP) and acid phoshatase (ACP) enzymes in liver, brain, gill and serum are used as stress indicators. The significant changes in activities of these enzymes in blood plasma indicate tissue impairment caused by stress. In the present study, significant changes were observed in AChE, ALP and ACP activities in liver, brain, gill and serum of *Heteropneustes fossilis* fish exposed to cadmium when compared to the control group. In this study, the AChE activity was inhibited moderately by sub-lethal concentration of cadmium. During 21 days treatment among the tissues tested, the gill AChE was more inhibited than any other tissue AChE. Alkaline phosphatase activities of cadmium treated fish under various sub-lethal concentrations were significantly decreased in liver and increased in brain, gill and serum. Acid phosphatase activities of cadmium treated fish under various sub-lethal concentrations were significantly increased in liver, brain, gills and serum.

Keywords: *Heteropneustes fossilis,* Acetylcholinesterase, Alkaline phosphatase, Acid phoshatase, Cadmium.

INTRODUCTION

Fish are mostly used in the evaluation of aquatic systems quality and some of their physiological changes can be considered as biological markers of environmental pollution (Dautremepuits *et al*., 2004). They have a great potential to serve as sensitive indicators, signaling exposure and understanding the toxic mechanisms of stressors in aquatic ecosystems (Vutukuru *et al*., 2006). The impact of metals as well as other pollutants on aquatic biota can be evaluated by enzymatical assays which are used to detect and evaluate the potential toxicological effects of chemicals on aquatic organisms.

The freshwater catfish, *Heteropneustes fossilis* is an important group of food fishes in India. This stinging catfish (*H. fossilis*) is commercially important and valuable food species also in many Asian countries (Akand *et al*., 1991). *H. fossilis*, commonly known as Shing or Singhi is a popular catfish in India and found naturally in lakes, ponds, swamps and marshes, ditches, floodplains and in muddy rivers. It is characterized by an accessory respiratory organ (air breathing organ) which enables it to exist for hours when out of water or in indefinitely oxygen-poor water and even in moist mud (Akand *et al*., 1991). So, this species is very potential in seasonal water bodies of India.

In recent years, there has been a rapid development of enzymatic biomarkers. This is not only due to advances in biochemistry but also to modern methods of measurement. The measurement of fish cellular enzymes is an indicator of health condition and has been used as diagnostic tool in monitoring programs of aquatic pollution (Fernandes *et al*., 2008). Phosphatases and Acetylcholinesterases are good indicators of stress condition in the biological systems (Verma *et al*., 1980). Acid and alkaline phosphatases are general enzymes present in almost all the tissues. They are hydrolytic enzymes concerned with the process of transphosphorylation and have an important role in the general energetics of an organism. They are associated

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with the transport of metabolites, with metabolism of phospholipids, phosphoproteins, nucleotides and carbohydrate, and with synthesis of proteins (Srivastava *et al*., 1995). Acid phosphatase is a lysosomal enzyme that hydrolyses the ester linkage of phosphate esters and helps in autolysis of cell after its death. Alkaline phosphatase (ALP) is a membrane-bound enzyme related to the transport of various metabolites (Lin *et al*., 1976). It has also been proposed as a good biomarker in ecotoxicology because of its sensitivity to metallic salts (Boge *et al*., 1992). Alterations in acid phosphatase (ACP) and alkaline phosphatase (ALP) activities in tissues and serum have been reported in fish species (Atli & Canli, 2007; Jyothi & Narayan, 2000; Rogers *et al*., 2003).

Acetylcholine is synthesized in neurons soma by combining choline with acetyl (originating from acetyl-CoA) *via* choline acetyl transferase (ChAT). Synthesized acetylcholine is transported to the nerve ends *via* axonal transport and released to the synaptic space (Mesulam *et al*., 2002). Acetylcholinesterase is responsible for hydrolysis of acetylcholine and therefore important for cholinergic neuronal system (Nachmansohn & Wilson, 1951). The inhibition of Acetylcholinesterase causes accumulation of acetylcholine in the neuromuscular synapses and nerve synapses creates abnormal results, the most important one is the over activity of muscle tissues (Roex *et al*., 2003). This over activity in fish leads to changes of behavior such as hyperactivity and anorexia as well as physiological effects such as asphyxia, potentially conducive to death (Beauvais *et al*., 2000).

ALP is a polyfunctional enzyme, present in the plasma membrane of all cells. It hydrolyses a broad class of phosphomonoester substrates, and acts as a transphosphorylase at alkaline pH is 9. It also acts as an early marker of cell differentiation in the osteogenic lineage in bivalve mollusc (Mouri *et al*., 2002). ALP activity has been reported to be sensitive to heavy metal pollutants (Regoli & Principato, 1995). In *Venus gallina* alkaline phosphatase activity is implicated in shell formation (Carpene & Vašák, 1989). ALP in serum and haemocytes of *C. farreri* were more important than any other enzymes in immune defense (Zhang *et al*., 2005).

Acid phosphatase is a major marker enzyme, material to be hydrolyzed is taken into lysosomes by endocytosis and the enzymes catalyze the hydrolysis of most of the major polymeric compounds as well as foreign bodies entered into animal body. Lysosomal enzymes are mainly acid hydrolases and ACP is known to hydrolyse the phosphomonoesters which are produced by hydrolysis of other major phosphates of the cell. Heavy metals accumulate to a relatively high concentration in lysosomes and destabilizing its membrane integrity followed by release of stored lysosomal hydrolases into the haemolymph thereby increasing the activity of the enzyme in haemolymph. The above explanation justifies the hyper activity of ACP as observed at high concentration of metals and the extended period of exposure.

MATERIALS AND METHODS

Collection of fishes

The freshwater catfish, *Heteropneustes fossilis* (Bloch) with a size range of 16-20 cm and, weighing 54 ±4 g irrespective of their sex, have been chosen as the test organism in the present study. The fishes were collected from the domestic fish market located at Guntur city ($16^0$20' N $80^0$27' E and 31 m elevation), Guntur district, Andhra Pradesh, India.

Acclimatization

Fishes were acclimatized to the laboratory conditions in large fiber glass tanks with unchlorinated ground water for 3 to 4 weeks at a room temperature of 28 ± 2°C. As these catfishes are benthic in nature, overcrowding was avoided by keeping small numbers of fishes in each tank. Water was changed on alternate days. Tanks were covered with fish netting to prevent the escape of fishes.

Selection of sub-lethal concentrations

In the present study $1/10^{th}$ of the 96h LC_{50} value was taken as sub-lethal concentration (A). The two other doses, B & C, used were a reduction in concentration of the sub-lethal concentration (A) in a graded manner. The half concentration of the sub-lethal concentration A (50 % reduction) was used as the second dose (B) while the third dose (C) was 50 % reduction in concentration of the second dose B (Kayode *et al*., 2016).

Estimation of Enzymatic activities

1. Assay of tissue and serum Acetylcholinesterase activity (AChE): Acetylcholinesterase activity in liver, brain, gill and serum was estimated as per the method of (Ellman *et al*., 1961). The principle underlying in this assay is that the substrate acetylthiocholine when hydrolysed by the enzyme Acetylcholinesterase yields thiocholine. This, on subsequent combination with DTNB forms the yellow anion 5-thio-2nitrobenzoic (TNB) acid which absorbs strongly at 412 nm.

Brain, liver and gill tissues of both test and control fish were dissected out and were isolated in ice-cold condition for further studies. The tissues were thoroughly washed in normal saline and homogenized (10%, w/v) for 1 min in sodium phosphate buffer (50 mM, pH 7.5) containing 0.2% Triton X-100 using homogenizer with teflon-coated pestle under ice cold condition. The homogenates were kept in ice for about 10 min and then centrifuged at 10,000 rpm for 30 min in a refrigerated high-speed centrifuge to solubilize

AChE. The clear cell free supernatant of each tissue homogenate was collected and used for determination of AChE activity.

AChE activity was determined using the Ellman's reagent DTNB 5,5-Dithiobis (2-nitrobenzoic acid) and acetylthiocholine iodide as substrate (Ellman *et al.,* 1961). Supernatant/serum of 50µl was taken for assay and 2.3 ml of 0.5 mM DTNB and 100 µl of 2.6 mM acetylthiocholine iodide was added. The rate of change of absorbance was measured at 412nm. Blank and samples were taken to make sure that there was no non-specific esterase or other background activity. Protein was estimated as described by Lowry et al, (1951)allowing the calculation of AChE as U (µmol/min) /mg protein.

2. Estimation of tissue and serum Alkaline Phosphatase (ALP): About 10% homogenate of gill, liver and brain were prepared in 0.33 M sucrose solution and centrifuged at 1000 rpm for 15 min. The supernatant obtained was used as the enzyme source. 1.5 ml of carbonate-bicarbonate buffer, 1.0 ml of substrate and 0.1 ml of magnesium chloride and requisite amount of the enzyme source were mixed together. The reaction mixture was incubated at 37°C for 15 minutes. The reaction was terminated by adding 0.l ml of folin's phenol reagent. Controls were incubated without adding enzyme source and enzyme source were added after the addition of folin's phenol reagent. 1ml of 15% sodium carbonate solution was added and incubated for further 10 minutes at 37°C. The blue colour developed was read at 640 nm against a blank. Standards also were treated similarly. The enzyme activity was expressed as micromoles of phenol liberated per hour/ mg protein.

3. Estimation of tissue and serum Acid Phosphatase (ACP): Both serum and tissue phosphatase activity was determined following the method by Cabrera & Anon Suarez, (1963)

Liver, brain and gill of both control and test fishes were homogenized in isotonic sucrose and were centrifuged at 5000 rpm for 15 minutes. Supernatant obtained was the source of enzymes. 0.5 ml of p-nitro phenyl phosphate was mixed with equal volume of 0.1 M phosphate buffer (pH 4.8). The enzyme was added and incubated for 30 minutes at room temperature. The reaction was arrested by adding 4ml of 0.1 N NaOH. The absorbance of solution was measured spectrophoto-metrically at 410 nm. The amount of p-nitro phenol liberated by the acid phosphatase per hour/ mg protein gives the specific activity. Protein was determined as per the method by Lowry *et al.* (1951).

Statistical analysis of the data

The mean and Standard Deviations (SD) were calculated by following the method of (Pillai & Sinha, 1968).

SD was calculated by using the formula:

$$StandardDeviation = \frac{\sqrt{Ex^2 - \frac{(Ex)^2}{n}}}{n-1}$$

Where

'x^{2}' is the sum of square of deviations from the mean

'n' is the number of individual observations.

The significance of the deviations from Normal was calculated by calculating student's t-test by using the formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Where

$\bar{x}_1$ is the mean of first set of observations,

$\bar{x}_2$ is the mean of second set of observations,

$s_1^2 + s_2^2$ are squares of standard deviations of the first and second set of observations, and n_1 and n_2 are number of the first and second sets.

RESULTS AND DISCUSSION

Cadmium interacts with legends in proteins, particularly enzymes and may inhibit their biochemical and physiological activities (Passow *et al.*, 1961). They have strong affinity to bond with the amino acid molecules of protein and may cause changes in enzyme structure. The most obvious consequences of these changes are the inhibition of enzymes.

Acetylcholinesterase (AChE) activity

The calculated values of Acetylcholinesterase activity and percent change over control after exposure to sub-lethal concentrations of cadmium for 7, 14 and 21 days were given in Tables 1 to 4 and Figure 1 to 3.

Acetylcholinesterase activities of the fish exposed to various sub-lethal concentrations of cadmium were significantly decreased. The Acetylcholinesterase activity in the liver, brain, gill and serum showed a continuous decrease as the exposure progressed (Table 4.4.1). Maximum decrease was observed at the highest concentration of cadmium (A) on 21st day exposure. Decrement of the enzyme activity was more intense as the time of exposure increased. In this study, the AChE activity was inhibited moderately by sub-lethal concentration of cadmium. During 21 days treatment among the tissues tested, the gill AChE was more inhibited than any other

tissue AChE. No significant changes were observed in the measured variables of fish maintained in uncontaminated water (control) (Table 4).

The enzyme Acetyl cholinesterase (AChE) which catalyses the hydrolysis of acetylcholine is ubiquitous in the animal kingdom (Walker & Thompson, 1991). It is a well characterized enzyme in vertebrates because of its critical catalytic function at the cholinergic synapses. Acetylcholinesterase is a potential cell membrane marker enzyme (Severson *et al.*, 1972; Steck, 1974; Watts & Pierce, 1978) that hydrolyzes the neurotransmitter acetylcholine to acetic acid and choline (Chuiko, 2000). Several studies have shown that high levels of AChE inhibition are needed to cause significant mortality of aquatic species in both acute and chronic exposures (Ansari & Kumar, 1984).

Acetylcholinesterase (AChE) activity is considered of great interest in evaluating the effects of exposure to neurotoxic compounds in aquatic animals (Cajaraville *et al.*, 2000). It is an enzyme involved in the synaptic transmission of nerve impulses and is inhibited by neurotoxic compounds (Bocquené *et al.*, 1998). However, the responsiveness of AChE to other chemicals including metals has also been reported by Leinio & Lehtonen, (2005). Several studies showed the potential use of this enzyme activity as a useful biomarker for detecting general physiological stress in aquatic organisms caused by exposure to contaminants (Rank *et al.*, 2007). The results of the present study showed significant inhibition of AChE activity after the exposure of *H. fossilis* to cadmium compared to control. The significant responses indicated that the AChE activity decreased to reach a minimum by the end of 21 days treatment. This inhibition may be the result of a neurotoxic effect due to cadmium toxicity. Similar observations have been reported in silver catfish, *Rhamdia quelen* exposed to Cadmium (Pretto *et al.*, 2010). Beldi *et al*,(2006) reported that heavy metal pollution and decreases AChE activity in *Donax trunculus* from industrialized areas and harbour sectors in the gulf of Annaba.

The present study revealed that there was a significant decrease of AChE in the liver, brain, gills and serum when they were exposed to increased concentration of cadmium and extended duration of time. The present results confirm that AChE can be used as a sensitive enzyme marker. Acetylcholinesterase, due to its rate of hydrolysis towards the substrate acetylcholine iodide, confirms its presence in *H. fossilis* is highly sensitive and is recommended as a useful biomarker in bio-monitoring studies.

Alkaline phosphatase activity (ALP)

The calculated values of alkaline phosphatase activity and percent change over control exposed to sub-lethal concentrations of cadmium for 7, 14 and 21 days are given in Tables 5 to 8. The alkaline phosphatase activity in the liver, brain, gill and serum showed a continuous increase as the exposure progressed. Maximum increase was observed at the highest concentration of cadmium (A) at 21 days exposure. Enhancement of the enzyme activity was more intense as the time of exposure increased.

The alkaline phosphatase is composed of several isoenzymes that are present in practically all tissues of the body, especially in cell membranes. It catalyses the hydrolysis of monophosphate esters and has a wide substrate specificity. The functional activity of this enzyme was found to increase during the exposure with heavy metals as an adaptive response in mitigating the metal toxicity (Kopp & Hetesa, 2000).

In the present study, the level of alkaline phosphatase activity increased in the, liver, brain, gill tissue and serum of *H. fossilis* when exposed to cadmium. This result suggests that increased level of alkaline phosphatase might be due to the toxicity effect of cadmium. These increased activities can be attributed to the destruction of cell membrane and lysosomes, which in turn lead to hepatic damage (Thirumavalavan, 2010). The present results are in agreement with (Shalaby & Abbassa, 2007) who obtained a significant increase in ALP in kidney of catfish, *Hetropneustes* sp. after toxication with Cd. In contrast to above results, decreased activity of ALP in liver was obtained by (Sastry & Subhadra, 1985). This decrease may be due to the damage and dysfunction of the liver. Characterization and effect of heavy metals on ALP was made by Mazorra *et al*, (2002) in the clam, *Scrobicularia plana,* and mercury showed highest inhibitory effects on ALP activity in various tissues analysed. ALP, which is sensitive to metals, gives a better picture of the general metabolic condition of the organisms (Regoli & Principato, 1995; Xiao *et al.*, 2002).

Acid phosphatase activity (ACP)

The mean±SD values of acid phosphatase activity and percent change over control after exposed to sub-lethal concentrations of cadmium for 7,14 and 21 days are given in Tables 9 to 12.

Acid phosphatase activities of cadmium treated fish under various sub-lethal concentrations were significantly increased in liver, brain, gills and serum. Increment of the enzyme activity was more intense as the time of exposure increased. Maximum increase was observed at the highest concentration of cadmium at 21 days exposure.

Table 1. Effect of Cadmium on the Acetylcholinesterase activity (U (µmol/min) /mg protein) in the tissues /serum of *H. fossilis* under exposure to sub-lethal concentrations.

Tissue /serum	Treatments											
	Control			A			B			C		
	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day
Liver	0.1506± 0.022	0.1507± 0.028	0.1508± 0.014	0.0954± 0.032	0.0768± 0.044	0.0542± 0.012	0.1122± 0.026	0.0926± 0.018	0.0806± 0.016	0.1276± 0.014	0.1108± 0.012	0.0956± 0.010
Brain	0.4902± 0.041	0.4904± 0.021	0.4900± 0.018	0.2888± 0.046	0.2466± 0.022	0.2056± 0.022	0.4028± 0.012	0.3642± 0.010	0.3022± 0.022	0.4356± 0.066	0.3986± 0.056	0.3576± 0.048
Gill	0.2635± 0.016	0.2636± 0.010	0.2634± 0.016	0.1826± 0.036	0.1245± 0.066	0.0965± 0.024	0.2046± 0.022	0.1722± 0.062	0.1448± 0.026	0.2146± 0.082	0.1964± 0.022	0.1656± 0.066
Serum	0.3274± 0.024	0.3272± 0.044	0.3269± 0.042	0.2196± 0.046	0.1654± 0.066	0.1244± 0.076	0.2536± 0.066	0.2122± 0.044	0.1864± 0.028	0.2896± 0.064	0.2525± 0.012	0.2246± 0.042

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

A = Sub-lethal conc. (2.068 ppm); B = 50% SL of A (1.034 ppm); C = 50% SL of B (0.517 ppm).

Table 2. Changes in specific activity levels of Acetylcholinesterase (U (µmol/min)/ mg protein) and % change over the control in different tissues/serum of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 7 days.

Tissue / serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	0.1506±0.022	0.0954±0.032	36.65	0.1122±0.026	25.50	0.1276±0.014	15.27
Brain	0.4902±0.041	0.2888±0.046	41.09	0.4028±0.012	17.82	0.4356±0.066	11.14
Gill	0.2635±0.016	0.1826±0.036	30.70	0.2046±0.022	22.35	0.2146±0.082	18.58
Serum	0.3274±0.024	0.2196±0.046	32.93	0.2536±0.066	31.70	0.2896±0.064	11.54

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 3. Changes in specific activity levels of Acetylcholinesterase (U (µmol/min) /mg protein) and % change over the control in different tissues/serum of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 14 days.

Tissue / serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	0.1507±0.028	0.0768±0.044	49.04	0.0926±0.018	38.55	0.1108±0.012	26.48
Brain	0.4904±0.021	0.2466±0.022	49.71	0.3642±0.010	25.73	0.3986±0.056	18.72
Gill	0.2636±0.010	0.1245±0.066	52.77	0.1722±0.062	34.67	0.1964±0.022	25.49
Serum	0.3272±0.044	0.1654±0.066	49.45	0.2122±0.044	35.15	0.2525±0.012	22.83

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 4. Changes in specific activity levels of Acetylcholinesterase (U (µmol/min) /mg protein) and % change over the control in different tissues/serum of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 21 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	0.1508±0.014	0.0542±0.012	64.06	0.0806±0.016	46.55	0.0956±0.010	36.60
Brain	0.4900±0.018	0.2056±0.022	58.05	0.3022±0.022	38.33	0.3576±0.048	27.02
Gill	0.2634±0.016	0.0965±0.024	63.36	0.1448±0.026	45.03	0.1656±0.066	37.13
Serum	0.3269±0.042	0.1244±0.076	61.95	0.1864±0.028	42.98	0.2246±0.042	31.29

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 5. Effect of Cadmium on the alkaline phosphatase activity (U (µmol/h) /mg protein) in the tissues/serum of H. fossilis under exposure to sub-lethal concentrations.

Tissue /serum	Treatments											
	Control			A			B			C		
	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day
Liver	1.1608± 0.012	1.1607± 0.018	1.1608± 0.012	1.5554± 0.012	1.7064± 0.024	1.9220± 0.024	1.3022± 0.016	1.4926± 0.018	1.6806± 0.010	1.1976± 0.014	1.2808± 0.022	1.4956± 0.016
Brain	0.9212± 0.041	0.9214± 0.021	0.9212± 0.012	1.8888± 0.016	2.4986± 0.020	2.9056± 0.028	1.2008± 0.012	1.6612± 0.016	2.0022± 0.022	1.0356± 0.016	1.2960± 0.056	1.6570± 0.028
Gill	0.7635± 0.022	0.7638± 0.016	0.7634± 0.016	1.0126± 0.030	1.8745± 0.016	2.3565± 0.020	0.9846± 0.020	1.5422± 0.026	1.8248± 0.026	0.8146± 0.082	0.8264± 0.012	1.2650± 0.018
Serum	5.5374± 0.034	5.5372± 0.014	5.5369± 0.012	6.5116± 0.018	7.1651± 0.026	8.1214± 0.016	6.2236± 0.016	6.7022± 0.014	7.2864± 0.020	5.9896± 0.024	6.3825± 0.010	6.9246± 0.012

**Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

A = Sub-lethal conc. (2.068 ppm); B = 50% SL of A (1.034 ppm); C = 50% SL of B (0.517 ppm).

Table 6. Changes in specific activity levels of alkaline phosphatase (U (µmol/h)/ mg protein) and % change over the control in different tissues/serum of H. fossilis exposed to sub-lethal concentrations of Cadmium for 7 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.1608±0.012	1.5554±0.012	33.99	1.3022±0.016	12.18	1.1976±0.014	3.17
Brain	0.9212±0.041	1.8888±0.016	105.03	1.2008±0.012	30.35	1.0356±0.016	12.41
Gill	0.7635±0.022	1.0126±0.030	32.62	0.9846±0.020	28.95	0.8146±0.082	6.69
Serum	5.5374±0.034	6.5116±0.018	17.59	6.2236±0.016	12.39	5.9896±0.024	8.16

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 7. Changes in specific activity levels of alkaline phosphatase (U (µmol/h) /mg protein) and % change over the control in different tissues/serum of H. fossilis exposed to sub-lethal concentrations of Cadmium for 14 days.

Tissue / serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.1607±0.018	1.7064±0.024	47.01	1.4926±0.018	28.59	1.2808±0.022	10.34
Brain	0.9214±0.021	2.4986±0.020	171.17	1.6612±0.016	80.29	1.2960±0.056	40.65
Gill	0.7638±0.016	1.8745±0.016	145.41	1.5422±0.026	101.91	0.8264±0.012	8.19
Serum	5.5372±0.014	7.1651±0.026	29.39	6.7022±0.014	21.03	6.3825±0.010	15.26

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 8. Changes in specific activity levels of alkaline phosphatase (U (µmol/h) /mg protein) and % change over the control in different tissues/serum of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 21 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.1608±0.012	1.9220±0.024	65.57	1.6806±0.010	44.77	1.4956±0.016	28.84
Brain	0.9212±0.012	2.9056±0.028	215.41	2.0022±0.022	117.34	1.6570±0.028	79.87
Gill	0.7634±0.016	2.3565±0.020	208.68	1.8248±0.026	139.03	1.2650±0.018	65.70
Serum	5.5369±0.01	8.1214±0.016	46.67	7.2864±0.020	31.59	6.9246±0.012	25.06

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 9. Effect of Cadmium on acid phosphatase activity (U (µmol/h) /mg protein) in the tissues/serum of H. fossilis under exposure to sub-lethal concentrations.

Tissue /serum	Treatments											
	Control			A			B			C		
	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day	7th day	14th day	21st day
Liver	1.2602± 0.032	1.2605± 0.048	1.2602± 0.032	1.3676± 0.044	1.5808± 0.024	1.8956± 0.036	1.3022± 0.046	1.4926± 0.028	1.6806± 0.040	1.2754± 0.032	1.3964± 0.034	1.4520± 0.024
Brain	0.9842± 0.041	0.9844± 0.022	0.9844± 0.042	1.9880± 0.032	2.5960± 0.026	2.9746± 0.040	1.2356± 0.044	1.6416± 0.032	2.1220± 0.032	1.0656± 0.056	1.3260± 0.028	1.8544± 0.040
Gill	0.7950± 0.046	0.7948± 0.046	0.7950± 0.056	1.0526± 0.040	1.8645± 0.034	2.2580± 0.032	0.9960± 0.032	1.6220± 0.052	1.9280± 0.036	0.8240± 0.032	0.8546± 0.032	1.2356± 0.032
Serum	5.3374± 0.044	5.3370± 0.024	5.3372± 0.042	6.3814± 0.038	7.0861± 0.028	7.8714± 0.024	6.0980± 0.042	6.6028± 0.044	7.1984± 0.044	5.8886± 0.022	6.2828± 0.042	6.8256± 0.044

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

A = Sub-lethal conc. (2.068 ppm); B = 50% SL of A (1.034 ppm); C = 50% SL of B (0.517 ppm).

Table 10. Changes in specific activity levels of acid phosphatase (U (µmol/h) /mg protein) and % change over the control in different tissues/serum of H. fossilis exposed to sub-lethal concentrations of Cadmium for 7 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.2602±0.032	1.3676±0.044	8.52	1.3022±0.046	3.33	1.2754±0.032	1.21
Brain	0.9842±0.041	1.9880±0.032	101.99	1.2356±0.044	25.54	1.0656±0.056	8.27
Gill	0.7950±0.046	1.0526±0.040	32.40	0.9960±0.032	25.28	0.8240±0.032	3.65
Serum	5.3374±0.044	6.3814±0.038	19.56	6.0980±0.042	14.25	5.8886±0.022	10.33

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 11. Changes in specific activity levels of acid phosphatase (U (µmol/h) /mg protein) and % change over the control in different tissues/serum of H. fossilis exposed to sub-lethal concentrations of Cadmium for 14 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.2605±0.048	1.5808±0.024	25.41	1.4926±0.028	18.41	1.3964±0.034	10.78
Brain	0.9844±0.022	2.5960±0.026	163.71	1.6416±0.032	66.76	1.3260±0.028	34.70
Gill	0.7948±0.046	1.8645±0.034	134.59	1.6220±0.052	104.08	0.8546±0.032	7.52
Serum	5.3370±0.024	7.0861±0.028	32.77	6.6028±0.044	23.72	6.2828±0.042	17.72

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

Table 12. Changes in specific activity levels of acid phosphatase (U (µmol/h) /mg protein) and % change over the control in different tissues/serum of *H. fossilis* exposed to sub-lethal concentrations of Cadmium for 21 days.

Tissue /serum	Treatments						
	Control	A	% Change	B	% Change	C	% Change
Liver	1.2602±0.032	1.8956±0.036	50.42	1.6806±0.040	33.36	1.4520±0.024	15.22
Brain	0.9844±0.042	2.9746±0.040	202.17	2.1220±0.032	115.56	1.8544±0.040	88.38
Gill	0.7950±0.056	2.2580±0.032	184.03	1.9280±0.036	142.52	1.2356±0.032	55.42
Serum	5.3372±0.042	7.8714±0.024	47.48	7.1984±0.044	34.87	6.8256±0.044	27.89

*Each value is represented as mean ± SD (n=5); Values are significant at $p<0.05$ (based on t-test).

In the present study, the acid phosphatase activity of liver, gill, brain and serum of *H. fossilis* increased in all the three sub-lethal concentrations of cadmium. This increased level of acid phosphatase might be due to the toxic effect of cadmium. The increased level of acid phosphatase activity suggested the involvement of lysosomes in metal toxicity. These results are in agreement with those of (Shalaby & Abbassa, 2007) who found that sub-lethal concentration of Cadmium caused significant increase in ACP of common carp after 7 and 15 days. Sastry & Subhadra, (1985)who also found a significant increased in ACP in kidney of catfish. *Hetropneustes* sp. after toxication with cadmium. The increased concentration of ACP on blood serum indicates impairement of parnchymatous organs. In addition, the increased plasma ACP may be attributed to the hepatocellular damage or cellular degradation by the heavy metals (Yamawaki *et al*., 1986).

Acid phosphatases are hydrolytic lysosomal enzymes and are released by the lysosomes for the hydrolysis of foreign material; hence it has a role in certain detoxification functions. Increase in acid phosphatase enzyme activity in all the three sub-lethal concentrations might be due to increase in protease activity which causes damage to the lysosomal membrane, thus permitting the leakage of lysosomal enzyme into cytoplasm. Alteration in the enzyme activity is due to adverse effect of xenobiotics on the cell and its organelles. In contrast to above results, decreased acid phosphatase activity in *Sarotherodon mossambicus* exposed to cadmium has earlier been recorded by Ruparelia *et al*, (1992). Gill *et al*, (1991) reported that the hepatic, bronchial and renal acid phosphatase activities were decreased in *Barbus conchonius* toxicated with Cadmium.

CONCLUSION

The heavy metal toxicity seriously impairs various metabolic functions of the fish *H. fossilis*, reflected as alterations in various enzymatical constituents. The activities of acetyl cholinesterase (AChE), alkaline phosphatase (ALP) and acid phoshatase (ACP) enzymes in liver, brain, gill and serum are used as stress indicators. In the present study, there were significant changes in AChE, ALP and ACP activities in liver, brain, gill and serum of fish exposed to cadmium compared to the control group.

The apparent sensitivity of ACP and ALP exhibited through fluctuating activity patterns suggests that analysis of these enzymes at different time periods can be used as biomarkers in metal pollution. In agreement with the observations of other workers, the data obtained once again confirm the reliability of choosing AChE activity pattern as an enzyme marker to assess metal stress.

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DEPARTMENT OF HOME SCIENCE

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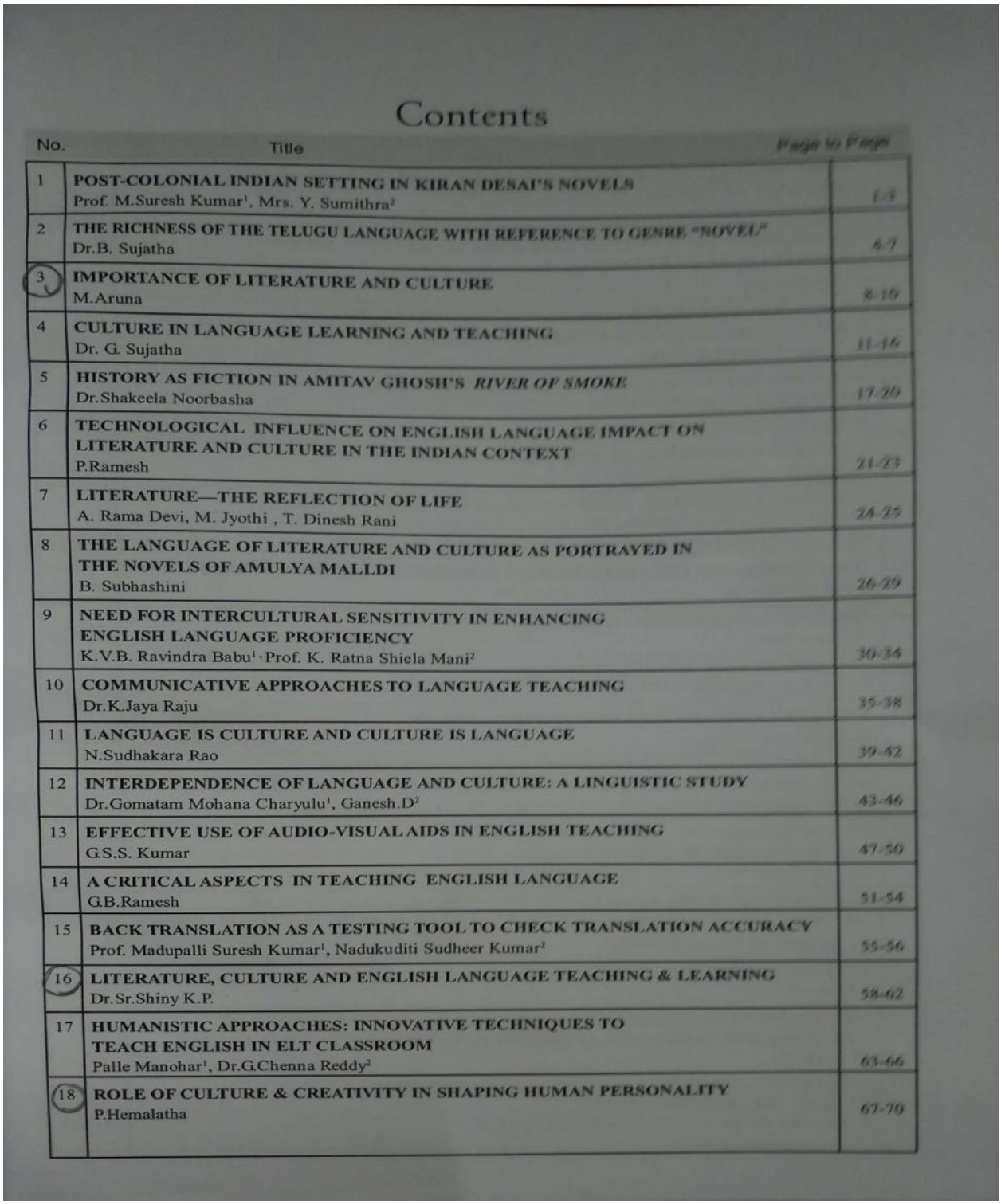

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"Creativity comes from a conflict of ideas"

Man is not born as person. At birth he is an infant possessing the potentiality of becoming a person. As a result of a variety of experiences and under the influence of culture, social factors he becomes a person and comes to possess a personality. The term 'personality' is derived from the Latin word 'persona' which means a mask. Herbert A. Bloch defined it as "the characteristic organisation of the individual's habits, attitudes, values, emotional characteristics which imparts consistency to the behaviour of the individual. All port defined personality as "the dynamic organization within the individual of those psychophysical systems that determine his characteristic behaviour and thought."

The five factors of personality are Biological, Social, Cultural, Physical Environment, & Situational Factors. Children are born in a family; inherit physical and psychological characteristics from their parents which become a part of their personalities. Some of the inherited traits are courage, coward, intelligence, weakness etc. When an individual interact with other persons it affects the personality of an individual. Social factors like group experiences and contacts with others influence the person whether it is good or bad and it becomes a part and parcel of that individual's personality. Both material as well as non-material culture affects personality of an individual, consciously or unconsciously and the individual acts accordingly.

Culture of any society determines the behaviour and personality of an individual as he/ she tries to behave according to the norms of that culture. Environmental factors include land, river, mountains, hills, forests, plain area, atmosphere etc which affect the personality to be good or bad, healthy or weak. All the feelings, emotions, ideas, attitudes, habits and behaviour as well as body structure are the result of physical environment of to which an individual belongs.

Every person face may situations in his life which enables him/her to change his/her behaviour. Personality is not the result of only one factor but every factor is responsible to give complete share in its formation. A person behave and his/her personality exists when interacts with environment, culture, society, parents, friends and to those who come in contact by chance.

Culture is a word used for the way of life of group of people, which means the way they do things. Different groups may have different cultures. Culture is passed on to the subsequent generations through learning where as heredity is passed through genes. The concept of culture is very complicated with several meanings. Culture is a system of behaviours and modes which we adopt unknowingly and unconsciously. It is a connection of ideas and feelings accepted by the majority of people in a society. (Rocher, 1972, 2004 P.No 142) Undoubtedly culture is learned. It includes all human phenomena which are not purely as a result of genetics. It is an integrated pattern of human knowledge, beliefs, behaviour, outlook, attitudes, values, morals, goals and customs shared by a society .In other words culture includes beliefs, arts, skills, moralities, laws, traditions, and behaviours that an individual, as a member of society gets from his own society(Taylor, 1974).

Culture is learnt by relating ourselves with other people that means through social interaction. It will be transmitted from one generation to the other. The elements are carried from one place to another. For example Indians who are migrated to other countries follows certain rituals which are pertinent to their religion and there by transmits them to the next generation as well as to others who are interested in them. Devotees from other countries to ISKON, PUTTAPARTHI, and SHRIDI who frequently visit India are another example for cultural exchange of ideas and beliefs. Similarly Inter-caste & Inter-religious marriages, living in group houses and gated communities also gives an opportunity to observe and learn various cultures. Words are the most significant tools of cultural heritage and poems, stories, epics, fictions; myths are some of the ingredients of the components of society's culture.

Indian culture is rich and diverse which made it as unique. Even though we have accepted modern means of living, improved our life style, our values and beliefs still remain unchanged because they are deeply rooted in our hearts, mind, body and soul. The humanity of the Indians made them to accept the reforming zeal of the British. The tolerance of Indians was exhibited through the principle of non-violence led by Mahatma Gandhi brought credit to India in the International arena.

Unity is another part of our culture where different castes and creeds live together, enjoys each other's rituals and celebrations. The elite business man and the common vendor on the road worship the same Deity and share the same news. Secularism is in our breath.

Hodgetts and Luthans feel that culture is the acquired knowledge that people use to interpret experience and generate social behaviour. This knowledge forms values, creates attitudes and influence behaviour. Culture becomes a flowing stream only when there is continuity of collective life of people. Such continuity is expressed in many ways

like common beliefs, customs, aspirations, goals, sharing of joy and pride. Culture has structure and well nit to bring changes in each component. It has an adaptive character.

Culture teaches many lessons and leads us towards right path. Mahabharata the great Indian epic is a big story house of stories. This book highlights the theory – how to avoid confrontation, rather than face it. It taught us to run institutions successfully and how to resolve problems in global management. Koutilya's ardhastra also talks about discipline as one of the management principles, which is of two kinds- inborn and acquired. He also pointed out the qualities of a trainable person as desire to learn (technical skills) effective listening ability (human skills), ability to reflect (design skills), and ability to reject false views (assertive skills), focus on truth not on any person9conceptual skills). Vidura also explained the personality traits of a good manager as one who is alert, set attainable goals, resilient, determined; perseverant which are highly essential even today to be successful in any field.

The real strength of any country lies in the development of human mind and body. The greatest challenge for our society today is to prepare the leaders of the future. Indian culture surviving science thousands of years has the foundation of universal truth. Indian culture teaches us inner quality of human being based on the concepts of self – management, self – control, self – realization.

Creativity is a powerful catch phrase. In Western societies it epitomises success, the modern, trends for novelty and excitement. Whether linked to individuals, enterprises, cities or regions creativity establishes immediate empathy, and conveys an image of dynamism. Creativity is a positive word in a society constantly aspiring to innovation and "progress".

To emerge culture-based creativity requires: - personal abilities (ability to think laterally or in a non-linear way, to be imaginative), - technical skills (often artistic skills or craftsmanship), - a social environment (a social context through notably education and learning that encourages, and appreciates creativity as well as an economy that invest in culture and culture-based creativity).

Culture-based creativity is an essential feature of a post-industrial economy. A firm needs more than an efficient manufacturing process, cost-control and a good technological base to remain competitive. It also requires a strong brand, motivated staff and a management that respects creativity and understands its process. It also needs the development of products and services that meet citizens' expectations or that create these expectations. Culture-based creativity can be helpful in this respect.

Apple's success is intrinsically linked to [illegible] founder's vision that technology, marketing and [illegible] alone are not sufficient to deliver corporate [illegible] A key factor is to have people who believe strongly in the values of the company and identify it with as creators and innovators - [illegible] campaign "Think different" featuring [illegible] Einstein, Gandhi was described by Steve Jobs as a way for the company to remember who the [illegible] are and who Apple is.1 Apple has succeeded to create empathy for technology that other technology companies have failed to provide. The aesthetics of the product range, through innovative design, yielded success.

Culture-based creativity is a fundamental means for industry and policy decision makers to adopt and implement more user-centred strategies (less about "making things" more about providing service). Culture-based creativity helps to promote well-being, to create lifestyle, to enrich the art consumption, to stimulate confidence in communities and social cohesion. It is increasingly used in the management of human resources, notably though artists-in-residence projects. Culture based creativity is therefore a key input for businesses or public authorities which want to communicate more effectively, challenge conventions and look for new ways to stand out. It contributes to product innovation, to branding, to the management of human resources and to communication.

Culture contributes to strengthening social ties among communities and thereby nurturing individual as well as organisational self-esteem and ultimately well-being. Society plays an important role in developing and advancing creativity.

A fundamental external factor that influences creativity is education and learning. Education and learning play a fundamental role in shaping a creative environment. Art and culture have the ability to stimulate people's imagination and creativity in schools, in colleges and universities and in lifelong learning. Creativity in learning is about fostering "flexibility, openness for the new, the ability to adapt or to see new ways of doings things and the courage to face the unexpected." Imagination, divergent thinking and intuition need to be considered as important characteristics of progressive arts education – by schools, universities and further education providers. Creativity involves a combination of cognitive elements that involve the ability to "connect ideas", "to see similarities and differences", be "unorthodox"," be "inquisitive" and

"to question societal norms". Creativity is also the ability to connect with senses and emotions expression of the human soul. Many of these personality elements are common to artists and creative people.

FACTORS INFLUENCING CREATIVITY

1. Genetic factors – genes which are inherited from parents and previous generations.
2. Personality factors which includes intelligence, motivation, divergent thinking, culture observed in and out of the family
3. Psychological factors which involves the combination of conscious and unconscious.
4. Cognitive factors which are skills to think, to connect, and to create.
5. Management skills which helps to organise, collaborate and to identify the relationships
6. The cultural and social environment in which the person lives.

"Creativity is a process based on intrinsic value and motivation that is often spontaneous, rebellious and chaotic" and that can be stimulated whether in early life, at home, school or work by nurturing exploration. We would like to add that culture-based creativity is essentially an act of imagination relying on memories.

Creative expression is a universal human phenomenon that is firmly grounded in culture itself. Creativity and divergent thinking are components of learning, skills tied to creativity, innovation; critical thinking, problem solving, collaboration and multimodal literatures are required to keep up with technology and an increasing connected world (Brandt, 2010).

Creativity is the act of turning new and imaginative ideas into reality. Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing.

Your ability to generate innovative ideas is not merely a function of the mind, but also a function of five key behaviours that optimize your brain for discovery:

1.Associating: drawing connections between questions, problems, or ideas from unrelated fields

2.Questioning: posing queries that challenge common wisdom

3. Observing: scrutinizing the behaviour of others, and to identify new ways of doing things

4. Networking: meeting people with different ideas and perspectives

5.Experimenting: constructing interactive experiences and provoking unorthodox responses to see what insights emerge

CONCLUSION

Creativity is present everywhere in society, but one should recognise the specific role that culture, family, society play in fostering it; Arts and culture play an important role in education and lifelong learning, particularly as a means of promoting creative thinking, unlocking the creative abilities of people and helping to develop new skills for new jobs in an evolving socio-economic environment;

Culture and creativity are driving forces for the development of human individuals as well as societies. Those creative individuals help to enhance & revitalise national economies. Creativity generates and stimulates the intellectual minds to invent something new. Culture can be an important factor in tackling the challenges that the societies, are now facing, particularly the demographic changes, social cohesion, globalisation and sustainable development in welfare of mankind

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DEPARTMENT OF BOTANY

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STUDIES ON HIGH FREQUENCY MULTIPLE SHOOT INDUCTION OF *SOLANUM SURATTENSE* BURM F FROM FLORAL BUD EXPLANTS

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ABSTARCT
An efficient and reproducible protocol has been developed for in vitro propagation from floral bud in Solanum surattense on MS medium fortified with various concentrations of cytokinins such as BAP and Kn individually and also in combination with auxins IAA(0.5mg/L)+BAP/Kn (1.0-8.0mg/L) for multiple shoot induction. High multiple shoot buds/explnt (19.0 ± 0.35) proliferation was observed at IAA (0.5mg/L) and BAP (3.0mg/L) from the floral bud explants within four weeks of culture was attained. Individual shoots were aseptically excised and sub cultured in the same media for shoot elongation. The elongated shoots were transferred to (IBA) (1.0–5-0 µM) for root induction. Rooting was observed within two weeks of culture. Rooted plantlets were successfully hardened under culture conditions and subsequently established in the field conditions. The recorded survival rate of the plants was 96%. Plants looked healthy with no visually detectable phenotypic variations.

KEYWORDS: In Vitro Proliferation, High frequency, floral bud explants, Solanum surattense. Burm.F.

INTRODUCTION

Medicinal plants are the source of various alkaloids and other chemical substances essential for mankind. The exploitation of tissue culture techniques in medicinal plants is indeed desirable for their *in vitro* propagation and extraction of important chemical compounds. *Solanum surattense* Burm. (Solanaceae) is a perennial herb. It is usually found in India, Pakistan, Malaya, and Australia. In Bangladesh, it was found as wild herb in almost all northern parts and it was very common in the Barind region. Nowadays, this plant rarely gets in the Barind region only. The solasodine and glycosides are rich in this plant, are very common properties for anticancer (Cham, 2007). Besides, this plant is widely used as folk medicine for breathing trouble, heart diseases and pain. Some drug companies (Unani, Hamdard Laboratories, Ayurvedic) are developed in India based on plant extract and they are attracted by the people. These companies are using extract of *S. surattense* as to prepare remedy for breathing disease; as well this plant is widely planted in highland of Bangladesh. Since this herb becoming a potential medicinal plant in south Asia, more advance investigations are needed concerning modification of characteristics including rapiid growth, increase essential chemicals content, disease resistant and stress tolerance in this plant. Limited reports have been published on the *in vitro* prropagation as well as genetic transformation systems of *S. surattense*. Pawar *et al.* (2002) developed a technique for direct shoot organogenesis from shoot tip and leaf segments. Using nodal and shoot tip segments, a micropropagation technique also established on this plant by Rama Swamy *et al.,* (2004). Rama Swamy *et al.,* (2005a) established a protocol on plantlet regeneration through somatic embryogenesis from cotyledon and leaf explants. Callus induction and shoot orgganogenesis system from apical bud were also reported earlier for this plant proliferation (Prasad *et al.,* 1998).

Ayodhya Ramulu. *et.al.,* (2014) reported protoplast isolation from leaf explants of *S. surattense*. Ugandhar *et al.,* (2016) Plantlet regeneration via callus induction from leaf explants of *S. surattense*. Rama Swamy (2006) reported *Agrobbacterium-mediated* genetic transformation systems using leaf explants of *S. surattense*. (Rama Swamy *et. al.,* 2005b) established streptomycin-resistant *S. surattense* plantlets using *in vitro* mutagenesis. For genetic improvement of plant, we usually use selection method as well as *in vitro* molecular breeding technique. Plant breeders showing great interest on molecular breeding technique for plant modification genetically because conventional selection method takes long time, tedious and occurs large variation within clones. For molecular breeding based

genetic transformation, we know, efficient regeneration systems are prime requirement. Stem segments are used as important explant for genetic transformation system, described in many plant species (e.g., Rastogi and Dwivedi, 2006).

The technique of culturing young excised flower buds affords a potentially useful tool for study concerned with the control of flower morphogenesis; influences of growth regulators and nutrients without the presence of intervening vegetative tissue (Konar and Kitchlue, 1982). In several plant species flower buds have been successfully cultured through to anthesis using different growth hormones/regulators of various concentrations (Galun *et. al.*, 1962, 1963; Tepfer *et. al.*, 1963; Blake, 1966, 1969; Hicks and Sussex, 1970; Bilderback, 1971, 1972; Rastogi and Sawhney, 1986, 1988).

Floral bud culture *in vitro* offers an unique technique where by the influence of vegetative parts could be eliminated facilitating analysis of the role of nutritional, hormonal and environmental factors in successful morphogenesis (Konar and Kitchlue, 1982). Floral bud culture in vitro was reported in a number of species (Dunstan and short, 1979; Novak and Howel, 1981). In the present study an effort was made to establish a protocol for the *in vitro* propagation of *S. surattense* from the floral bud explants of field grown plant through direct adventitious shoot organogenesis.

METHODOLOGY

Plant material: *S.surattense* plant bearing inflorescence having 1-2 flower buds measuring (1.0-1.5 cms) were cut from plants grown in the experimental field of Govt. Degree College Mahabubabad. The shoots were trimmed carefully by removing excess leaves and washed several times in tap water. The shoots were then surface sterilized by completely submerging the shoots for 15 minutes in 5-7% (v/v) Sodium hypochlorite solution prepared in double glass distilled water and having a few drops of a wetting agent Tween 20. The flask was shaken periodically to allow complete wetting of the shoots. These were then washed 3-4 times with sterilized double glass distilled water. Again the excised inflorescences were placed in 1% (w/v) "Mericuric chloride solution for 1-2 minutes and agitated to ensure complete surface sterilization. The shoots were then transferred to another flask and washed several times with sterilized double glass distilled water to ensure complete removal of mercuric chloride solution. For the purpose of surface sterilization and washings of excised inflorescences only sterilized glassware were used.

The shoots were then taken out and the flower buds were carefully cut in size, leaving a small portion of the stem attached to the inflorescence, with the help of a sterilized blade in a sterilized petriplate. The floral buds were then placed on a sterilized 1% agar-plate in a petridish for easy/quick handling during inoculation. All these processes of surface sterilization, washing and cutting of the plant material and inoculation were done under aseptic condition using a laminar air-flow chamber also fitted with ultraviolet light.

Culture media and Culture Conditions: These were placed on modified MS (Murashige & Skoog1962) medium (Devoid of $CaCl_2$ $2H_20$ & KI) containg 6% (w/v) sucrose and solidified with 0.8% agar and supplemented with various concentrations of cytokinks such as BAP and Kn (Table-1) individually and also in combination with auxins viz. IAA (0.5mg/L) + BAP /Kn (1.0-8.0mg/L) (Table-2) pH 5.7- 5.8. The percentage of explants responding was evaluated after 4 weeks of culture. Responses scored were the percentage of explants with evidence of multiple shoot bud stage floral buds. All the cultures were incubated under 16/8 h. light/ dark photoperiod at 25 ± 2ºC a light intensity of 40 µ mol m-2 $^{s-1}$ was provided by cool- white florescent tubes. The cultures were transferred to fresh medium after an interval of 4 weeks. During inoculation one flower bud was transferred onto the medium in each 250 ml flask with the help of a sterilized inoculating needle. The stem portion of the flower buds was slightly inserted into the medium. As soon as inoculation was over each flask was re-plugged with the cotton plug and capped with aluminium foil. The regenerated plantlets were transferred to poly cups containing sterile compost and soil (1:1) mix for 3 weeks for acclimatization. Subsequently these were shifted to the greenhouse. For statistical analysis, means were based on 25 replicates for each treatment. Data were collected after 6 weeks beginning of the experiments.

RESULTS

Within the first week, most of the inoculated flower buds enlarged. After 2 weeks of culture they opened followed by the enlargement of the ovary. Adventitious shoot buds were induced from the ovary region after 3 weeks of culture. Direct shoot buds were formed from the explants on modified MS medium amended with cytokinins alone and also cytokinins in combination with auxins tested. These were developed without intervening callus phase.

Table. 1: Effect of BAP and Kin on induction of high frequency multiple shoots from floral bud explants of Solanum surattense.

Hormone cone (mg/L)	Hormone	% of cultures responding	Average Number of shoot buds/explants (SE)*
1.0	BAP	28	4.0 ± 0.42
1.0	Kin	23	5.0 ± 0.29
2.0	BAP	33	10.0 ± 0.43
2.0	Kin	29	9.0 ± 0.37
3.0	BAP	62	17.0 ± 0.32
3.0	Kin	57	13.0 ± 0.25
4.0	BAP	55	12.0 ± 0.23
4.0	Kin	47	10.0 ± 0.17
5.0	BAP	51	8.0 ± 0.27
5.0	Kin	32	6.0 ± 0.40
6.0	BAP	50	9.0 ± 0.25
6.0	Kin	39	5.0 ± 0.29
7.0	BAP	42	7.0 ± 0.29
7.0	Kin	40	4.0 ± 0.32
8.0	BAP	30	4.0 ± 0.17
8.0	Kin	25	3.0 ± 0.22

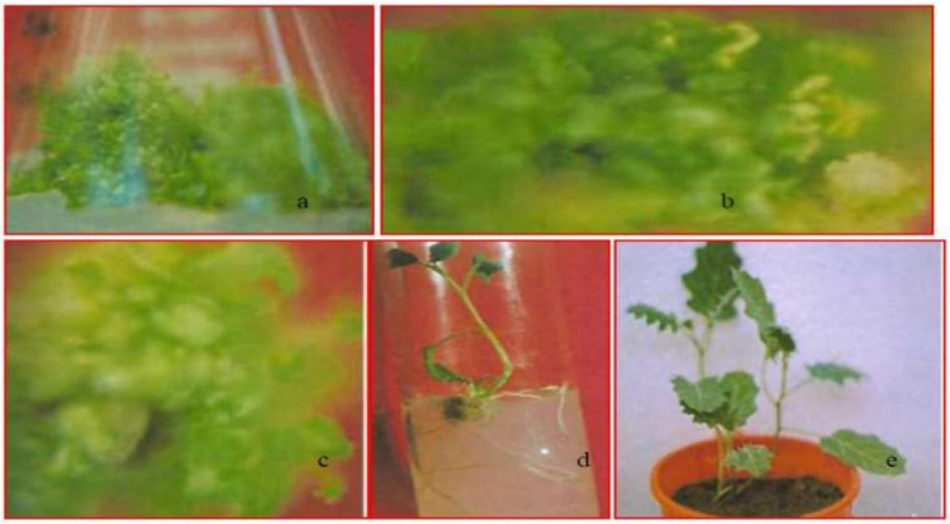
Effect of BAP/Kn on multiple shoot bud induction: The floral buds cultured on MS modified medium supplemented with (1.0, 2.0, 3.0, 4.0, 5.0, 6.0 7.0and 8.0 mg/L) BAP/Kn showed maximum percentage (62%/57%) of responding cultures at (3.0 mg/L) BAP/Kn. At higher concentration of BAP/Kn (8mg/L) the percentage of response was reduced gradually upto (30%/25%) respectively. Likewise maximum number of multiple shoot buds/explant was found at (3.0 mg/L) BAP when it was added alone to the medium, but highest percentage of responding cultures and more number of shoot buds (17.0±0.32) were recorded at (3.0 mg/L) BAP in comparison to Kn (13.0±0.25). As the concentration of cytokinin increased upto (3 mg/L) BAP/Kn the frequency of number of shoots induction was found to be decreased (12.0 ± 0.23/10.0 ± 0.17, 8.0 ± 0.27/6.0 ± 0.40 shoots at 4.0, 5.0 mg/L) BAP/Kn. At 8.0 mg/L BAP/Kn very less number of shoots (4.0 ± 0.17/3.0 ± 0.22) were developed compared to other concentrations of BAP/Kn individually (Fig. 1). (Plate-I).

Table. 1: Effect of IAA in combination with various concentrations of BAP/ Kin on induction of high frequency multiple shoots from floral bud explants of *Solanum surattense.*

Auxin cone IAA+BAP/Kn(mg/L)	Hormones	% of cultures responding	Average No of shoot buds/explants (SE)*
0.5+1.0	BAP	30	8.0 ± 0.32
0.5+1.0	Kin	38	6.0 ± 0.43
0.5+2.0	BAP	36	12.0 ± 0.23
0.5+2.0	Kin	42	11.0 ± 0.32
0.5+3.0	BAP	62	19.0 ± 0.35
0.5+3.0	Kin	59	15.0 ± 0.45
0.5+4.0	BAP	58	17.0 ± 0.35
0.5+4.0	Kin	50	14.0 ± 0.35
0.5+5.0	BAP	52	12.0 ± 0.27
0.5+5.0	Kin	45	11.0 ± 0.35
0.5+6.0	BAP	52	8.0 ± 0.25
0.5+6.0	Kin	38	6.0 ± 0.34
0.5+7.0	BAP	45	5.0 ± 0.32
0.5+7.0	Kin	32	3.0 ± 0.32
0.5+8.0	BAP	42	4.0 ± 0.17
0.5+8.0	Kin	30	2.0 ± 0.12

Effect of IAA and BAP/Kn on multiple shoot bud induction: Modified MS medium containing (0.5 mg/L) IAA in combination with BAP/Kn (1.0-8.0 mg/L) showed the enhanced efficiency in inducing the adventitious shoot buds from the explant as compared to media with cytokinin alone. IAA (0.5 mg/L) in combination with (3.0 mg/L) BAP/Kn produced maximum number of shoots (19.0 ± 0.35/15.0 ± 0.45) with highest responding frequency (62%/59%) compared to other concentrations of BAP/Kn. As the concentration of BAP/Kn increased in the medium showed the less response and decreased number of shoots gradually from

(4.0 mg/L) BAP/Kn + (0.5mg/L) IAA combination onwards (17.0 ± 0.35/14.0 ± 0.35, 12.0 ± 0.27/11.0 ± 0.35, 8.3 ± 0.25/6.3 ± 0.34, 5.3 ± 0.25/4.0 ± 0.35 shoots' at 4.0, 5.0, 6.0 and 8.0 mg/L) BAP/Kn +(0.5 mg/L) IAA (Plate-I)(Fig-2).



***High frequency multiple shoots* Propagation of *Solanum surattense* from floral bud explants culture a) Formation of high frequency shoot buds on MS +0.1mg/L IAA+3.0 mg/LBAP b) Induction of Multiple shoot buds on MS+0.5mg/L IAA+3.0mg/L Kn c) Formation of shoot of shoot buds on MS+3.0mg/LBAP d) *In Vitro* rooting from Micro shoots on MS+ 3.0 mg/L IBA e) Hardening of plantlets.**

Rooting of Shoot and Acclimatization of Plantlet

The microshoots were excised and individually transferred to MS medium augmented with (0.5 to 1.5 mg/L) IAA for root induction. Root initiation was profuse with 8-10 roots in the medium containing (1.0 mg/L) IAA as compared to (0.5 mg/L) (4 roots) and (1.5 mg/L (6 roots) IAA. High percentage of rooting efficiency (90%) was observed at (1.5 mg/L) IAA followed by (1.0 mg/L) (80%) and (0.5 mg/L) (70%) IAA from *in vitro* regenerated shoots. These *in vitro* regenerated plants were shifted to the greenhouse after acclimatization in the culture room.

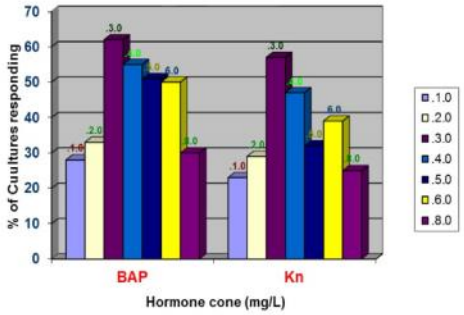


Fig. I. Hormone concentration of (mg/L).

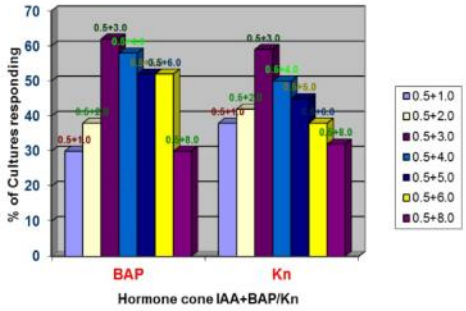


Fig. II. Hormone concentration of IAA+BAP/Kn.

DISCUSSION

In the present investigations, direct shoot regeneration from floral buds was obtained in all the concentrations and combinations of plant growth regulators used. The cytokinin BAP had shown superiority over Kn in all the concentrations and combinations studied for inducing multiple shoots in S. *surattense*. The requirement of growth hormones for flower bud development under *in vitro* conditions has been demonstrated by many workers (Tepfer *et. al.,* 1963; Hicks and Sussex, 1970; Polowick and Greyson, 1982; Rastogi and Sawhney, 1986,) The present findings that flower buds can be grown to anthesis in artificial medium supplemented with a single

growth hormone is in agreement with the findings of (Rastogi and Sawhney 1986, 1988). (Brulfert and Fontaine) (1967) also obtained normal flowers from excised flower buds of *Anagallis arvensis* in simple medium supplemented with IAA. Hicks and Sussex (1970) and Rastogi and Sawhney (1986, 1988) demonstrated the essentiality of kinetin and BAP for the growth and development of floral organs to maturity. In the present study BAP or kinetin (cytokinin) could not induce formation of pollen grains in the anther. This is contradictory to the findings of earlier workers (Hicks and Sussex. 1970; Rastogi and Sawhney, 1986, 1988) who observed pollen grains development in floral buds grown in kinetin supplemented medium. Maximum efficiency of shoots formation per explant was observed on MS modified medium comprising (0.1 mg/L) IAA and (3.0 mg/L) BAP followed by (0.5 mg/L) IAA and Kn.

When auxin (IAA) was added in combination with cytokinins showed the high induction efficiency during the present studies (Plate-I). Adventitious shoot regeneration in S. *surattense* has been reported with 58 shoots per explant from internodal explants cultures respectively (Mahabubur Rehaman *et.al.,* 2011) and also 25.8 shoots from leaf and 23.6 shots from nodal explants (Seetharam *et.al.,* 2003). Whereas during the present investigation the number of shoot buds developed directly from the explant was 35. When the same was subculture in a conical flask containing the fresh medium, induced in thousands of shoots per explant. About 90% of the plantlets survived onto compost soil two months after transfer and seasonal flowering observed in the *ex vitro* conditions. The detectable variation in the *in vitro* grown potted plants was not found when compared with the donor plants. Hence, the present study shows that the floral bud culture is amenable to high frequency regeneration in medicinally important herb *S. surattense,* which could be easily adopted for large scale multiplication of the species. Thus, it opens up the possibility of using this plant in genetic manipulation for introducing genes of interest using particle gun bombardment or *Agrobacterium tumefaciens* and also the established shoot regeneration technique in the present study has a potential impact for clonal propagation of elite genotypes and improvement characteristics by molecular breeding technique of *S. surattense* for plantation and utilization in the drug industries.

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DEPARTMENT OF ECONOMICS

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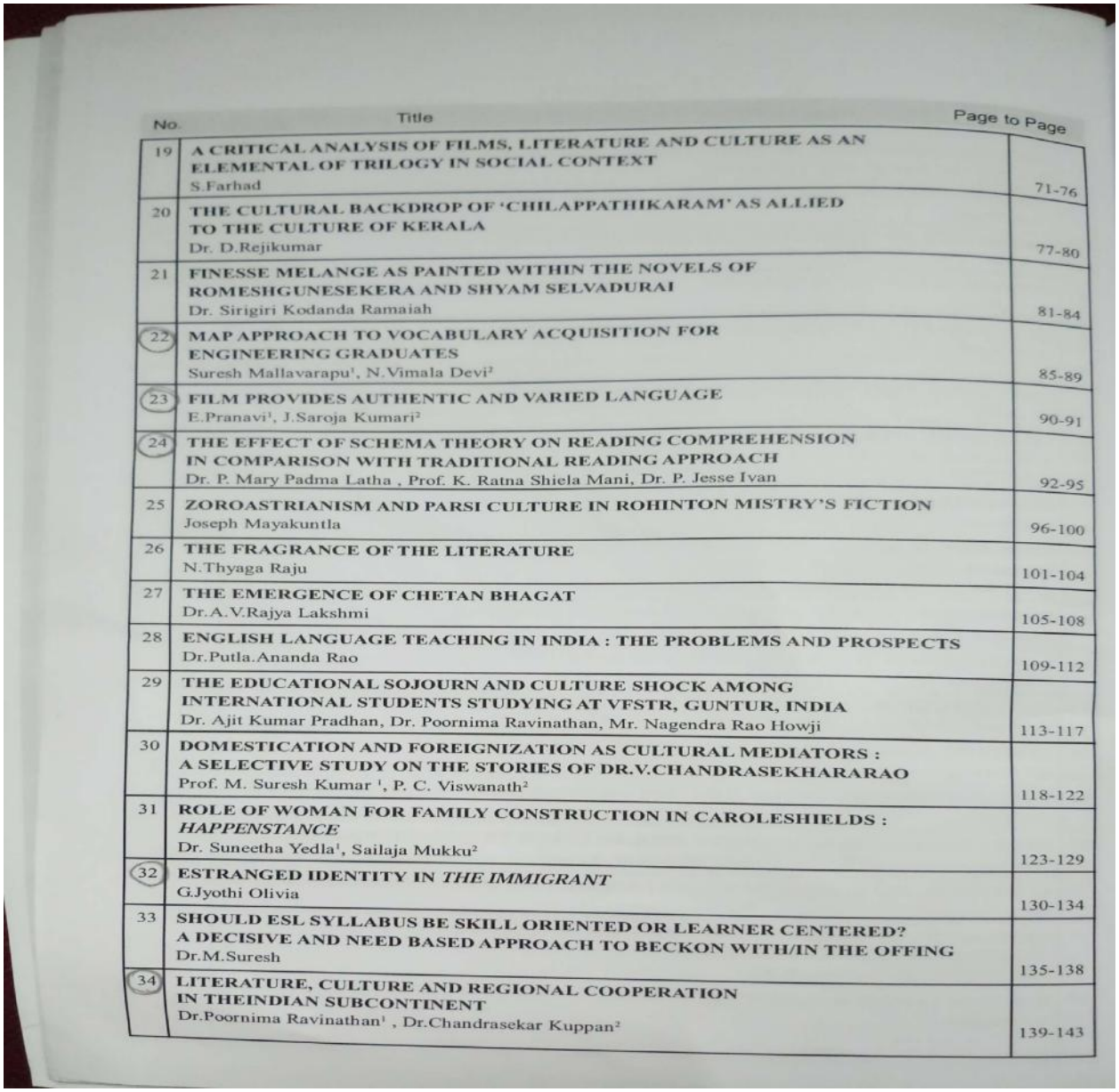

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LITERATURE, CULTURE AND REGIONAL COOPERATION IN THE INDIAN SUBCONTINENT

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ABSTRACT

This paper will provide the analyses of unnoticed relation namely the cultural familiarity as a possible source for successful regional cooperation, in order provide better access and opportunity to people for harmony and religious tole Indian subcontinent which is known as South Asian countries, are mostly post-colo political organisation.Due to their collective colonial past, South Asian region is unique with shared in history, heritage, literature, culture, religion and languages. South Asia culture is also very rich and varied, which seems to beoriginated from the rich Valley civilization that saw the influx and mix of the Aryan and Dravidian races. In the recent past with lot of small countries booming as emerging economic zones synchronized with civilization, these south Asian countries identities in culture was basically hampered by various religious practices that prevails in these Nations.

South Asian Association for Regional Cooperation (SAARC), aims for collective development through economic cooperation, maintenance of peace and security, social unity, promotion of cultural synthesis and regional integration in the Indian sub-continent. However, a major obstacle that has to be considered towards regional integration is frequent political and military conflicts happening between the states of this region. Many of the nations in the South Asia, are plagued by diverse social and economic problems wherehigh rates of illiteracy and unemployment take the major part. Education and employment remain two important areas in the nation building discourses of most South Asian countries in the recent years due to an alarming increase in population growth. Hence, there is a need for greater cooperation among the Nations in the South Asian Region, in the field of education to improve the situation. Culture and literature go hand in hand in shaping the growth of any of the nation by addressing all social-economic issues which is believed to be an integral part in bringing regional cooperation with similarities in lifestyle, recreation and entertainment.

Keywords: *Region, Cooperation, Indian Subcontinent, Culture, Literature.*

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INTRODUCTION

The South Asian regions are inseparably linked through geography, shared history, and culture heritage, but they are divided by their internal politics and geopolitical environment. Economic imperatives drive them towards connectivity and cooperation, however the lack of coherence of interests keeps them apart. Consequently, South Asia's economic development has failed to reach its optimal level and hamper the progress towards integration within the region[i].

The South Asian Association for Regional Cooperation (SAARC)is the regional inter-governmental organisation, founded in the year 1985 with seven South Asian countries - Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Later, in 2007, Afghanistan joined the Association making the member list grew to eight. The main aim of the organisation is to promote a shared understanding, good neighbourly relations, and meaningful cooperationin orderto achieve peace, freedom, social justice, and economic prosperity in the region[ii].

South Asia occupies around 3.4 % of the world's available land, which is ultimately home to approximately 24 percent of the world's population (1.749 billion), making it the most densely populated place on earth[iii].SAARC occupies a land area larger than the European Union (EU) and the Association of Southeast Asian Nations (ASEAN). Nonetheless, despite of such traits, SAARC has failed to achieve its objectives and South Asia in present scenario, is treated as "one of the least integrated regions" in the world as per the World Bank (2017) statistics[iv].

Promoting intra-regional connectivity through trade is one of the primary focus areas of SAARC. However, even after three decades of existence, intra-SAARC trade stands at a mere5% of overall South Asia's total trade.In contrast, intra-regional trade constitutes 35 % of East Asia's total trade, and 60 % of Europe's[v].

LANGUAGE AND CULTURE IN SOUTH ASIA

Culture is nothing but the knowledge of a group of people, encompassing language, religion, cuisine, social habits, music and arts.Before we analyse the concept Culture, first we may answer the question, does culture matter? Looking back at the place of culture in social science, the answer in the 70s and 80s would have been negative. But as contribution to an anthology on economic development and democracy, David Lands answers the question affirmative: "If we can learn anything from the history of economic development, it is that culture that makes almost all the difference" but also "On the other hand, culture does not stand alone"[vi].

If we look at the South Asian Region, there is an evidence of Neolithic culture that has been found throughout the modern states of Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan and Sri Lanka which represent South Asia or Southern Asia (also known as the Indian subcontinent). Following the Indo-Aryan settlement in the Indo-Gangetic Plain and the establishment of the characteristic social groups (Brahmanas, Kshatriyas, Vaishyas and Shudras) in the caste system based on theJatimodel in the Varna order, the tribal entities variously consolidated into oligarchic chiefdoms or kingdoms (the 16 Mahajanapadas), beginning in the 6th century B.C. Hinduism, Buddhism, Jainism and Sikhism are major world religions that originated in South Asia[vii]. These arguably represent the furthest reaching, most profound and permanent South Asian ideas on other cultural spheres.

Afghanistan and Pakistan are situated at the western periphery of South Asia, where the cultural character has been made by both, Persia, a civilization rooted in Mesopotamia and the Indosphere.Pakistan's two eastern regions of Punjab and Sindh share cultural links to Northwest India. The Brahui are a group of tribes who live primarily in Baluchistan and Sind provinces of Pakistan. Brahui is a Dravidian language and, as such, is distinct from the languages of the neighbouringPathan, Baluch, and Sind people. It is reported that many Brahui are bilingual in Baluchi and that Brahui contains numerous loanwords from Baluchi and Sindhi. The heart of Brahui territory is the district of Kalat, in Baluchistan. Politically, the Brahui are best described as a loose confederation of tribes, which was ruled from about 1700 to Pakistan's independence in 1947 by the Ahmadzais dynasty[viii].

Bangladesh and the Indian state of West Bengal share a common heritage and culture based on the Bengali language. Urban Bengali elite culture has produced one of South Asia's finest literary traditions, including not only the novel, short story, and poetry but drama and film as well. Some of India's best classical musicians and greatest exponents of the dance have been Bengalis. Bengalis have also made major contributions to Indian and world cinema. Rural Bengal has an old and well-developed folk literature, including narrative poetry (*puthi*), drawn from history, myth, and legend, as well as a very popular itinerant theatre (called *jatra*)[ix]. Despite industrialization and the spread of commercially manufactured products throughout the region, the Bengali rural economy still depends on the services of traditional craftspeople weavers, potters, carpenters, blacksmiths, metalworkers, and the like whose lifestyle often represent a high quality of both technique and aesthetic design.

Nepal is culturally linked to both India and Tibet and the varied ethnic groups of the country share many of the festivals and cultural traditions which were used and celebrated in North and East India and Tibet. Nepali, the dominant language of Nepal uses the Devanagari alphabet which is also used to write many North Indian languages.Nepal is a Hindu kingdom in which the king is considered an incarnation of the god Vishnu. Although the majority of the country is Hindu, a number of groups of sizable populations are Buddhist. There are a few groups of Muslims in the country and an even smaller number of converts to Christianity. Generally, Hinduism in Nepal is based on the Dharmashastras, Puranas, and various developments in Vaishnavism and Shaivism that have largely originated in India. Buddhism in Nepal blends Mahayana, or the Great Vehicle, with Vajrayana, the Diamond Way[x].

Bhutan is a culturally linked to Tibet with significant influences from India. Tibetan Buddhism is the dominant religion in Bhutan and the Tibetan alphabet is used to write Dzongkha, the dominant language of Bhutan. In Bhutan about 20 dialects are spoken which also includes Nepali[xi]. The national dress is the symbol of unity without which the nation lacks meaning. In Bhutan, culture is largely shaped by religion (Buddhism). Before Buddhism, the bonism culture (worshipping of animals and nature) was widespread. The first temple is being constructed in the capital city of Thimpu. One can also see the film industry growing where Bollywood certainly has influence.

Sri Lanka is culturally tied to both India and Southeast Asia. Sinhalese, the dominant language of the country is written in the Sinhalese alphabet which is derived from the Kadamba-Pallava alphabet. certain cultural traditions, and aspects of its cuisine, for example, show South Indian influences. Cultural festivals, aspects of its cuisine and Theravada Buddhism, the dominant religion in Sri Lanka, show Southeast Asian affinity. The unique culture of Sri Lankan Tamils took on distinctiveness early from its close proximity to the Sinhalese and from waves of immigration from diverse regions of southern India. Many features of Sri Lankan Tamil culture, including village settlement patterns, inheritance and kinship customs, and domestic and village "folk religion" stand in sharp contrast to mainland Tamil customs. One possible reason is that the immigrants who created the first Tamil settlements in Sri Lanka appear to have come not just from the Tamil region of south India but from the Kerala coast as well[xii].

Indo-Aryan languages are spoken in Pakistan, Sinhalese of Sri Lanka and most of North, West and East India and Nepal. Dravidian languages are spoken in South India and in Sri Lanka by the Tamil community. Tibeto-Burman languages are spoken in the North and North East India. Iranic languages are spoken in Baluchistan and Khyber Pakhtunkhwa in Pakistan. The main languages of Afghanistan are Pashto and Dari.

The above stated infusion of languages in different parts of the country apart from their country of origin, shows how varied the trade happened between those places in earlier days with the merger of different culture and traditions. At present day scenario trade between two countries is not happen as olden days as conflict of interest arises between different political parties which show their supremacy to retain their position in their own country. Despite these hurdles, there is still lot of scope and hope in the rising generation which can put a barricade to difference in opinion between the

political parties and ruling government which they have to abide based on their constitution.

LINKAGE BETWEEN CULTURE AND REGIONAL COOPERATION IN SOUTH ASIA

Apart from economic gains, regional cooperation is needed for maintenance of peace and security, social unity, promotion of cultural synthesis and for religious integrity.Prof Partha Ghosh in his paper titled "Culture, Cultural Productions and South Asian Spaces", said South Asia is more a cultural rather than a geo-political construct and it will survive even if SAARC were to disappear[xiii].

Peace and security has always been the focus of Bhutan's foreign policy. Cultural identity is also part of the nine points of Gross National Happiness in Bhutan. Bhutanese culture is composed of Buddhist identity, competence in the mother language, knowledge of art and craft, and manifestation of various views. Culture is of course one of the factors in Indo-Bhutan relations. This cultural foundation brings together many people from both the countries including writers and artists. Culture can be used as a unifying factor to build bridges[xiv].

There is a rise of identity at the social, political and religious levels that have acquired far serious proportions. The intermingling of politics and identity is poisonous as the cultural space is fragmented by political divisions. Prof. Muni in his paper, emphasised that culture retains the potential to promote harmony. It is, however, important to keep politics away from cultural aesthetics[xv].There is another author correctly mentioned that, theCulture could be used as an instrument for foreign policy and where thepolicies belonged to the states and culture belonged to the people, with a constant tension between the two. There were framed consciously by bureaucrats and politicians to serve their interests while culture was organic and constantly evolving, which she says is a complex and diverse concept[xvi].

For India, culture as a foreign policy tool in the neighbourhood had limited appeal and was often perceived with suspicion. However, there has been a metamorphic change in South Asia in recent years and there is greater openness to accept diverse identities and use culture as an instrument to bring countries and people together which seems to be an ice breaker towards religious and cultural cooperation.

CONCLUSION

Culture is one of the leading subject having very effective elements that will directly help people in the nations to lead their development strategies. So the SAARC Cultural Centre should engage in implementing programmes to promote culture in South Asian Countries.There should be more access to each other's repositories of culture. Apart from Governments initiatives, other Cultural societies and NGOs must work for new harmonisation, a realignment of interest. The future of South Asian integration lies in the strategic use of soft power to promote values which are beneficial for the region as a whole.

Since the China's presence in South Asian Region, has been increasing in the recent time, India should take all the possible ways to have collaboration with each Nation in the region. Literature and Culture would be the one of the best way for that. Another option would be through SAARC, India may cooperate with nations in South Asia. This cultural collaboration may not change the prolonged political issues, between the Nations, however, this may change the mind set of people in positive way.

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