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Principal's Message

One of the essential areas of college/ university activity is research. The College contributes to human progress by increasing the store of precise, useful knowledge. The concern of the research and the ways in which it is done will influence the contents and the interests incorporated into teaching.

The Colleges are to be ever more effective instruments of cultural progress, both for individuals and for society. It is also desirable that the Colleges contribute to transformation of society in search of deeper levels of justice and freedom. In this regard research plays fundamental role.

Some of the major areas of research could be the dignity of human life, the promotion of justice for all, the quality of personal and family life, the preservation of nature, the search for peace and political stability, a more just distribution of the world's resources, and a new economic and political order which will better serve the human community at both national and international levels. Research that will contribute to the solution of human problems is to be carried out.

All research starts off from certain initial interests, chooses the pertinent questions and inevitably concentrates on what is considered the most relevant data. Any research is not truly neutral because it always carries with it the bias of the values and particular conceptual structure of human beings. That is why it is necessary to ask "for whom and for what" research is being done.

I thank the editor and his team for their wonderful efforts in bringing out this issue of the research journal Al-Shodhana. May God bless all our efforts in educating our youth to build our Nation!

Fr Swebert D Silva, SJ

Principal

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CONTENTS

Editor's Note

Generation and dissemination of knowledge is one of the major functions of a modern higher educational institution. *Al-Shodhana* is an attempt in this regard. Published bi-annually this peer reviewed multi-disciplinary refereed journal provides an opportunity for the young faculty members, research scholars and students for disseminating their research findings and views to a wider audience and promotes devotion to the scientific process. Keeping our promise we are happy to present the 5th issue containing 13 articles from various disciplines.

In the article ***Defining Civil Society in the Indian Context,*** *D'souza makes an attempt to revisit the concept of civil society to explain its origin in Indian polity. The article also makes an attempt to establish the growth of civil society due to democratization and participative modes and analyses its underlying challenges. In the paper* ***Community*** **Perception about the Risks Associated with the Child Occupations: A Case of Bangaluru** *Nanjunda takes up a case study of Bangaluru city to find out how community evaluates the risks associated with various child occupations using focus group study technique. The article also assesses the level of community awareness towards the risk associated with various kinds of child's work.*

Pereira and *Hugar using the secondary data collected from the offices of the 4 NGOs and also on the basis of thier personal interaction with the programme co-coordinators of each NGO try to analyse the efforts of the four NGOs managed by Christian minority in Dakshina Kannada District in the upliftment of the poor through most comprehensive financial inclusion tools, namely, microfinance* in their paper ***Initiatives of Christian Minority NGOs in the Inclusive Growth of Marginalised Poor Through Self-Help Groups in Dakshina Kannada District****. The study also makes an attempt to compare the performance of the selected 4 NGOs with the overall position of microfinance in Dakshina Kannada District in order to find out their contribution to the field of microfinance. Based on the findings from their field study* ***Adapting to Technology: The Web in the Undergraduate English Classroom****, Baliga* and *Pai* make an attempt to find out student preferences and web skills that will help in the designing of an ICT enabled pedagogy, which in turn, will help students to speak, read and write English independently. They also discuss the activities to develop each of the listening, speaking, reading, writing skills. Based on semiotic analysis of a few infographics that are posted in various social networking sites by the major

political parties in India, *Thomas* in the paper ***Usage of Infographics in Social Media Campaigns of 2014 Lok Sabha Elections in India: A Semiotic Analysis*** tries to identify its effectiveness, usage, challenges and prospects of infographics in 2014 Loka Sabha election campaigns.

In their article ***Metro Domination Number of C_n X P_2*** *Sherra and Mathias* found out the metro domination number of some graphs. Effect of incorporating cowpea into traditional dishes like *idli* (fermented steam cooked pudding prepared with rice grits and blackgram dhal paste) and *vada* (deep fried snack item prepared with ground blackgram dhal paste) was investigated by *Bangera* in the article ***Replacement of Blackgram Dhal with Cowpea Dhal in Traditional Preparations*****.** In the articles ***Comparative Analysis of Slotted Microstrip Antenna Using FR4 and Roger Material for Dual Frequency Band*** by *Singh, Kaur and Singh,* ***Design of Rectangular Microstrip Antenna for Multiband Slits*** by *Kaur, Kaur and Singh,* ***Enhancement in AODV Routing Protocol to Reduce Link Failure Problem in MANET*** by *Kaur and Kaur* **, *Design, Optimization and Synthesis of Decoderusing Reversible Logic*** by *Kaur and Singla****, Comparative Analysis of Octagon Slotted and Unslotted Patch Microstrip Antenna Using Teflon for Multi Frequency Band Applications*** by *Singh, Kaur and Singh* and ***Optimization of 4-Bit Reversible Asynchronous Counter Using Reversible Logic Gates*** by *Kaur and Singla*, student scholars present findings of their respective studies in the field of electronics and communication.

I thank all these authors and wish a fruitful academic and research career to the student scholars. My thanks are due to the members of editorial board and editorial advisory board. I am grateful to *Dr Sylvia Rego*, *Dr Suresh Poojary*, *Dr Narayana Moolya,* Dr Rose Veera, Dr Denis Fernandes and Mr Chandrashekar Shetty for their whole hearted support in editing this issue.

Norbert Lobo
Editor-in-Chief

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DEFINING CIVIL SOCIETY IN THE INDIAN CONTEXT

- **Rose Veera D'Souza**

Abstract

One of the significant developments of the recent past is, considering civil society as the panacea for the ills of the weakening state. So much so that a few writings even pose civil society as an alternative to state. In the recent years, the Indian democratic polity seems to have reposed an enormous hope in the role of civil society to make it more viable and participatory. The ensuing article makes an attempt to revisit the concept of civil society to explain its origin in Indian polity. The nuances of freedom struggle and deliberations of the making of the Indian constitution did bring to the fore the involvement of civil society. However the Independent Indian government especially after the post independence era in the later years trailed off the need for such civil society as the people established trust in the existing government. However the decline of political institutions over the years brought in the need for civil society assertions and it became more animated in the late 1960s. The growing restlessness of the people towards the inefficacy of the ruling government to negotiate and deal with their demands brought forth the modes of civil society in an interface with the modes of state. As such 'participatory development' came to define the moorings of civil society. The article also makes an attempt to establish the growth of civil society due to democratization and participative modes and analyses its underlying challenges.

Keywords: *State, Civil Society, Governance, Freedom struggle, Participatory development*

In recent decades, State and civil society[1] in India have been increasingly collaborating essentially due to the strong felt need for participatory development. Often the 'nurturing state'[2] is considered as the significant base for such a change.[3] The role of civil society in intervening to promote good governance, resolving social conflicts, defending human rights, supporting participative democracy through decentralization and in enhancing opportunities to enable people to lead a good life is considered essential in the present context of political change. As Madeline Otis in her paper "Re-imagining Civil society in India writes, "civil society project takes its strength from a confidence in the pragmatic value and moral worth of strong democracy." Therefore, civil society has also become a significant qualifier in the promotion of democracy and to influence the goals of development too.

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A good democracy is considered to be a very good facilitator for enabling the people to enhance their quality of life and address their basic needs. The development and maintenance of healthy civil society is extremely important for the successful development and operation of democratic political systems. Hence civil society is often credited with the kind of assertions and bargaining it entails and succeeds to claim against the state. The civil Society is now often associated with social movements, cultural assertions and political participation.[4]

LOCATING CIVIL SOCIETY IN INDIA

Civil society in India has to be situated in the freedom struggle and more so in the Constituent Assembly debates. The Constituent Assembly seems to have emphasized the role of civil society in making the Indian Constitution viable. Responding to the discussion in the Constituent Assembly to make directive principles of state policy as justifiable, Dr. Ambedkar said, "Surely …it is not the intention, to introduce in this part these principles as mere pious declarations. It is the intention of this [Constituent] Assembly that in future both the legislature and the executive should not merely pay lip service to these principles but that they should be made the basis of all legislative and executive action…."[5]

The discussion on directive principles displayed three aspects. The first part of it was circled around the nature of these directives. Discussion basically went on in terms of making these directives as fundamental for implementation as ensuring the welfare of the people was considered a matter of the highest priority. Many, especially Ambedkar expressed the view that it was fundamental to bring the directives into operation.[6] H.V. Kamath another stalwart believed that it should be titled as 'fundamental principles of state policy' so that they do not remain as aims but are assured their proper implementation.[7]

The second part of the discussion basically circled around who will make these directives workable as there is no fixed authority to implement them. There was a consensus in the assembly to make the public opinion responsible for them. In the words of A. Ayyangar, "It is not the court that can enforce these provisions or rights. It is the public opinion and the strength of public opinion that is behind a doubt that can enforce these provisions….election will take place, and then it is open to the electorate not to send the very same person who are indifferent to public opinion. That is the real sanction, and not the sanction of any court of law."[8] Thus a great faith was reposed on the strength of civil society.

The third part of the discussion basically circled around the subject of promoting welfare, prosperity and progress of the people in establishing and maintaining a democratic socialist order. It redefined the role of civil society in asserting economic democracy viable and arguing for affirmative provisions for the well being of the marginalized and disadvantaged. Hence the civil society assertions fell in place to articulate and argue for an interventionist state.

CONTEXTUAL DISPOSITIONS

The role of civil society in India is emphasized as elsewhere in eradicating poverty, promoting democracy and good governance, protecting human rights at all levels of generation rights today. The inertia of the state is highly viewed as the reason for lack of support to avert the problems. The lack of effective delivery system is at both the village and communities are highlighted to be the concern of many citizen-inspired associations. The inequities generated between both the rich and the poor at the domestic level and as rich and poor state at the international level, due to globalization seem to have occupied a significant thrust for such a concern. As such, hopes are raised on its significant role in empowering citizens through participatory democracy and forging connections in settling social conflicts.

Due to the economic reforms India experienced a major shift though one has to yet to assess the substantive consequences. However there has been a greater shift in terms of the relations across the state, market and civil society affecting public domain (Arora 2005:16). In the changing context, the role of the state is transformed from a regulator to a facilitator of the market. As such state is compelled to work in a context where the role of international financial institutions is significantly increased even in defining policy and policy framework. In turn it has increased a boast for civil society institutions that argue for rights and justice of people.

In the case of the growing strength of the lower strata of the society vis-à-vis the upper classes the state needs to strengthen its material base which the marginalized and the disadvantaged rely upon. In the view of Deepak Nayyar '[t]he rich dominate the economy now more than earlier, but the poor have a strong voice in the polity now more than earlier'(Mooij 2005:31). Such a politics of inclusive democracy helps the state to strengthen itself to concentrate on helping improve its human development capabilities and to accommodate the civil society and marginalized and disadvantaged sections of the society who assert their rights for an egalitarian order.

The inability to respond to the needs of the people by the political parties and government in India has encouraged the Indian public to mobilize through non-governmental organizations and social movements. The formation of civil society has made Indians less confident of the transformative power of the state and more confident of the ability of the individual and local community to bring a change. Such a development has paved hopes to solve the socio-economic problems.

CIVIL SOCIETY AND SOCIAL MOVEMENTS

The broad-based social movements, which developed in India in the 1970s have actively qualified those interests which were hitherto neglected by the state and political parties. The last two decades in India especially the 1980s has seen wide varieties of social movements. The 1980s was considered to be a golden age of social movements. It came to be identified as 'New Social Movements' with the women's movement, the anti-caste movement, the farmer's movement and environmental movement growing increasingly. The Shetkari Sanghatana, the Narmada Bachao Andolan, Autonomous Women's Organisations, the Dalit Panthers, the Mandal Commission agitation represented powerful forces making a strong plea.[9] Social Movements have influenced the nationalist movement in India and played a major role in crafting India's democratic framework. However, the role of social movements in the post-independence political phase has been quite peripheral. In spite of their ideological interventions, the movements have never been able to exert successful influence on mainstream politics vis-a-vis their own agenda of social transformation.[10] However, the 1980s brought a sea change in this regard.

For example the farmers' movement, has been able to bargain for higher prices on agricultural commodities and more investment in rural areas. The Dalit Panthers have adequately rearticulated the identity of former Untouchables. Women have been empowered to articulate their interest and negotiate for its success. The environmentalists have attempted to compel the government to be more responsive to environmental concerns. There has been much progress in redefining the concept of "development" to include issues and concern for indigenous cultures and environmental sustainability.

Civil society in India has to be analysed in its pluaralistic sense and often Gandhi's model of civil society is considered. Gandhi believed in the social group as the basic truth of the social world. " the fundamental characteristic of the

behaviour of human beings …consists in the relationship of the individual to micro groups, and the relationship of micro-groups to society."[11] The Gandhian technique of Panchayati raj is easily compared with the "civility" in Western paralance.

CHALLENGES TO CIVIL SOCIETY

An important aspect of the rise of civil society in India is the mobilization of voluntary or nongovernmental organizations. To some extent, Indian state is responsible for the growth of such voluntary organizations. A 1987 survey of 1,273 voluntary agencies reported that 47 percent received some form of funding from the central government. Voluntary organizations also have thrived due to foreign donations, a survey says, and that in 1991-92 contributed more than US$400 million to some 15,000 organizations. Such developments influence the defining of Civil society in India. There have been several attempts to define civil society in the Indian contexts. While situating civil society in Indian context it has to be remembered that there is lot of difference between the way the western world is associated with civil society and the way Indian society associates with civil society. In India the motivation for civil society comes from the inability of the state to deliver the benefits of advancement in technology and modernization to the average citizens where as in the west it is a response to the fatigue that has been generated due to the inability of the technological advancement to provide room for alternative life styles.[12]

In the present context of rising communal tensions and disturbances violence has been used as an instrument in the polarization of civil society and polity. Such a polarization is further deepened as there are attempts to divide, fracture civil society along communal lines, through social and physical ghettoisation.[13] Yet the democratization effect raises hope.

The space for social movements however is shrinking in the situations of globalization. It is not that there is no presence of social movement today. No doubt there are numerous social movements but they are more of a weak, localized and fragmented nature. In the context of globalization, 'the expressions of domination have become complex and dispersed' exerting a rapid change in the nature of a civil society. As a result, 'the mobilizational space available to the social movements is shrinking' bringing in new uncertainties.[14] There are splits and divisions among the issues on reforms thereby rendering the social movements weak.[15] The movements do not align with each other or they cannot align given the subtlety of

the context. The farmer's movement of the 1980's had attacked the established model of development which prioritized industry. Whereas, in 1990s the interests of capital and sections of rich peasants coincided and sections of farmers movement began to welcome and endorse globalization and the policies of privatization in support of industries.[16]

With economic reforms India experienced a major shift, though through the substantive articulation and consequences of it may not be wholly anticipated. Such a shift is yet to find a definite articulation. It provides for a reorganization of relations across the state, market and civil society affecting public domain.[17] In the changing context, the role of the state is transformed from a regulator to a facilitator of the market. As such many regulatory practices are dismantled, though new ones are getting formed to respond to the changing scenario. Reduction of subsidies and privatization is secured along with the changing precepts of the welfare state. The role of international financial institutions is significantly increased even in defining policy and policy framework. At the same time there is also a significant growth in civil society institutions that argue for rights and justice of people. However, responding with reference to participatory development in a country like India, where civil society is less strategic and less developed it needs to be seen how it meets its challenges. It needs to be acclaimed that the secure future of our participatory democracy lies in the well informed, inspired, committed and engaged citizenry and civil society needs to rise up to take this challenge in India.

FOOTNOTES

1 The term civil society originally meant a political community and today it is used to be distinguished from the state and is used to describe institutions that are private and independent from government. Hence it refers to "autonomous groups and associations, business groups, interest groups, clubs, families and so on.", Quoted from, B. M. Sharma and Roop Singh Bareth eds., *Good Governance, Globalization and Civil Society",* New Delhi, Rawat Publications, 2004.

2 Contrary to this, Often it is argued that the need of the civil society is also due to inability of the state to in fulfilling promises.

3 Democratic decentralization, participatory democracy are the widely used significant words in the development discourse. See, Pillai, P.P., *Democratic Decentralization, Participatory Development and civil Society: The Story of People's Campaign for Decentralised Planning In India*, World Society Focus Paper Series, Zurich, March 15, 2006.

4 See Dipankar Gupta, Civil Society in the Indian Context: Letting the State off the Hook", http://www.jstor.org/pss/2654010

5 Quoted from, *Constituent Assembly Debates*, *op. cit.,* Vol. VII, Friday, 19 November 1948, http://164.100.24.208/ls/condeb/vol7p9.htm.

6 Ibid.

7 Ibid.

8 Quoted from, Ibid.

9 See, Gail Omvedt, "Social Movements in Western India: Visions for the Future", in P.G. Jogdand and S. M. Michael eds., *Globalization and Social Movements: Struggle for a Humane Society,* New Delhi: Rawat Publications, 2003, p. 108.

10 In this regard see, Rajeshwari Deshpande, "Social Movements in Crisis?", in Rajendra Vora and Suhas Palshikar, eds., *Indian Democracy: Meanings and Practices,* New Delhi : Sage Publications, 2004, p.379.

11 Amritananda Das, Foundations of Gandhian Economics, New York, St. Martin's Press, 1979, p.51.

12 See, Dipankar Gupta, ibid.

13 See, Asghar Ali Engineer, *Religion, State & Civil Society*, Centre for study of Society and Secularism, Mumbai.

14 Ibid., p. 380.

15 For example the leading activists of women, environmental and few sections of the farmer's movements opposed the economic reforms, whereas the anti-caste movement remained aloof and another section of the farmers movement led by Sharad Joshi supported economic reforms. See, for such details, Lalit Kumar, "Do We Have a Theoretical Framework to Explain Social Movement? Third System, Third sector, Third Way - No way", *Planning Commission,* Yojana Bhavan, New Delhi, http://www.TEMP/kumar.pdf.

16 See, Rajendra Vora, "Decline of Caste Majoritarianism in Indian Politics", in Rajendra Vora and Suhas Palshikar, *op. cit*., p. 286 17 Ibid., p. 16.

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COMMUNITY PERCEPTION ABOUT THE RISKS ASSOCIATED WITH THE CHILD OCCUPATIONS: A CASE OF BANGALOORU

- NANJUNDA

Abstract

Recent World Bank report (2009) has revealed that, approximately more than twelve crore children are working in India in various sectors, which is the largest in terms of any country in the world. In every nation, the welfare of the entire community depends on the health and welfare of the child. The child welfare policy should acknowledge the fact that the personality of a human being is built up in the formative years of the child. Physical, social and cultural health of the nation is determined by the manner in which the life of the child is shaped in early stages. Child welfare includes the total well being of the child. It not only includes care of the malnourished child, delinquent and the disabled child, but also the development of the normal child's physical, mental, emotional and social faculties. Risk in any child work is a common phenomenon. Different risks involved in child work will leads to have more impact on her/his future life. Risks involved in the any child work has not yet been effectively revealed by any studies so far. This study has been conducted in Bangalore city -India to find out how community evaluates the risk associated with various child occupations using focus group study technique. This study conclude that community has partially aware of the risks associated with various kinds of child's work .

Key words: *Child labour, Community, Development, Risk*

INTRODUCTION

The term 'Child Labour' has different meanings in different societies. A universally accepted definition of child labour is not available. A distinction is often made between child work and child labour. 'Child Work' refers to occasional light work done by the children, which in most of the societies is considered to be an

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integral part of child's socialization process(Kumar,2002). While helping parents at home and in family farms, children learn to take responsibilities and pride in their own activities, acquire certain skills and prepare themselves for the tasks of adulthood. 'Child Labour' implies something different in which young people are being employed to have economic benefits or overworked or deprived of their rights to health, education or just to enjoy childhood. It impairs their health, overall physical, and mental and social growth (Burgess, 1998)

Child labour has remained both an economic and a social problem in our country for a long time. Legislative and welfare measures taken by Government and various NGOs have proved to be ineffective in fighting the problem of the child labour. In this regard, it should be recognized that employers' role is very crucial because they are the real people who are behind the screen (Kar,2001). Researchers are yet to pay adequate attention to this aspect. However, one of the objectives of this study is to find out crucial views of the employers on child labour issue. The issue of child labour has drawn increasing attention both at the national and international forms. Criticism has been focused on inhuman working condition in both unorganized and organised sectors, the impact of which is observed on physical, mental, social, moral and spiritual health of the children (Weiner, 1991).

Since 1990, the ILO is emphasizing the need to remove children from both unorganized and hazardous sectors as soon as possible. (Kar,2001). If so, social scientists research have to concentrate on how community evaluates the risk associated with the employments of the children and on the issue of age as being appropriate to each kinds of work. So, the objective of the present study also includes to reveal how particularly the community evaluates the risk associated with different types of works and age as being appropriate to each type of work(Nagpal,1998).

At present the community is very sensitive regarding the working condition of the children in both organised and unorganised sectors. Facilities like wage structure, working atmosphere, and employer's attitude, child abuses are some of the issues currently being under discussion among the community members. Even International Labour Organization (ILO) has raised its voice against inhuman working conditions in both the sectors. So the present study highlights the working conditions of the children working in both organized and unorganized sectors in the city.

The analysis of the problem demands a deeper socio anthropological insight into the century. Old traditional norms and values prevailing among Indian societies,

the involvement of children during their early ages in various works as a part of socialization and acceptance into the society as members need to be considered. The process of taking a person as an acceptable human being into society is of anthropological significances. Experts felt any theoretical research on child labour must find out the social and cultural factors responsible for the issues related to the child labour and how parents/ community opines about risks involved in the job. This kind of analysis of the value system leads to the understanding of the conflict between the traditional and modern values accepted by the society (Singh,2004).

Recent studies have revealed that the concept of children's work must be geographically, temporally, and ethically deconstructed and historically situated giving attention to place, era, generation and social class. Critics have further asserted that given the socio economic realities of most developing countries even if children were prohibited from working they would be unable to experience the kind of childhood envisioned as appropriate in developed countries. To succeed in the short term in removing children from the most hazardous forms of the work will require culturally and geographically specific data concerning how a community classifies the particular type of work as being appropriate for different age groups, how they judge the degree of risk associated with each type of work, and how community social economic resources can be mobilized for remediation campaigns. The objective of this paper is to find out community perception about risks associated with various child work(Nieuwennuy.; 2003; Patrions, and Hearry,2003).

OBJECTIVE

To find out how community evaluates the risks involved in various sectors where children are working in different sector

METHODOLOGY

The data of this section is largely depending on the community norm study. The community norm study had as many as 15 focus group interviews having 10 members each from randomly selected pockets of Bangalore city India. Totally 150 community members were selected to elicit the data. These community members were from different sections of the society like teachers, community leaders, politicians, Government servants, religious leaders, administrators, advocates,

RESULT

Table -1: How Community Evaluates Risk in Case of Risky Part in Hotel Work

Risky aspects	Numbers	Percentages	X2	p
Children always work with water	71	47.3		
Have to carry hot food items always	50	33.3	12.789	0.000
Some time children have to carry heavy things	15	10.0		
Chances of skin and nervous problems	14	9.3		
Total	**150**	**100.0**		

traders, etc. Data is analysed using simple Minitab software.

Risky aspects	Numbers	Percentages	X2	p
Working always with sharp tools	73	48.6	21.330	0.000
Chances of burning and deep cuttings are more	65	43.3		
Working always with oil and grease	05	3.3		
Have to carry heavy things	03	2.0		
Dirty smoke and clothes	03	2.0		
Other	01	1.0		
Total	**150**	**100.0**		

Table-2: How Community Evaluate the risk in Case of Garage Work

Risky aspects	Numbers	Percentages	X2	p
Have to carry heavy things to many floors	72	48.0	15.819	0.000
Working on scaffold is dangerous	61	40.6		
Rashes on palm and foot.	13	8.6		
Mixing of cement is dangerous	4	2.6		
Total	**150**	**100.0**		

Table -3 How Community Evaluates the Risk in Case of Construction Work

Risky aspects	Numbers	Percentages	X2	p
Always children have to work with water	61	40.6	11.980	0.000
Washing cloth and utensils is beyond the physical capacity of the children	57	38.0		
Chances of child abuse is more	29	19.3		
Long hours of work/harassment	3	2		
Total	**150**	**100.0**		

Table-4: How Community Evaluations Risk in Case of Domestic Work

Risky aspects	Numbers	Percentages	X2	p
Working with sharp and dangerous machines	51	34.0	20.981	0.000
Chance of getting severe occupational injures	48	32.0		
Working without any protective measurs or gear	46	30.6		
Chances of child abuse is more	5	3.3		
Total	**150**	**100.0**		

Table-5: How Community Evaluates the Risk in Case of Factory Work

Table-6: How Community Evaluates the Risk in Case of Shops Commercial

Risky aspects	Numbers	Percentages	X2	p
Always have to carry heavy things	57	38.0	17.091	0.00
Long working hours	48	32.0		
More chances of learning bad habits	31	20.6		
Chances of child abuse	14	9.3		
Total	**150**	**100.0**		

Establishments.

Suggestions	Numbers	Percentages	X2	p
Promote vocational education	45	30.0	23.912	0.00
Alternative livelihood strategy for families	34	22.6		
Banning child- dependent industry	26	17.3		
Other	45	30.0		
Total	150	100.0		

Table-7: Community Opinion about Stopping Child labor

DISCUSSION

From the Table (1) it is clear that more than 47% of community members say working always with water is the most risky part of this job. 33% community members have asserted that carrying prepared hot food items is the second risky aspects of the hotel work for children.12% feels that carrying heavy things seems to be very crucial for children in case of hotel work. Another 12% fears that hotel work may cause some health related problems in the future. Also majority of the community members feel children should be at least 12-13 years old to work in hotels. Hence community mainly feels working always with water and carrying hot food items are the most risky aspects in hotel jobs. From the Table (2) it is quite revealed that majority of the community members (48%) unanimously admitted that working with sharp tools is the most crucial aspects of the garage work. Next, 43% of community members find chances of having deep cuts and burns the second most risky aspects in case of garage work for children. 3.3% members said always working with oil and grease are dangerous aspects in case of garage work.2 % of members felt bad smoke and cloth causes acute health problems in the future. A negligible number of members said test raiding is also risky aspect in case of garage work. Majority of the community members said children should be at least 15 years old to work in garages. Hence this table proves that working with sharp tools and chances of having deep cuts and burns is most crucial and risky aspects in case of garage work to the children.

From the Table (3) it is found that In case of construction work community has a unanimous opinion that (54%) carrying heavy things like bricks, mixed cements etc to many floors is the riskiest aspects for children. More than 40% community members said working on scaffold is the second dangerous part in case of construction work. Next 8% community members have an opinion that it causes severe palm and foot problems among the working children. Further,2% community members felt mixing of powered cements leads to acute lungs problems in case of children working in construction sites. Majority of the community members expressed that children should be at least 17-18 years old to work in construction sites. Hence it is revealed that majority (88%) of the community members feel that carrying heavy things to many floors and working on scaffold are the most risky aspects in case of construction work to the children.

From the table (4) it is found that since it is expected that children have to always work with water in case of domestic work most of the community members (40%) said it is the most riskiest aspects for children. Next, 38% community members felt that washing clothes and utensils is beyond the physical capacity of the children, and it seems to be the second most risky aspects for children in case of domestic work. Since girl children have to work inside the house, 19% community members said chances of child abuse are more in case of domestic work.. 2% members said long working hours in case of domestic work affects physical and mental development of the children. Majority of the community members felt that children should be at least 16 years old to work in any domestic sector except household industry. Hence it is noteworthy to reveal that working always with water and washing clothes and utensils are the risky aspects in case of domestic work to the children.

From the table (5) it found that that in the case of factory, community was not completely aware of organized and unorganized factories. In general however 34% community members feel working with sharp and dangerous machines are the most risky aspects in case of factory work. 32% community members' feel carrying heavy things is the second risky aspect in case of factory work, which is common in both the type of the factories. Next, 30% community member feel that working without having any protective gear is also a risky part in case of factory. 3% of member said chance of child abuse is more in case of factory work. Hence community feels working with sharp and dangerous machines, carrying heavy stuff and working

without any protective gear are the most risky part in case of factory work.

Few members also felt working with different chemicals is also dangerous to the tender children. Community members said children should be at least 18 years old to work in any kind of factory. Table (6) established that carrying heavy stuff by the children is the most risky aspect in case of shops and commercial establishments, as felt by 38% of community members. 32% community members say long hours of work even until late at night are the second riskiest aspects for children in case of shop and commercial establishment work. 20% of community members fear that chances of learning of bad habits is more in case of shops and commercial establishment work. More than 8% community members felt there are more chances of child abuse in this kind of work. Majority of community members expressed their opinion that children must be 17 years old to work in shops and commercial establishments. In case of this sector community was not absolutely sure about risky part to the children. However they have expressed some general opinion about the risk.

From these facts it is revealed that community is just aware of only physical risks in the occupations. Community has not thought about the mental risks involved in the jobs of the tender children. Community is not exactly assessing the risks involved in child's work. It proves that the community thinks about only short-term effects of health related risks involved among the working children. Community is not properly evaluating risks from the perspective of long-term vision regarding children. It means, community does not show concern about how this work will affect the normal growth and development of the child and how it badly affects his/her mental development in the future life.

A few community members opined that there does not appear to be broad relationship between poverty and child labour. However it is reinforced as well as offset by the economic and social differentiation of the poor. Factors like caste, religion, and ethnicity and gender act in conjunction with poverty as well as independently of it, to explain variations in the incidence of child labour as well as children absence, or irregular presence, in the educational system. One of the more interesting aspects that this research found is that community is not in favor of early socialization of children by sending them only to work (Mohsin,1993). Community asserted that children could effectively be socialized by sending them

to the school and by allowing them to mingle with their peer group friends. Also it is found that some of the other cultural factors are independent variables with family structure and sex role (Kundur,2001).

Each day, a number of children are exposed to dangers that hamper their normal growth and development. They are often victims of gender and communal discrimination, aggression, neglect, cruelty and exploitation. A child being the last major subgroup of the family has drawn the attention of the social scientists with regard to their protection and rights. (Heart, 1991). India is also one of the signatories of the International Convention for Child Rights (CRC). Hence, this is the right time to focus on community perception about child labour, rights of children including how rights of the children can be operationalised within the existing culturally diverse social settings.

CONCLUSION

Experts opine that factors like caste, religion, ethnicity and gender act in conjunction with poverty as well as independently of it, to explain variations in the incidence of child labour as well as children absence, or irregular presence, in the educational system. One of the more interesting aspects is that, this research found that community is not in favor of early socialization of children by sending them only to work. Community asserted that children could effectively be socialized by sending them to the school and by allowing them to mingle with their peer group friends. Also it is found that some of the other cultural factors are independent variables with family structure and sex role. Finally it is revealed that the community has felt, risk factor among child labourers should be examined especially in the Indian context based on different types of hazardous occupations.

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INITIATIVES OF CHRISTIAN MINORITY NGO'S IN THE INCLUSIVE GROWTH OF MARGINALISED POOR THROUGH SELF-HELP GROUPS IN DAKSHINA KANNADA DISTRICT

- Therese Pereira and S. S. Hugar

Abstract

Economic independence and social empowerment of rural poor especially women are major challenges faced by the government. Since 1991, the government through Banks and financial institutions, has accelerated its efforts for inclusive growth with its massive financial inclusion programmes.

Microfinance in India has made exceptional progress and has brought number of people above the poverty line. Involvement of women especially the rural women in SHG movement has brought about positive changes among them and have contributed to the success of inclusive growth agenda of the government.

This paper analyses the efforts of the four NGOs managed by Christian minority in Dakshina Kannada District in the upliftment of poor through most comprehensive financial inclusion tools viz. Microfinance. It examines the role of these NGOs in catering to the needs of marginalized poor especially women viz. Canara Organisation for Development and Peace (CODP), Mangalore, Spandana Trust, Jeppu, Mangalore, Capuchin Krishik Seva Kendra - Vimukthi, Ujire, Belthangady and Dharmajyothi Social Centre, Vamanjoor, Mangalore in the microfinance sector in order to bring about economic and social freedom to marginalized poor. It also makes an attempt to compare the performance of these 4 NGOs with the overall position of microfinance in D.K. District in order to find out their contribution to the field of microfinance.

The paper is prepared based on the secondary data collected from the offices of the 4 NGOs and also on the basis of personal interaction with the programme co-ordinators of each NGO. On analysis it was found that CODP plays major role in terms of formation of SHGs as well as the disbursement of microfinance. CODP reaches out to all the five taluks of D.K. District whereas the other three NGOs are confined to only one or two taluks. When compared with the total performance of the district in the field of microfinance the contribution made by these four NGOs is very less.

Keywords: *Microfinance, Financial Inclusion, Inclusive Growth, Self Help Group, minority.*

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INTRODUCTION

Financial Inclusion and Microfinance have provided a platform for the deprived people in India especially the rural poor to improve their standard of living and attain a level of social, cultural and economic empowerment. It enables them to engage in micro enterprises and other economic activities. Economic freedom is the structure on which micro-finance rests. If poor and needy people are provided access to financial assistance and financial services it would enable them to come out of the gap of poverty. It is an enabler for accelerating their initiatives thereby enhancing the process of building incomes, assets and economic security. Eventually it empowers the underprivileged and brings them into mainstream financial system and development process.

Empowerment through microfinance is one of the components in the development programs in Dakshina Kannada, on the west coast of Karnataka. In this region, the State, Non-government Organizations, Voluntary sector, Co-operative sector and the Civil Society Organizations are actively involved in the task of women empowerment through microfinance. (Kumar Uday & Shreedhar T N, 2004). These organizations have been working towards the achievement of women empowerment.

Canara Organisation for Development and Peace (CODP), Mangalore, Spandana Trust, Jeppu, Mangalore, Vimukthi Rural Development Programme, Ujire and Dharmajyothi Social Centre, Vamanjoor, Mangalore are such four NGOs managed by the Christian Minority in Dakshina Kannada District. A brief outline of these 4 NGOs has been given in this article, in order to analyse their role in the empowerment of marginalised poor in the D. K. District. The paper attempts to evaluate the effectiveness of these organizations and the programs implemented by them in enhancing the economic freedom of the rural poor.

OBJECTIVES

i) To study the agency-wise initiatives in the promotion of SHG and microfinance in D. K. District

ii) To understand the contribution of the NGOs under study in comparison with the total performance of microfinance sector in D.K. District

LITERATURE REVIEW

Several research studies are made by both Indian and foreign researchers on microfinance.

According to the study by Economic Development Association, Gurgaon, Haryana (2006), microfinance has helped to uplift the poor and empower the women who have no access to credit. Ghate, et al., (2007) concluded that microfinance channelised through SHGs has emerged as a visible credit channel to the poor as their access to conventional credit channels is constrained by the requirements of collateral, and high transaction cost. Dr. Kaptan and Lata Swaminathan concluded that since women constitute about 50% of the population, their involvement in economic activity will fasten the pace of economic development in the nation. Mahajan and Nagasri (1999) observe that high transaction cost, low scale of operation, high clients turnover, high frequency of transactions, etc. are hindering factors for microfinance from the formal channels. Mahajan (2005) says that the role of government, formal financial institutions, Non Government Organization (NGOs), and people participation play an important role in the success of microfinance as a means of poverty alleviation. In Rajasekaran's (2004) view microfinance programs alone cannot alleviate poverty. Development of economic infrastructure besides providing bank finance to microfinance groups must be undertaken by the government. Russell Mask (2000) quotes World Relief, one of the larger Christian microfinance providers, and suggests that Interest rates must be high in order to cover the high costs of reaching out to remote communities, with very small individual transactions, and prompt repayment must be rigorously enforced in order to sustain the institution rather than to make excessive profits for its owners.

The vision of the limited potential of microfinance on its own is prominently similar to the growing trend (Dichter, 2006) to reassess microfinance critically, and to recognize that its potential has been seriously exaggerated. The missing elements may be livelihood development, training, primary health care or infrastructure and good governance, or all of them, but microfinance on its own is not enough. Brian Fikkert (2003) accepts that when funds have to be obtained from various sources, and when development initiatives are under pressure to be 'sustainable', it is impractical even to attempt to build a large microfinance institution and at the same time to achieve some balance by working on a small local scale using microfinance groups because of their potential. Ingie Hovland (2005) analyses the tensions between the Norwegian Missionary Society (NMS) and its dependence on funding received from NORAD, the Norwegian government's official development assistance agency. As Dicklitch and Rice, (2004) puts it the development activities of the Mennonite Central Committee (MCC) represent a very different and more

liberal Christian approach to development assistance who work closely with local church organizations, and are strongly antiviolence in their orientation. As analysed by K. Paul Thomas, (2005), The Evangelical Social Action Forum (ESAF), of Kerala in southern India, occupies a middle point between the extremes. They have a number of programmes, focusing mainly on savings and credit groups for income generation. ESAF believes that 'microenterprise development is empowering the poor for their lives and their communities.

These studies and many more studies signify the importance of microfinance in the lives of the poor for their inclusive growth. At the same time, they indicate the role of different NGOs in enhancing the utility of microfinance for the poor.

RESEARCH METHODOLOGY

This paper is prepared based on the secondary data obtained from the four NGOs and the input received at the time of interacting with the facilitators. It also takes into account the secondary data obtained from the electronic media and the journals.

BRIEF HISTORY OF THE NGOs UNDER REFERENCE

I. CANARA ORGANISATION FOR DEVELOPMENT AND PEACE (CODP)

CODP is a NGO Voluntary Agency operating in the coastal Karnataka Districts of Dakshina Kannada & Udupi and Kasargod in Kerala which is committed to the developmental activities in underdeveloped areas. It was registered as the developmental organisation on 16.4.1974 under Mysore Societies Regulation Act 1960 (Mysore Act No. 17 of 1960) with a view to cater to the needs of the poor and marginalized, irrespective of caste, color and creed (http://www.codpindia.org).

PROGRAMMES OF CODP

CODP is employing an integrated approach to eliminate poverty and empower the marginalized and women by undertaking a number of projects. In each case, the poor and women are helped through the formation of Self Help Groups. The various projects undertaken by CODP include:

1. WOMEN'S EMPOWERMENT PROGRAMME

This project was envisaged with the objective of ensuring self-reliance of the women by motivating them to form Self-help groups and to undertake income generating activities.

Activities conducted upto 31-03-2013

- ❖ Regular awareness, training, health check-up camps are organized for the members.
- ❖ All festivals are celebrated in common and various cultural activities are also held by the SHGs.

Achievements

- ❖ 282 sanghas (SHGs) with a membership of 4041 were formed.
- ❖ 62 members are elected to Gram Panchayat as a result of continuous motivation.
- ❖ 201 SHGs are using the Internal Learning and Monitoring System methods.
- ❖ Micro finance amounting to Rs 29.68 lakhs is advanced to 206 SHG members for self employment activities.
- ❖ 768 women are self employed or have increased their income through Income generating activities.

2. EMPOWERMENT OF MARGINALIZED VILLAGERS

This project was started with the objective of providing necessary awareness and leadership training to encourage participation in local governance, imparting training in income generating activities and giving awareness on RTI, Civic Rights, Panchayat Raj etc. and aims at empowering these villagers through the formation of SHGs.

Trainings conducted upto 31-03-2013

Under this project:

- 101 awareness training sessions on relevant topics, 12 medical/alcohol de-addiction camps were conducted.
- International Womens Day celebrated at 8 centres
- Around 7198 people have benefitted from the training programmes conducted under this project.

Achievements

- 137 S.H.Gs are formed with a membership of 1960
- Total Savings up to date Rs 36,81,074/-

- Members are able to avail internal loans for emergency needs and IGP activities to the tune of Rs 55,30,653/-
- Training in IGP activities has motivated 498 members to start their own self employment ventures

3. DOMESTIC WORKER'S ASSOCIATION

To organize the women domestic workers for their integral development and to empower them through a process of awareness and training, CODP initiated the formation of this association.

Trainings conducted upto 31-03-2013

❖ Monthly awareness programmes are conducted on topics such as Importance of organization, SHGs, Health, Rights & Duties, Leadership, Domestic violence, etc.

Achievements

❖ Total number of members registered in the Forum – 1043

❖ Total number of Self Help Groups formed – 44 with 652 members

4. FOOD SECURITY AND LIVELIHOOD IMPROVEMENT

The project aims to bring an awareness on ecological balance and ensure water for drinking-domestic-irrigation throughout the year and will sustain the agricultural productivity.

Achievements upto 31-03-2013

❖ 20 Self Help Groups are formed with 255 members- Savings by the members is Rs 5,31,913/-- One Village Development Committee is formed.- The members meet periodically, discuss related issues and also supervise the watershed works in the project area.- For Soil & Water conservation – 2200 trenches are done in 74 acres, 83 drain plugs, 15 farm ponds, 54 percolation pits and 2 tanks and 15 drinking water wells were renovated- 27 varieties totalling 1142 fruit and herbal medicinal plants were distributed.- For sustainable organic farming – 20 vermin composting units, 12 Jeevamrutha and 26 bio-pesticide units are set up.- 2 SHGs have come forward to start IGP in candle making, 14 members were given bee-keeping boxes and have started producing honey, and 13 members have purchased sewing machines and started earning through tailoring.

5. FAMILY HELPER PROGRAM

This project was implemented with the objective to provide relief to the poor and needy families in their daily struggles till they attain a state of self-reliance and to bring a ray of hope in their lives.

Achievements upto 31-03-2013

- ❖ Over 365 families have become self-reliant and are phased out.* 103 families from 49 centres are presently receiving assistance.

6. RURAL SELF EMPLOYMENT PROGRAM (RUSEMP)

The Rural Self-employment Programme (RUSEMP) started in 1982 aims at empowering the rural poor semi-literate youth with skill training and technical training in various trades for self-employment and reducing the percentage of unemployment among the rural youth. This programme also enables the youth to act as change agents in their own villages. RUSEMP is registered with the Central Govt. as a vocational training provider under Modular Employable Skills scheme.

Achievements upto 31-03-2013

- ❖ So far, 2327 youth have completed training in over 50 trades of their choice.
- ❖ 60% of the trained youth have set up their own ventures or are gainfully employed.
- ❖ 71 candidates have successfully completed MES assessment in 3 batches.

7. PROMOTING GOOD GOVERNANCE

This project is designed to make the common people aware of their right to seek accountability which will ultimately lead to Good Governance. It aims at empowerment of rural masses through awareness programmes on Right to seek accountability, so that they can tap Government schemes.

Awareness / Trainings conducted upto 31-03-2013

Awareness trainings on:

- ❖ RTI Act: 23 programmes - 1205 participants
- ❖ RTI for school children: 17 programmes - 1604 students
- ❖ National Rural Employment Scheme: 29 programmes - 1338 people

- ❖ National Rural Health Scheme: 30 programmes - 1693 people
- ❖ Consumer's Rights: 26 programmes - 1259 people

Achievements

- ❖ Peoples Watch Committees formed: 6

No. of people and Benefits availed as a result of GG awareness/training

- ❖ Job cards received under MGREGA: 2,379
- ❖ Health cards/benefits under NRHM: 383 people
- ❖ Widow/Old-age/Handicap pension: 66 people
- ❖ Housing/Ashraya Scheme: 100 people
- ❖ Welfare Schemes for construction workers/agricultural labourers, etc.: 100

Group benefits availed

- ❖ SHG Revolving Fund received by: 32 groups
- ❖ Street lights: 1 village
- ❖ Ration shop/Anganwadi/Drainage: 1 group each
- ❖ Road repairs/New road/Asphalting/concretizing: Total 14 1/2 kms.

The following projects do not involve microfinance but they too contribute to the welfare of the marginalized and poor.

8. CHILDREN SPONSORSHIP PROGRAMME

"Child Sponsorship Programme" is an attempt to educate children from poor families by providing financial assistance. This programme aims at Educating and shaping the future of a child from a poor family who in turn will help the family and the siblings in the family.

Achievements 31-03-2013

- 1049 children are presently receiving financial assistance
- Personal interviews were conducted and progress of each child at school was recorded.
- 750 children actively participated in the camps and Christmas get-together
- Children were enlightened on topics such as Civic responsibilities, Importance

of higher education, Career guidance and utilizing holiday time fruitfully

- Visit by representatives from Caritas Slovakia and interaction with children supported by them

9. CAREER ADVANCEMENT PROGRAMME (CAP)

In order to inspire, guide and enable young people to become value based leaders of tomorrow in areas of public service, the Career Advancement Programme Cell was set up in 2005 with the objective to see the youth grow out to be well educated and highly placed individuals whose potentials are used to the fullest extent. The focus is on providing motivation and training to youth to take up civil services and thereby involve themselves in the country's decision making process.

Activities upto 31-03-2013

- ❖ CAP Quiz conducted at 15 centres : 522 students participated.
- ❖ CAP Collaborators Meet held in Dec.2009 : 49 Govt. officers participated.
- ❖ 21 programmes on Career Guidance was conducted which has benefitted around 4130 participants.

Trainings conducted

- National Talents Search Examination : 1 programme : 56 participants
- Orientation on Civil Services : 3 programmes : 9 participants
- 2 Motivation programmes conducted – 44 participated.

Achievements

As a result of intense motivation sessions:

- One candidate is appointed as Sub Inspector of Police.
- Two candidates are serving as Civil Judges in the State Judiciary
- Six are selected as Panchayat Development Officers.
- Two are selected as Village Accountants.
- One candidate is working as officer in the Postal department.

10. STUDENTS' SCHOLARSHIP PROGRAM

The Students Scholarship Programme started in 1975 renders financial support

to the poor but intelligent students to pursue higher studies. Total number of students assisted – 2195 in over 30 disciplines.

These are the major programmes of CODP through which the institution cater to the needs of the marginalized poor.

Table-1 Awareness / Training programmes organised during 2013-14 - at a glance:

Sl. No.	Name of the programme	No. of programmes
1.	Public Distribution System	18
2.	Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREG)	44
3.	Panchayath Raj	28
4.	Pension Schemes	75
5.	Rashtriya Swasthya Bhima Yojana (Insurance)	48
6.	Right to Information Act	35
7.	Consumer Rights	18
8.	Swawalamban Scheme	44
9.	Janashree Bhima Yojana	52
10.	Marriage Registration Rules	54
11.	Organic Farming & Vermin-composting	05
12.	Strengthening of Milk Diary	01
13.	Marketing skills and seed selection	04
14.	Village Development Committee Training	12
	Total	**438**

AN ANALYSIS OF THE VARIOUS PROJECTS AND PROGRAMMES

A review of the above projects and the achievements under each project indicates that the CODP has contributed major share for the benefit of different sections of the society such as women, farmers, children, youth and deprived people. It has initiated a number of awareness programmes for the purpose of creating awareness among various sections of the society. In a span of one year, it has organised 14 different kinds of awareness and training programmes which have helped the poor and village people to reap the benefit of various government schemes which was otherwise not reaching them. At the same time, the training given for income generating activities has encouraged many women to undertake certain economic activities and to become self-reliant.

In this context, it can be concluded that a number of people have benefitted in

different ways because of the initiatives of CODP through various projects.

Table 2: A Glance over the Performance of CODP

Year	No. of SHG	No. of members	Savings (Rs.)	Loans disbursed (Rs.)
2009-10	404	5252	47,26,800	2,67,31,000
2010-11	423	5922	53,29,800	3,64,62,000
2011-12	474	5688	51,19,200	3,94,42,000
2012-13	525	6825	61,42,500	5,19,22,000
2013-14	597	7761	69,84,900	5,49,62,000

Source: Secondary data obtained from the CODP

From the Table 2, it is clear that CODP has taken keen interest in the upliftment of the poor through the formation of SHGs. Over the last five years, there has been increase in the number of SHGs formed and the number of members enrolled. At the same time, the microfinance disbursed through the SHGs has increased over the years which shows that the poor people have taken the benefit of small loans and attained economic freedom.

II. KAPUCHIN KRISHIK SEVA KENDRA - VIMUKTHI RURAL DEVELOPMENT PROGRAMME, UJIRE

VIMUKTI RURAL DEVELOPMENT PROGRAMME is a social action unit of the Capuchin Franciscan of Karnataka Province, Registered under the Trust Act which undertakes and executes socio-economic empowerment activities among the disadvantaged and the vulnerable sections of the society.

Vimukthi was started as a unit of Capuchin Krishika Seva Kendra, Dayalbagh Rural Development Programme, Ujire, Belthangady taluk (http://www.kapuchinkrishiksevakendra.org). Capuchin Krishika seva Kendra was established in 1969 by the Capuchin Priests as an entity of Social work in a small village called Kalmanja in Belthangady Taluk in order to conduct various training programmes for the benefit of the farmers and to help them to improve their financial condition by enhancing modern skills of agriculture.

Later on it was felt that if a woman is empowered it will result in the upliftment of the entire family. Integral development of the family can be realized through the women empowerment. Hence keeping the concept of Self Help Group the project

started **Vimukthi,** a rural development programme in 1998 which initiated the SHG movement in Belthangady taluk.

This provided an impetus for the formation of SHGs and within a year 100 groups were formed in 28 villages of Belthangady Taluk. Today there are 229 Self Help Groups who function on their own leadership and maintain micro finance activity, financial savings over a crore rupees and making a loan transaction of above three crores. Programs on Health, Education, seminars, training, awareness programs and entrepreneurial activities are undertaken by the women as the empowerment process.

Hence, Vimukthi helps the women to achieve social and economic freedom through Self Help Groups which gives microfinance to them for meeting their various personal needs and for undertaking income generating activities. They also organize a number of awareness programmes to educate women on various legal issues, health aspects, government schemes and human rights.

In addition to this, Vimukthi is also working for the empowerment of children in collaboration with **Child Fund, India.** Through this fund it undertakes a number of activities for the benefit of the children such as distribution of various materials (books, toys, clothes etc.) to the children who are enrolled under the child fund. It also undertakes community development programmes such as training the anganawadi teachers, supplying the required materials to the anganawadi, conducting health awareness programmes etc. Today 785 poor children in 15 adopted villages are reaping the benefit of this project.

VIMUKTI SHG FEDERATION

Formation, nurture, promotion and strengthening of the SHGs are the main activity of the society for the last 15 years. The SHGs are the basic structure for all the developmental activities of the society. Under the patronage of Vimukti there are 229 SGHs in 33 villages. The total number of members of women has crossed 3000.

THE MAIN ACTIVITIES UNDERTAKEN DURING THE LAST 15 YEARS

The programs are divided into 6 sectors like Health and Sanitation, Nutrition, Early Childhood Development, Basic Education, Child Participation and Protection, Livelihood and Economic Enhancement programs. All these programmes are conducted for the benefit of the women, children of the SHG members as well as the children of the community.

HEALTH AND SANITATION

The Project is mainly concentrating on HIV/AIDS and Reproductive Health Care. Vimukthi assisted 1500 poor families to cover the health Insurance for their unexpected health problems.

NUTRITION

To bring about a considerable change both in the nutritional and attitudinal standards, the Project emphasized on imparting right nutritional habits among the children and their mothers. Issues like economic status, lack of accessibility of health services, food insecurity and misconception related to food, poor hygienic practices, limited knowledge of parents in terms of child care especially about nutrition and management during illness need to be handled effectively. The Project selects malnourished children and mothers to give more attention on their health.

EARLY CHILDHOOD DEVELOPMENT

Qualitative education is the requirement of every child. Vimukthi along with **Child Fund India** tries to implement programmes, imparting knowledge through formal and non-formal education. The Project ensures the active participation of the parents, school children and the community at large. Basically, the children of the members of the SHG are enrolled. In addition, other children are also given the benefits of all the child development programmes.

BASIC EDUCATION

Education programs are focused on facilitating quality education services so that children could gain learning and life skills, building capacity of families, communities and their institutions to respond to the education needs of children.

TAILORING CLASS

To encourage the women for self sustainability and to support the young women in income generating activities the project undertakes tailoring class for SHG members.

LIVELIHOOD AND ECONOMIC ENHANCEMENT OF THE POOR (LEEP)

A new beginning towards self-dependence LEEP is playing a vital role in the development of the SHG women. As a prime unit of Vimukti, LEEP is supporting women to take-up self-employment and income generation activities. The LEEP program is interlinked with Vimukti Women's Federation through which the dreams of economic empowerment are realized.

LEEP has helped Vimukthi in mobilizing 2500 women and enabled them to access various Government schemes and faculties.

MAJOR INCOME GENERATING ACTIVITIES UNDER LEEP

DAIRY

- **LOAN FOR CATTLE REARING**

  The Project has provided loan facility for cattle rearing. This enables the women to tap the naturally available resources. And due to the high returns the repayment of the loans is realized in a steady process.

- **MILK COLLECTION UNIT**

  The milk collection unit is installed at a small place called Guripalla and necessary infrastructure with machinery like Chilling, fat tester, Milk cans, measuring instruments etc., has been installed and the unit is running smoothly.

- **ANIMAL HEALTH CARE**

  For easy access to animal health care and time-to-time follow-up, a Veterinary Care Centre has been set up with the services of an expert. The beneficiaries avail the resources of the expert at a very low fee.

- **CATTLE FEED**

  To give quality feed to cows, the dairy management has taken initiative to supply the quality feed directly to the beneficiaries' house which has contributed to high production of milk.

- **AGRICULTURE**

  Agricultural loans were given to the beneficiaries to deepen the wells and install sprinklers in the farms. Families were also given assistance to plant areca saplings and extend their cultivation.

  A glance over the different programmes organised by Vimukthi, it is clear that the NGO has been striving hard to provide necessary inputs to the members for taking wise decisions and to motivate them to undertake income generating activities. This has helped thousands of people to lead a respectable life in the society.

Table 3: A Glance over the performance of VIMUKTI

Year	No. of SHG	No. of members	Savings (Rs. In lakhs)	Loans disbursed (Rs. In lakhs)
2009-10	165	1980	10,29,600	28,46,700
2010-11	190	2280	11,85,600	55,25,400
2011-12	210	2520	13,10,400	47,52,100
2012-13	220	2640	13,70,800	76,08,000
2013-14	230	2760	14,35,200	58,65,000

Source: Secondary data obtained from the office of VIMUKTHI

An analysis of the data for the last five years as shown in Table 3, indicates that the number of members enrolled in the SHGs have increased. So also, the savings mobilised from the members through SHGs shows the upward trend. On an average, the loans disbursed by Vimukthi through SHGs have crossed half crore. Since the NGO is functioning only in Belthangady Taluk, the loans disbursed have been limited. If the activities are extended to the entire district of D.K. surely the benefit of microfinance will reach many more people and the microloans will be given to the tune of crores of rupees.

III. SPANDANA CHARITABLE TRUST

Spandana Charitable Trust, Infant Mary's Convent, Jeppu was formed and registered under Income Tax Act, 1961 on 16th April, 2003 (http://www.mlore.sccg.in). It is managed by the Society of Sisters of Charity and it was established with the objectives of upliftment of the poor, marginalised and deprived through the process of empowerment and for promoting sustainable environment and contributing to eliminate poverty, exploitation and ignorance among people without discrimination of caste and creed through education, training, awareness, capacity building and sensitizing people on their rights. At present it covers the entire Mangalore Taluk and two villages of Bantwal Taluk.

Spandana has been organising a number of activities and training programmes for the benefit of the members of the SHG. A glance over the activities and training programmes organised during 2013-14 are as below:

Table 4: Awareness Programmes organised by SPANDANA

Sl. No.	Awareness Programme	No.	No. of Participants
1.	Right to food	17	1505
2.	Right to Information	23	1655
3.	Government schemes	72	2952
4.	Marriage Registration Act	07	950
5.	MGNREGA	06	240
6.	Leadership training	07	336
7.	Vocational training	70	176
8.	Career guidance	612	412
9.	Consumer rights and PDS	16	1452
10.	Global warming and climate change	12	1300
11.	Child marriage and human trafficking	15	1112
12.	Communicable diseases	07	956
13.	Drug abuse	07	925
14.	Child development	07	952
15.	Government facilities	07	940
16.	Women and human rights	07	982
17.	Gender discrimination and legal amendments	07	918
18.	Construction workers and beedi rollers benefits	15	1250
19.	Sakala	07	922
	Total		**921**

Source: Secondary data obtained from the office of SPANDANA

AN ANALYSIS OF THE TRAINING PROGRAMMES

A review of the above awareness / training programmes, indicates that the Spandana has contributed major share for the benefit of women and children. It has initiated a number of awareness programmes for the purpose of creating awareness among various sections of the society. During the previous year (2013-14), it has organised 19 different kinds of awareness and training programmes which have surely reached the beneficiaries as they were repeatedly organised. Thus, Spandana Trust has been working with the poor especially women to guide and enlighten them in various issues through various programmes.

The programmes have helped the poor to enhance their awareness and knowledge about various social, legal and sanitary matters.

Table 5: A Glance over the performance of SPANDANA

Year	No. of SHG	No. of members	Savings (Rs)	Loans disbursed (Rs.)
2009-10	200	3245	95,76,752	3,00,00,000
2010-11	210	3850	2,08,76,680	2,03,95,340
2011-12	215	4280	65,98,884	2,68,69,610
2012-13	215	3440	74,16,640	2,76,72,605
2013-14	225	3825	90,07,248	3,97,12,775

Source: Secondary data obtained from the office of SPANDANA

From the data in Table 5, it is clear that though there is an increase in the number of members enrolled in the SHGs up to 2012, later on the number has been reduced due to drop out of the existing members and the closure of the SHGs which were not functioning properly. So also, the same trend is followed in the savings mobilised from the members through the SHGs. However, there is an increase in the amount of loans disbursed by Spandana through SHGs . It is heartening to note that the cumulative total of loan disbursed upto 31/03/2014 has crossed three crores and is nearing four crores though the activities are confined only to Mangalore Taluk and 2 villages of Bantwal taluk. Extension of the activities to the entire district of D.K. will ensure that the benefit of microfinance will reach many more people and help them in attaining economic independence.

IV. DHARMAJYOTHI SOCIAL CENTRE, VAMANJOOR

Dharmajyothi Social Centre is a NGO managed by SRA (Missionary Sisters of the Queen of the Apostles) sisters, which is registered as a Trust. It was established in 1987 (http://www.srasisters.org) and has been actively involved in the microfinance activities since 12 years through the formation of SHGs. It plays a vital role in the empowerment of poor women by encouraging them to undertake income generating activities. At present it covers the areas of Neermarga, Moodushedde and Kuppepadavu and the city limits of Mangalore city corporation.

Awareness and training programmes organised during 2013-14

Dharmajyothi has been organising a number of awareness and training prorgramms for the benefit of the members as well as the public. A summary of such programmes is given below:Awareness programmes on: Right To Information Act, Right to Education, Right to Food, Global Warming, Organic farming. Watershed management, Women harassment and Womens' rights, Gender Equity, Teenage problems, Alcoholic Anonyms, Child labour Prevention act and the problems of child labour, Financial literacy, Information on self-employment, Government schemes, Insurance schemes, Scholarships through minority department and other benefits, Medical camps, Benefits from city corporation, Career guidance, personality development camps etc. for students, Short term courses on tailoring, beautician, embroidery, electricians, aluminium fabrication, motor repair, computer course, welding etc are erranged. The above list shows that Dharmajyothi has been organising useful awareness programmes in order to help the members and the public to take advantage of the benefits under different schemes. It also tries to create awareness about various social evils. The short term vocational courses in different areas have motivated the youth to take up self-employment.

Table 6- A Glance over the performance of DHARMAJYOTHI in D.K. District

Year	No. of SHG	No. of members	Savings (Rs. In lakhs)	Loans disbursed (Rs. In lakhs)
2009-10	63	1054	16,23,449	27,95,300
2010-11	67	1040	24,67,500	40,25,300
2011-12	62	1016	55,54,960	73,40,000
2012-13	66	1001	38,27,600	87,92,000
2013-14	65	1024	48,97,800	92,64,600

Source: Secondary data obtained from the office of DHARMAJYOTHI

Above data in Table 6, shows that over the last five years the number of members enrolled in the SHGs have increased except in 2012-13. The savings mobilised from the members through SHGs also show the upward trend. At the same time, the loans disbursed by Dharmajyothi through SHGs have increased and it is clear that at the end of March 2014, the loans are nearly 1 crore. Since the operations are confined to only Mangalore Taluk, the loans have not crossed

1 crore. If the scope of activities are extended to the entire district of D.K. surely the impact of microfinance will be on many more people.

AN ANALYSIS OF THE MICROFINANCE LENDING BY THE SELECTED NGOs

The SHGs registered under these NGOs have access to two types of loans:

- Internal Loan – This loan is provided by the SHG to the members out of the savings mobilised. So, the amount available for lending is limited to the extent of the savings available. It is lent to the members according to the priority of their needs. The rate of interest on these loans is decided within the SHG. At present the rates charged by the SHGs of each NGO as follows:
  - CODP – Between 5% - 10%
  - VIMUKTHI – I year of membership - 10% & then onwards 5%
  - SPANDANA – 1% - 2%
  - DHARMAJYOTHI – 6% - 12%

From the above it is clear that, the rate of interest charged by the SHGs of Spandana is the minimum, which surely will help the poor people to meet their financial requirement without much cost, whereas the SHGs of the other 3 NGOs varies between 5% to 12% which is yet less when compared to the bank loan or any loan advanced by the other microfinance institutions.

- External Loan – either
  - Bank Loan or
  - Federation / NGO Loan

In both these cases the SHGs obtain the loan and the same will be on-lent to the members at the same rate of interest as charged by the bank / federation/ NGO.

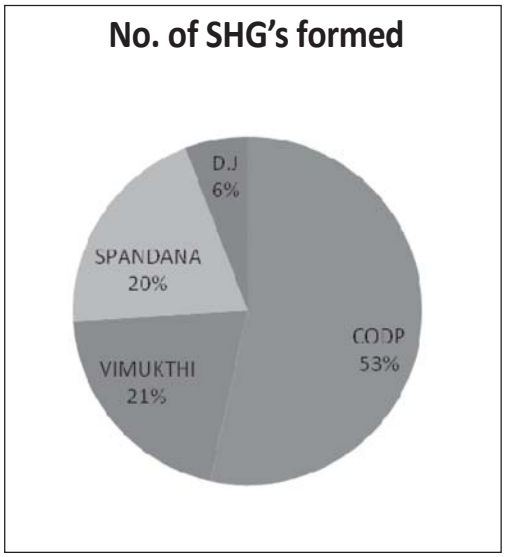
So, it is clear that all the four NGOs are not-for profit organisations as they do not keep any margin for themselves. They are concerned only about the welfare of the members and upliftment of the rural poor by satisfying their financial requirements at the lowest possible cost.

Table 7: A Comparative Analysis of the Performance of the 4 Ngos

Sl. No	Parti-culars	CODP	VIMUKTHI	SPANDANA	DHARMAJ-YOTHI	Total	Data for D.K. District
1.	No. of SHGs formed	597 (53.45%)	230 (20.59%)	225 (20.14%)	65 (5.82%)	1,117 (100%)	34,207 (3.27%)
2.	No. of members covered	7,761 (50.49%)	2,760 (17.96%)	3,825 (24.89%)	1024 (6.66%)	15,370 (100%)	NA
3.	Total savings mobilised (Rs.)	69,84,901 (31.29%)	14,35,200 (6.43%)	90,07,248 (40.35%)	48,97,800 (21.94%)	223,25,149 (100%)	79.49 crores (2.81%)
4.	Loans disbursed (Rs.)	5,49,62,000 (50.05%)	58,65,000 (5.34%)	3,97,12,775 (36.17%)	92,64,600 (8.44%)	10,98,04,375 (100%)	17.55 crores (62.57%)

Source: Secondary data obtained from the office of the concerned NGO

Figure I



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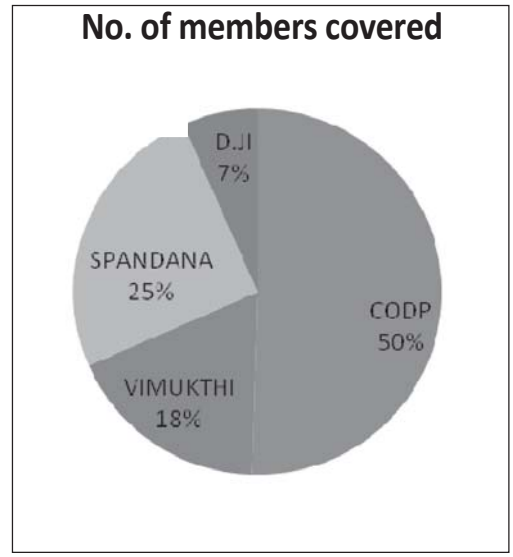

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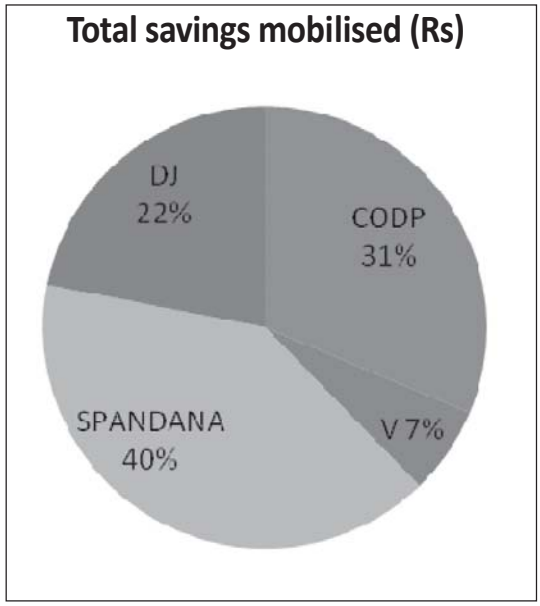

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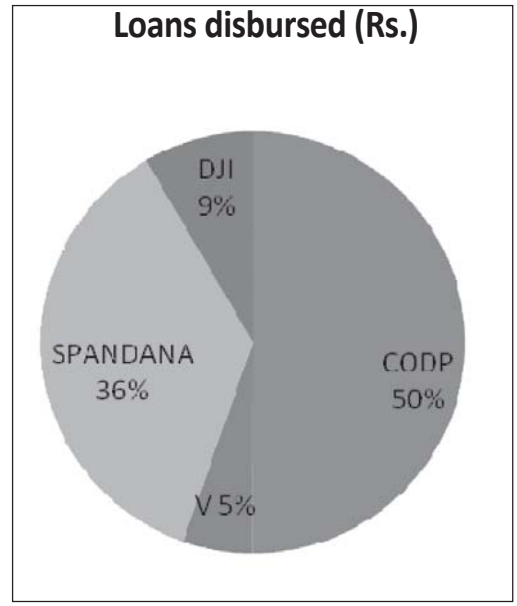

Note: V- Vimukti; DJ - Dharmajyothi

AN ANALYSIS

As per the information in Table 6, it is clear that CODP has the major share in terms of number of SHGs formed, number of members and the loans disbursed (more than 50%) when compared to other 3 NGOs. But Spandana (40%) has overtaken CODP in terms of savings mobilised in spite of covering only one taluk. Spandana and Vimukthi have more or less same share (20%/21%) in terms of SHGs formed. Spandana stands next to CODP in terms of members enrolled (25%) and the loans disbursed (36%). Dharmajyothi has the least share in the total SHGs (6%), total members enrolled (7%) and loans disbursed (9%) though the NGO accounts for 22% of the total savings mobilised by the four NGOs.

As per the information published by the Lead District Office, Hampankatta, Mangalore, Karnataka as on 30/6/2013 the total fresh SHG's formed and credit linked (including indirect linkage) were 34207. It shows that the 4 Christian

minority NGOs account for only 3.27% of the total SHGs in D.K District. At the same time, the total savings mobilized from the members constitute only 2.81% of the total savings of the entire D.K. District.

However, it is noteworthy that these 4 NGO account for 62.57% of the total loans distributed by the various microfinance institutions which are a part of SHG-Bank linkage model. Besides, the recovery of the loans also is good which is 77.3% of the total repayment received. It should be noted that CODP covers all the 5 taluks of D.K. district whereas the other 3 NGOs function only in one taluk. Since, microfinance has good demand and scope throughout the district, steps need to be taken by these NGOs to operate in all the 5 taluks of D.K. District.

FINDINGS

The study of these 4 NGOs throws light on the following aspects:

- All the four NGOs have been continuously creating awareness about various issues and the government schemes so that the weaker sections of the people are able to reap the benefits of these schemes.
- Among the four NGOs, only CODP is functioning in all the 5 taluks of Dakshina Kannada District, whereas the other 3 NGOs are yet to take the initiative.
- CODP contributes the major share in terms of inclusive growth of marginalised poor when compared to the other 3 NGOs.
- All the four NGOs organise training for the SHG members through various Income Generating Programmes and motivate them to undertake self-employment / microenterprises.
- There is direct linkage between the SHG and the bank. So, the NGOs do not interfere in the disbursement of loans and at the same time in deciding the interest rates. All the four NGOs are only the facilitators of the SHGs.
- The interest charged on the loans is reasonable and no margin is kept by the SHGs while on-lending the amount to the members. So, it is clear that they do not have any commercial motive.

- It is noteworthy that the NGOs do not have any follow-up system in respect of usage of microfinance as well as the income generating activities of the members of the SHG.
- None of these NGOs have set up separate marketing unit for marketing the products of their members which they have produced through Income Generating activities, which is a setback for the members to market their products.

CONCLUSION

The four NGOs managed by Christian minority have been actively involved in the financial inclusion process through the formation of SHGs for the benefit of rural women. They have contributed their major share in terms of microfinance but they need to cover more and more deprived poor and marginalised women, so that it is possible to empower majority of the rural women.

These Organizations have invested considerable efforts in making women strong and independent. On the way of becoming independent, they have to look for self employment. If a woman starts earning, she will be able to face the world. All that she needs is proper direction and financial support, which is given by these Organizations. If more than 50% of the women start self employment activities, the desire of a woman becoming independent will be fulfilled as early as possible.

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ADAPTING TO TECHNOLOGY: THE WEB IN THE UNDERGRADUATE ENGLISH CLASSROOM

- Padma Baliga and Nalini Pai

Abstract

Most research studies on ICT as used in teaching, focus more on theoretical aspects of ICT-enabled teaching rather than practical ones. Others examine the constraints that technology-enabled pedagogy brings with it. Some studies look at ICT use in specific sectors like the corporate sector or technical institutes. While we have today, students who are technology competent, we do not have corresponding ICT enriched syllabi or pedagogy that caters to the needs to these students. This paper details and discusses the findings of a survey conducted on undergraduate students. The survey aims at finding out student preferences and web skills that will help in the designing of an ICT enabled pedagogy, which in turn, will help students to speak, read and write English independently. The findings of the survey have been represented using a graph. Further, the paper gives what one might look at as a module (which relies on ICT for teaching all the four skills - listening, speaking, reading, writing), when teaching the first semester BA or BSc students. Part of the paper also takes the reader through activities to develop each of the four skills. The paper makes a plea for technology to play a more important role in syllabus design and pedagogy.

Keywords: *English, ICT, module, needs, pedagogy.*

INTRODUCTION

That the internet has great potential as a learning tool is a truism that needs no reiteration. But it is also a fact that the teaching potential of the internet has not really been tapped in a systematic manner in most colleges. While students use the net to access social media, keep in touch with friends, exchange news, plans, pictures and scour for information regarding issues that interest them, students and teachers rarely collaborate on using the internet as a pedagogical tool.

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Research has also shown that internet assisted teaching methods are being used extensively at school level almost all over the country ("Overview on ICT"). However when it comes to the undergraduate level, while we have young adult learners who are internet savvy and technology competent, skilled in the use of audio visual aids and the internet, we do not have a complementary pedagogy that will leverage these skills to offer them a learning package that is tailored to their needs and strengths.

Marc Prensky calls the students of today 'digital natives' and argues:

today's students are no longer the people our educational system was designed to teach ... [With] the arrival and rapid dissemination of digital technology in the last decades of the 20th century ... they have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. Today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV). Computer games, email, the Internet, cell phones and instant messaging are integral parts of their lives. (np)

Being a generation that are technology natives, they may be less quick to take to the book as a means of information or leisure and quicker to learn from media that they are comfortable with.

Ever since the launch of Massive Open Online courses (MOOCs) in 2008, Indian students have taken to them in great numbers. Most of the courses are free. Moreover, their student-centred approach, easy accessibility, use of contemporary technology, and the fact that they offer a mix of lecture method, quizzes, assignments, self-checks, etc. have made the courses very popular among students. In August 2013, *The Times of India* reported that Indian students "represent the largest percentage of Coursera students outside of the US, roughly 10%", and that "EdX, a non-profit created by Harvard and MIT, has pegged its Indian participation at 13%" (Nair, Malini). Students appear to like the format of learning that the internet offers as it allows them to set the time, place and pace and be in greater control of their studies.

LITERATURE REVIEW

Research papers that examine use of ICT in English language pedagogy usually focus more on the theoretical aspects of how ICT could be used as well

as look at the constraints of technology in the Indian situation. For instance, Shyamlee (2012) argues that a multimedia technology supported way of teaching is necessary and also examines the disadvantages that this kind of a system brings. Chhabra (2012) details the availability of various ICT tools and their uses and offers an overview of traditional teaching methods.

Mayur Chhikara examines the implications of internet in English learning and argues for a shift away from the traditional approach to teaching and advocates a more student friendly approach to English language teaching (2014). Ahluwalia and Gupta (2011) surveyed twenty teachers of 'Communication Skills' from ten engineering colleges of Punjab to collect information about their attitudes towards teaching English using the internet and the challenges faced by them in doing so. In her work on the impact of internet on English language training in India, Revathi Viswanathan (2008) analyses ICT use in schools and also details ICT and English language teaching in the corporate sector.

Some studies aim to understand ICT usage patterns at technical universities. Maheshwari and Arulchelvan (2012) collected data on the attitude and level of usage of ICT among the students and teachers and attempted to find out whether ICT has simplified the teaching-learning process.

None of these studies have considered how to develop a web-based syllabus to teach English to undergraduate students in India. This paper uses the findings of a survey of students preferences and web-skills to design a syllabus that will focus not only on teaching the four aspects of language learning, but also attempts to teach students to think, read and write independently.

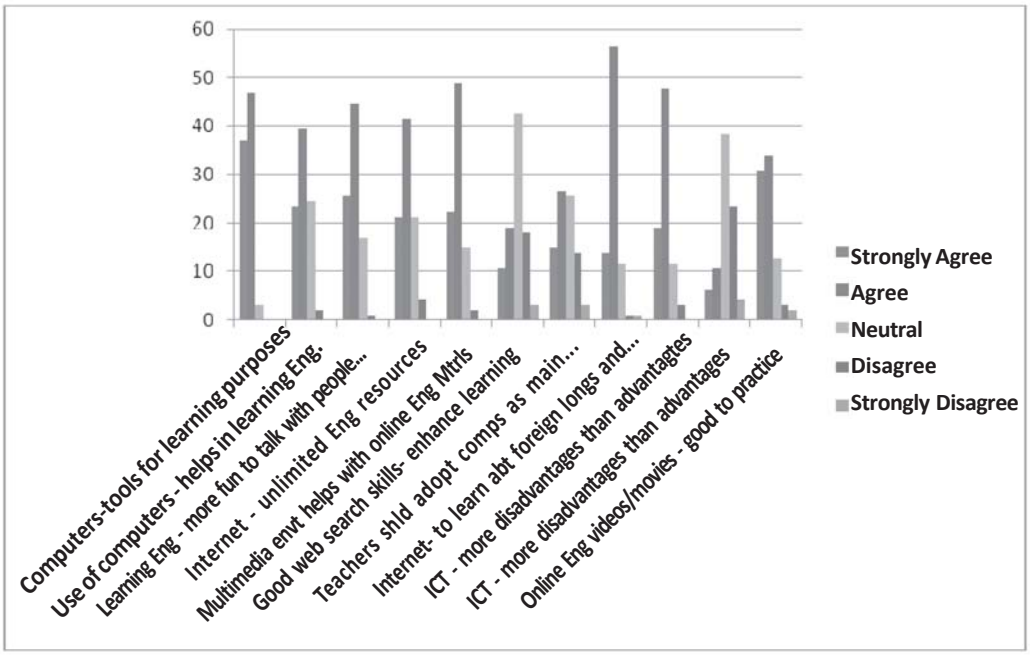
BRIEF LOOK AT OUR SURVEY FINDINGS

As part of a research project sanctioned by UGC, we conducted a survey in our college to understand students' familiarity with the internet and the ways in which they used it, whether students can use the internet to sharpen their reading, writing, speaking and listening skills. We learnt, for instance, that while 57.44% of our survey group practise their writing skills in class under the instruction of the teacher, 36.17% also post comments online. So, while writing is done as a task in the classroom, a lot of informal writing does happen online. Similarly, 56.38% of the students sharpen reading skills by reading newspapers and magazines, while reading online sources is a practice followed by 31.91%. About 52% listen to the radio and try to pick up the language this way and online listening is preferred by 24.46%.

Another finding was that 70.21% of the students feel that the material in textbooks is dull and uninteresting. It was clear to us that students look outside the college curriculum to hone their command of the language, including listening, speaking and reading skills. Adopting an ICT enabled approach to teaching in the undergraduate classroom is therefore not a matter of choice.

THE INTERNET IN THE LANGUAGE CLASSROOM

Technology has changed, and continues to change, the ways in which we work, travel, communicate, pay our bills, prepare and consume our food, and so on. It has also changed the ways in which students receive, collate and disseminate information. The teaching-learning process cannot be isolated from the growing impact of technology. During the course of our survey, when we checked for perceptions of ICT use in learning English (graph given below), we found that 71.3% feel that learning how to use the Internet helps them to understand online English materials better. 67% are of the opinion that the Internet provides them with a reliable way to learn about foreign languages and cultures. 64.9% feel that watching English movies or shows online helps them comprehend the language better, and are a good way to practise listening comprehension. Only 17% of the respondents feel that there are more disadvantages than advantages arising from the use of ICT in a classroom.



With this in mind, we planned a module to teach English to undergraduate students in urban or semi-urban areas. We began with the following assumptions:

1. That all the students in a college have access to internet in the college campus and maybe also at home
2. That they can access the internet either on computers provided by the college, or on their phones or tablets
3. That, hopefully, the college campus is wifi-enabled
4. That the curriculum can be decided by the Board of Studies in terms of skills to be acquired and mastered and the syllabus can be devised by the teacher individually keeping the class profile in mind.
4. That the university permits a change in both curriculum and evaluation practices – so that we move towards a dynamic syllabi which can change from year to year and an exam system that does test content recall but acquisition of skills.

This paper will focus on the preparation of a module for students of the first semester of a BA or BSc course. First Semester undergraduate students should develop the ability to independently read articles relating to their discipline, listen to lectures on different subjects and make lecture notes, write lucidly, comment on and give opinions on what they hear and read, and articulate their thoughts and ideas in a comprehensive manner. The module we have devised will empower the teacher and learner to achieve this with the internet. It will focus on the four skills that constitute an important part of language learning.

READING SKILLS

The internet is a reader's delight. In place of the dozen prose and poetry readings anthologised in a college-level textbook, the internet offers lakhs of books, short stories, newspaper and magazine articles, blogposts, webpages and other material completely free of cost. Students can be encouraged to read articles of their choice, on matters that interest them, at a time and place that is most convenient to them. Alternatively, the teacher can download selected readings, photocopy and circulate them. The following activities combine use of the internet with reading, writing, listening and speaking practice.

a. Discuss an article from an online paper in class, for example, from *The Guardian* and get students to read online any related article and summarise/ respond to the article in writing or orally the next day in class

b. Read an advertisement, comic strip, graphic novel (all of which are available on the net). Sites like *PHD Comics* or *The Oatmeal* offer plenty of cartoons and comic strips. Students can be asked to write copy for an advertisement (they can be provided only the image) or describe it, or narrate the tale told by the comic or the advertisement. Such an exercise will also teach students to read not only the written word, but images, embedded texts, subtexts, biases, messages etc.

c. Build a reading comprehension exercise based on material from the internet. Many such exercises are already available online

d. Select one or two authors/poets and ask students to locate online a short story/poem written by them, read it and come to class. The class activity can span a review, critical analysis, character sketch or even rewriting the story with a different character/beginning/ ending, etc.

e. Illustrate or comment on a news article they have read online or watched on TV. This will teach students that reading is not a passive activity but instead is an act of interpretation, a form of writing.

Exposing the student to new resources and different genres rather than only the predetermined textbook will lead to the development of an interdisciplinary approach which can only prove valuable. Such activities help the student to move from being receivers of knowledge to becoming creators of knowledge. This can empower the student and inspire them to take charge of the learning process.

WRITING SKILLS

The internet offers several resources to teach writing. For instance, the Purdue University Online Writing Lab (OWL) offers free resources to learn and teach writing, grammar, etc. Dozens of other sites offer worksheets for students to practise the mechanics of grammar. We have created a module to get students to write creatively and effectively. Some of the ways in which the teacher can inspire students to write are:

a. A lot of information, news and entertainment happens today through YouTube

videos, which are short videos that are shot and uploaded on the internet by the videographer. From academic lectures to play performances, music videos, cultural and political events, YouTube videos offer a way of knowing the world in a format that appeals to youngsters. A teacher can download and play these videos in class and ask students to write in response. The response can span various genres of writing such as descriptive writing, analytical writing, a reflective essay, or a personal essay.

b. As part of a team activity, the teacher can also show video clippings of short plays or scenes of plays and the students can work in teams to develop the play further or write a street play based on a similar theme or a radio play etc. Students can also be asked to practise writing stage directions or directions to the lighting director, costume director etc.

c. The teacher can attempt an activity that is a reverse of the normal Fiction into Film process. Students can be shown a scene from a film and be asked to describe it elaborately. For example, a scene from a film like *Castaway, Harry Potter*, *Game of Thrones, Hunger Games,* etc.

d. Students can be given links to blogs on food writing or travel writing. Once they have read and discussed samples of writing from these blogs, they can be asked to write on locally available cuisine, the city or town or neighbourhood in which they reside.

e. The teacher can start a class blog. In the beginning, familiarize students with the concept of writing online by getting them to introduce themselves and write a few lines about their interests. Then they can take turns to report on the classes they have had that day, put up lecture notes on the blog, discuss the chapters etc. If possible, students can also submit their assignments via the blog.

f. After studying a poem, students can listen to the poet reading his poem online, use *PoemHunter* to look up other poems by the same person and do a critical appreciation piece on any one of the poems.

SPEAKING SKILLS

While it is important that every student develops a reading life and learns to express herself in writing, it is no secret that with the increased use of digital

technology, speaking has become a far more important accomplishment than earlier. Today, most ideas are communicated orally or through images along with oral explanations. It is important for students to learn to communicate their ideas and their knowledge and skillsets in order to succeed.

The old textbook method offered little space to teach speaking, a lacuna we hope to correct. Using videos and news reports currently available online, will mean that students are exposed to everyday language, the way it is spoken currently, rather than the language of early twentieth century essayists or dramatists. Teachers can come up with various methods to get students to talk, debate and discuss – the trick is to create interest in their minds. Some of our suggestions are:

a. Play YouTube videos covering issues that interest them and encourage students to discuss the same in groups

b. Listen to recordings of famous speeches such as ones made by Nehru, Barack Obama, Malala, the Dalai Lama, etc and persuade students to sum up the main points using similar voice modulation

c. Show them advertisements, cartoons or comic strips and get them to talk about it for a couple of minutes. This can be in the form of a response, a comment, a critique or a description.

LISTENING SKILLS

While most college classrooms treat listening as a passive process, listening is an interactive process in the workplace, wherein the listener has to actively listen and make sense of what is being said and be able to reply. Students should also practise listening to various accents and tones, and be able to respond. Some of our suggestions are:

a. Play tapes of the *Mind Your Language* series and get students to discuss the kind of humour, the cultural differences, the stereotypes, etc.

b. Play news podcasts or news programmes and encourage students to summarize the main points, discuss the issues at stake, and comment on style of presentation.

c. Play interviews that are available on the web such as *Hard Talk, Walk the Talk* or The Devil's Advocate and ask students to write a critique of the views aired.

d. Language games are available on the internet which require the player to listen actively in order to win the game.

Of course, none of these skills are disparate but are interconnected and interdependent and are learnt in tandem.

A part of our questionnaire tested our students' attitudes towards the use of ICT in college life. We discovered that 73.4% of the students rated themselves high on confidence when it comes to learning new computer skills. Around 83% are already using the computer for their studies and enjoy doing so. About 68% feel confident about using the internet. 46.8% of the students like studying with the internet. About 38.3% are willing to devote their time online to improve their command over the English language. These statistics indicate that the respondents are willing to learn new things using the internet.

Technology increasingly occupies a large part of our lives and as members of the teaching community, we should prepare to incorporate it into our pedagogy so that our students benefit. Rather than resist its presence, we should build upon its strengths and leverage them to our advantage. The English language itself is changing and we no longer speak and write as Austen, Eliot or Hawthorne did. The dynamism and adaptability of the language should reflect in the manner of teaching it.

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USAGE OF INFOGRAPHICS IN SOCIAL MEDIA CAMPAIGNS OF 2014 LOK SABHA ELECTIONS IN INDIA: A SEMIOTIC ANALYSIS

- Juby Thomas

Abstract

Recently, social media has become the latest medium of campaigning in India. Politicians and political parties are on a constant strive to woo the young urban voters by taking active part in Google+ Hangouts, televised interviews organized by Social Media, using the smart phone messaging apps like WhatsApp and many more. According to a study by IAMAI and Mumbai-based market researcher IMRB International report, the political majors in the country, the Congress and the BJP has allocated 2-5 per cent of their election budgets for social media. Though usage of social media to send photos, videos and messages to potential voters is very common, incorporation of infographic is a trend setter. Hence the present study focuses on the effectiveness and impact of this new trend due to its vital possibility to initiate discussions and debates and helping citizens vote for the best candidate.

Key words: *2014 Lok Sabha Elections, Social media, Infographics, Election Campaigns in India*

INTRODUCTION

The usage of infographics or social media for election campaign was a rare sight in the Indian election campaigns unlike the other countries. During 2009 general election, social media usage in India was infinitesimal. As per the *IAMAI report,* at present, however, Facebook has 93 million users and Twitter has an estimated 33 million accounts in the country. During the 2008 US elections, Barack Obama pushed the boundaries of online political campaigning, from raising online contributions to wider levels. Nonetheless the incorporation of infographics in the 2014 Lok Sabha election in social media campaigns could be considered as a trend setter. Infographics enables the campaigners to simplify the complicated matters and easily turn a boring campaign into most engaging and interesting one.

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The power of infographics in information generation is relatively high, therefore it requires much attention. Every sign in an election campaign infographic signifies great meaning and when it comes to its interpretation of meaning, it is difficult in a country like India because of its multilingual and multicultural space.

The advancement in social media has facilitated the young voters to move towards new media to get information about candidates. They supported the campaigning through their 'Likes and shares'. The urban middle class Indian youth, students and the techies who participated in online discussions are relatively high compared to the previous elections. These online platforms have turned out to be a main source of funding for the AAP in 2014 Lok Sabha Elections. Thus Indian Lok Sabha Election has witnessed a remarkable change through the adoption of social media in its campaigning.

The Present study focuses on the use of infographics in social media election campaigns of 2014 Lok Sabha elections and assesses its semiotic significance seeking to identify its effectiveness, usage, challenges and prospects.

METHODOLOGY

Keeping the area of study in mind, the logical methodology adopted is a qualitative research method. To get a basic understanding about the subject researcher depended on secondary data sources like books, journals, online sources etc. The primary data is collected through qualitative research method i.e. semiotic analysis of few infographics that are posted in various social networking sites by the major political parties in India. Infographics are selected randomly. The study is further delimited to the following objectives.

- ❖ To identify the effectiveness of the usage infographics in 2014 Lok Sabha election campaigns
- ❖ To analyze the usage and prospects of infographics in Indian election campaigns
- ❖ To understand the challenges and threats of the use of infographics

FINDINGS

The present study identifies a sudden leap in the usage of infographics in

the recent Indian election campaigns due to the adoption of social media as a campaigning tool. Major political parties like BJP, Congress and AAP have effectively made use of infographics in their social media campaigns through Facebook, Twitter and even YouTube. It is not only the political parties but individual politicians also were the users of infographics. A sporadic growth can be observed in the way the political parties use infographics in the recently concluded general election campaigns. For example:

Figure 1

Figure 2

Both Figure 1 and Figure 2 signify or represent the future electricity plans of the leading political parties in India. Figure 1 is of the Congress party which describes the past, present and future plan of electricity status with the combination of text and visuals. It signifies the role played by congress to electrify the nation and at the bottom of the infographics the logo and URL of INC can be observed to determine the ownership. The Figure 2 is prepared by the BJP attracts, informs and displays the usage of variety of signs and symbols, whereas the highlight of infographics is the concentration on Modi and the state of Gujarat. There is only one element that highlights the party as a whole directly and that is the symbol of lotus, the logo of BJP and the ownership credits are given to NDOC (National Digital Operation Center). Such a common phenomenon can be observed in almost all BJP infographics.

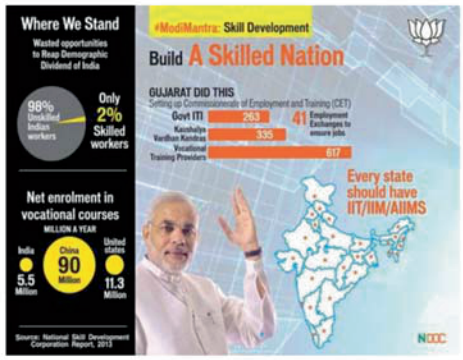


Figure 3

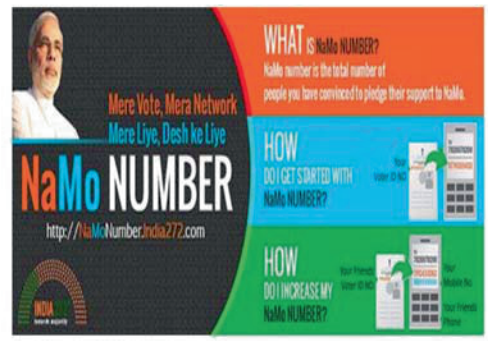
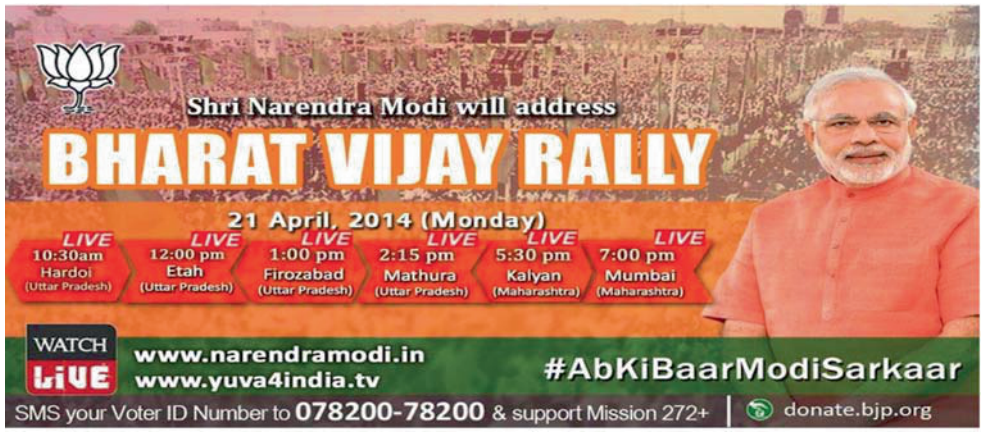


Figure 4



Due to its tremendous reliance on infographics BJP requires a special mention. Compared to all the other political parties BJP has effectively made use of infographics in their election campaigns. The theme or purpose of the usage of infographics by the BJP varies. Notification about the upcoming events, Television programs (figure 5), rallies, and even notification/ advertisements about the other modes of campaign (figure 4) like Whatsapp and Namo tea. Almost all the infographics used by the BJP is distinctly characterised and independent. The only repetition is its design.

Whereas repetition of theme, design and the other elements can be observed in the infographics of INC (Figure 1 and 6)

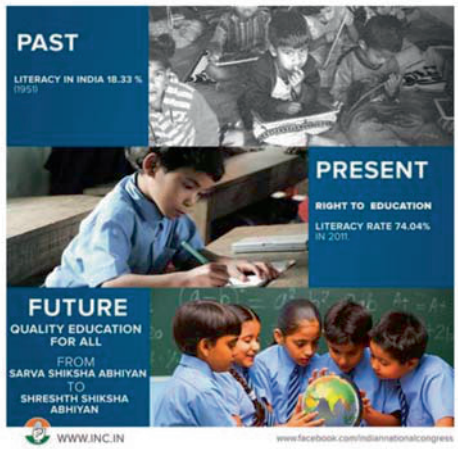


Figure 6

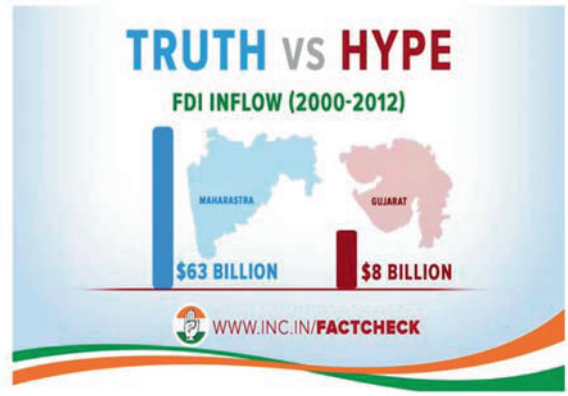


Figure 7

Usage of INC colour (Figure 7) and criticisms are other highlights of infographics that were used by INC. There is no monopoly of any individual in INC infographics and displays technical weakness. Compared to BJP the usage of infographics by the INC is relatively less, whereas AAP has made an attempt to incorporate it in their campaigns and few of them had the monopoly of an Individual (Figure 8). However on the infographics represented the nation and it was a call for action (Figure 9), that signifies the national interest of the party.

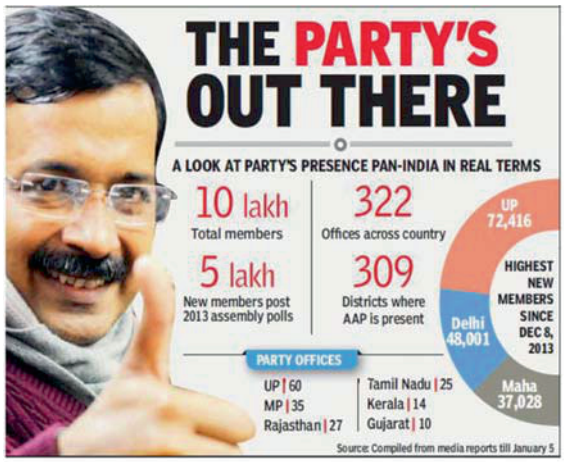
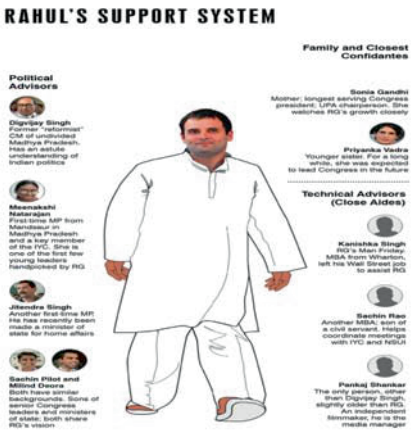


Figure 8

Figure 9

Besides these, social media has also effectively made use of infographics during the election process. Social media majors like Facebook and Twitter used it to describe their research findings and election predictions. Negative social media reports about the opposition party leaders were highlighted in websites and other social media platforms (Figure 10 & 11)



Besides all these the search engine giant Google has come up with a unique infographic with live Google score of about the most popular Indian politicians too. (Figure 12).

Figure 12

Conclusion

Some of these infographics signifies time series- where it has a connection with the past, present and future as democracy is a dynamic process. Few others signifies statistical distributions - which reveals trends based on how numbers are distributed. Majority of the infographics signify hierarchies- dominance by an individual or dominance by numbers. Several infographics signify relationships- such as friendships and cliques. Semiotic analysis of all these infographics results into following findings like:

Primarily, there is a sudden boom in the usage of infographics in social media election campaigns. Compared to the other modes of campaigning in social media like uploading of video and photos of campaigns and rallies infographics are much more effective in terms of public responses. Likes and shares are the most evident form of public response and there are incidents where few infographics achieved almost 20,000 likes and 1500 shares. This can be considered as a huge trend setter, because for photos and videos, the likes and shares are below 100s. Here lays the prospects of infographics in future elections.

Secondly, when it comes to the usage of infographics by the political parties and politicians in India there is a huge gap between the parties and the politicians. BJP can be said as the most effective user of infographics and BJP itself leads in terms of the quality. They are keenly followed by the Congress and AAP.

However an analysis of the use of infographics in social media campaign display its challenges and threats. The boom may soon become a bane due to several reasons like some of the political parties misuse infographics to directly attack the competitor/opposition. The infringement of the law is often quite evident. A strong monitoring body has to be set up to prevent such kind of unethical practices. With regard to the common man, as the usage of infographics increases they should be educated to analyse the media content. Three types of education/empowerment is required to critically analyse the contents in infographics.

The public should primarily have Information Literacy Standards: The ability to recognize when information is needed and to locate, evaluate, and effectively

use the needed information. Secondly, the Visual Literacy Standards: It is a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media. Images and visual media may include photographs, illustrations, drawings, maps, diagrams, advertisements, and other visual messages and representations, both still and moving. Visual literacy skills equip a learner to understand and analyze the contextual, cultural, ethical, aesthetic, and technical components involved in the construction and use of images and visual media. And finally the Technology literacy standards for evaluating the skills and knowledge; public need to learn effectively and live productively in an increasingly global and digital world.

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METRO DOMINATION NUMBER OF $C_n \times P_2$

John Sherra and Hazel S Mathias

Abstract

A domination set of a graph G(V,E) is a subset of V having the property that for each vertex $\upsilon \in V - D$ there is a vertex u in D such that $u\upsilon$ is in E . A dominating set of G is called minimal dominating set of G if no proper subset of D is a dominating set. The minimum of cardinalities of minimal dominating sets of G is called the lower dominating number and is denoted by $\gamma(G)$.

The maximum of cardinalities of minimal dominating sets of G is called the upper dominating number and is denoted by $\Gamma(G)$. For each ordered subset $S = \{\upsilon_1, \upsilon_2, \ldots \upsilon_r\}$ of V, each vertex v in V can be assigned a vector $(d(\upsilon_1, \upsilon), d(\upsilon_2, \upsilon), \ldots, d(\upsilon_r, \upsilon))$ of distances which is denoted by $\Gamma(\upsilon/S)$. The set S is said to be a resolving set of G,if $\Gamma(\upsilon/S) \neq \Gamma(u/S)$ for every $u, \upsilon \in V - S$.

A resolving set of minimum cardinality is a metric basis and cardinality of metric basis is metric dimension of G. The k- tuple $\Gamma(\upsilon/S)$ assigned to the vertex $\upsilon \in V$ with respect to the metric basis S is referred as a code generated by S for that vertex υ. If $\Gamma(\upsilon/S)=(a_1, a_2, \ldots a_k)$ then $a_1, a_2, \ldots, a_k$ are called the components of the code of υ generated by S and in particular a_i, $1 \leq i \leq k$ is called i^{th} component of the code of υ generated by S.

The dominating set D of G which is also a resolving set of G is called a metro dominating set or in short MD -set. An MD set D of G is called a minimal metro dominating set of G if no proper subset of D is a metro dominating set of G.The minimum of cardinality of minimal MD -sets of G is called the lower metro domination number or simply metro domination number of G and is denoted by $\gamma_\beta(G)$.

INTRODUCTION

Consider two cycles of n vertices each. Name the vertices of the first C_n as $u_1, u_2, \ldots u_n$ and of the second C_n as $v_1, v_2, \ldots v_n$. Join u_i to v_i for each i. The resulting of graph is $C_n \times P_2$

Each vertex u_k dominates vertices, u_k , u_{k-1},u_{k+1} and v_k. Number of vertices in $C_n \times P_2$ is 2n . In order to dominate 2n vertices at least $\frac{2n}{4}$ vertices are required. Hence we have the lemma,

Lemma 1.1. If D is a dominating set for $C_n \times P_2$ then $|D| \geq \frac{n}{2}$

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Lemma 1.2. If n=4k , then $\gamma(C_n \times P_2)=2k$

Proof. We prove by induction on k.

When k=1, we have $C_4 \times P_2$, $|D| \geq \frac{n}{2} = \frac{4k}{2} = 2k=2.$ Further u_1 dominates u_1,u_2,u_4 and v_1. The vertex v_3 dominates v_3,u_3,v_2 and v_4. Then $D=\{u_1,v_3\}$ is a minimal dominating set. Therefore $|D|=2=2k$.

Suppose D is a minimal dominating set for $C_{4k} \times P_2$ and $|D| = 2k$,

where $D= \{ u_1, v_3, u_5, v_7,...,u_{4k-3}, v_{4k-1}\}$. The vertex u_1 dominates u_1, u_2, u_n and v_1. The vertex v_{4k-1} dominates v_{4k-1}, v_{4k-2}, v_{4k} and u_{4k-1}. When n=4(k+1), four vertices u_{4k+1}, $u_{4k+2,}$ u_{4k+3} and u_{4k+4} are inserted between u_1 and u_n and hence u_1 dominates u_{4k+4} and does not dominate u_{4k}. Similarly the four vertices v_{4k+1}, v_{4k+2}, v_{4k+3} and v_{4k+4} are inserted between v_1 and v_{4k}. Take $D'=D \cup \{u_{4k+1},v_{4k+3}\}$. Now u_1 dominates u_{4k+4}; u_{4k+1}dominates u_{4k} . Further they dominate all the remaining vertices inserted. Thus D' is a dominating set for $C_{4k+4} \times P_2$.

$|D'|=|D|+2 =2k+2 =2(k+1)$.

By Lemma1.1, $|D'| \geq \frac{4k+4}{2} = 2k + 2.$

Therefore $\gamma(C_n \times P_2)=2k$ when n=4k.

Lemma 1.3. When n=4k+1, $\gamma(C_n \times P_2)=2k + 1$.

By Lemma 1.1, $|D| \geq \frac{n}{2} = \frac{4k+1}{2} = \frac{4k}{2} + \frac{1}{2} > 2k.$ i.e., $|D| \geq 2k+1$

Taking $D=\{u_1, v_3, u_5, v_7,...,u_{4k-3}, v_{4k-1}\}$, we observe that u_{4k} and v_{4k+1} are not dominated by any vertex in D. Note that u_{4k} and v_{4k+1} do not dominate each other. Hence we take $D'=D \cup \{v_{4k}\}$. Then v_{4k} dominates u_{4k} and v_{4k+1} and $|D'|=2k+1$

Therefore $\gamma(C_{4k+1} \times P_2) \leq 2k+1$. Thus $\gamma(C_{4k+1} \times P_2)=2k+1$.

Lemma 1.4. When n=4k+2, $\gamma(C_n \times P_2)=2k+2$

By Lemma1.1 , $|D| \geq \frac{n}{2} = \frac{4k+2}{2} =(2k+1) \Rightarrow |D| \geq 2k+1$

As in lemma1.3, we take D={u_1,v_3,u_5,. . . ,u_{4k-3},v_{4k-1}}. A vertex can dominate, itself and 2 more in its component and one from the opposite component. In this case u_{4k} and u_{4k+1} from one component are not dominated by D and v_{4k+1} and v_{4k+2} from the other component are not dominated by D. If any one of these vertices is inserted in D, then D cannot dominate all vertices .Therefore we insert two vertices u_{4k} and v_{4k+1} in D to form D'=D$\cup${u_{4k}, v_{4k+1}}. Now D' is a minimal dominating set and

|D'|=2k+2. Hence $\gamma(C_n \times P_2)$ =2k+2

Lemma 1.5. When n=4k+3

Again by Lemma1.1 , $|D| \geq \frac{4k+3}{2} = (2k+1)+\frac{1}{2} > 2k+1$. Therefore $|D| \geq 2k+2$

We construct D' with |D'|=2k+2

Consider D={u_1, v_3, u_5,. . . ,u_{4k-3}, v_{4k-1}} . Then u_{4k}, u_{4k+1},u_{4k+2}, v_{4k+1}, v_{4k+2} and v_{4k+3} are not dominated by D. Take D'=D$\cup${u_{4k+1},v_{4k+2}}. Then D' dominates all vertices of V. |D'|=2k+2. Hence $\gamma(C_{2k+3} \times P_2)$=2k+2. Thus we have the following theorem.

Theorem. For $k \geq 1$, $\gamma(C_n \times P_2) = \begin{cases} 2k+2 & \text{if } n=4k+2 \text{ and} \\ \left\lceil \frac{n}{2} \right\rceil & \text{otherwise} \end{cases}$

Let n be even. If $i \leq \frac{n}{2}$ then $d(u_1,u_i)$ =i – 1 and $d(u_1,v_i)$ = i. If $i > \frac{n}{2}$,

then $d(u_1,u_i)$ = n–i+1 and $d(u_1,v_i)$ = n–i+2. Further $d(v_3,u_i)$ = i–2, if $3 \leq i \leq \frac{n}{2} + 3$ and $d(v_3, v_i)$ = i - 3. If $i > \frac{n}{2} + 3$, then $d(v_3,u_i)$ =n–i+4 and $d(v_3, v_i)$ = n–i+3.

If $1 \leq i \leq 2$ then $d(v_3,u_i)$ = 3-i+1 = 4–i and $d(v_3, v_i)$ = 3-i.

Let n be odd. If $i \leq \frac{n+1}{2}$, $d(u_1, u_i)$ =i-1 and $d(u_1,v_i)$ = i. If $i > \frac{n+1}{2}$

then $d(u_1,u_i)$ = n-i+1 and $d(u_1,v_i)$ = n-i+2. If $3 \leq i \leq \left(\frac{n+1}{2}\right) + 2$

then $d(v_3, u_i)$ = i-2 and $d(v_3,v_i)$ = i – 3. If $i > \left(\frac{n+1}{2}\right) + 2$

then $d(v_3,u_i)$ = n-i+4 and $d(v_3,v_i)$ = n-i+3. If $1 \leq i \leq 2$

then $d(v_3,u_i)$ = 3-i+1=4-i and $d(v_3,v_i)$ = 3-i.

Note that v_3 has a unique code as $v_3 \in D$

Let n be even.

Suppose $3 \leq i \leq \frac{n}{2}$. Then $d(u_1, u_i) = i - 1 = d(u_1, u_{n-i+2}) = d(u_1, v_{i-1}) = d(u_1, v_{n-i+3})$.

However $d(v_3,u_i) = i-2$, $d(v_3,u_{n-i+2}) = i+2$, $d(v_3,v_{i-1}) = i-3$ and $d(v_3,v_{n-i+3}) = i$. We observe that they all differ. Hence the codes generated by $\{u_1, v_3\}$ are not identical. Similarly it is observed that $\{u_1, v_3\}$ generate distinct codes to all vertices except for u_i and v_i with $1 \leq i \leq 3$.

Note that $d(u_1,v_2)=2$ and $d(u_1,u_3) =2$, $d(u_1,u_{n-1}) = 2$, $d(u_1,v_n)=2$ and

$d(v_3,v_2)=1$, $d(v_3,u_3) = 1$, $d(v_3,u_{n-1}) = 5$ and $d(v_3,v_n) = 3$

Hence codes generated by $\{u_1, v_3\}$ to $v_2$and u_3 are identical. Similarly codes generated by $\{u_1, v_3\}$ to u_2 and v_1 are identical i.e (1,2). However the codes differ to all other vertices.

However , $d(u_5,v_2) =4$ and $d(u_5 ,u_3)=2$. Therefore codes generated by $\{u_1,u_3,u_5\}$ to v_2 and v_3 differ. Therefore we conclude,

Theorem : $\gamma_\beta (C_n \times P_2) = \gamma(C_n \times P_2)$

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REPLACEMENT OF BLACKGRAM DHAL WITH COWPEA DHAL IN TRADITIONAL PREPARATIONS

- **Mamatha Bangera Sheshappa**

Abstract

Functional properties of cowpea and blackgram dhal (dehulled cotyledon) flours were studied. Effect of incorporating cowpea into traditional dishes like idli (fermented steam cooked pudding prepared with rice grits and blackgram dhal paste) and vada (deep fried snack item prepared with ground blackgram dhal paste) was investigated. Functional properties like water-holding capacity and foaming capacity were higher for blackgram flour, while oil absorption capacity, foam stability and bulk density were essentially similar in the two dhal flours. Hydration capacity of blackgram dhal was slightly higher (52%) than cowpea dhal (50%). Both titrable and total acidity of idli batter increased with cowpea incorporation while viscosity decreased. The product (idli) exhibited marked differences due to incorporation of cowpea. Addition of cowpea increased the bulk density of idli and was proportional to the cowpea added. Sensory scores for softness, fluffiness and taste were lower for idlies containing cowpea. However, partial incorporation (upto 50%) could retain the textural characteristics and the product was acceptable. A similar trend was noticed in case of vada. Sensory scores for blackgram dhal vada were significantly (P< 0.05) higher than those with cowpea. The oil uptake by cowpea vada was lower (12.2%) than the control. It can be concluded that partial incorporation of cowpea to an extent of 50% in the traditional dishes appears to give acceptable sensory quality products with low cost.

Keywords: *Blackgram, Cowpea, Functional property, Idli, Sensory property, Vada.*

INTRODUCTION

In many food preparations, ingredients are considered important largely for their chemical and functional properties that provide desirable qualities to the final product. Both starch and protein in foods contribute to the functionality, affecting the texture of prepared foods. Proteins contribute to water absorption capacity, which is an essential attribute in cooked foods. Starch participates as stabilizer and contributes to viscosity, texture, and consistency to the products (Kaur et al. 2004). Legumes by virtue of their high protein content possess

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characteristics suitable for baked products or those that require soft texture (Umaid 2001). Studies have indicated that various factors affect functional properties of food, hence controlling the factors judiciously may help to manipulate food properties so as to obtain products with desirable organoleptic characters.

Cowpea is a versatile legume consumed all over the world. It has been subjected to vigorous testing for the functional properties and has been compared to other legumes (Umaid 2001). Minimum processing like de-hulling was reported to improve the functional properties such as water absorption and oil absorption capacity (Sunday and Giami 1993). Cowpea flour was demonstrated by few workers to possess good foaming capacity comparable to that of egg albumin (Sunday and Giami 1993; Sosulski et al. 1976; Mc Watters 1985). Since cowpea is known to have desirable functional properties and is of low cost, it was proposed to replace blackgram dhal with cowpea in two traditional preparations viz. *idli* and *vada.*

Idli is a popular fermented and steam cooked breakfast food in India, prepared from rice grits and blackgram dhal batter. It has spongy texture with a characteristic odour. *Vada* is a deep fried food prepared from blackgram dhal paste with salt. This also possesses soft and spongy texture, a characteristic property offered by blackgram dhal. Hence, the present investigation was carried out to study the effect of replacing blackgram dhal with cowpea dhal (fully and partially) on the organoleptic and nutritional quality of the two products - *idli* and *vada with low cost.*

MATERIALS AND METHODS

Procurement and processing treatments: Cowpea – brown variety was purchased from local market in bulk, cleaned and de-hulled in a mini dhal mill to obtain the de-hulled cotyledons (dhal). The dhal was dried in the truck drier at 45 -50 °C for 2 hours. The dried dhal was cooled and placed in a plastic bag, sealed and stored in cold room at 6 °C for further use.

Rice semolina (NR brand-Ennar refineries Pvt Ltd, Tumkur, India) and blackgram dhal (de-hulled cotyledon) local variety were purchased from the local market.

FUNCTIONAL PROPERTIES

HYDRATION CAPACITY

10 gm (W_1) of each dhal (blackgram and cowpea) was taken in six beakers containing 50 ml of tap water. The dhals were soaked at room temperature for 30, 60, 90, 120, 150 and 180 minutes. After each interval of soaking, water was drained and the surface moisture was removed by pressing the dhal between filter papers. The samples were then weighed (W_2) and dried in oven at 105 °C for 24 hrs; cooled in a desiccator and the final weight was taken (W_3). Hydration capacity (HC) was calculated and expressed as percentage (Ahmed and Schmidt 1979).

$$HC = \frac{W_2 - W_1}{W_2}$$

BULK DENSITY

The method of Wang and Kinsella (1976) was used to measure bulk density of the powdered samples.

WATER ABSORPTION CAPACITY (WHC) AND OIL ABSORPTION CAPACITY (OAC)

These determinations were done according to methods described by Sosulski et al. (1962)

FOAM CAPACITY (FC) and FOAM STABLITY (FS)

They were determined according the methods of Ahmed and Schmidt (1979). FC is expressed as per cent increase in volume using the formula

$$\text{Foam capacity} = \frac{(\text{Volume after whipping} - \text{Volume before whipping})}{\text{Volume before whipping}} \times 100$$

The foam volume was recorded at 15, 30, 60 and 120 min after whipping; the Foam stability was calculated using the formula:

$$\text{Foam stability} = \frac{\text{Foam volume after time't'}}{\text{Initial foam volume}} \times 100$$

EMULSION CAPACITY (EC)

The method of Beuchat et al. (1975) was used to determine Emulsion capacity. Emulsification capacity is expressed as ml of oil emulsified per 100g of flour.

PREPARATION OF *IDLI*

Three variations were made in the preparation of idli, that is; traditional method (100% blackgram dhal), variation 1 (partial replacement of blackgram dhal i.e., 50% of blackgram dhal and 50% of cowpea dhal) and variation 2 (complete replacement of blackgram dhal i.e., 100% cowpea dhal). Dhals were soaked in tap water (dhal to water ratio 1:4) separately for 4 h at room temperature and ground to fine paste along with the water in a mixer grinder.

The paste so obtained was mixed with rice semolina (twice the dry dhal weight equivalent) with 2% of salt and allowed to ferment overnight (14-16 hours) at room temperature. The fermented batter was steam cooked for 15 minutes in *idly* moulds.

PHYSICO CHEMICAL CHARACTERISTICS OF *IDLI* BATTER

Total acidity, titrable acidity and bulk density of *idli* batter was determined according to Wine and Must analysis (Amerine 1974). Viscosity of idli batter was measured by Brookfield viscometer (RVT model, Brookfield engineering Inc. USA) using spindle no. 5 for traditional and variation 1, and spindle no. 4 for variation 2 at an rpm of 100.

PREPARATION OF *VADA*

Three variations were made in the preparation of *vada* that is; traditional method (100% blackgram dhal), variation 1 (partial replacement of blackgram dhal i.e., 50% of blackgram dhal and 50% of cowpea dhal) and variation 2 (complete replacement of blackgram dhal i.e., 100% cowpea dhal) variation 1 (partial replacement of blackgram dhal with cowpea dhal at 1:1 ratio) and variation 2 (complete replacement of blackgram dhal with cowpea). Dhals were soaked in tap water (1:2 dhal to water ratio) at room temperature for four hours. The water was drained completely using a strainer and ground to a fine paste, without adding any extra water. The ground paste was mixed with salt (2%) and sodium bicarbonate (0.25%) and kept aside for 30 minutes at room temperature.

The paste was given the shape of v*ada* (two teaspoon paste was taken and flattened on the palm and a hole was made in the center) and fried in oil heated to 140 ^{0}C. Frying was continued for 10 minutes with occasional turning to sides. The doneness was identified with change in colour to golden brown. Oil absorption of v*adas* during frying was determined following AOAC method (1984).

SENSORY ANALYSIS

A panel of 30 semi-trained members (who were familiar with the products) participated in the sensory analysis of *idli* and *vada*. Physical characteristics of *idli* (softness, fluffiness, appearance, beany odour, taste and overall quality) and v*ada* (appearances. flavor, taste, texture, and overall quality) were assessed according to Qualitative Descriptive Analysis (QDA). Traditionally prepared *idli* and *vada* was considered as control.

STASTICAL ANALYSIS

The data reported in all the tables are an average of triplicate observations. The data were subjected to one-way analysis of variance (ANOVA) using "Graph Pad Instat"- a computer software version 1.14, 1995. Bonferroni test of comparison among the means were used to test the significance $p \leq 0.05$ levels.

RESULTS

Effects of replacing cowpea partially or completely with blackgram dhal in traditional products were studied and the results are presented in Table 1 to 4. Hydration capacity of cowpea and blackgram dhal is depicted in Figure 1, it is evident that blackgram dhal had higher hydration capacity than cowpea dhal. In case of blackgram dhal, equilibration of water absorption of 83% moisture level was attained by 120 min, whereas cowpea required 150 min to absorb 80% moisture. Functional properties of the dhal flours are presented in Table 1. It is evident that the characteristics of the two dhals were distinctly different. Foaming capacity, WAC and bulk density of blackgram dhal flour was considerably higher to that of cowpea flour but OAC of cowpea (1.6%) was more than blackgram flour (1.4%). FC of the two dhals were different, wherein blackgram dhal exhibited significantly higher values than that of cowpea, while foam stability of the two dhals were essentially similar (Table 1).

The physico-chemical properties of the fermented *idli* batters prepared with blackgram dhal and those with partially and fully replaced cowpea dhal is presented

in Table 2. The mean increase in percent volume (%) after fermentation in all the variations remained similar, however other parameters such as pH, titrable acidity, total acidity and viscosity varied considerably. A low pH in batter containing cowpea (4.52 and 4.23 in variation I and II) was observed than that in the batter containing blackgram alone (5.20 Traditional). The total acidity and titrable acidity also depicted a similar trend. Batter containing cowpea alone exhibited 13.4% total acidity as against 6.5 and 8.4% with blackgram alone and the mixture of cowpea and blackgram, respectively. Similarly titrable acidity was 50% higher in batter with cowpea (8.4%) than that with blackgram dhal alone (4.1%) and the batter containing the mixture had 5.3% falling in between. Batter, with blackgram dhal (Traditional) exhibited highest viscosity and that with cowpea alone had lowest, whereas mixed dhal batter gave viscosity values in between the two.

Idlies from all the three variations were assessed for texture and bulk density. Bulk density values for i*dli* (Table 2) suggested that traditionally prepared *idli* was fluffier than those made with fully and partially replaced cowpea. Further, among the variations traditional *idli* had the lowest bulk density and those with fully replaced cowpea, which had the highest values (375 kg/m^3 variation II). *Idli* with cowpea alone was found to be porous but tough in texture. These differences are also exhibited in the sensory qualities of *idlies* as judged by the trained panel (Table 3). Sensory scores for softness, fluffiness, pleasant beany odour, taste and overall quality of traditional *idli* and variation I was similar but significantly higher to those for variation II (Table 3). On the other hand, scores for appearance for *idlies* in both the variations were significantly lower to that of traditional *idlies*.

The observations suggest that cowpea behaves very different from that of blackgram dhal. Presence of small proportion of blackgram dhal tended to alter the characteristics of the batter. The results in Figure-1 showed small differences in hydration capacity of cowpea and blackgram dhal. Blackgram dhal required higher amount of water for complete hydration than that for cowpea. The time required for complete hydration was 90 min in both the dhals. However at 60^{th} min of hydration cowpea exhibited a hydration capacity of 50% while blackgram dhal had 52%. Hence a 2% difference in hydration capacity was noticed. It has been demonstrated that hydration capacity of the legumes is related to the viscosity and gelatin. This difference was probably due to the low WAC of cowpea flour. This finding was in accordance to those reported by others (Giami 1993).

Bulk density values for *idli* (Table 2) suggested that traditionally prepared *idli* was fluffier than those made with fully or partially replaced cowpea. Further,

among the variations, traditional *idli* had the lowest bulk density and the fully replaced with cowpea had the highest.

The sensory qualities of steam cooked *idli* is presented in Table 3 as can be seen except for appearance all the other attributes were high for the traditional *idli* than those with other variations. *Idlies* with partially replaced cowpea exhibited significantly higher values than those with fully replaced cowpea.

The result suggests that partial replacement of blackgram dhal with cowpea gave better products than those where blackgram dhal was fully replaced by cowpea. Blackgram dhal possibly contributes to certain specific characteristics to *idlies* for desirable organoleptic behavior. Softness and fluffiness, which are the most desirable properties in *idlies*, were significantly lower in product where cowpea was fully replaced.

Sensory quality of *vada* is presented in Table 4. Characteristic differences were observed in the entire sensory attribute; where the traditional *vada* was scored highest for texture, appearance; flavour, taste and overall quality than the two variations. It was interesting to note that *vada* with partial replacement had scores in between those with blackgram dhal (traditional) and cowpea alone (variation II). Comparing with sensory quality of *vada*, it can be mentioned that v*ada* with fully replaced cowpea was just acceptable; although organoleptically it is not as desirable as that of the traditional v*ada*s. Figure 2 presents oil uptake of the fried *vadas*. Traditional *vada* had highest oil uptake (20.9%) while that with cowpea alone (8.2%) was lowest. *Vada* with partially replacement of cowpea had considerably lower oil uptake as compared to blackgram dhal but higher than that of the cowpea alone (fully replaced). The nutritional advantage therefore lies in its low fat content.

DISCUSSION

Comparison of the properties of cowpea and blackgram dhal indicated their major differences in water absorption capacity, oil absorption capacity, foaming capacity, and foam stability and bulk density. Proteins are considered to play an important role in water absorption capacity (Kaur et al. 2004; Kuntz 1971). The polar amino acid groups of protein are reported to be higher in blackgram, which increases water absorption capacity. The differences observed in the texture of both the products prepared with blackgram dhal and cowpea could be attributed to the difference in the water absorption capacity of the two dhals. Cowpea flour has a WAC of 0.8%, which is four times lower than blackgram flour (3.2%). It is known that polar amino acids of a protein have an affinity for water. Hermanssen

(1979) pointed out that proteins could increase their water holding capacity when their swelling capacity in increased. Cowpea protein (24%) is one of the main contributing components to the functionality of the flour (Mwangwela et al. 2006). It is also known that polysaccharides, which are hydrophilic in nature greatly, affect water absorption (Hutton and Campbell 1981). In case of blackgram because of higher polar amino acid content and also due to mucilaginous type of polysaccharide it exhibits a high WAC (3.2%). Addition of blackgram dhal to cowpea contributed textural differences, which explains the role of blackgram dhal in improving the texture of the products. Foam capacity and foam stability was considerably lower in cowpea than that of blackgram dhal. However, literature suggested variation in foam capacity and foam stability of cowpea. Hard to cook cowpea was reported to have poor functional properties (Mbofung et al. 1991). These physicochemical properties of cowpea protein are crucial in retaining the good foaming properties of the flour, necessary for imparting a spongy texture of cowpea flour-based products, such as akara (Plahar et al. 2006). Presumably, genetic variations in cowpea affect the functional properties. The variety used in the present study that exhibited low foaming capacity and foam stability was not comparable to that of blackgram dhal. Hence, the textural difference observed in idli was scored less for cowpea than those for the traditional product. The partial replacement of blackgram dhal with cowpea provided a desirable product therefore it could be cost effective to use cowpea as a partial supplement in the preparation of idli and *vada*.

Oil absorption capacity is also influenced by protein quality and quantity in the food. According to the literature, oil absorption capacity of cowpea is 2.8± 0.4g/g flour (Giami 1993). However, the variety used in the present investigation exhibited very low values. Cowpea flour is found to be lipophillic and therefore retains oil better (Witoon et al. 1997). Oil absorption of fried products reported to differ with different legumes. The differences are attributed to factors like starch content and nature of protein (Sathe and Salunkhe, 1981). The tradition fried products (*vada*) indicated significant difference in the oil uptake capacity of the two dhals used. Blackgram dhal recorded the highest oil uptake while cowpea exhibited lowest. The observed functional properties of cowpea are very different from those of the literature. The reason could be attributed to the variety of cowpea and the processing (dehulling) used. It can be concluded that further research is required to identify the varietals differences in functional properties of cowpea and to standardize processing condition to enhance the functional properties of the product so as to use in such Indian traditional preparations.

Table 1: Functional properties of blackgram dhal and cowpea dhal flours

Samples	WAC (%)	OAC (%)	FC (%)	FS (%)	Bulk density (ml/gm)
Blackgram dhal	3.2 ± 0.04	1.4 ± 0.15	52.0 ± 2.0	97.0 ± 1.7	85.2 ± 3.5
Cowpea dhal	0.8 ± 0.02	1.6 ± 0.04	43.0 ± 3.8	89.0 ± 2.6	79.8 ± 4.7

Table 2: Characteristics of fermented idli batter- traditional verses variations with cowpea

	Fermented *idli* batter					*Prepared idli*
Variations	Batter volume (%)	pH	Total acidity (%)	Titrable Acidity (%)	Viscosity (Pascal)	Bulk density (kg/m3)
Traditional	50	5.20 ± 0.05	6.53 ± 0.56	4.08 ± 0.56	294 ± 3.2	336 ± 10.3
Variation 1	50	4.52 ± 0.02	8.45 ± 0.08	5.28 ± 0.11	234 ± 5.1	354 ± 10.5
Variation 2	50	4.23 ± 0.07	13.44 ± 0.7	8.40 ± 0.07	111 ± 4.4	375 ± 12.7

Table 3: Sensory attribute of *idli* – in comparison with traditional

	Sensory quality					
Variation	Softness	Fluffiness	Appearance	Flavour	Taste	Overall quality
Traditional	$5.76^{a} \pm 1.25$	$5.14^{a} \pm 1.56$	$4.38^{a} \pm 2.01$	$6.95^{a} \pm 1.10$	$5.79^{a} \pm 1.45$	$6.38^{a} \pm 1.44$
Variation 1	$5.06^{a} \pm 1.27$	$4.9^{a} \pm 1.79$	$5.88^{b} \pm 1.34$	$6.19^{a} \pm 1.20$	$5.18^{a} \pm 1.34$	$5.95^{a} \pm 1.82$
Variation 2	$2.77^{b} \pm 1.81$	$3.66^{b} \pm 1.89$	$6.52^{b} \pm 1.58$	$3.87^{b} \pm 1.91$	$3.99^{b} \pm 2.16$	$3.8^{b} \pm 1.54$
F-Ratio	38.48	6.97	11.29	36.62	9.17	23.08
Degree of Freedom	2	2	2	2	2	2

Note- Mean followed by the same superscript are not different. Those mean followed by different superscript are significantly different at 5% level

Table 4: Sensory characteristic of cowpea *Vada* in comparison with traditional

Variation	Sensory quality				
	Appearance	**Flavour**	**Taste**	**Texture**	**Overall quality**
Traditional	0.82a ± 0.22	1.10a ± 0.81	0.40a ± 0.12	0.70a ± 0.22	0.43 a ± 0.06
Variation- I	4.69b ± 0.39	4.92b ±0.63	5.13b ± 0.41	5.05b ± 0.23	1.40 b± 0.27
Variation-II	2.87c ± 0.63	3.08c ± 0.58	2.43d ± 0.84	2.69d ± 0.25	1.18 c ± 0.23
F-Ratio	24.22	24.99	73.38	50.03	53.42
Degree of Freedom	2	2	2	2	2

Note- Mean followed by the same superscript are not different. Those mean followed by different superscript are significantly different at 5% level

Figure 1:•. Hydration capacity of cowpea and blackgram dhal

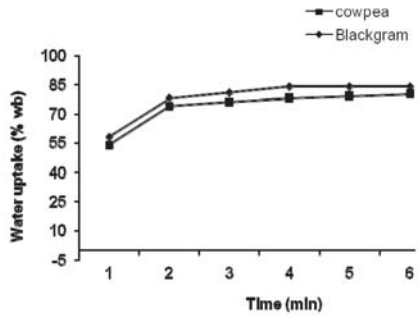
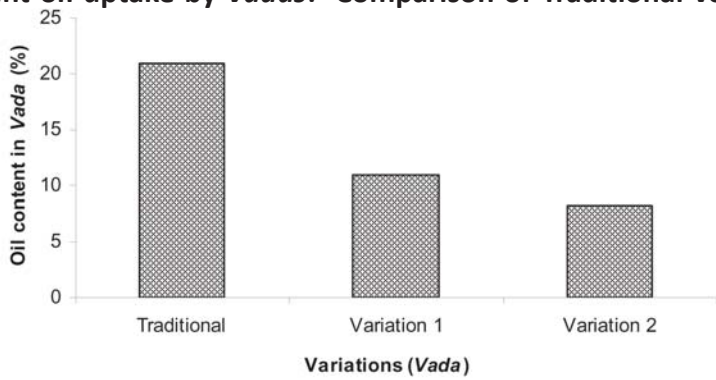


Figure 2: Percent oil uptake by *Vadas*: Comparison of Traditional verses two variations



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COMPARATIVE ANALYSIS OF SLOTTED MICROSTRIP ANTENNA USING FR4 AND ROGER MATERIAL FOR DUAL FREQUENCY BAND

- **Gursharan Singh, Manpreet Kaur and Jagtar Singh**

Abstract

In this paper a microstrip slotted antenna is designed and compared with two different substrates FR4 and Rogers RT/Duroid 5870. This designed antenna's patch consists of one H shape slot and two square slots, hence minimize return losses and improves gain and bandwidth. This antenna is operating on dual frequency band. The microstrip feed. The antenna with FR4 substrate has 2.4 db gain and 150 MHz bandwidth when it operates on 4.4 GHz and at the 5.6 GHz, it has 3.4 db gain and 250 MHz bandwidth. The return losses are -13db at 4.4 GHz and -25 db at the 5.65 GHz. When same dimension antenna is designed with Rogers RT/Duroid 5870 then it presents the 5.8db gain and 250 MHz bandwidth at the 5.6 GHz and when operated at 7.35 GHz, it has 6.2 db gain and 450 MHz bandwidth. The antenna model is simulated on Ansoft HFSS software.

Key words: *Slotted microstrip antenna, FR4 substrate, Roger RT/duroid.*

INTRODUCTION

In the recent years demand of small antennas has increased in wireless communication, so the interest of research work on compact microstrip antenna design[13]. The microstrip antennas are low cost, low profile, light weight, configure to planar and non- planar surfaces and easy to implement using printed-circuit technology [10],[9]. In the recent years, many techniques are use to improve the antenna parameters like efficiency, Bandwidth, Gain and reduce the return losses. To reduce losses and increase the bandwidth and gain, the thickness of substrate is increase, use of low dielectric substrate, use of various feeding methods and impedance matching techniques are used [10].One another method without these techniques is slotted patch antenna. In this method

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different slot passions have been introduced on the surface of patch element. For patch antenna without slot, the maximum current distribution center of patch. The effective area of conducting is reduces by extraction of slot in the patch [9]. In the previous researches different shapes slots are use in antenna patch. In this work, the antenna Patch extract with one H and two square slots. The antenna with same dimensions designed with two different substrates FR4 and Roger RT/ duroid 5870.The FR4 has dielectric permittivity 4.4[9].The Roger RT/duroid 5870 has dielectric permittivity 2.33[14].The FR4 has advantages provide a small size of antenna, but disadvantages high loss, low bandwidth and gain. The Roger RT/ duroid 5870 is a low loss substrate and it offers high gain, bandwidth.

II. ANTENNA CONFIGURATION

The antenna dimensions calculate by following:-

At first to calculate the patch length width first specify these three parameters:

$_r$,f_r, and h

After that Determine

W, L

$$W = \frac{\upsilon^0}{2fr}\sqrt{\frac{2}{\in r+1}} \quad (1)$$

^{0}= velocity of light

f_r= frequency

$_r$=Dielectric permittivity

$$\in_{reff} = \frac{\in_{r+1}}{2} + \frac{\in_{r-1}}{2}\ [1+12\ \frac{h}{w}]^{\frac{1}{2}} \quad (2)$$

r_{eff} = effective dielectric constant

$$L_{eff} = \frac{C}{2fo\sqrt{\in eff}} \quad (3)$$

L_{eff} = effective Length

$$\Delta L = 0.412h\ \frac{(\in reff+0.3)\left(\frac{W}{h}+0.264\right)}{(\in reff-0.258)\left(\frac{W}{h}+0.8\right)} \quad (4)$$

ΔL= length extension

$$L = L_{eff} - 2\Delta L \quad (5)$$

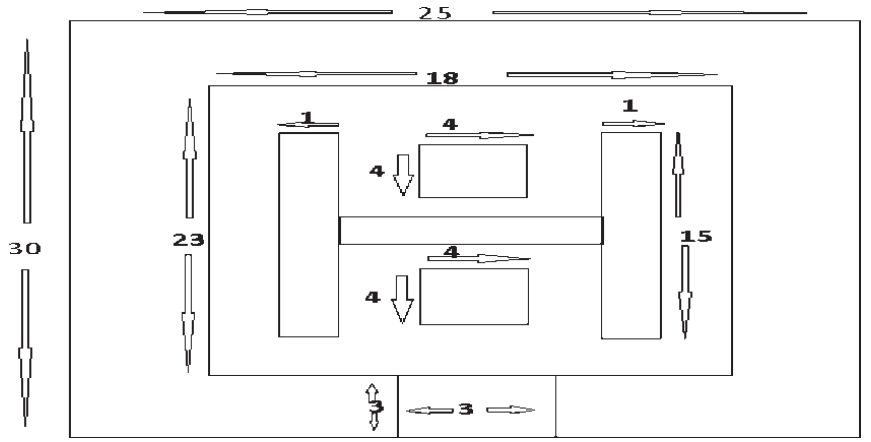


Fig. 1. Slotted antenna with H and two Square slots

Table 1. Various dimensions of antenna

Parameter	**Size in mm**
Size of substrate	30×25×2.2 mm
Size of patch	23×18mm
Size of strip	3×3mm
Length of arms Of H slot	15 mm
Width of all arms of H slot	1 mm
Length of center arm of H Slot	11 mm
Size of Upper Square slot	4 x 4 mm
Size of below Slot	4 x 4 mm
Size of ground plane	30×25 mm

The detail of dimensions of antenna is shown in the fig. 1. The antenna Patch consists one H and two square shape slots on different passions. Theses slots change current distribution on the surface. So by this antenna provide low return looses, high gain and large bandwidth.

III. RESULTS

Results using FR4 Substrate

The antenna designed used with FR4 substrate work on 4.4 and 5.6 GHz. The Return Losses are -13 db at the frequency 4.4 GHz and -25 db at the 5.65 GHz.

The VSWR value is 1.51 at 4.4 GHz and 1.10 at 5.65 GHz is shown in figure 2. These two parameters of antenna are sufficient value.

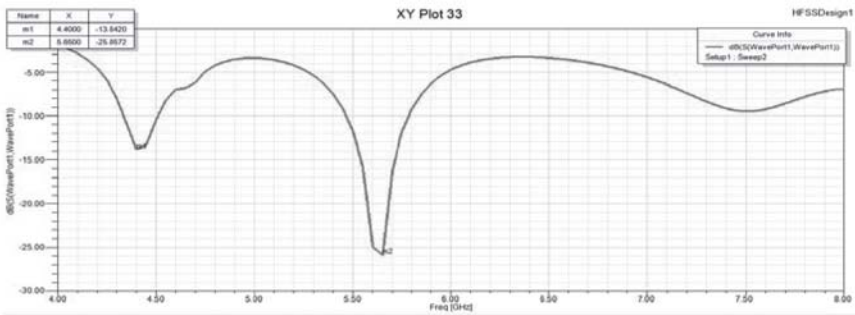


Figure 2 Return losses using FR4

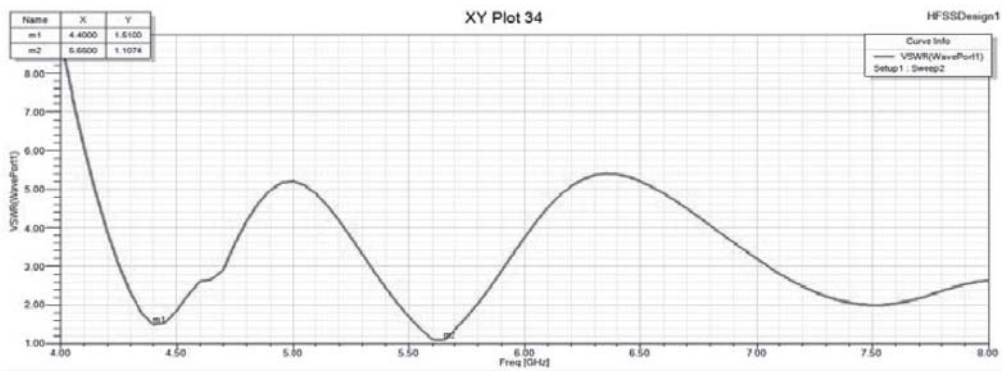
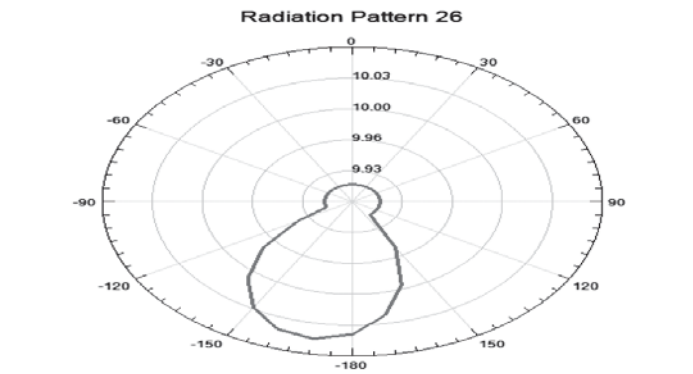
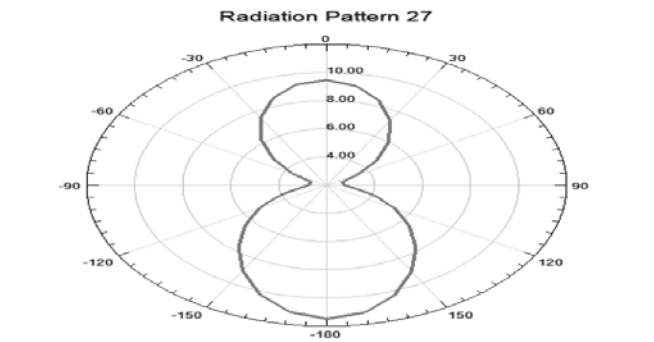


Fig.3 VSWR are on 4.4 and 5.65 GHz using FR4

The gain of antenna 2.5db at 4.4 GHz and 3.4 db at 5.65 GHz. This value of gain is acceptable value. This antenna gives bandwidth at 4.4 GHz 150 MHz and 250 MHz at 5.65 GHz. The radiation graphs are also shown in the figure 4.



4(a)



4(b)

Fig.4 Radiation pattern on 4.4 GHZ (a) and Radiation pattern on 5.65 GHz

Results using Roger substrate

Using the FR4 substrate obtained the good results, but the gain, bandwidth and efficiency are less. So in the further work with same dimensions antenna is design using Roger RT/duroid 5870 substrate. This substrate is Low dielectric permittivity, so it gives better results than FR4.

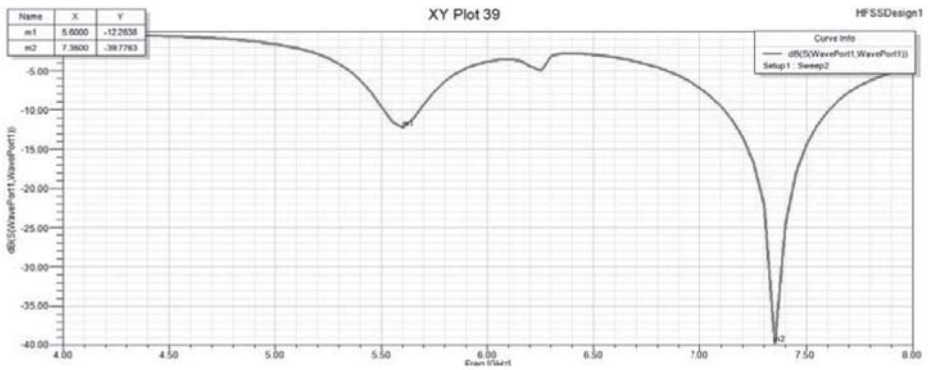


Fig. 5 Return losses using Roger RT/duroid 5870

When the substrate has change of same configuration antenna then the operating frequency of antenna is also change. Then the antenna is work on the 5.6 GHz and the 7.35 GHz. The Graph of Return losses is shown in figure 5. The slot antenna geometry has Return losses are -12 db at the 5.6 GHz and -39db at 7.35 GHz.

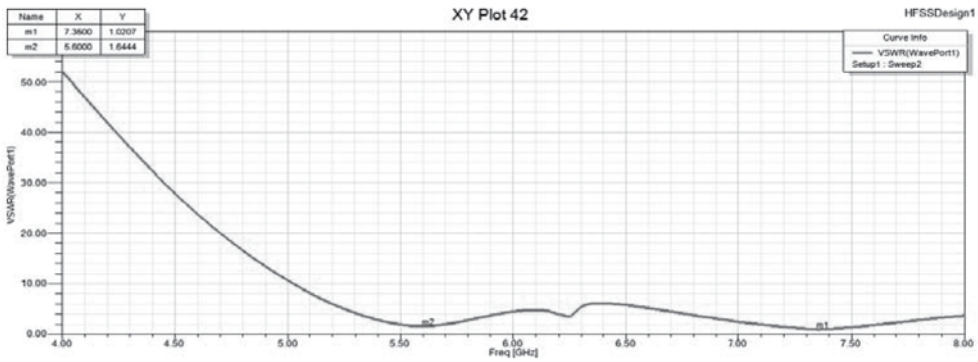
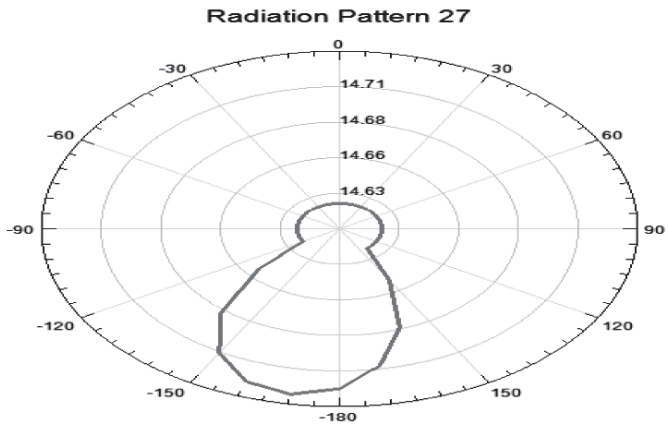


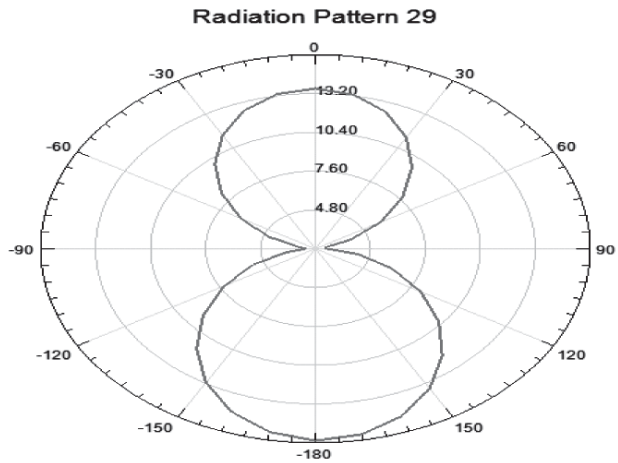
Fig.6 VSWR are on 5.6 and 7.33 Ghz using Rogers

The VSWR is 1.64 at the 5.6 GHz and 1.02 at the 7.3 GHz frequency bands. The acceptable value for the VSWR is less than 2. So this value of VSWR is sufficient for this microstrip antenna. The VSWR Occur due to mismatch in connections. So if the input impedance is good, then the VSWR value is also less. The high value of VSWR is not acceptable because the power is loss in the transmission line then the antenna does not radiate any power. The value of gain at 5.6 GHz is 5.6db and at 7.35 GHz is 6.2 db and the bandwidth is180 MHz at 5.6 GHz and 450 MHz at 7.35 GHz. These value of gain and bandwidth are high

compare to using FR4 material in same geometry. So it is observed that if the low dielectric material in microstrip antenna is use then it gives the high value of gain and bandwidth with low losses.



7 (a)



7(b)

Fig. 7 (a) Radiation pattern at 5.6 GHz and (b) Radiation pattern at 7.3 GHz using roger

Table 2 Comparison of FR4 and Roger substrate antenna

Substrates	Frequency band	Band width	Return Losses	VSWR	Gain	Radiation Efficiency
FR4	4.4GHz	150MHz	-13.8db	1.51	2.4db	77%
	5.65Ghz	250Mhz	-25.8db	1.10	3.4db	74%
Rogers	5.6Ghz	180Mhz	-12db	1.64	5.8db	82%
	7.35Ghz	450 MHz	-39db	1.02	6.2db	88%

CONCLUSION

At last, I reach the conclusion that the material which has low range dielectric permittivity is best for the microstrip antenna. The slots are used to improve the performance of antenna. In this research, the antenna designed with the Roger material has low losses, high gain and large bandwidth as compare to FR4.The antenna designed with FR4 substrate can operate 4.4 GHz and 5.6 GHz frequency bands. It provides 2.4db gain and 150 MHz bandwidth when it operate at 4.4 GHz and at 5.6 GHz it has 3.4 db gain and 250 MHz bandwidth. When the same antenna designed with the Rogers duroid RT/5870 then it gives the 5.8db gain and 250 MHZ bandwidth at the 5.6 GHz and when operated at 7.35 GHz this antenna provides 6.2 db gain and 450 MHz bandwidth. The results of Rogers duroid RT/5870 are better than the FR4. So now I can say that Roger substrate is best than the FR4 for the microstrip antenna design. These frequency bands come under the C-band. So this antenna is used for C-band applications.

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DESIGN OF RECTANGULAR MICROSTRIP ANTENNA FOR MULTIBAND SLITS

- Ramandeep Kaur, Manpreet Kaur and Jagtar Singh

Abstract

In this paper, a multiband rectangular microstrip antenna with slits using microstrip feed line is designed using Ansoft HFSS 11. The FR4 substrate with dielectric constant 4.4 is used as dielectric substrate. Antenna has ten slits with different length and one triangular slot. The slits in the antenna are placed to increase the current distribution and to reduce the return losses. The gain of an antenna is improved by the systematic placement of slits. The proposed antenna operates at multiband frequencies i.e. 3.25 GHz, 4.20 GHz, 4.40 GHz, 6.0 GHz. VSWR of the proposed antenna is less than 2 and at these frequencies, return losses are -23.26dB, -32.09dB, -27.1dB and -19.09dB at different operating frequencies. The proposed antenna can be for wireless applications such as WiMAX and WiFiapplications. Maximum gain of the proposed antenna is about 6.36dbs.

Keywords: *Microstrip Antenna, MicrostripFeedline, Multiband, Slits.*

INTRODUCTION

Antenna is one of the important parts of the wireless communication systems. The microstrip patch antenna is one of the recently developed types of an antenna. Nowadays, as the communication systems are rapidly changing from wired system to wireless [7], demand for microstrip antenna is increasing for dual band and multiband operations. Therefore, the field of antenna design has become one of the most attractive fields in communication and research. Wireless technology provides a flexible way for communication with low cost alternatives. A Microstrip patch antenna is a type of antenna that offers a low profile i.e. thin and easily manufactured, which offers a great advantage over

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conventional antennas [1][2]. A patch is typically wider than a feed and its shape and dimension are important features of the antenna.The shape of a patch may be rectangular, circular, elliptical, square etc [5]. Microstrip antennas are mostly appropriate for use as active antennas. Active antenna is an antenna having the essential components such as antenna element and a feeding circuit. Microstrip patch antenna has the advantages of light weight, low volume, low cost, compatibility with integrated circuits and is easy to fit on the rigid surface [3][6]. Furthermore, they can be easily designed to operate at dual-band and multi-band operations.

This paper focuses on using the meandering technique means introducing slits [4] to achieve multiple bands and improved return losses, which are based on increasing the length of current's distribution path on antenna surface [8]. The second target of proposed antenna is to increase antenna gain.

DESIGN METHODOLOGY

The proposed multiband microstrip antenna is intended using high frequency simulator structure i.e. HFSS tool. HFSS is a higher awarding full wave electromagnetic (EM) field simulator for random 3D volumetric inactive device model that takes advantage of the well-known Microsoft Windows graphical user interface. Ansoft HFSS can be used to calculate parameters such as S-Parameters, fields and Resonant Frequency. FR4 substrate material is used for the proposed antenna with dielectric constant=4.4, loss tangent= 0.02 and thickness h=2.6mm. The substrate material is placed above on the ground plane. The slits results in expansion of the current path for a fixed patch dimensions thus lowering the operating frequency. Equation 1 gives the relation of frequency and length of antenna.

$$F= \frac{C}{2Lp\sqrt{\in r}} \quad (1)$$

Given that, the size of antenna and frequency has inverse relationship, thus reducing the antenna size shifts operating frequency to the higher value. The slits are also used to operate the antenna at multiband frequencies [1]. The systematic arrangement of slits on the patch helps to improve the antenna parameters like gain, return losses and VSWR. The approximation states that the width and length of patch antenna can be modelled according to the specified central frequency by using the following equations [3].

$$W = \frac{C}{2F}\sqrt{\frac{2}{\in r+1}} \quad (2)$$

$$L = \frac{C}{2F\sqrt{\in_r}} - 2\Delta l \quad (3)$$

The gain of proposed antenna is 6.36 dB. A typical set of dimension for antenna design is given in table.

Table1. Various dimensions of antenna

Parameter	Size in mm
Size of substrate (FR4)	40×35×2.6 mm
Size of patch	32×31mm
Length of each slits	10mm,8mm,6mm,4mm,2mm
Width of each slit	1mm
Size of arms of triangle	7×8×7 mm

USING HFSS THE GEOMETRY OF THE MULTIBAND MICROSTRIP ANTENNA

In this proposed work rectangular microstrip antenna using one triangular slot and slits is designed. In this configuration the slits are placed on the surface of patch carefully and systematically to improve gain of antenna at each frequency and also improves the return losses and VSWR. This antenna operates at four different frequencies. The proposed antenna gives the advantage of multiband operations.The FR4 substrate material is used whose dielectric constant is 4.4.

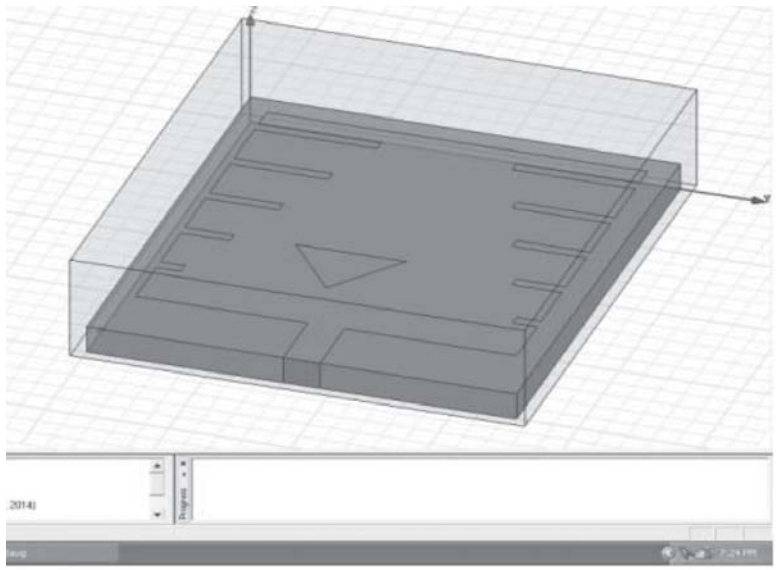

Figure 1: Geometry of Proposed antenna

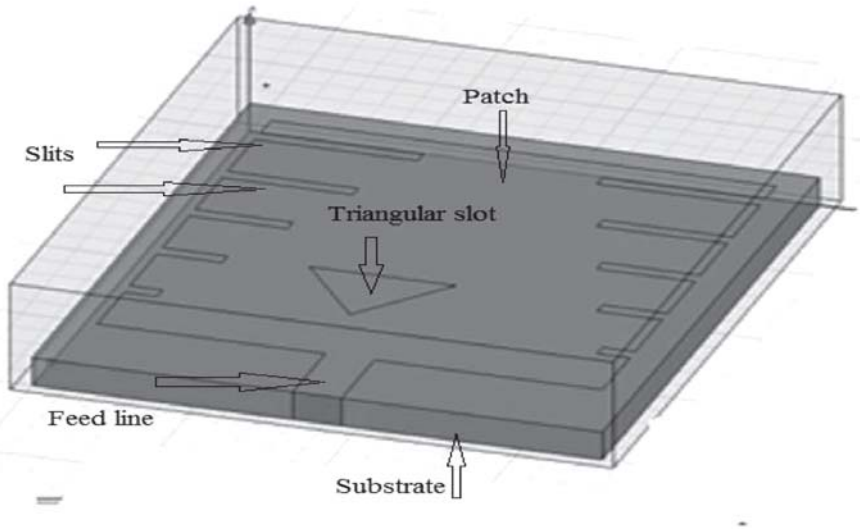

Figure 2: Isometric view of the multiband microstrip antenna

RESULTS

The proposed antenna using slits are simulated by software Ansoft HFSS 11.0. The HFSS software is used to calculate the return loss, VSWR and gain etc. The simulated Return Loss at different frequencies is shown in figure 3. The return losses are improved up to -32.09dB. At frequency 4.20GHz the value of return loss is -32.09 dB, at other frequencies such as 3.25GHz, 4.40GHz and 6.0GHz the corresponding return losses are-23.28dB, -27.61dB and -19.09dB.Bandwidth for different frequencies is 100 MHz, 150MHz, 150MHz, 300MHz.

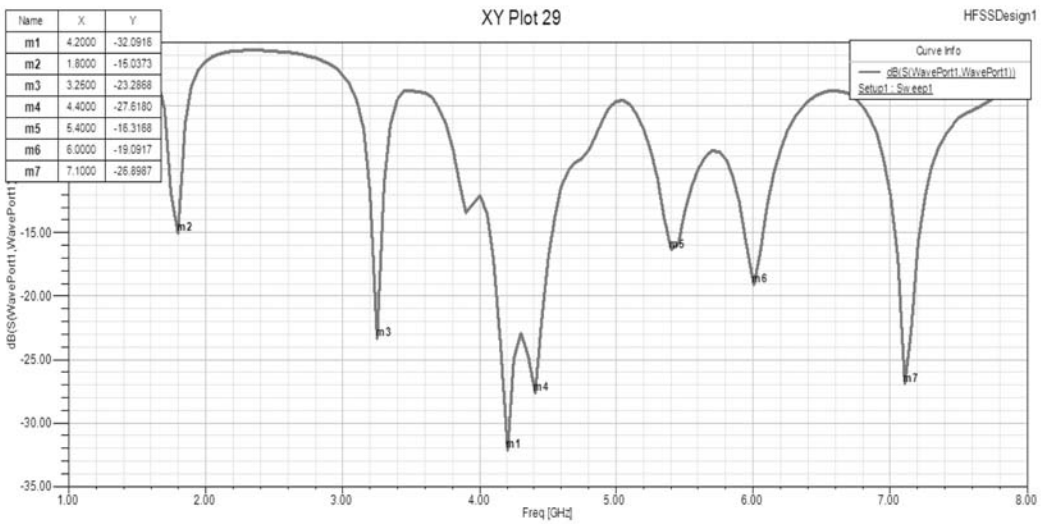

Figure 3: Return Losses or S-Parameter

From the reflection coefficient the voltage standing wave ratio is calculated for different frequencies. The range for VSWR should be between 1 and 2. This proposed antenna satisfies that requirement means VSWR of different frequencies is between 1and 2. The VSWR for this proposed antenna is 1.05. The figure 4 describes the VSWR.

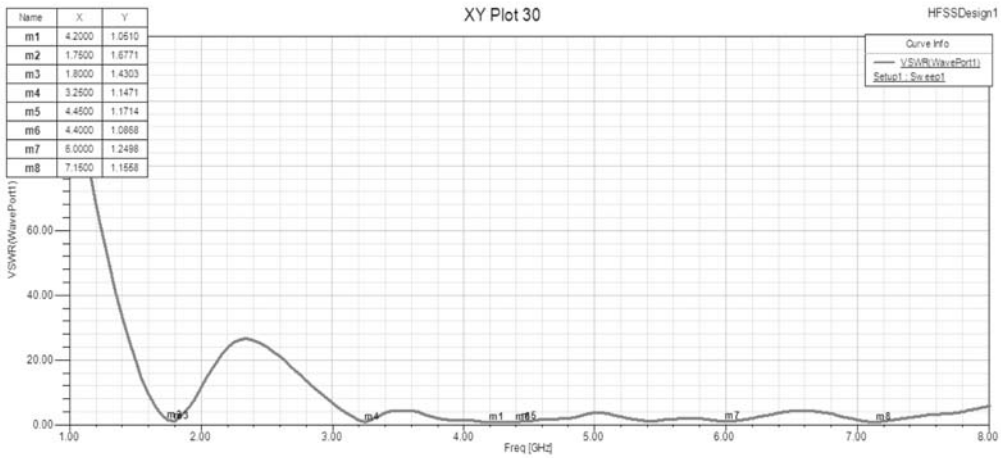

Figure 4: VSWR of Multiband Microstrip Antenna

Figures 5,6,7 shows the radiation pattern for the multiband microstrip antenna using slits with a gain of up to 6.36dB. It is observed that the gain of antenna increases with the systematic arrangement of slits.

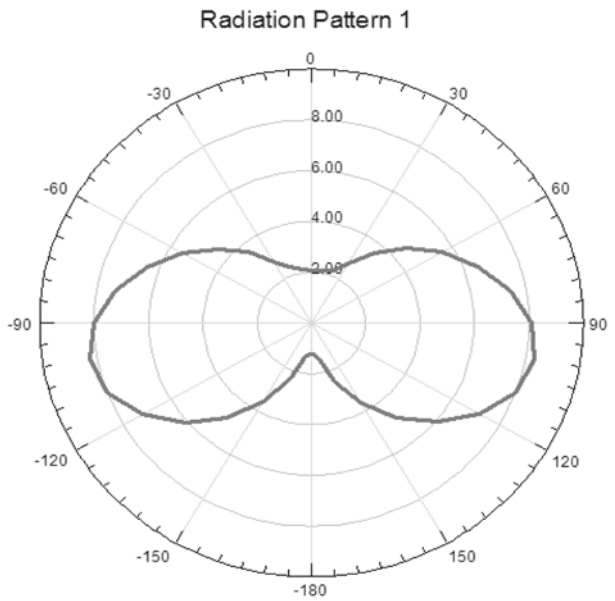

Figure 5: Radiation Pattern at 4.20 GHz

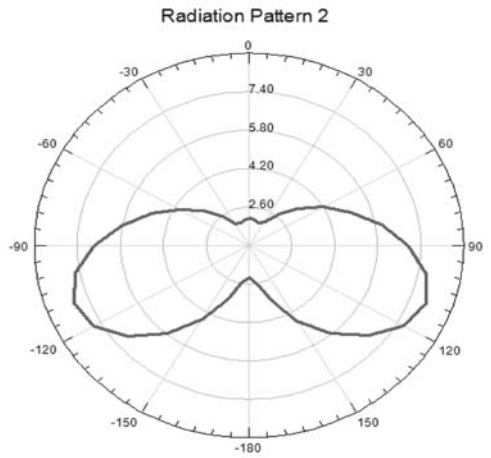

Figure 6: Radiation Pattern at 4.40 GHz

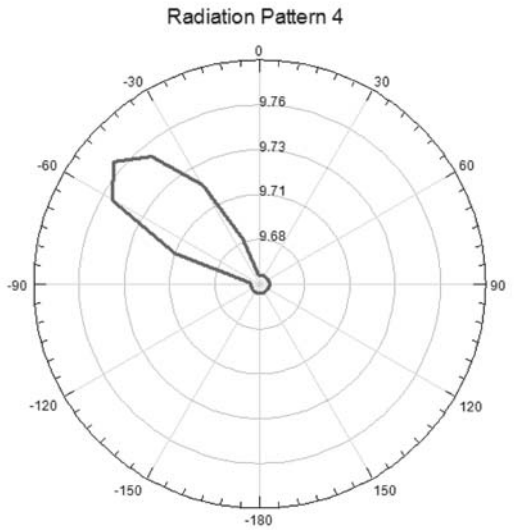

Figure 7: Radiation Pattern at 6.0 GHz

CONCLUSION

A rectangular microstrip antenna having triangular slot and slits with small microstrip line feed is proposed. In this antenna slits are arranged in a systematic manner which improves the overall antenna performance. Slits at the corners increase radiating edges which results in improved gain and reduces return

losses. The proposed antenna is used for wireless applications,WiFi and WiMAX applications. The antenna with more number of slits can operate further in more number of frequency bands and with the systematic slit pattern, the gain and return losses can be improved.

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ENHANCEMENT IN AODV ROUTING PROTOCOL TO REDUCE LINK FAILURE PROBLEM IN MANET

- Arjot Kaur and Manpreet Kaur

Abstract

The wireless ad hoc network is the self configuring network; where mobile nodes can leave or join the network when they want. There are various types of routing protocol in MANET, by using these protocols communication can be possible. I use AODV protocol for the transferring data. But there is a problem in AODV routing protocol i.e. link failure problem which is responsible for degrade the performance of the network. So we proposed a new method is knowledge based learning and implement the ACO algorithm. In our proposed technique we follow that path only which has the highest signal strength. Second assumption is based upon the hop count similar as AODV protocol. The path which has the minimum hop count is considered as the final path. Third assumption is based upon the sequence number. The experimental results show that, proposed technique has minimum packet loss, less energy consumption, minimum delay and highest throughput in the network when compared to the results of link failure, ACO and KBL technique.

Keywords: *AODV, Link failure, MANET, Routing protocols.*

INTRODUCTION

A network is a group of two or more communication systems which are linked together for the exchange of information. The physical connection between networked communication devices is established using either cable media or wireless media. When number of devices are joined together to exchange information they form networks and share resources. Networking is used to share information like data communication. Wireless Network term refers to a kind of networking that does not require cables to connect with devices during

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communication. In case of wireless communication medium are radio waves. World Wide Web application is supported by Computer Network. It is used to share emails and instant messages and storage servers, printers and fax machines. The wireless network offers certain advantages over the wired networks that are as follows:

- It is very easy and fast to set up a wireless system and it eliminates the need for wires and cables.
- Wireless networks can be extended to the places that cannot be wired.
- It adapts easily and is more flexible to changes in the configuration of the network.

MANET stands for Mobile Ad hoc Network. It is a robust infrastructure less wireless network. It can be formed either by mobile nodes or by both fixed and mobile nodes. Nodes are randomly connected with each other and form arbitrary topology. They can act as both routers and hosts. their ability to self-configure makes this technology suitable for communication. For example, disaster-hit areas where there is no communication infrastructure or in emergency search and rescue operations where a network connection is urgently required. In MANET routing protocols for both static and dynamic topology are used**.**

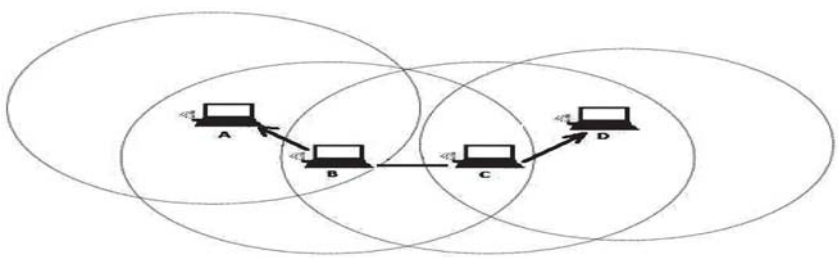

Fig.1: MANET

An ad hoc network is a wireless network described by the nonexistence of a centralized and fixed infrastructure. The absence of an infrastructure in ad hoc networks poses great challenges in the functionality of these networks. Therefore, we refer to a wireless ad hoc network with mobile nodes as a Mobile Ad Hoc Network. In a MANET, mobile nodes have the capability to accept and route traffic from their intermediate nodes towards the destination, i.e., they can act as both routers and hosts. More frequent connection tearing and re-associations

place an energy constraint on the mobile nodes.It is one of the types of ADHOC network.

There are mainly two types of routing protocol available. These are as following:

1. Proactive Routing Protocol (Table-driven)
2. Reactive Routing Protocol (On- demand)
3. Hybrid

BACKGROUND AND RELATED WORK

Wireless networks are increasing in popularity. With current advances in technology, the architecture of such networks is not based on centralized base station but on each node which acts like a router and forwards packet data to other nodes in the network. The movement of the nodes is the important characteristic of the ADHOC network [2]. Due to the mobility of any node or source node, there is a result of link failure in the network. This problem can be solved by using local repair procedure for path updating using NS2 simulator [3]. The ADHOC network has many types like WSN, MANET and MESH Networks. MANET also has different types likes VANET and other sensor networks [6]. The various design possibilities for AODV implementation and development of the on demand routing protocols are discussed by IAN D.CHAKERE [9]. MANET or ADHOC network having many applications in the fields of communication, mass media and military areas [11]. Problem occurs during the data transfer that is link failure. ACO technique is used to overcome this problem. The routing table at each node will collect the additional information of next two nodes, which can be updated by RREP. In case of link failure an alternate route for next to next node can be searched by using ACO. Using this method END TO END delay can be least and throughout is maximum. Control of packets using forward and backward ants (RREPs and RREQs)[12]. The performance of the network is disturbed due to the problems in movement of nodes in MANET. So to overcome this problem they address the new technique that is **Ant Colony Algorithm(ACO)** that is inspired from the social insects [14]. This technique is ACO and is further used by many researchers.

LINK FAILURE IN AODV

Link failure is a main problem in AODV which is responsible for the performance degradation and packet lost. Suppose we have number of nodes in our network. Source is host node from where data has to be sent and destination node is final node. Any active node is responsible for the updating of table entry. When source node moves, new route discovery is initiated. If intermediate nodes or the destination move then following conditions possible:

1. The next hop links break resulting in link failures.
2. Routing tables are updated when link failure occurs.
3. All active neighbors are informed by Route Error message.

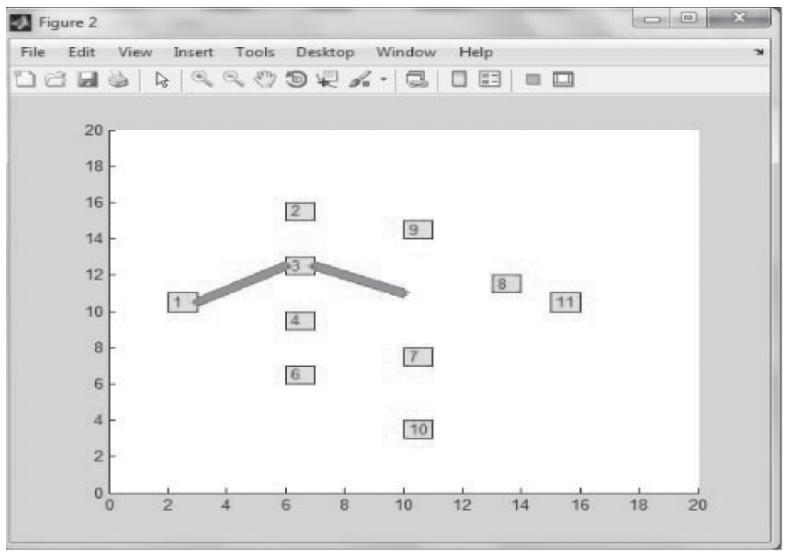

Fig.2: Link failure Problem

Link between node3 and node8 breaks. Now node3 invalidates route node8 in the route table. Node3 creates Route Error message and lists all destinations that are now unreachable and sends to upstream neighbor this message0.

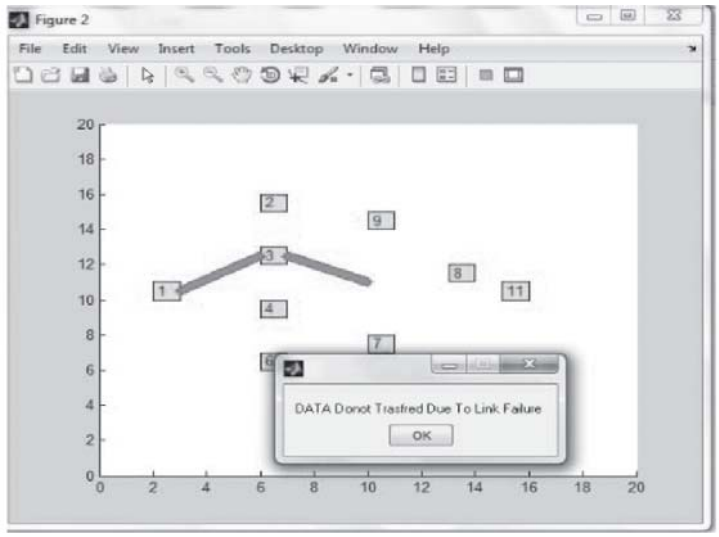

Fig. 3: Data transfer fails due to link failure

RESULTS AND SIMULATION

I proposed a KBL technique for the better performance of the ADHOC Network. In this proposed work, enhancement of AODV protocol takes place by using knowledge based learning. In this proposed work, consider a new path for transferring data. In case of MANET nodes are free to move anywhere. There is no central controller in the system. Data is transfered from source to destination. In AODV protocol, with the help of RREQ message data is broadcast. RREP message is sent back from destination to source as a response. Header part is added within RREQ message which helps to find out the destination. To find out the best path first assumption is based upon the signal strength. Source node checks the visibility of the adjacent nodes and those nodes further check the visibility of their adjacent nodes. After that source finds out the average of the path. The path which has the maximum average value is selected as the final path. This value lies 1 to 10. So this will overcome the problem of link failure. This proposed technique follows that path, which has the highest signal strength. Second assumption is based upon the hop count similar as AODV protocol. The

path which has the minimum hop count is considered as the final path. Third assumption is based upon the sequence number. The fresh sequence number nodes path will be selected as final path. So in this way with the help of signal strength best path will be selected in enhanced AODV. This will help to improve the performance of system than simple AODV could. So through by this proposed technique, consider the path through node1, node3, node7 and node 11(destination node) by KBL technique. These nodes have the highest signal strength. So best path is considered for the improved performance of the AODV protocol.

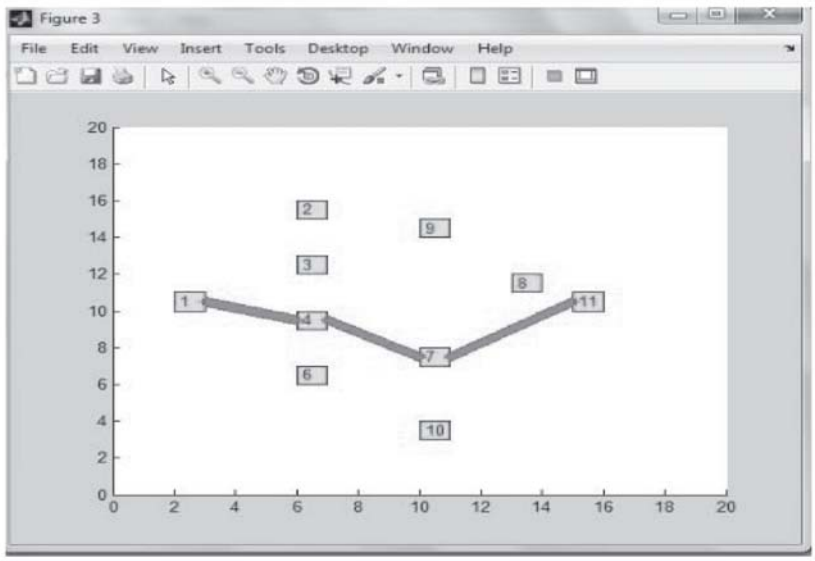

Fig. 4: data is send by using KBL

Experimental Results

As illustrated in fig. 3, in case of link failure there is consumtion of more energy as more messages are exchange between them. New technique consumes less energy.

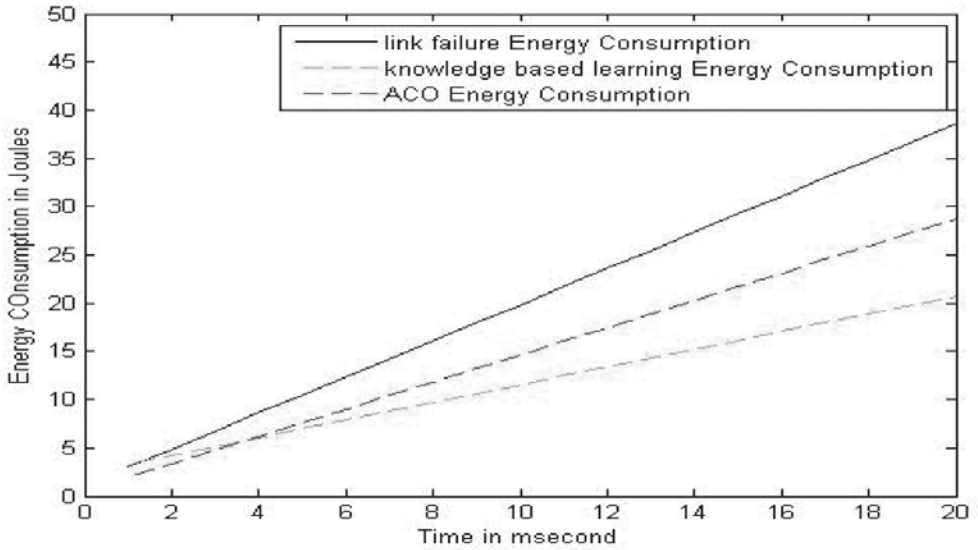

Fig. 5: Energy consumption graph

During link failure problem packet loss occurs in old AODV. But this problem can be overcome by signal strength in enhanced AODV. Graph shows that in case of link failure large number of packet loss occurs as compared to new proposed technique.

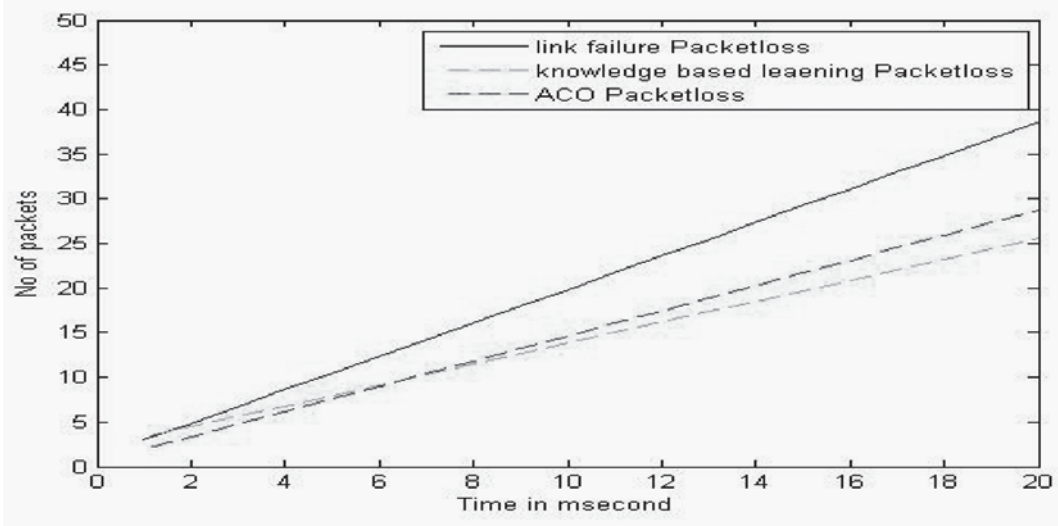

Fig. 6: Packet loss

Delay graph represents that old AODV has more delay than new AODV. Thus transmission is fast in new AODV which helps to improve performance.

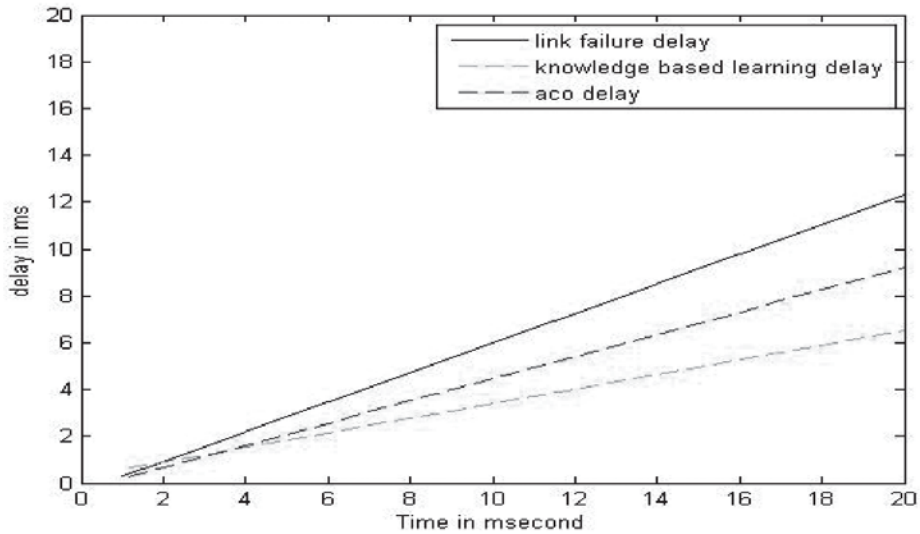

Fig. 7: Delay

During link failure the throughput is very less. When new proposed technique is used then there is improvement in the throughput. Throughput is increased in case of enhanced AODV protocol. Throughput is 1000bytes per second.

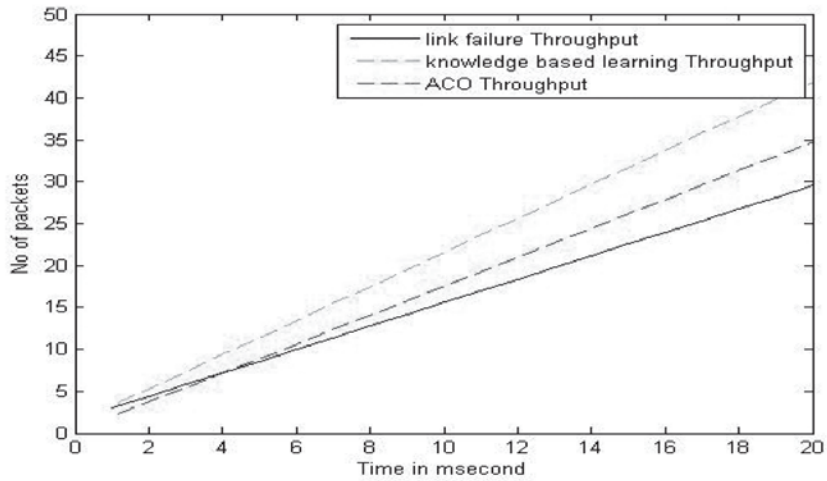

Fig. 8: Throughput

Noise is also less in case of improved AODV protocol. So by using knowledge based learning technique all parameters are improved.

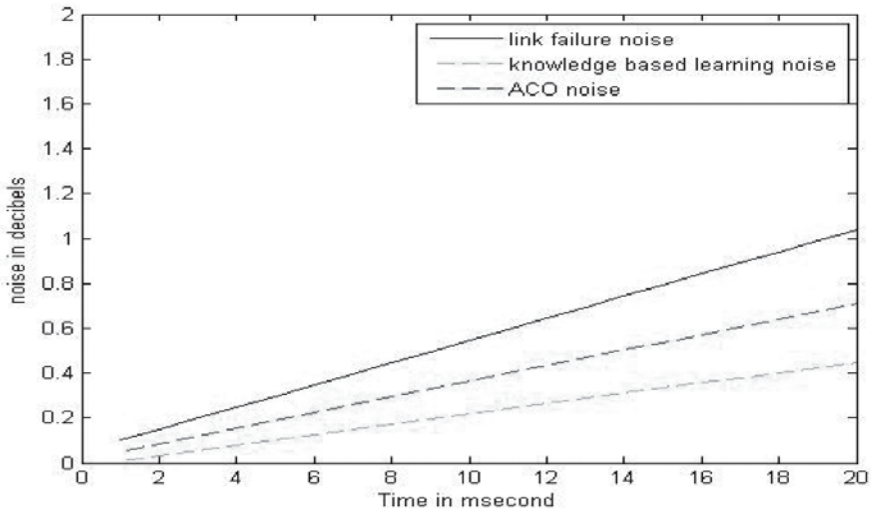

Fig. 9: Noise

CONCLUSION AND FUTURE WORK

AODV is used to find out the path of the data transfer. But simple AODV has the problem when the nodes move. Enhancement in AODV is required so as to overcome the problem of link failure during data transfer from host to destination. First of all mutual authentication is required between the mobile nodes to prevent the various inside and outside attacks. When the mobile nodes are mutually authenticated, it leads to the reliable data transmission between the mobile nodes. But the main problem occurs during the failure of the link. Due to link failure packet is lost easily. In proposed work, enhancement in AODV concept is important. This protocol is designed to provide best path according to signal strength. The path which has maximum signal strength will be choosed as a final path. This work will helps to reduce the problem occur in link failure and packet lost problem. Now the performance degradation problem will also improve. In new AODV, route selection is based upon the signal strength. The maximum signal strength nodes are considered as final routes.

In future more efficient protocols can be used rather than AODV protocol. Noise can be more efficient. Number of nodes can be more.

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DESIGN, OPTIMIZATION AND SYNTHESIS OF DECODER USING REVERSIBLE LOGIC

- Sukhdeep Kaur and Ashwani Kumar Singla

Abstract

In this paper,the performance of reversible decoder using reversible logic is analysed. FG, NFT and MFG gates are utilized and implemented on Tanner tool v13.0 software. The number of constant inputs, garbage outputs and quantum cost are improved as compared to existing reversible decoder. The 2:4 proposed systems implemented using FG, NFT and MFG gates have improvement over existing decoder in terms of constant inputs, garbage outputs and quantum cost are, 50%, 50% and 16.66% respectively. In 3:8 decoder there is improvement in constant inputs by 25% and for garbage outputs improvement is 33.33%. Quantum cost is improved by 9.37%. In 4:16 decoder constant inputs, garbage outputs and quantum cost are calculated.

Keywords: *Constant Inputs, Decoder, Garbage Outputs, Quantum Cost, Reversible Logic*

INTRODUCTION

Reversible logic is appealing in present technology due to its less heat dissipation characteristics. In digital circuits, heat dissipation becomes the critical limiting factor. Higher levels of integration and new fabrication processes decreases the energy loss over last decades. The energy loss in digital structures can be reduced by using reversible logic gates. Reversible circuits are those circuits that conserve information. In these circuits no information can be lost [1]. Reversible computing relates to the recycling to computing. Reversible computing has been found to be useful in quantum computation. Reversible computing can

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be outlined by two concepts: logical reversibility and physical reversibility [2]. **Logical reversibility** is that in which a system can be able to return to its initial state from its final state. In logical reversibility it is possible to retrace data of earlier stage and reconstruct data for every step of computation [3].**Physical reversibility** is that in which there is no energy dissipation in circuits. It ameliorates the performance of digital logic designs. The device can actually operate in backward direction i.e. each process exchanges no energy to heat and produces no entropy [3]. Landauer has proved that kT ln 2 joules of energy are dissipated for irreversible computation, where k Boltzmann's constant and T is absolute temperature. The amount of energy dissipation in computation operation increases in direct proportion to the number of bits that are erased during computation operation. In 1973, Bennett concluded that energy loss would not take place if computation were carried out in reversible mode. Reversible computing can be achieved by using reversible gates in the system [4] [5].

REVERSIBLE GATES

A gate is reversible; if the logical function it realizes has distinct output assignment for each distinct input vector i.e. bijective operation takes place in reversible gates. In reversible gates the inputs can be uniquely reproduced from its outputs. Reversible gates are balanced and there must be one to one mapping between inputs and outputs of reversible gates[6] [7].

NOT GATE: It is the simplest reversible gate and has only one input and one output. It is a 1*1 reversible gate with zero quantum cost.

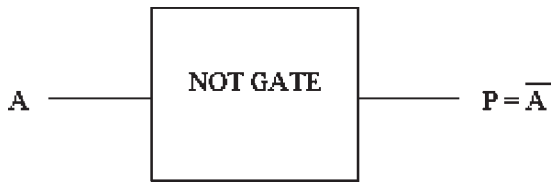

Figure 1: Block diagram of the NOT GATE

FEYNMAN GATE: It is also known as CONTROLLED NOT(CNOT) gate. It is a 2*2 reversible gate with quantum cost of one.

Figure 2: Block diagram of the FEYNMAN GATE

TOFFOLI GATE: It is one of the most popular 3*3 reversible gates with three inputs and three outputs. It is also known as Controlled-CNOT reversible gate i.e. if two control inputs are both one ,then third input is inverted else original signal is passed at output. It has quantum cost of five [8].

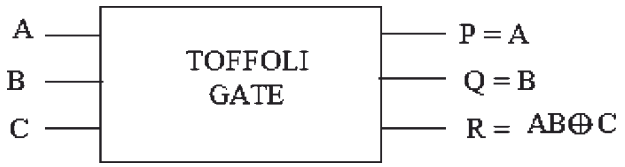

Figure 3: Block diagram of the TOFFOLI GATE

FREDKIN GATE: It is a 3*3 reversible gate with three inputs and three outputs. It is also known as Controlled-Swap gate i.e. if the control bit is equal to one then the two input bits are swapped at the output. It has quantum cost of five [8].

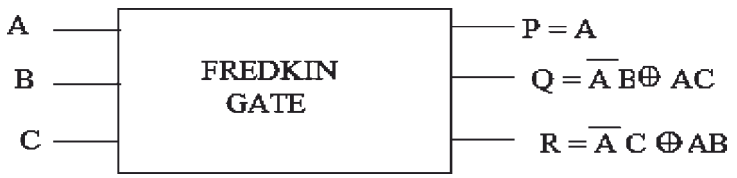

Figure 4: Block diagram of FREDKIN GATE

PROPOSED DECODERS USING FG, NFT AND MFG REVERSIBLE GATES

In the proposed work there will implementation of decoder by using different reversible gates to reduce the number of constant inputs and garbage outputs of the existing system. In proposed system, there will be less quantum cost and delay. There will performance analysis of decoder to compare the improvements in proposed system over the previous work. In the proposed work firstly there will implementation of 2:4 decoder by using different reversible gates, then 3:8 decoder will implement by using different reversible gates and compared with existing system. There are improvements in constant inputs, garbage outputs and quantum cost in this work. A 4:16 decoder will implement by using new reversible gates and compared with previous work and conventional decoder.

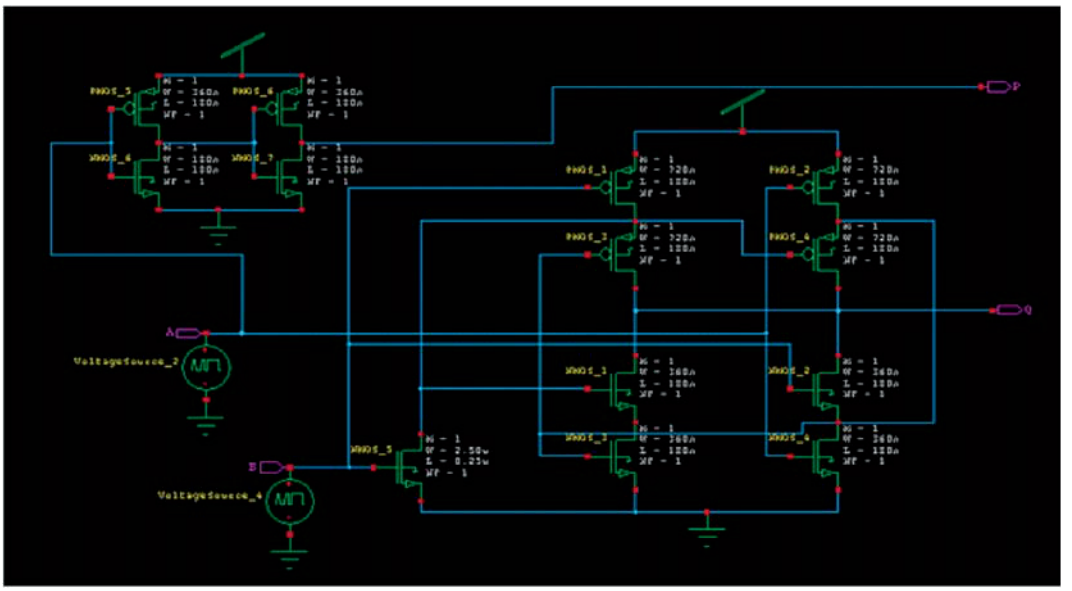

Figure 5: Circuit diagram of Feynman gate

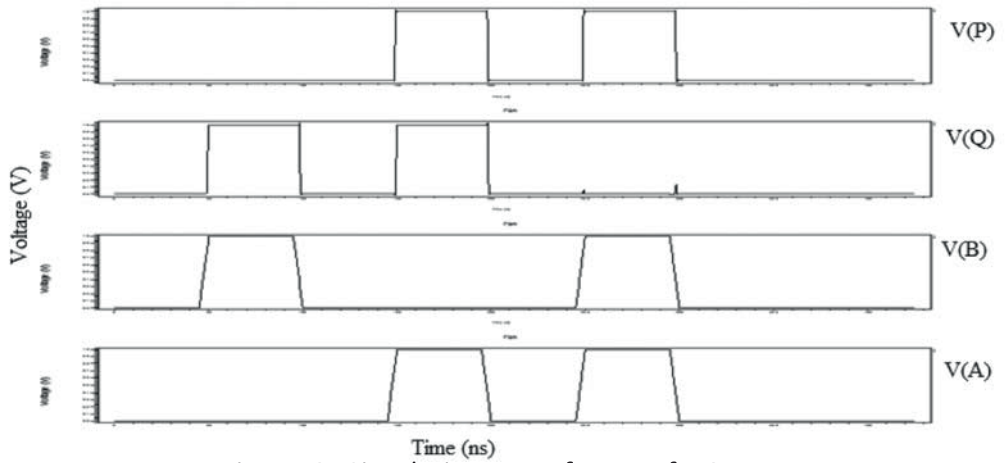

Figure.6: Simulation waveforms of FG gate

Novel Fault Tolerant Gate (NFT)

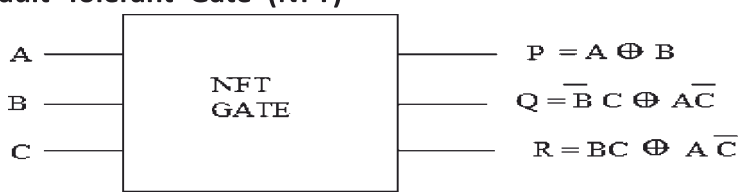

Figure 7: Block diagram of NFT GATE

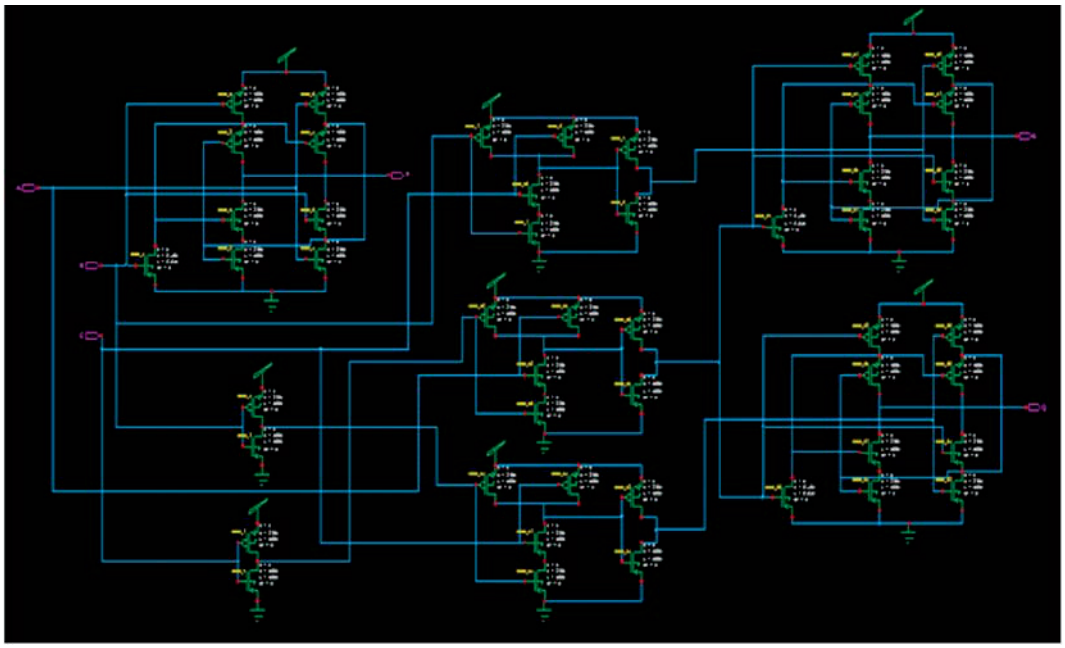

Figure 8: Circuit diagram of NFT gate

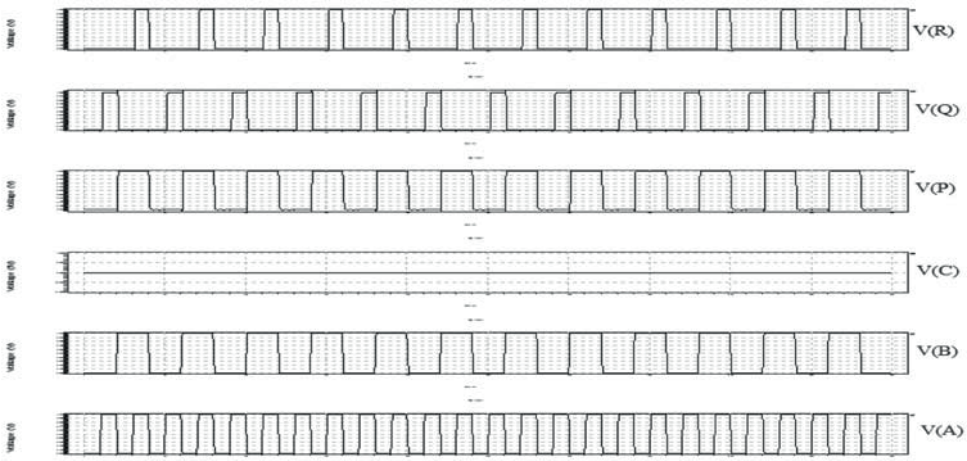

Figure 9: Simulation waveforms of NFT gate

Modified fredkin gate(MFG)

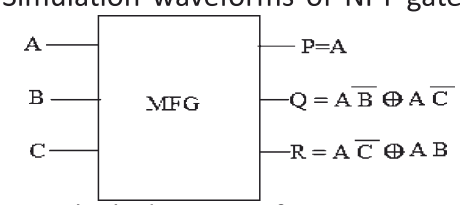

Figure 10: Block diagram of MFG gate

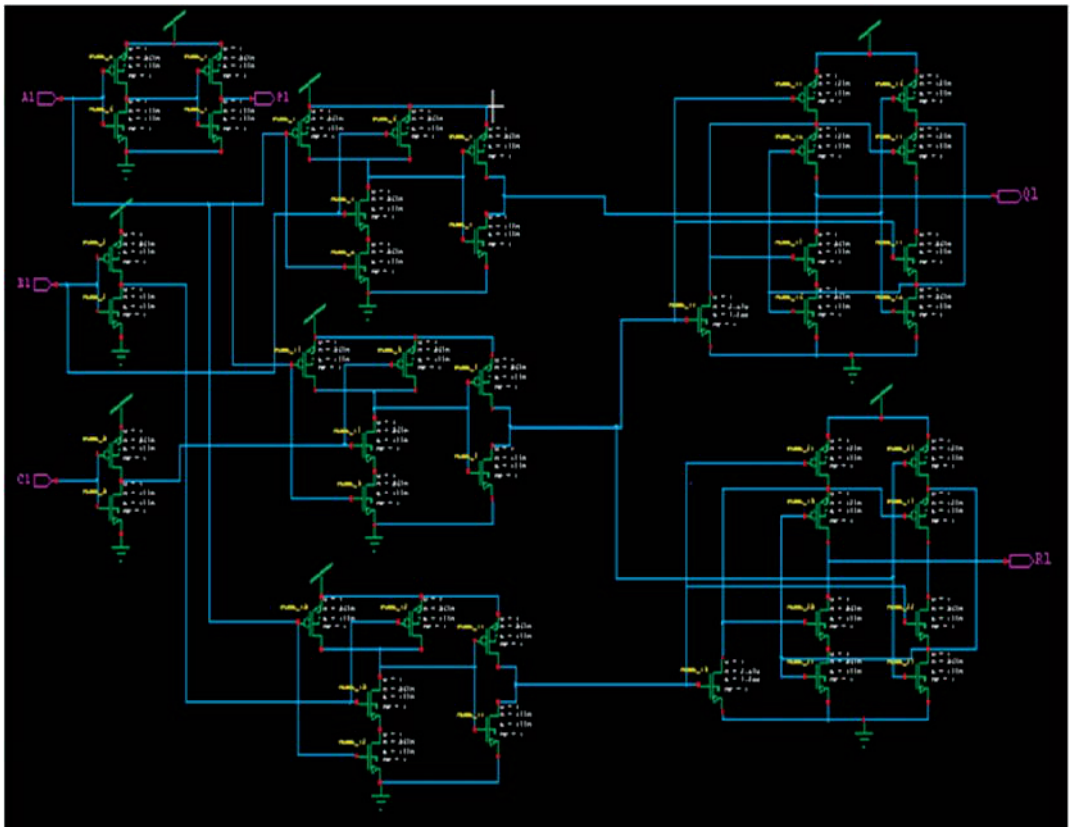

Figure 11: Circuit diagram of MFG gate

Figure12: Simulation waveforms of MFG gate

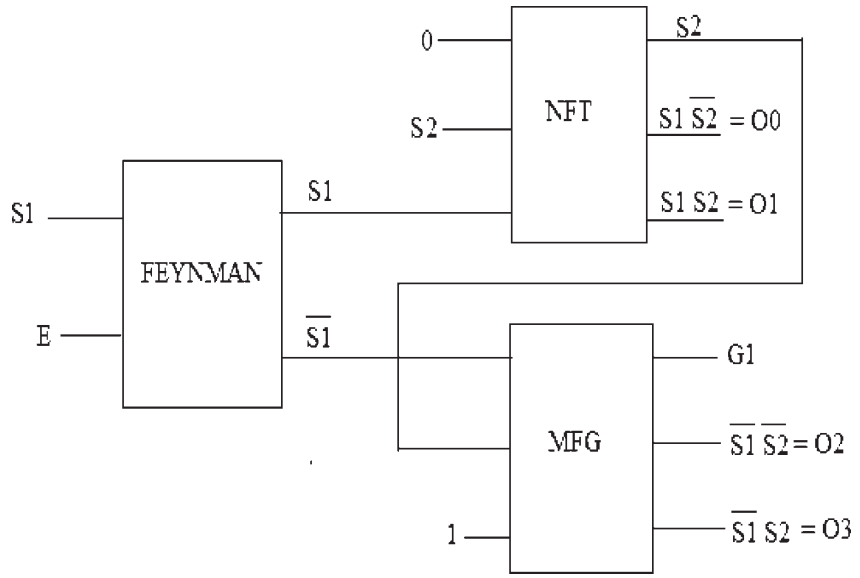

Figure 13 : Block diagram of the 2:4 reversible decoder with FG,NFT and MFG gates

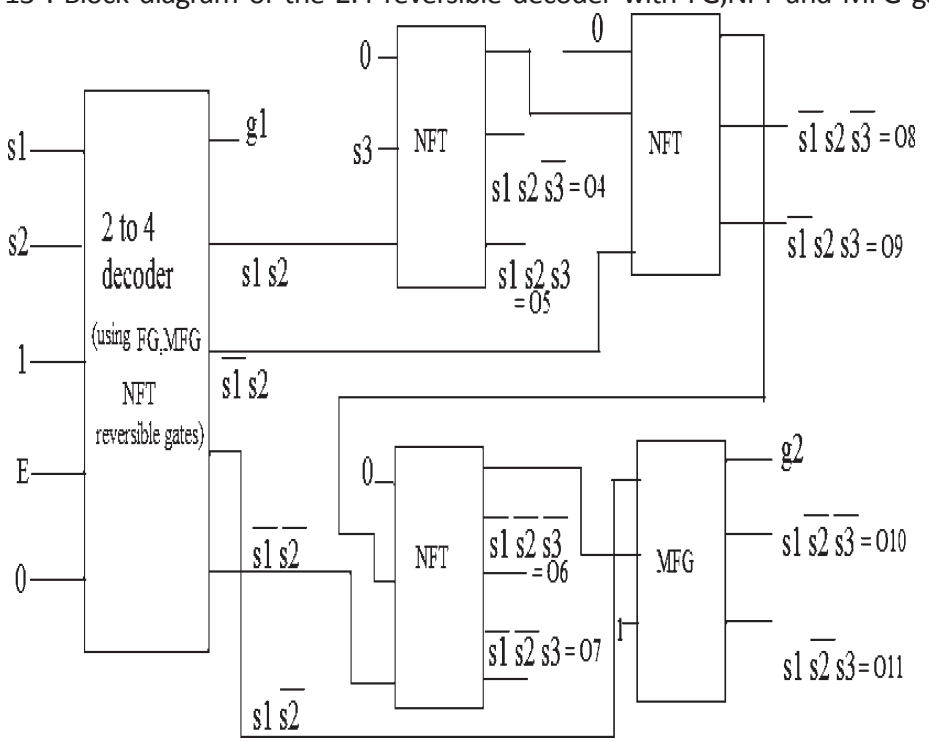

Figure 14: Block diagram of the 3 to 8 reversible decoder using FG,NFT and MFG gates

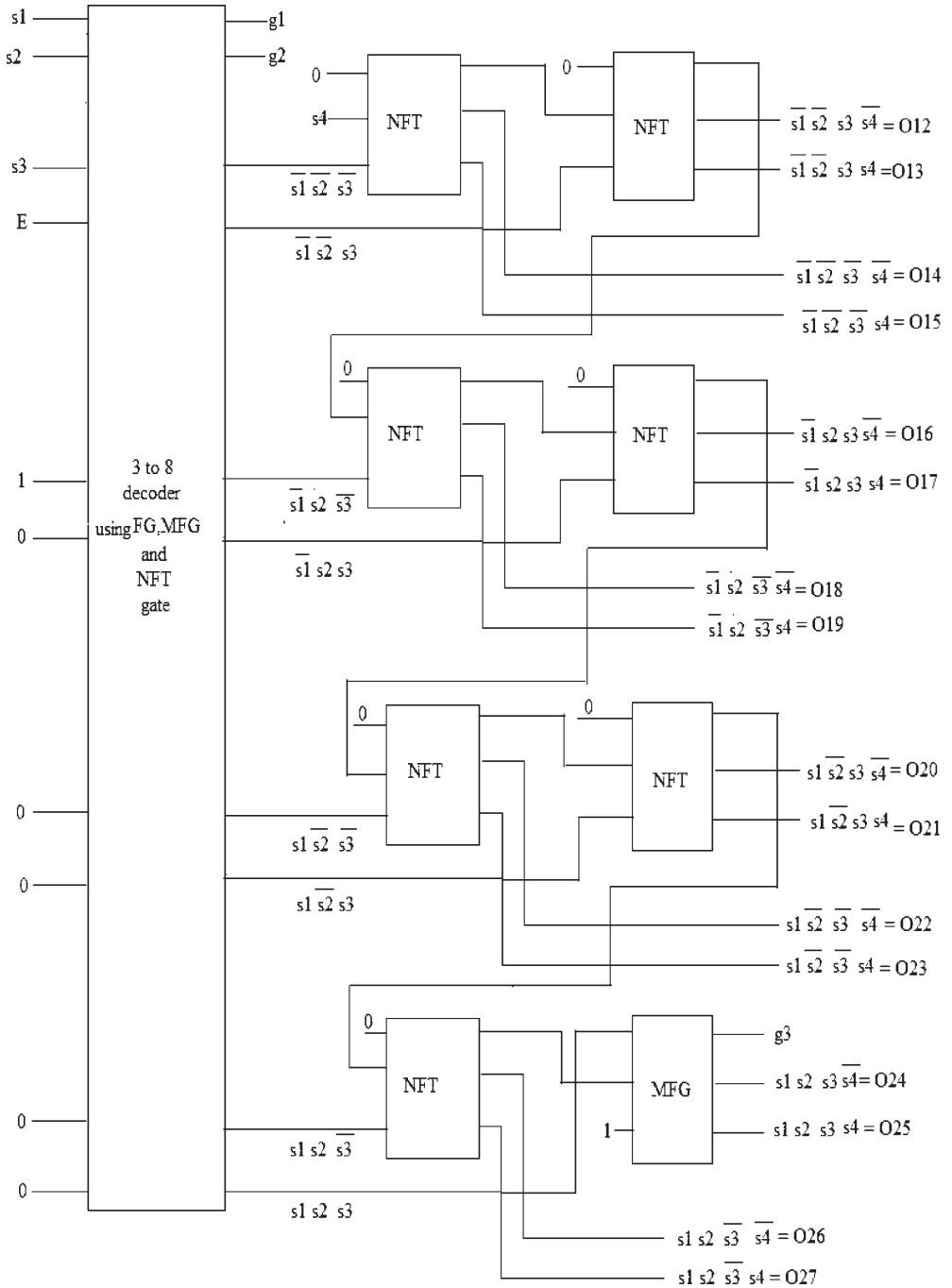

Figure 15: Block diagram of the 3 to 8 reversible decoder with FG,NFT,MFG gates

3. Results

TABLE 1

COMPARISON OF 2:4 REVERSIBLE DECODERS IN EXISTING AND PROPOSED WORK

	CONSTANT INPUTS	GARBAGE OUTPUTS	QUANTUM COST
Using F2G and FRG Existing Circuit[9]	4	2	12
Using FG,NFT and MFG(Proposed)	2	1	10
Improvement (%) w.r.t [9]	50	50	16.66

TABLE 2

COMPARISON OF 3:8 REVERSIBLE DECODERS IN EXISTING AND PROPOSED WORK

	CONSTANT INPUTS	GARBAGE OUTPUTS	QUANTUM COST
Using F2G and FRG Existing Circuit [9]	8	3	32
Using FG,NFT and MFG(Proposed)	6	2	29
Improvement (%) w.r.t [9]	25	33.33	9.37

TABLE 3

COMPARISON OF 4:16 REVERSIBLE DECODERS IN PROPOSED WORK

	CONSTANT INPUTS	GARBAGE OUTPUTS	QUANTUM COST
Using FG,NFT and MFG (Proposed)	14	3	68

CONCLUSION

The reversible decoder using Feynman, NFT and MFG reversible gates is proposed to improve the performance of reversible decoder and is compared in terms of constant inputs, garbage outputs and quantum cost to the reversible decoder proposed by Md. S. Sujjoha et al. in [9]. The 2:4 and 3:8 proposed decoder is better in terms of quantum cost than previous and there is reduction in number of constant inputs and reduction in number of garbage outputs which affect the performance of decoder. In proposed 4:16 decoder there is fourteen

number of constant inputs and circuit have quantum cost of 68. The proposed circuit produces three garbage outputs. Constant inputs and garbage outputs should be kept as minimum as possible for better performance of circuit. Minimizing the number of constant inputs and garbage outputs is one of the main tasks while using reversible logic. In conventional 4:16 decoder 16 four-input AND gates are used which are irreversible. For each AND gate, there is loss of three bits of information i.e. for all AND gates 48 bits are erased in 4:16 conventional decoder. So, in conventional 4:16 decoder more power is consumed as compared to proposed reversible decoder. The presented decoder produces less number of constant inputs and garbage outputs that is an improvement over previous ones. But in reversible decoder there are equal number of inputs and outputs i.e. no bit is erased during computation so there is less power consumption in reversible decoder.

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COMPARATIVE ANALYSIS OF OCTAGON SLOTTED AND UNSLOTTED PATCH MICROSTRIP ANTENNA USING TEFLON FOR MULTI FREQENCY BAND APPLICATIONS

- Simran Singh, Manpreet Kaur and Jagtar Singh

Abstract

In this paper design and compare slotted and Unslotted hexagonal patch microstrip antenna by using microstrip feed line which is easy impedance matching to 50 ohm and simulated with the help of HFSS 11 software. The proposed antenna have compact in size the total size of antenna 30 × 31 ?mm?^2 and teflone used as substrate material have dielectric constant 2.2.Due to lower dielectric constant provide higher operating bandwidth. This antenna can designed for C-band and X-band applications whose range is from 4-8 GHz and 8-12 GHz. The antenna design with slot on patch has 4.2db gain , return loss-11.96 dB and 290 MHz bandwidth when it operate on 4.35 GHz and at the 7.55 GHz it has 3.2dB gain , return loss -13.53dB and 330 MHz bandwidth and at 10.3 GHz it has 7db gain , return loss -26.72dB and 1100MHz bandwidth .When antenna design without slot it has return loss -12.72 db , 40 MHz bandwidth and -8db gain at 3.35 GHz , return loss -14.76 db,130 MHz bandwidth and gain 1.8dB at 6.10 GHz, return loss -13.26 dB,130 MHz bandwidth and 2.6db gain at 6.60 GHz , return loss -12.77db,160 MHz bandwidth and -3.4 db gain at 10.55 GHz. The simulation model of the proposed slotted antenna designed using software Ansoft HFSS.

Key words: *Slotted and unslotted microstrip antenna , Teflon.*

INTRODUCTION

The field of antenna design has become one of the most attractive fields in the communication. Antenna is the one of most important elements of the wireless communications systems. The antenna is designed to transmit and receive electromagnetic wave. The microstrip patch antenna is one of the recently developed types of antenna. Communication has an important role to play in the worldwide society. Now days as the communication systems are rapidly changing

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over from “wired to wireless”. Wireless technology provides low charge alternatives and a flexible way to use it for communication [1].The microstrip antenna is mostly useful for such as aircraft, spacecraft, satellite, and missile applications, where size, weight, cost, performance, ease of installation, and aerodynamic profile are constraints where low profile antenna may need. Now a days there are many other government and commercial applications, such as mobile radio and wireless communications that have similar specifications. To fulfill these requirement the microstrip antenna may be used. The other advantage of micro strip antenna is simple in structure and easy to manufacture facility and it’s also mechanical rebuts [2]. These antennas are suitable for planer and non planer surface. They are light in weight, low in volume, have low cost, low profile are smaller in dimension and have show ease of fabrication and conformity. However microstrip patch antennas naturally have narrow bandwidth and enhancement is usually a demand for practical applications. So for extending the bandwidth countless approaches have been utilized for multi frequency applications.

ANTENNA CONFIGURATION

The antenna dimensions calculate by following : -

$$a = F\left\{1+\frac{2h}{\pi F\in_r}\left[\ln\left(\frac{\pi F}{2h}\right)+1.7726\right]\right\}^{\frac{-1}{2}} \quad 1$$

Where F can be calculated by using

$$F=\frac{8.791\times 10^9}{f_r\sqrt{\in_r}} \quad 2$$

F = resonant frequency of patch

$$a_e= a\left[1+\frac{2h}{\pi a\in_r}\left(\ln\ \frac{\pi a}{2h}+1.7726\right)\right]^{\frac{1}{2}} \quad 3$$

a = Actual radius of patch

h = height of substrate

•r = dielectric constant of substrate

$$\text{Angle of Inerier} = \frac{2n-4}{n} * 90 \qquad 4$$

n = number of segment

The effective radius of the antenna is obtained with equation given by Where fr is the operating frequency of antenna and år is the dielectric constant of material and h is the thickness of the circular patch.

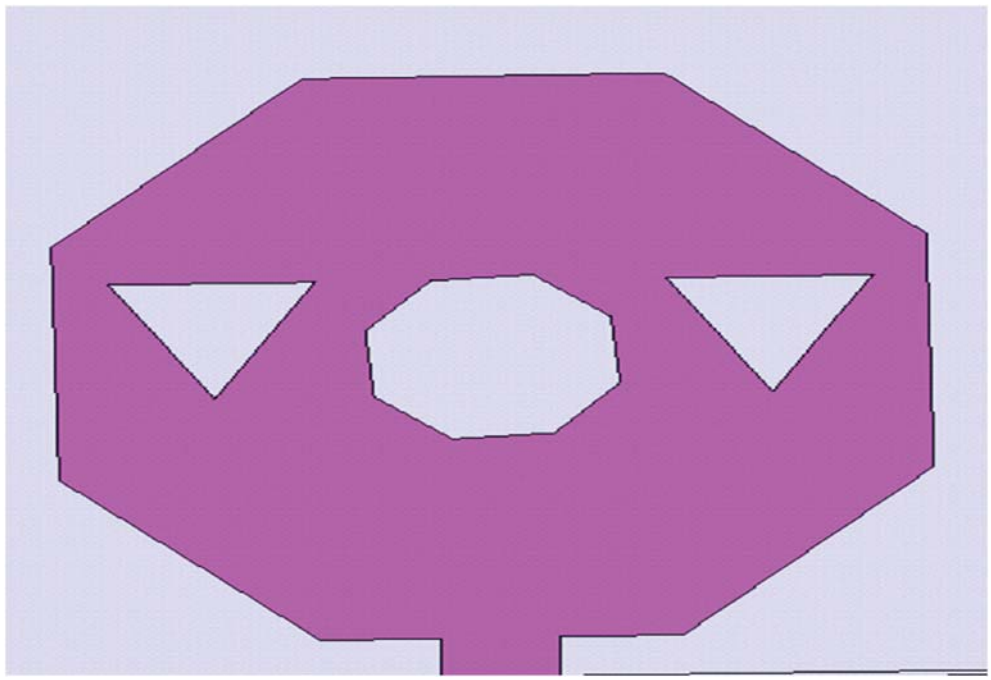


Fig 1 - Slotted patch hexagonal microstrip antenna

Table 1 – Same Dimension for both slotted and unslotted antenna

Dimension of substrate	30 × 30
Height of substrate	1.8 mm
Dielectric constant •r	2.1
Radius of patch	13
Dimension of feed line	3 × 3
Number of segment	8

III. RESULT

Result for slotted patch octagon microstrip antenna

Table 2 - Dimension of slot in octagon patch

Size a arms of left triangle slot	5 × 5 × 5mm
Size a arms of right triangle slot	5 × 5 × 5mm
Radius of octagon slot	3 mm
Interial angle of octagon slot	135^0
Length of each segments of octagon slot	2 mm
Number of segments of octagon slot	8

The Return Loss (RL) is a parameter which indicates the amount of power that is "lost" to the load and does not return as a reflection. The waves which are reflected leads to the formation of standing waves, when the transmitter and antenna impedance do not match.Antenna designed with slotted patch operate on 4.35 GHz , 7.55GHz , 10.34 GHz.The return loss -11.96dB at frequency 4.35 GHz, -13.53dB at frequency 7.55GHz and -26.72dB at frequency 10.35GHz.

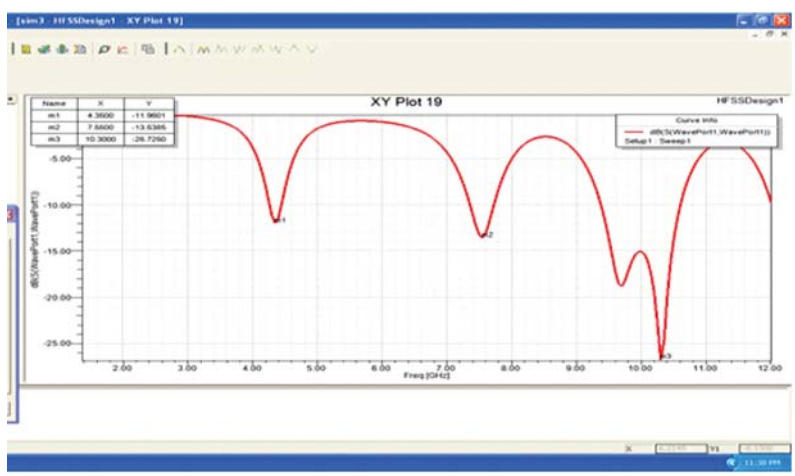


Fig 2- Return loss of slotted octagon patch antenna

The parameter VSWR is a measure that numerically describes how well the impedance of antenna has matched to the radio or transmission line to which it is connected. VSWR is a function of the reflection coefficient, which describes the power reflected from the antenna. The VSWR 1.67 at frequency band 4.35 GHz, a VSWR 1.53 at frequency 7.55 GHz and VSWR 1.09 at frequency band 10.3 GHz.

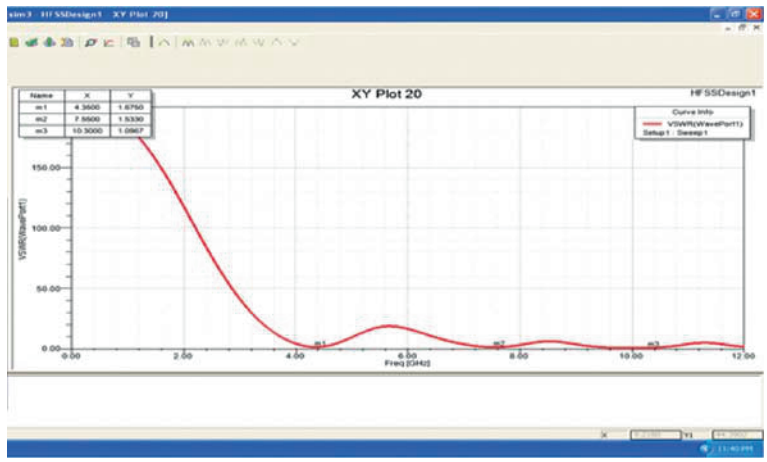


Fig 3- VSWR of slotted octagon patch antenna

Total Gain of antenna

There is another useful parameter to describe a performance of antenna. The gain is closely related to antenna directivity. The directivity describes directional properties of antenna. Antenne give a different gain at different frequency.Gain 3dB at frequency 4.35GHz , 3dB at frequency 7.55 GHz and 7dB at frequency 10.3 GHz.

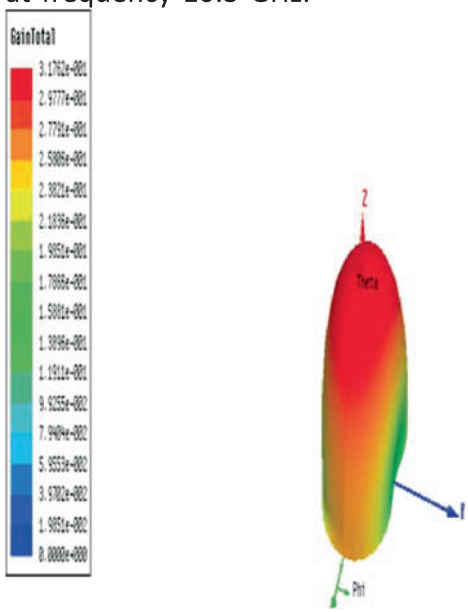


Fig 4 - Gain at frequency 4.35 GHz

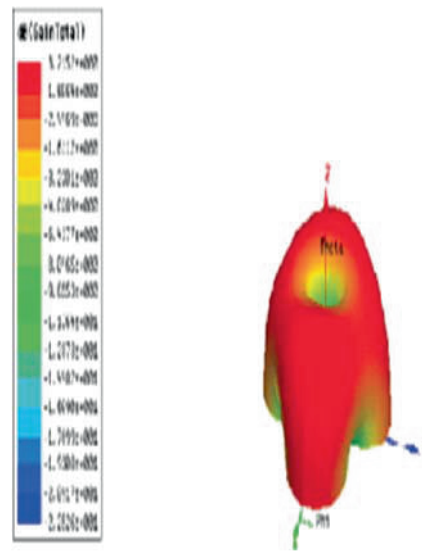


Fig 5 - Gain at freqency 7.55 GHz

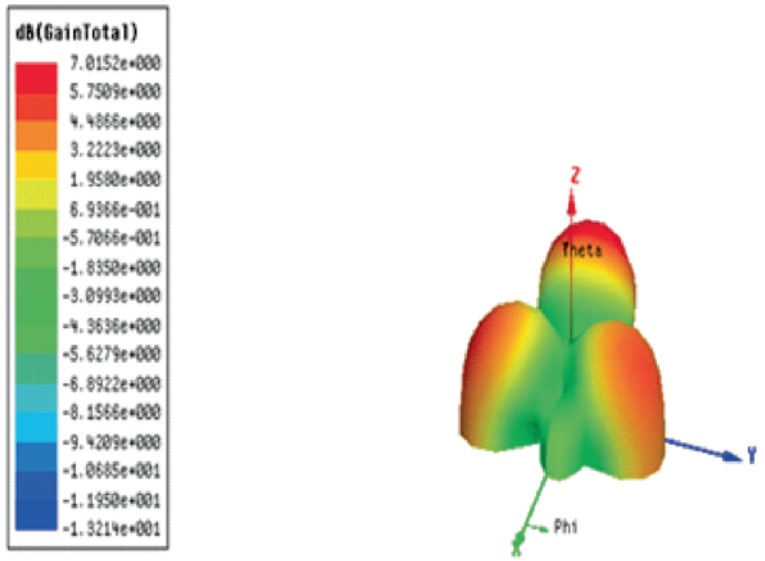


Fig 6-Gain at frequency 10.34 Ghz

Result of unslloted patch microstrip antenna

The return loss (S) -12.49dB at frequency 3.35 GHz , -14.76 dB at frequency 6.10GHz,-13.26dB at frequency 6.60 GHz and -12.77dB at frequency 10.55GHz.

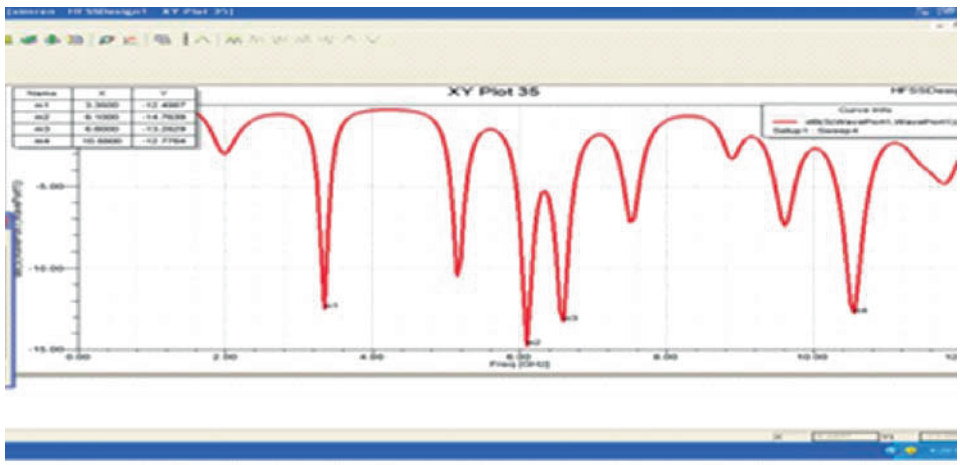


Fig 7-Return loss of unslotted octagon patch microstrip antenna

VSWR 1.16 at frequency 3.35GHz , 1.44 at frequency 6.10GHz,1.55 at frequency 6.10GHz and 1.59 at frequency 10.55 GHz.

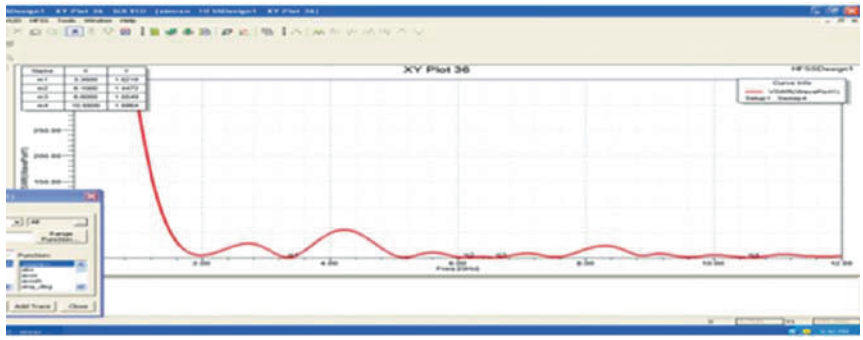
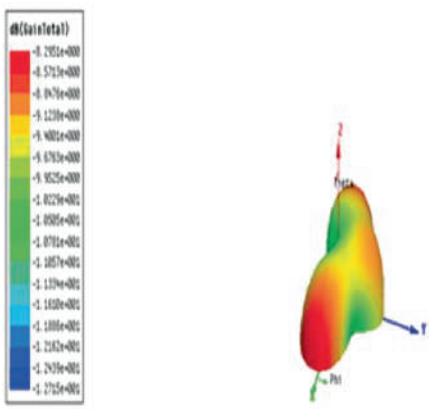


Fig - 8 VSWR of unslotted octagon patch microstrip antenna

Total gain of antenna



Fig–9 Gain at frequency 3.35 GHz

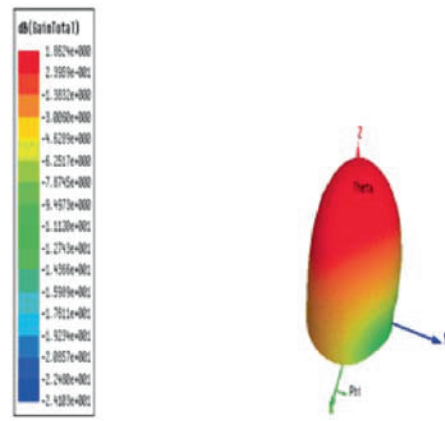


Fig-10 Gain at frequency 6.10 GHz

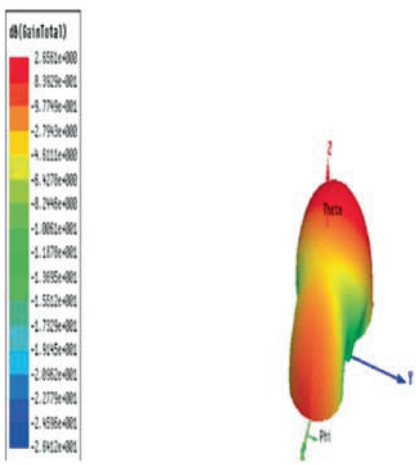


Fig-11 Gain at frequency 6.60 GHz

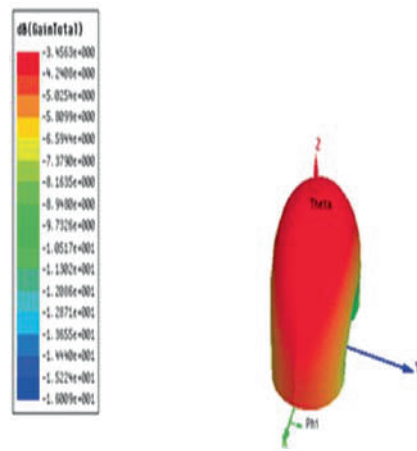


Fig-12 Gain at frequency 10.55 GHz

Table 3- Comparisons of slotted and unslotted microstrip antenna

Patch	Freqency band	Band width	Return loss	VSWR	Gain	Radition Efficiency
Slotted	4.35 GHz	290 MHz	-11.72 dB	1.67	3 dB	94%
	7.55 GHz	330 MHz	-13.53 dB	1.53	3.2 dB	96%
	10.55 GHz	110 MHz	-26.72 dB	1.09	7 dB	92%
Unslotted	3.35 GHz	40 MHz	-12.49 dB	1.16	-8 dB	44%
	6.10 GHz	130 MHz	-14.76 dB	1.44	1.8 dB	64%
	6.60 GHz	130 MHz	-13.26 dB	1.55	2.6 dB	70%
	10.55 GHz	160 MHz	-12.77 dB	1.59	3.4 dB	60%

CONCLUSION

Octagon microstrip antenna designed with slot and without slot on compact octagon patch using microstrip line feed for a wide band wireless communications systems is fabricated on TEFLON and designed in HFSS. The result demonstrates that the proposed antenna with triangular and octagon slots and the cuts at special positions can to generate steady radiation patterns and is capable of wrapping the frequencies demanded by UWB Communication system, RFID, GSM, Wi-Fi and Wimax. Good agreement between the simulated and measured results further validates the utility of proposed antenna for given applications. Different design parameters with their effects were studied. From the measurement results, when this antenna is designed with slot give a performance at band 4.35

GHz a return loss is -11.96 dB ,bandwidth 290 MHz and gain 4.2 dB, at 7.55 GHz a return loss is -13.53dB , bandwidth 330MHz and gain 3.2 db, at 10.3 GHz a return loss is -26.72dB,bandwidth 1100 MHz and gain 7dB and the unslotted antenna at 3.35 GHz a return loss is -12.49dB,bandwidth 40 MHz and gain -8dB,at 6.10GHz a return loss-14.76 dB ,bandwidth 130 MHz and gain 1.8dB ,at 6.60 GHz a return loss -13.26dB,bandwidth 130MHz and gain 206dB,at 10.55 GHz a return loss -12.77 dB ,bandwidth 160MHz and gain -3.4dB. The slots and cut used here play an important role in balancing resistive part and reactive part which affects the impedance matching.

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OPTIMIZATION OF 4-BIT REVERSIBLE ASYNCHRONOUS COUNTER USING REVERSIBLE LOGIC GATES

- Sandeep Kaur and Ashwani Kumar Singla

Abstract

-In recent year's reversible logic has been considered as an important issue for designing low power digital circuits. It has voluminous applications in the present rising nanotechnology such as DNA computing, Quantum Computing, low power VLSI and quantum dot automata. In this paper we have proposed optimized design of reversible sequential circuits in terms of number of gates, delay and hardware complexity. We have designed the reversible T latch with a new reversible gate and reduced the required number of gates, garbage outputs, and delay and hardware complexity. As the number of gates and garbage outputs increase the complexity of reversible circuits, this design will significantly enhance the performance. We have proposed reversible T-latch and asynchronous up counter and down counter which are better than the existing designs available in literature.

Keywords - *Low-power VLSI, Low-power CMOS design, reversible logic, quantum computing, reversible counters*

INTRODUCTION

Reversible logic has received great attention in the recent years due to its ability to reduce the power dissipation. According to Landauer's principle, the loss of one bit of information dissipates kTln2 joules of energy where k is the Boltzmann's constant and T is the absolute temperature at which the operation is performed [1]. Later Bennett, in 1973, showed that in order to avoid kTln2 joules of energy dissipation in a circuit it must be built from reversible circuits . Models of computation which are not logically reversible typically lose information in the process of execution. As the laws of physics appear to be reversible, that information cannot really be lost, it is be being translated into another form. That form is usually heat. So, loss of information results in power dissipation. To

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reduce this power dissipation reversible logic was introduced. The main idea of reversible logic is to allow the construction of reversible computers by using components which preserve information content, and can thus potentially be run backwards. Hence, by implementing reversible designs of computer hardware significant amount of heat can be reduced. It has been shown that, for irreversible logic computations, each bit of information lost generates kTln2 joules of heat energy, where k is Boltzmann's constant and T the absolute temperature at which computation is performed [1], Benet showed the reverse that, kTln2 energy dissipation would not occur if the computation were carried out in a reversible manner [4]. Reversible circuits do not lose information and reversible computation in a system can be performed only when the system consists of reversible gates. Reversible logic is likely to be in demand in high speed power aware circuits, low power CMOS design.

The main challenges of designing reversible circuits are to reduce number of gates, garbage outputs, delay and quantum cost. Another important matter is hardware complexity. In the existing designs in literature of sequential circuits several designs are proposed. In this paper we have proposed most optimized designs of reversible T Latch and asynchronous up counter and down counter. While designing the reversible latches; few researchers concentrated on reducing the number of gates and garbage output, while other tried to reduced the quantum cost. In this paper we optimized the number of gates, garbage output, delay and hardware complexity for the total circuit and shown the results with illustrative calculation. Reversible RS and JK latch is designed in the most optimized form in [7]. So we have worked with the T-Latch. A new reversible gate "Sayem Gate" (SG) is proposed here to design the latches.

REVERSIBLE LOGIC GATES

This section describes the function of reversible logic gates that are being used in design.

Fig.1 shows a 2*2 Feynman gate. The input vector is I (A, B) and the output vector is O(P, Q). The outputs are defined by P=A, Q=A B. Quantum cost of a Feynman gate is 1[8].

Fig 2 shows the UPG (universal programmable gate) gate that is used for designing T latch and asynchronous up and down counters. Its quantum cost is 4.

Fig 3 shows the sayem gate that is used in the existing design system.

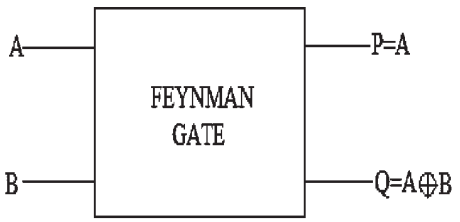

Fig 1. Feyman gate

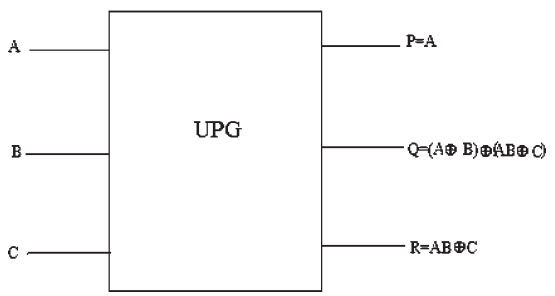

Fig 2.UPG gate

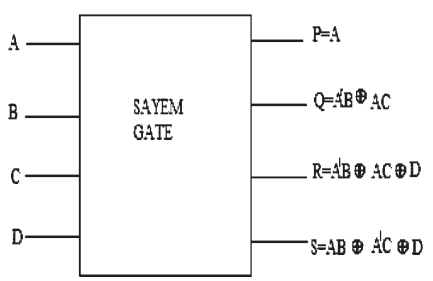

Fig 3. Sayem gate

3.PROPOSED REVERSIBLE POSITIVE EDGE TRIGGERED T FLIP FLOP

A flip flop is a bi-stable electronic circuit that has two stable states and can be used as a one-bit memory device. This paper constructs edge triggered T flip flop using reversible gates. The truth table of T flip-flop is shown in table and corresponding block diagram is shown in fig. This reversible realization of T flip flop has one UPG gate and one FG gate and having one constant input and gives two garbage outputs.

CLK	T	Qt-1	Q
0	0	0	0
1	0	0	0
0	0	1	1
1	0	1	1
0	1	0	0
1	1	0	1
0	1	1	1
1	1	1	0

Table 1: Truth table reversible positive edge triggered T flip flop

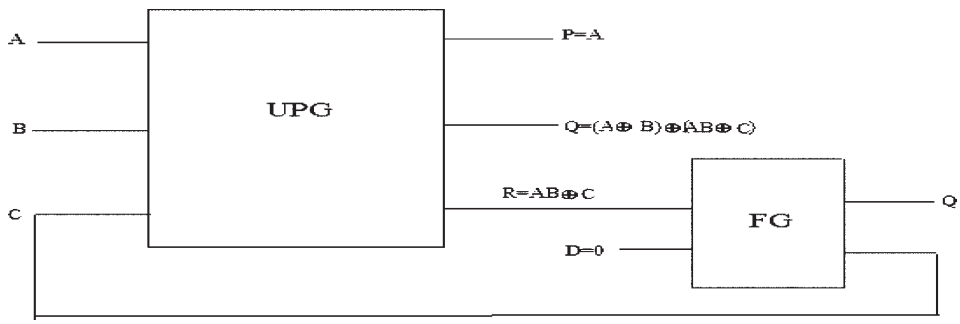

Fig 4: Block diagram of reversible triggered flip-flop

3.1 Comparison chart of parameters of T flip flops between existing and proposed work

	Garbage output	Constant inputs	Quantum cost	No. of gates
Existing[3]	12	11	8	8
Existing[6]	12	6	—-	6
Existing[8]	3	3	13	3
Proposed	2	1	5	2
Improvement				
Factor	33.33	66.66	61.53	33.33

DESIGN OF ASYNCHRONOUS REVERSIBLE COUNTERS(4-bit)

The digital circuit used for counting pulses is known as counter. It is a sequential circuit. Counters are widest applications of flip-flops. It is a group of flip-flops with a clock signal applied. Counter count the number of clock pulses. Hence with some modifications it can be used for measuring frequency and time period.

A.Proposed 4-bit asynchronous up counter

The reversible design of the 4-bit asynchronous up-counter is shown in fig. At the output of each reversible T FLIP FLOP, the complemented Q output is produced using Feynman gate with the input B=1.

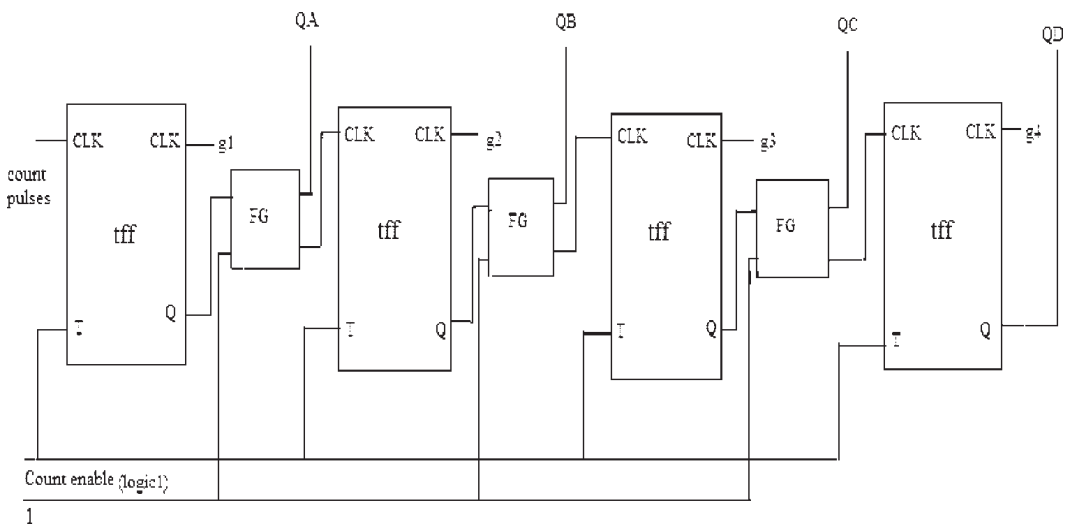

Fig. 4: block diagram of reversible asynchronous up counter

These complemented Q outputs of each T flip flop trigger the subsequent T flip flops and the reversible design performs the up-counter operation. It is made up from reversible T FLIP FLOP and reversible Feynman gate. It contains total 11 gates in which 4 are being UPG gates and 7 FG gates. Quantum cost of this counter is 23 that is very low as compared to existing counter cost.

B.Proposed 4- bit asynchronous down counter

The reversible design of the 4-bit asynchronous down-counter is shown in fig. At the output of each reversible T FLIP FLOP, the complemented Q output is produced using Feynman gate with the input B=0.

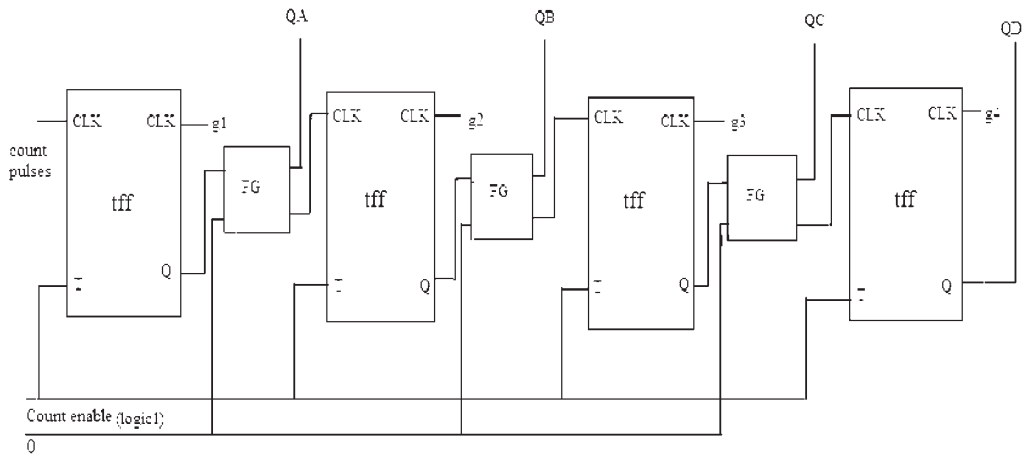

Fig. 5: Block diagram of reversible asynchronous down counter

And the reversible design performs the down-counter operation. It is made up from reversible T FLIP FLOP and reversible Feynman gate. It consists of total 11 gates in which 4 UPG gates and 7 FG gates. Quantum cost of this counter is 23 that is very low as compared to existing counter cost.

4.1 Comparison chart of parameters of counters (asynchronous up and down counters) between existing and proposed work

	Garbage output	Constant inputs	Quantum cost	No. of gates
Existing[8]	12	11	55	15
Proposed	8	7	23	11
Improvement Factor	33.33	36.36	58.18	26.66

CONCLUSION

The focus of this paper is to design of reversible of 4-bit Asynchronous and synchronous counters by using proposed reversible gates and the existing one. As far as it is known, this is the second attempt to apply reversible logic to counter design in synchronous counters. We have optimized the reversible counter with the fundamental building block proposed by Feyman and UPG gates. This approach reduces quantum cost, power consumption. The power consumption has been evaluated using TANNER EDA version 13 software tool. The design strategy is chosen in such a way to make them highly optimized in terms of number of reversible gates and garbage outputs. This work forms an important step in the building of complex systems reversible systems.

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9)	Chemistry	Microbiology	Zoology
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11)	Bio-chemistry	Chemistry	Zoology
12)	Bio-chemistry	Chemistry	Botany
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