NATIONAL WORKSHOP CUM CONFERENCE

ON

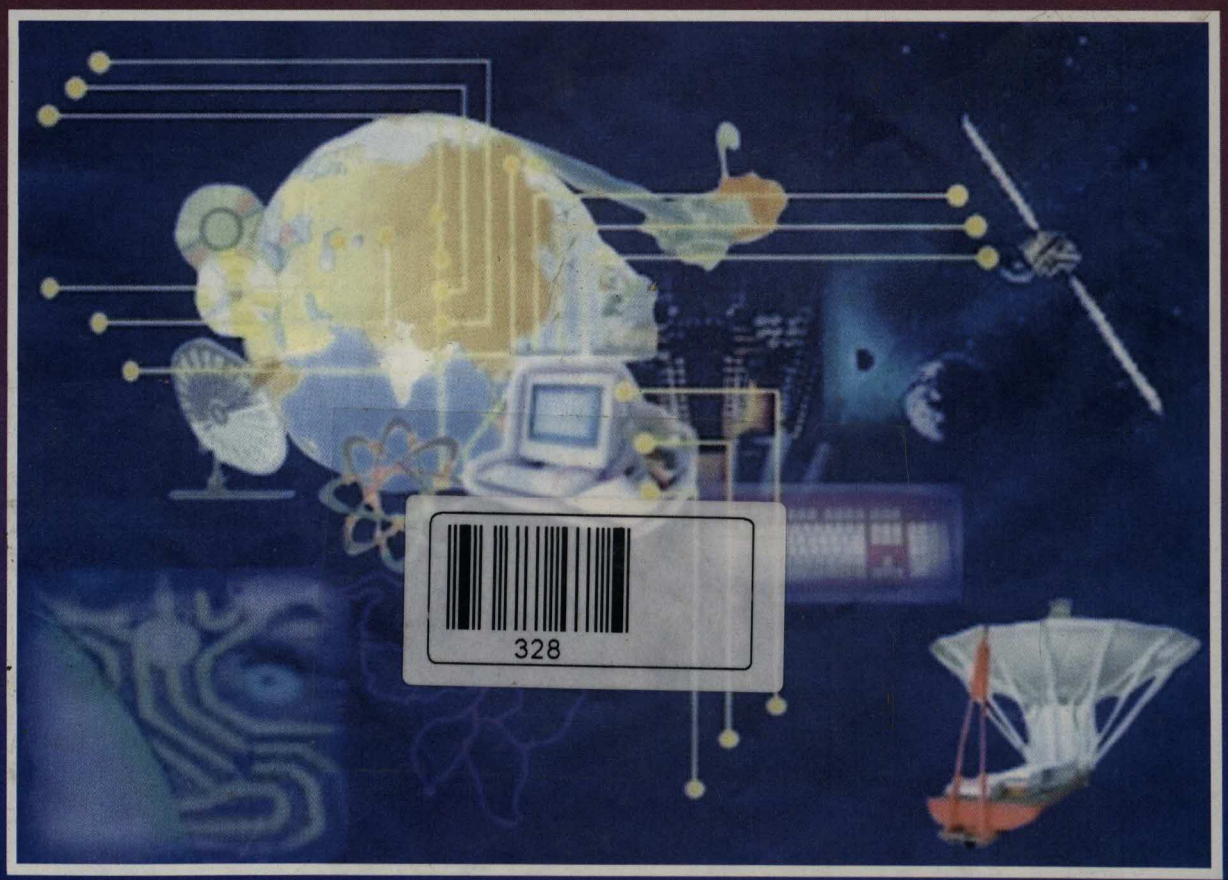
THE ROLE OF INFORMATION TECHNOLOGY

IN

THE DEVELOPMENT OF INDIA WITH SPECIAL REFERENCE TO N.E.REGION

NOVEMBER 13-15, 2002

PROCEEDINGS VOLUME



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(P.J. Bazeley)

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ON

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NOVEMBER 13 – 15, 2002

Proceedings Volume

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DEPT. OF INFORMATION TECHNOLOGY & DEPT. OF EDUCATION,
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"THE ROLE OF INFORMATION TECHNOLOGY IN THE DEVELOPMENT OF INDIA WITH SPECIAL REFERENCE TO N.E. REGION"

NOVEMBER 13 – 15, 2002

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Dated Shillong the 4th July, 2003

FOREWARD

Information Technology has come a long way in a short period of time. Technology in particular is evolving at such a rapid pace and with a very extensive impact on our society. The realities of economics, technology, culture and politics have become very fluid. It has, therefore become more important today to consider the implications of technological changes in India and the world around it. In the South-East Asian Region, the impact of the IT Development is more pronounced in counties like Singapore, Malaysia and Thailand. Information Technology has helped to shape these societies economically, socially and culturally. As for IT itself, one major change is the change in perception it has undergone, from being an infrastructure in itself to being a tool to aid infrastructure development.

Individuals and organizations today are being linked or can be linked almost universally at light speed. The unprecedented knowledge-sharing through these widely available communications should surely lead to improved education, enhanced service delivery, reduced operational costs and more economic opportunities. It is hoped that the increasingly widen distribution of information will result in a massive societal change. It is not the power structure but technology that will exercise control and there can be no better case than India for such technological change.

There is already a tremendous amount of change sweeping over the country. The middle class and the richer ones are already enjoying better and faster education. And even those who are economically weaker, more so in the villages, are gradually coming up for better access to information. More and more villages in the various parts of the country are using this new knowledge and information procured through new and cheaper means.

Digital empowerment for all, therefore, is the need of the hour if we want to raise the quality of life of the downtrodden and the deprived. There is no end to the good that infotech can do to us-education, employment, better yield in the agricultural produces, better health care etc.

The North-East in rich with a variety of natural resources. It has also a great potential for tourism development. The region also has an increasing unemployment problem. Both physical and often emotional remoteness have further added to the complexity of the problems. All these can be tackled better today through IT application and empowerment.

Given the enormous potential of Information Technology for problem-solving and raising the standard of living in this part of the country, this workshop and conference will go a long way for knowledge-sharing and awareness-spreading.

Shillong College and Shillong College Academic Society have done an excellent and timely job by bringing out this extremely useful 'Proceedings Volume' for the use of all concerned. All my best wishes for the good work done and may this be carried out ahead in future most successfully.

Jai Hind

(D.D. Lapang)

National WorkShop *cum* Conference

ON

"The Role of Information Technology in the Development of India with Special Reference to N.E. Region"

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NATIONAL WORKSHOP *cum* CONFERENCE

ON

"THE ROLE OF INFORMATION TECHNOLOGY IN THE DEVELOPMENT OF INDIA WITH SPECIAL REFERENCE TO N.E. REGION"

NOVEMBER 13 – 15, 2002

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NATIONAL WORKSHOP *cum* CONFERENCE

ON

"THE ROLE OF INFORMATION TECHNOLOGY IN THE DEVELOPMENT OF INDIA WITH SPECIAL REFERENCE TO N.E. REGION"

NOVEMBER 13 – 15, 2002

Programme

13th NOVEMBER, 2002 (Wednesday)

Registration of Delegates
(9.00 A.M. to 10.00 A.M.)

Shillong College
Shillong – 793003

INAUGURAL SESSION

10.30 A.M.

Chairperson	:	**Dr (Mrs.) M.P.R. Lyngdoh** Principal, Shillong College, Shillong
Welcome Address	:	**Dr S.K. Gupta** Joint Convener
Address By	:	**Shri Sreeranjan,** I.A.S., Commissioner Deptt. of I.T. Govt. of Meghalaya
		Prof. T. Chuba Hon'ble Minister of Science & Technology etc., Govt. of Nagaland
Inaugural Address	:	**His Excellency Shri M.M. Jacob** Governor of Meghalaya
Chairperson's Address	:	**Dr (Mrs.) M.P.R. Lyngdoh**
Key Note Address	:	**Dr V.K. Dharmadhikari** Director General, C.E.D.T.I., New Delhi
Vote of Thanks	:	**Shri R.K. Datta** Vice-Principal & Joint Convener
Inauguration of Exhibition	:	**Prof. T. Chuba** Hon'ble Minister of Science & Technology etc., Govt. of Nagaland
Vote of Thanks	:	**Shri Bikash Roy** Co-Convener

LUNCH BREAK

13th November, 2002 (Wednesday)

1:30 P.M. **Shillong College Seminar Hall**

Workshop / Technical Session – I : ROLE OF I.T. IN INDIAN CONTEXT – AN ASSESSMENT

Chairman	:	**Prof. K. Ismail** Head, Deptt. of Chemistry, North Eastern Hill University, Shillong
Invited Lectures on –		
❖ **Community Information Centre**	:	**Shri Timothy Dkhar** State Informatics Officer, National Informatics Centre, Meghalaya
❖ **e-Education**	:	**Dr S. Aravamudhan** Deptt. of Chemistry North Eastern Hill University, Shillong

Participants :

1. **I.T. in India – with reference to Power Grid**
   Ponen and A.B. Sengupta, Power Grid Corp of India Ltd., Shillong.
2. **Voice Over Internet Protocol**
   Shahzia Anjum and Vibha Sethi, Apeejay institute of Inforamtion Technology, Haryana.
3. **Education Today – Problems and Solutions**
   Tapas Kumar Sinha, Computer Centre, North Eastern Hill University, Shillong
4. **I.T. and the Virtual University**
   A.S. Guha, I.G.N.O.U., Shillong.
5. **Hidden Information Retrieval from very Large Databases**
   Subhajit Ghosh, Computer Centre, North Eastern Hill University, Shillong.
6. **Log in – Ms Housewife**
   Shahzia Anjum and Ayasha Ashraaf Ahmed, Deptt of Botany, Shillong College.
7. **Virtual or Cyber Learning**
   Roger Haw, Ansted university, Malaysia.
8. **e-Governance**
   Timothy Dkhar, National Informatics Centre, Meghalaya.
9. **Information Technology in India – with reference to North Eastern Region**
   A. Nengnong, Software Technology Group International Ltd., Shillong.
10. **Information Technology School Education Programme in North Eastern Region**
    A.K. Verma, A.D. Kharshiing and B. Ghosh, North Eastern Council, Shillong.

14th November, 2002 (Thursday)

10:00 A.M. **Shillong College Seminar Hall**

Workshop / Technical Session – II : APPLICATION & IMPORTANCE OF I.T. (I)

Chairman : **Dr K.C. Bhattacharya**
Director,
North Eastern Space Application Centre,
Meghalaya

Invited Lectures On –

- **e-Governance** : **Dr Subir Roy**
  Technical Director,
  National Informatics Centre, W. Bengal.
- **ERNET India** : **Shri Ashok Singh Sairam**
  Indian Institute of Technology,
  Guwahati

Participants :

1. **Role of Communication in the Development of I.T. with Special Referance to N.E. Region of India**
   S.S. Chyne, BSNL, Shillong.
2. **Application of Data Mining**
   Debyajoyti Chutia, North Eastern Space Application Centre, Deptt of Space, Govt. of India, Umiam, Meghalaya.
3. **I.T. in North East**
   Debopriya Deb, S.S. NetCom, Shillong.
4. **I.T. as an Important Supplimentary Input for Effective Science Education**
   Ansuman Chattopadhyay, Centre of Science Education, North Eastern Hill University, Shillong
5. **Unified load Dispatch & Communication Project for the N.E.R.**
   Ajoy Patir, Power Grid Corp. Of India, Shillong.
6. **I.T., the liberator of Underdevelopment in Meghalaya**
   W.L. Buam, I.T. Deptt, Govt. of Meghalaya
7. **I.T. - Enabled Services _ An answer to the Rising Unemployment in the NER**
   A. Zulfi, Grace Systems, Shillong-3
8. **Development of Tele-Medicine Network for NER**
   A.K. Verma, North Eastern Council, Shillong.
9. **Impact of I.T. in Higher Education on 21st Century**
   D.L. Buam, Deptt of Chemistry, Shillong College.
10. **I.T. and Natural Resource Management with special reference to NER**
    M.N. Mishra, P.G.R.S. Div., Geological Survey of India, (NER), Shillong.

LUNCH BREAK

14th November, 2002 (Thursday)

2:00 P.M. — **Shillong College Seminar Hall**

Workshop / Technical Session – III	:	**APPLICATION & IMPORTANCE OF I.T. (II)**
Chairman	:	**Dr Subir Roy** Technical Director, National Informatics Centre, W. Bengal
Invited Lectures On –		
❖ **e-Learning**	:	**Shri Amitav Ghosh** Zonal Head, APTECH Computer Education, Kolkata
❖ **e-Education**	:	**Shri Sukhendu Ghosh** N.I.I.T. Ltd., Kolkata
❖ **e-Education**	:	**Shri Synshar S. Syiem** Shillong College, Shillong

15th November, 2002 (Friday)

10:00 A.M. — **Shillong College Seminar Hall**

Workshop – IV	:	**APPLICATION & IMPORTANCE OF I.T. (III)**
Invited Lectures On –		
❖ **e-Education**	:	**Shri Sukhendu Ghosh** N.I.I.T. Ltd., Kolkata
❖ **e-Education**	:	**Shri R. Ram** Shillong College, Shillong

LUNCH BREAK

15th November, 2002 (Friday)

VALEDICTORY SESSION **Shillong College Seminar Hall**

2:30 P.M.

Chairperson	:	**Dr (Mrs.) M.P.R. Lyngdoh** Principal, Shillong College
Welcome Address	:	**Shri N.K. Sarkar** Co-Convener
Valedictory Address	:	**Dr P.K. Das** Director, Software Technology Parks of India, Guwahati
Address By Chief Guest	:	**Shri R.G. Lyngdoh** Hon'ble Minister of Urban Affairs etc., Govt. of Meghalaya
Chairperson's Remark	:	**Dr (Mrs.) M.P.R. Lyngdoh**
Joint Conveners' Remark	:	**Shri R.K. Datta**
Observation by Participants	:	**Shri Timothy Dkhar** State Informatics Officer, National Informatics Centre, Meghalaya
	:	**Shri Chris Cajee** Director, APTECH Computer Education, Shillong
	:	**Shri P.P. De** Officer-incharge, Computer Centre, North Eastern Hill University, Shillong
Vote of Thanks	:	**Dr S.K. Gupta** Joint Convener

NATIONAL WORKSHOP *cum* CONFERENCE

ON

"THE ROLE OF INFORMATION TECHNOLOGY IN THE DEVELOPMENT OF INDIA WITH SPECIAL REFERENCE TO N.E. REGION"

NOVEMBER 13 – 15, 2002

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APTECH Computer Education
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Shillong

Shri A. Zulfi
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Dr M. Dey
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Dr (Smti.) Eva Kharkongor
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Shillong

RECOMMENDATIONS

Pursuant to detailed deliberations, the Conference unanimously recommended the under mentioned measures to accelerate the development and growth of Information Technology and I.T. related activities in the North East and make the region an attractive destination for I.T. as an Industry:

GENERATION OF BETTER I.T. AWARENESS

1. Creation of facilities for adequate exposure of the student community of the region to the latest applications of Information Technology to various spheres of human knowledge such as bioinformatics, embedded systems, et. al.,

2. Compulsory inclusion of I.T. literacy in the curriculum and syllabi of secondary and higher secondary education.

3. Provision of suitable stipends or soft loans to desirous students for pursuing I.T. studies.

4. Holding of District and Block level seminars to popularise scope for studies for I.T. and I.T. enabled services, among students.

5. Organization of Annual Conferences or Seminars with wide cross country participation to popularise the applicability and scope of bio-informatics, embedded systems, telemedicine, medical transcription, linux, et. al.,

6. Central and State Governments are urged to liberally fund the aforesaid activities for the first few years, to enable the wide ranging prospects of I.T. and I.T. related services to crystallize in the region.

DECLARATION OF I.T. AS INDUSTRY

1. To accord I.T. and I.T. enabled services with the status of 'Industry' to make such services eligible for all concessions and incentives available to industries from the Central and the State Governments, as well as eligible for bank finance at concessional rates of interest.

2. To set up I.T. Park at State Headquarters and I.T. Centres at District headquarters with required infrastructure, assured and stable power supply and reliable connectivity to the I.T. Highway.

PRIVATE SECTOR PARTICIPATION

1. Grant of liberal concessions and incentives to attract private sector participation in the creation of I.T. infrastructure, establishment of information kisoks, creating data base oriented services and similar activities.
2. Generation of optimum public-private-partnership I.T. interface in areas such as issue and renewal of driving licenses, collection of utility (power, water supply, etc.,) user charges, management of land records, registration of birth, marriage and death, travel reservations, educational admissions, job applications, etc.
3. Constitution of I.T. User Forums with adequate representation form academicians, entrepreneurs, I.T. Industry and concerned officials. The forum should meet at least once a month.

ROLLING STATE I.T. POLICY

1. State Governments of the North Eastern Region are urged to set up High Powered State Level Information Technology Advisory Councils under the leadership of the State Chief Ministers.
2. The High Powered State Level Information Technology Advisory Councils should include representatives from industry, I.T. professionals, academicians and I.T. related NGO's besides the concerned representatives of State and Central Governments, etc.,
3. The High Powered State Level Information Technology Advisory Councils need to constantly review State, regional, national and global I.T. scenario and adapt the State I.T. policies to ensure that such policies are compatible and harmonious with ground realities and contemporary developments in the field of inormation technology.

GOVERNMENTAL SUPPORT

1. The Central Government is urged to establish wide state-of-the-art bandwidth for the north eastern region to enable these States to have unhindered round-the-clock access to the International I.T. Highway.
2. The State governments of the North Eastern States are urged to subsidise the cost of private entrepreneurs or setting up international gateways for providing high speed internet connectivity.
3. To Central and State Govenments are urged to place I.T. hard and soft ware in the exempt or zero-category for assessment of Sales Tax or VAT as the case may be for a period of ten years ending March 2013.

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LIST OF PARTICIPATING ORGANISATIONS TO THE NATIONAL WORKSHOP CUM CONFERENCE AND EXHIBITION

1. NORTH EASTERN COUNCIL, SHILLONG
2. INFORMATION TECHNOLOGY DEPARTMENT, GOVT. OF MEGHALAYA
3. PLANNING DEPARTMENT, GOVT. OF MEGHALAYA
4. NATIONAL INFORMATICS CENTRE, MEGHALAYA
5. COMPUTER CENTRE, NORTH EASTERN HILL UNIVERSITY
6. BHARAT SANCHAR NIGAM LIMITED, SHILLONG
7. GEOLOGICAL SURVEY OF INDIA, SHILLONG
8. POWER GRID CORPORATION OF INDIA, SHILLONG
9. FINANCE DEPARTMENT, GOVT. OF MEGHALAYA
10. STATE COUNCIL OF SCIENCE, TECHNOLOGY & ENVIRONMENT, MEGHALAYA
11. APEEJAY INSTITUTE OF INFORMATION TECHNOLOGY, GURGAON, HARYANA
12. INDIRA GANDHI NATIONAL OPEN UNIVERSITY, SHILLONG
13. ANSTED UNIVERSITY, PENANG, MALAYSIA
14. BOTANY DEPARTMENT, SHILLONG COLLEGE, SHILLONG
15. NORTH EASTERN SPACE APPLICATIONS CENTRE, UMIAM, MEGHALAYA
16. CENTRE FOR SCIENCE EDUCATION, NORTH EASTERN HILL UNIVERSITY SHILLONG
17. APTECH COMPUTER EDUCATION, KOLKATA
18. GRACE SYSTEMS, SHILLONG
19. APTECH COMPUTER EDUCATION CENTRE, SHILLONG
20. S.S. NETCOM, SHILLONG
21. NIIT @ K12, KOLKATA
22. IBM ADVANCED CAREER EDUCATION, SHILLONG
23. ANDERSON COMPUTERS, SHILLONG
24. PREMIER INFOSIS, SHILLONG
25. WIPRO INFO TECH, GUWAHATI
26. TECHNO DROME, SHILLONG
27. TATA INFOTECH. EDUCATION, SHILLONG
28. SOFTWARE TECHNOLOGY GROUP INTERNATIONAL LTD., SHILLONG
29. GLOBAL NET WORK, SHILLONG
30. CHEMISTRY DEPARTMENT, SHILLONG COLLEGE, SHILLONG.

DELEGATES

1. Shri Sreeranjan I.A.S., Commissioner, Information Technology, Govt. of Meghalaya
2. Shri S.B.C. Mishra, Executive Director, Power Grid Corp. of India, Shillong
3. Dr A.K. Verma, Director, Science & Technology, North Eastern Council, Shillong
4. Shri S.S. Chyne, Bharat Sanchar Nigam Ltd., Shillong
5. Shri Timothi Dkhar, National Informatics Centre, Meghalaya, Shillong
6. Shri W.L. Buam, Deptt. of Information Technology, Govt. of Meghalaya
7. Shri Dibyajoyti Chutia, North Eastern Space Application Centre, Umiam, Meghalaya
8. Smti Shahjia Anjum, Apeejay Institute of Information Technology, Gurgaon, Haryana
9. Smti Vibha Sethi, Apeejay Institute of Information Technology, Gurgaon, Haryana
10. Shri W. Synrem, Deptt. of Information Technology, Govt. of Meghalaya
11. Shri M.B. Lyngdoh, Planning Deptt. Govt. of Meghalaya
12. Shri Amitav Ghosh, Zonal Head, APTECH Computer Education, Kolkata
13. Shri J.P. Saikia, Chairman cum Managing Director, North Eastern Development & Financial Institution, Guwahati
14. Shri Shonly Litting, North Eastern Development & Financial Institution, Shillong
15. Dr Subir Roy, Technical Director, National Informatics Centre, West Bengal, Kolkata
16. Shri Osmond E.J. Nongbri, Branch Manager, North Eastern Development & Financial Institution, Shillong
17. Shri P.K. Das, Director, Software Technology Parks of India, Govt. of India, Guwahati
18. Dr V.K. Dharmadhikari, Director General, Centre for Electronics Design & Technology of India, New Delhi
19. Dr S. Aravamudhan, Deptt. of Chemistry, North Eastern Hill University
20. Shri Ponen, Power Grid Corp. of India, Shillong
21. Shri A.B. Sengupta, Power Grid Corp. of India, Shillong
22. Shri A. Patir, Power Grid Corp. of India, Shillong
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24. Shri Sekhar Dey, National Informatics Centre, Meghalaya, Shillong
25. Smti Swagata Nandi, Deptt. of Physics, St. Mary's College, Shillong
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27. Dr (Smti) Jaya Gupta Chaudhury, Deptt. of Mathematics, St. Mary's College, Shillong
28. Smti Nivedita Chakraborty, St. Mary's College, Shillong
29. Dr A.S. Guha, Indira Gandhi National Open University, Shillong
30. Shri P.P. Dey, Computer Centre, North Eastern Hill University, Shillong
31. Shri Subhajit Ghosh, Computer Centre, North Eastern Hill University, Shillong
32. Dr Tapash Kumar Sinha, Computer Centre, North Eastern Hill University, Shillong
33. Shri Conrad Sangma, Director, S.S. NetCom, Shillong
34. Shri Debopriya Deb, S.S. NetCom, Shillong
35. Shri Chris Cajee, Director, APTECH Computer Education Centre, Shillong
36. Shri J.R. Myrbok, Managing Director, Meghalaya Industrial Development Corp., Shillong
37. Shri R. Kharmujai, Dy. General Manager, Meghalaya Industrial Development Corp., Shillong
38. Shri S.F. Pyngrope, Dy. General Manager, Meghalaya Industrial Development Corp., Shillong
39. Shri R.P. Kharpuri, Director (E.M.), North Eastern Council, Shillong
40. Shri P.L. Thanga, Secretary, North Eastern Council, Shillong
41. Shri H.W.T. Syiem, former Secretary, North Eastern Council, Shillong
42. Shri Rishan Rapsang, Rapsang Group of Industries, Shillong
43. Shri R.D. west, Member Secretary, State Council for Science, Technology & Environment, Shillong
44. Shri J.B. Dutt, Managing Director, The Meghalaya Co-operative Apex Bank Ltd., Shillong

45. Shri S.K. Bhattacharjee, Indian Overseas Bank, Shillong
46. Shri A. Lyngdoh, General Manager, State Bank of India, Shillong
47. Shri T. Chuba, Hon'ble Minister for Science, Technology etc., Govt. of Nagaland, Kohima
48. Shri P.J. Bazeley, I.A.S., Principal Secretary, Govt. of Meghalaya, Shillong
49. Shri G.P. Wahlang, I.A.S., Commissioner, Education, Govt. of Meghalaya, Shillong
50. Shri C.S.R. Prabhu, Senior Technical Director, National Informatics Centre, Andhra Pradesh, Hydrabad
51. Shri S.S. Gupta, I.A.S., Managing Director, Mawmluh Cherra Cement Ltd., Shillong
52. Shri R. Bhattacharjee, Company Secretary, Mawmluh Cherra Cement Ltd., Shillong
53. Shri E. Khonglam, Accounts Officer, Mawmluh Cherra Cement Ltd., Shillong
54. Shri Mahendra Rapsang, N.I.I.T. @K-12, Shillong
55. Dr (Smti) E.M.L. Buam, Deptt. of Physics, St. Mary's College, Shillong
56. Shri A. Zulfi, Sr. Executive Director, Grace Systems, Shillong
57. Shri K.C. Bhattacharya, Director, North Eastern Space Application Centre, umiam, Meghalaya
58. Shri T.N. Ranjan, Director, Geological Survey of India, Shillong
59. Shri P.C. Patra, Geologist (Sr.) Geological Survey of India, Shillong
60. Shri D.P. Chakraborty, Geological Survey of India, Shillong
61. Shri A.K. Singh, Geological Survey of India, Shillong
62. Shri Y. Kumar, Director (Sr.), Geological Survey of India, Shillong
63. Shri A.K. Singh, Geological Survey of India, Shillong
64. Shri Balambok, S. Wahlang, Manager, APTECH Computer Education Centre, Shillong
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66. Shri Jayanta Chaudhury, Sankar Dev College, Shillong
67. Shri T.K. Chakraborty, Director of Industries, Govt. of Meghalaya
68. Prof. K. Ismail, Deptt. of Chemistry, North Eastern Hill University, Shillong
69. Dr Zave Heise, Director, State Council of Science & Technology, Govt. of Nagaland, Kohima
70. Shri Sukhendu Ghosh, Sr. Territory Executive, N.I.I.T., Kolkata
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72. Smti R. Ruby Daiophika, Shillong Commerce College, Shillong
73. Shri S. Nagi, Deptt. of Computer Science, St. Edmund's College, Shillong
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77. Smti Dakapaia Lyngdoh, Thomas Jones Synod College, Jowai
78. Shri Ryan R. Kharkongor, Thomas Jones Synod College, Jowai
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80. Smti S. Bhattacharjee, Forests Deptt., Govt. of Meghalaya
81. Shri Clive Dunai, Deptt. of Sports & Youth Affairs, Govt. of Meghalaya
82. Shri Julius Wanrap, I.B.M. Advance Career Education, Shillong
83. Dr S.K. Chakraborty, Magnetic Observatory, Govt. of India, Shillong
84. Shri S. Chakraborty, Software Technology Group International Ltd., Shillong
85. Shri S.C. Sahu, Central Seismological Observatory, Govt. of India, Shillong
86. Shri S.S.G. Lyngdoh, Revenue Deptt., Govt. of Meghalaya, Shillong
87. Shri J. Marwein, Revenue Deptt., Govt. of Meghalaya, Shillong
88. Shri Ashok Singh Sairam, Indian Institute of Technology, Guwahati
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95. Smti F.R. Tyntathiang, Naban Synod College, Shillong
96. Shri S.K. Chakravarty, Kendriya Vidyalaya, Shillong
97. Shri Biswajit, Chakravarty, Kendriya Vidyalaya, Shillong
98. Smti Adella Lyngdoh, Mawlai Presbyterian H.S. School, Shillong
99. Shri Amit Gurung, Army School, Shillong
100. Shri H.S. Warjri, Laitumkhrah Presbyterian H.S. School, Shillong
101. Smti Papia Bhattacharjee, St. Mary's School, Shillong
102. Shri Dipon Chanda, Quenie School, Shillong
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104. Shri Imtisunep Ao, Vision Home School, Dimapur, Nagaland
105. Shri D.T. Myrthang, Govt. Boy's H.S. School, Shillong
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120. Smti L.D. Marak, Shillong College, Shillong
121. Smti M. Gatphoh, Shillong College, Shillong
122. Shri T.S. Rajee, Shillong College, Shillong
123. Smti D. Mawroh, Shillong College, Shillong
124. Smti A. Nongbri, Shillong College, Shillong
125. Shri W. Lawai, Shillong College, Shillong
126. Shri T.T. Pachunga, Shillong College, Shillong
127. Shri N.B. Rai, Shillong College, Shillong
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130. Shri L. Pathaw, Shillong College, Shillong
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132. Smti I.S. Kharkongor, Shillong College, Shillong
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136. Smti H. Diengdoh, Shillong College, Shillong
137. Shri N.K. Sarkar, Shillong College, Shillong
138. Smti N. Lyttand, Shillong College, Shillong
139. Smti J. Choudhury, Shillong College, Shillong
140. Smti V.C.S. Dkhar, Shillong College, Shillong
141. Shri K.K. Choudhury, Shillong College, Shillong
142. Smti S. Dhar, Shillong College, Shillong
143. Dr H. Dhar, Shillong College, Shillong
144. Shri D. Shadap, Shillong College, Shillong
145. Dr (Smti) D. Chattopdahayay, Shillong College, Shillong
146. Shri K.D. Ramseij, Shillong College, Shillong
147. Smti J.P. Biswas, Shillong College, Shillong
148. Dr B.P. Tripathi, Shillong College, Shillong
149. Smti N. Sinha, Shillong College, Shillong
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153. Smti R.P. Pyngrope, Shillong College, Shillong
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160. Shri S. Sarma, Shillong College, Shillong
161. Shri T.J. Kharbhih, Shillong College, Shillong
162. Dr M.N. Bhattacharjee, Shillong College, Shillong
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164. Smti R. Sarkar, Shillong College, Shillong
165. Dr (Smti) A. Ahmed Ashraf, Shillong College, Shillong
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167. Smti R. Devi, Shillong College, Shillong
168. Dr M. Dey, Shillong College, Shillong
169. Smti D.N. Shabong, Shillong College, Shillong
170. Dr U. Ghosh, Shillong College, Shillong
171. Shri D. Mukherjee, Shillong College, Shillong
172. Smti E.N. Dkhar, Shillong College, Shillong
173. Shri R.K. Das, Shillong College, Shillong
174. Smti S. Choudhury, Shillong College, Shillong
175. Smti W. Dkhar (Lib), Shillong College, Shillong
176. Shri Raphael Lyngdoh, Laban Presbyterian H.S. School, Shillong
177. Shri Rajesh Ram, Shillong College, Shillong
178. Shri Synshar S. Syiem, Shillong College, Shillong

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1. Smti Sharon Nongkynrih, Shillong Commerce College, Shillong
2. Shri Banker Kharkongor, Shillong Commerce College, Shillong
3. Shri Macdonald Syiemlieh, Shillong Commerce College, Shillong
4. Shri Dannywill Wahlang, Shillong Commerce College, Shillong
5. Shri Rudolf Kharpuri, St. Anthony's H.S. School, Shillong
6. Shri Lakshpreet Singh, St. Anthony's H.S. School, Shillong
7. Shri K.H. Suman Singha, St. Anthony's H.S. School, Shillong
8. Shri Raju Neupane, St. Anthony's H.S. School, Shillong
9. Smti Ferisha Nongkhalw, Naban Synod College, Shillong
10. Smti Seorene Carol Kharbuli, Naban Synod College, Shillong
11. Smti Banylla Lyngdoh, Naban Synod College, Shillong
12. Shri Pilosp Pohkyrmi, Thomas Jones Synod College, Jowai
13. Shri Fred Tennyson Poswet, Thomas Jones Synod College, Jowai
14. Smti Rimiki Dhar, Thomas Jones Synod College, Jowai
15. Smti Iaishisha Phawa, Thomas Jones Synod College, Jowai
16. Shri Fanky Mark Syiem, Mawlai Presbyterian H.S. School, Shillong
17. Shri Sankupar K. Mawlong, Mawlai Presbyterian H.S. School, Shillong
18. Smti Lyndarisa Khongwir, Mawlai Presbyterian H.S. School, Shillong
19. Smti Babianglin Sawkmie, Mawlai Presbyterian H.S. School, Shillong
20. Shri Ronak Jain, Army School, Shillong
21. Shri Vishal Khargwal, Army School, Shillong
22. Shri Harmeet, Army School, Shillong
23. Shri Shubro, Army School, Shillong
24. Shri Arjun Vaswami, Army School, Shillong
25. Shri Bashan K. Suchen, Laitumkhrah Presbyterian H.S. School, Shillong
26. Smti Pynhunlang Iawphnawai, Laitumkhrah Presbyterian H.S. School, Shillong
27. Shri Adelbert Nongbri, Laitumkhrah Presbyterian H.S. School, Shillong
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34. Shri Roshan Chettri, Quenie H.S. School, Shillong
35. Shri B. Mynsang, Quenie H.S. School, Shillong
36. Md. Imran Ali, Quenie H.S. School, Shillong

37. Shri Deepak Tahkur, Quenie H.S. School, Shillong
38. Shri Rajesh Chettri, Quenie H.S. School, Shillong
39. Shri Banthom S. Sumer, Shillong College, Shillong
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41. Smti Shangmaya Muikah, Shillong College, Shillong
42. Smti Pdiang Arti Rynjah, Shillong College, Shillong
43. Shri Lalrimer Warjri, Shillong College, Shillong
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46. Smti Jayanti Warjri, Shillong College, Shillong
47. Shri Lambri Suting, Shillong College, Shillong
48. Shri Lanvakum, Vision Home School, Dimapur, Nagaland
49. Smti Akuminla Jamir, Vision Home School, Dimapur, Nagaland
50. Shri Pynshngainlang Ranee, Govt. Boy's H.S. School, Shillong
51. Shri Banshanlang Siangshai, Govt. Boy's H.S. School, Shillong
52. Shri Precious Star Tmung, Govt. Boy's H.S. School, Shillong
53. Shri Jeremy S. Nongrum, Govt. Boy's H.S. School, Shillong
54. Smti Aromaliza Lyngdoh, K.J.P. Secondary H.S. School, Shillong
55. Smti Larisa Makri, K.J.P. Secondary H.S. School, Shillong
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57. Smti Ferita Sunn, K.J.P. Secondary H.S. School, Shillong
58. Smti Margaret, Shillong College, Shillong
59. Smti Mary Candida, Shillong College, Shillong
60. Shri R.V. Mukhim, Shillong College, Shillong
61. Smti Diana Mawrie, Shillong College, Shillong
62. Smti Patricia K. Kongor, Shillong College, Shillong
63. Smti Barisha, Shillong College, Shillong
64. Smti Dahunlang, Shillong College, Shillong
65. Shri Gopal K. Kongor, Shillong College, Shillong

RAPPORTEURS

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4. **Dr M.N. Bhattacharjee**
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5. **Dr B.P. Tripathi**
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6. **Smti I.S. Warjaree**
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7. **Shri S.K. Roy**
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8. **Shri S. Lyngskor**
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9. **Shri Phillip Tariang**
   N.I.I.T., Shillong-793001

WELCOME ADDRESS AT THE INAUGURAL SESSION

Dr S.K. GUPTA
JOINT CONVENER

Madme Chairperson Dr (Mrs.) M.P.R. Lyngdoh, His excellency Shri M.M. Jacob, the Governor of Meghalaya, Prof T. Chuba Hon'ble Minister for Science Technology and Higher Technical Education of Nagaland. Dr V.K. Dharmadhikari. Director General, Centre for Electronics Design and Technology of india, Shri Sreeranjan, Commissioner, Information Technology, Govt. of Meghalaya, Vice Principal Shri R.K. Datta, Distinguished Scholars and Scientists, Learned Participants and Delegates, Members of the Media and Press Corps, Beloved students and Fellow Teachers, Ladies and Gentlemen.

I Sincerely welcome you all to this inauguration of National Workshop cum conference on "the Role of Information Technology in the Development of India with special reference to N.E. Region" on behalf of the Organiser and on my own behalf. It's a wonderful privilege and opportunity for us to have you all this morning in our midst for a successful beginning of a series of meaningful sessions we have been preparing for and looking forward to for the last couple of months. Your valued presence here today will greatly encourage us to go ahead with our humble mission in creating an awareness about the Role of Information Technology in the Development of the region and the country as a whole.

Scientific & Technological activities and Manpower are major input resources for indirect measurement of the strength of the country owing to their contribution towards Socio-economic development and self reliance of the nation. The planning and formulation of a science and technology policy requires the knowledge of total availability of qualified human resource, especially, active stock of Scientists and Technical Personnel. By the application of science and technology, the economy of the country can be uplifted which can be easily judged by the provision made and expenditure incurred in Research & Development in the last V^{th}, VI^{th}, VII^{th} & $VIII^{th}$ five year plans of the Country. This volume of expenditure shows a phenomenal development in Science & Technology, which resulted in our country from the Green Revolution, White Revolution, Blue Revolution to Information Technology Revolution. Due to advancement of space technology which in turn leads to information communication and internet technology, our Country is moving towards the knowledge based society. As a result, our country is experiencing a shift from brain-drain, body shopping of a few years back to knowledge bargaining system, forcing major companies of the World to setup their centre in our Country, providing multifaceted opportunities to join hands to ensure adquate Socio-economic development. The North Eastern region is still not in a position to join in the race, in a systematic and structured way, due to lack of infrastructure required and adoptation of adequate technology required for the development of the region. Since the current trend of technology and information revolution is changing very rapidly, it becomes very important for the region to come forward with the application of Space and Information Technology which are inter-related and interdependent, as there is an urgent need to enhance the bandwidth means information communication channel, and which could change the face of the region in terms of socio-economic development.

Keeping the above back ground in view, Shillong College and Shillong College Academic Society are holding this workshop cum conference and exhibition who look upon themselves primarily as humble hosts with the generous help of man, money and material from different well meaning organisations. We are discharging probably more of an academic role of pointing out to the huge potential of Information Technology which can be explored for the development of the N.E. Region. We would like to see ourselves more as a bridge between classroom and developmental agency, research development and common man and above all to strive for the involvement of all classes of people in the scientific progress of the society.

My hearty welcome to each one of you once again and a big thank you for your kind presence amongst us this morning.

Thank you.

ADDRESS: SHRI SHREERANJAN, IAS, COMMISSIONER & SECRETARY GOVT. OF MEGHALAYA

Madame Chairperson, His Excellency, Shri M.M. Jacob, the Governor of Meghalaya, Hon'ble Minister for Science & Technology Prof. T. Chuba, Dr V.K. Dharmadhikari, Dr S.K. Gupta, Shri R.K. Dutta, Members of the Media and Press Corps., Learned participants, Member of Shillong College Faculty, Students, Ladies & Gentlemen.

It has been a great privilege for some of us to have been associated with the Advisory Committee, but the successful organisation of this 3-day National Workshop cum Conference and Exhibition is entirely due to the ceaseless hard work of Dr (Mrs.) M.P.R. Lyngdoh, Principal, Shillong College. Dr S.K. Gupta, Shri R.K. Datta, Jt. Conveners and the dedicated members of her organising committee, along with the spontaneous cooperation and participation of a very large number of NGO's, private & public sector undertakings and central and state Government departments and Regional Directorates. May their efforts succeed in preparing the region and its people, in their march towards the new millennium of hope and promise.

Meghalaya is a developing state of India, with high potential of resources including the people, who are relatively prosperous and educated. Information Technology sector was anchored in the state, like elsewhere, by entrepreneurs movement and some pioneers in the state who have established the sector in the state. The facilitative role of Government was acknowledged hesitantly in the state. The Information Technology Department in the state is in infancy, being created in May, 2001.

Its initial roles and functions are as follow :

- Policy matters relating to Information Technology, such as design review and monitoring of the Information Technology Policy for the State and implementation of the relevant Provisions of the Information Technology Act, 2000.
- Promotion of knowledge based enterprises, e-commerce; Information Technology enabled services and Information Technology Education.
- Development of Microelectronics, Information Technology Standardization, Computer Software Exports etc.
- Provision of infrastructures and training for e-governance such as connectivity across Departments, Information Kiosks to the people etc.
- To liaise with the Ministry of Information Technology, Govt. of India and tis various organizations.

The Department has made some initiatives in facilitating the setting up of the 32 Community Information Centres in the State, in respect of Software Technology Park in Shillong, and setting the ball rolling towards formulation of an Information Technology policy.

Much needs to be initiated, formulated and implemented, even though the department's key initiatives have only been on a level of promise owing to resource constraints including the land, fund, manpower and expertise.

I would like to enlist and flag some of the issues which can form the perspective of Information Technology sector in the state, though such perspective may not cater to on a micro-scale of specificities and wish list and also does not necessarily reflect order of priority.

- **Building and generating of quality Information Technology manpower to sustain Information Technology related activities in the State.**

It is high time that the commercial Information Technology Institutions should introduce only DOEACC courses and Industry Certified Courses while the basic courses equivalent to existing Certificate Courses or Diploma Courses should be introduced in schools and colleges as part of the curriculum/ syllabus. Such Industry certified courses have proved to the Information Technology Industry that they can really contribute positively to the Industry. Mushrooming and unplanned courses can adversely

affect the development of skilled manpower of Information Technology in the State as they may be literate but not employable. To sustain the Information Technology related economic activities in the State, such generated quality Information Technology manpower must be utilized efficiently. For this, there has to be growth in Information Technology business. Any slide/slump in the sector will add up to the unemployment problem.

- **Establishing infrastructure for hardware, software, firmware industries of economic importance such as Software Technology Parks, Hardware Diagnosis cum Repairing Centres, CEDTI etc. including establishment of infrastructure required for Information Technology Enabled Services, Call Centres, data entry operations etc.**

As of now there is a good market for software exports (development of applications, systems software, firmware programming for embedded systems etc.) from our country. At this stage, the Department has to take firm steps to set up the Software Technology Park through STPI, New Delhi or through joint ventures. Much has to be invested by the State and entrepreneurs to sustain the Information Technology activities in the STPs.

- **Establishment of testing and measuring centre equipped with instruments required for hardware diagnosis and repair which an individual or a business establishment is not capable of acquiring them.**

Setting up of Testing and Repairing Centres such as CEDTI, facilities such as High Frequency Digital Multi-probe Oscilloscopes, High frequency signal generators, Sophisticated SMD Rework Stations, library of data manuals of various electronic components, an inventory of frequently used and popular electronic components, library of circuit diagrams for various circuitries ranging from UPS, Monitors to advanced CPU motherboards etc. could be made available for use not only for the needs of the testing and repairing works of hardware in State's Govt. Departments but also for the local entrepreneurs working in the field of hardware and electronics who cannot afford to have such expensive testing equipments. The Testing and Measuring Centre may initially have the basic testing and repairing tools which will serve for the interest of the existing IT infrastructure established in the Govt. Departments as well may be used to cater the needs of the IT entrepreneurs in their respective diagnosis and repair, in the same manner in which the STPs work.

- **Establishment of an independent Internet Gateway for the State and for the North Eastern Region as a whole**

There is a growing demand for faster Internet connectivity such as Broadband Internet Access. There is an increasing number of domestic Internet users, cyber cafes, educational institutions, service providers etc. As a result, the Internet backbone is getting so much importance that end users are hoping for a bandwidth, which would be sufficiently high enough for a good Internet connectivity. With the help of agencies like DONER, perhaps one such Internet Gateway could soon be a reality in the State and in the Region as a whole. An Internet Gateway would be able to support a number of Internet Service Providers (ISPs) without any interruption in the established link, thus better service to the end customers and many entrepreneurs would be able to get good jobs for themselves and for others by way of staring ISPs in the State.

- **Sponsoring of survey, study and research and development programmes in the field of Information Technology which are of economic benefit and importance to the State**

Much cannot be visualized at this juncture as to what would suit best in the State in the field of Information Technology. It is therefore necessary to develop a mechanism through which Industrial Research and Development programmes could be facilitated and catalyzed leading to generation of the technology know-how useful to the State as well as to the nation. Facilities to carry out such Research and Development programmes may be established in the Department. To name a few of the programmes as could be visualized currently, are the development of e-governance systems and applications leading to better accountability, transparency etc. in the governance of the State, development of systems and applications enabling better and constructive participation of the elements of the society in the process of governance and so on.

❖ **Re-engineering of existing government process and practice to suit the Information Technology environment capable of providing effective and efficient citizen services online**

There has been a great deal of computer purchases in the Govt. Departments, but in practice there is relatively a negligible or no computerization of their processes and transactions. Most of the computers are utilized only for typing letters and making statements, which reflect a state of under utilization of Information Technology resources. We need to have concrete e-governance systems and applications to effectively enhance the performance of the concerned processes, transactions and services in any particular Department or any particular function.

If the Information Technology is to be utilized effectively and efficiently with an objective of *bringing good governance through concepts like e-governance,* we need to study the prevailing services, process and transactions in the Government. We may have to re-engineer certain processes and transactions before we even think of computerizing them. The process of re-engineering of government processes (procedures) and transactions, though not at all an Information Technology activity, yet it is the main factor governing the success and failure of e-governance implementation.

Since attempts have been made by many Information Technology organizations including NIC to computerize the government processes and transactions but the outcome has been moderately encouraging. There has been a common tendency to provide the infrastructure before even thinking of its utilization and it is a common experience that either these expensive Information Technology infrastructure are used only for petty applications such as typing letters using MS Office or simply used for browsing the fancy websites on the Internet. There is another tendency to think of developing e-governance applications without attendant linkages, consequences and even their relevance which the prevailing system as existing may limit their effectiveness.

We, therefore, need to involve the experts in administrative research and reforms in the process of re-engineering. This may require the involvement of the National Institutes of Academic Research (e.g. Lal Bahadur Shastri National Academy of Administration, ASCI), the Indian Institute of Management, IIPA and other reputed organizations in the field of public administration, financial management, personnel management, financial accounting and legal practice. A Working Group on Re-engineering under the chairmanship of the Chief Secretary may have to be constituted to study and present all the current practice (viz. services, processes, transactions etc.), to enlist the defects, loopholes etc. in the present system, to come up with a proposed new system where services, processes, transactions etc. are adaptable to the digital/automated environment and ***to finally develop a blue print*** **for good governance.** This activity would have to start immediately to avoid future delays in the implementation of e-governance applications. The Working Group may devise interim systems for immediate use of e-governance implementation or even suggest the existing practice not subject to changes or at most with minimal changes which could be taken up for immediate e-governance implementation. We should avoid arbitrary formulation of policies, selection of e-governance applications and systems.

❖ **Development and implementation of effective e-governance applications including content creation, training of the government employees in specific and relevant e-governance systems and applications**

Based on the above exercise, effective e-governance applications may be developed and implemented. The blue print generated by above scheme would be the basis for all e-governance applications. There are many reputed organizations, companies and software houses that can develop e-governance applications for the Govt. of Meghalaya have approached the Government directly or indirectly viz. Computer Maintenance Corporation Ltd. (CMC), Tate Consultancy Services (TCS), National Informatics Centre (NIC), Centre for Development of Advanced Computing (CDAC) and so on. Application based training should then be imparted to the concerned govt. employees to understand and be able to use the concerned e-governance system or application.

❖ **Establishing Information Technology infrastructure for Remote Sensing based Planning and Management of Development Programmes and for utility mapping in the State**

The presence of the North Eastern Space Application Centre (NESAC), Umiam, Department of Space, Govt. of India in our state gives us an advantageous position that all necessary support with respect to remote sensing activities can be provided from this centre. The National Remote Sensing Agency (NRSA) is the sole agency for distribution of satellite imageries. The Govt. of Meghalaya should have a database of satellite imageries as much as it could collect. These highly reliable data and information would be required by the planners to effectively plan the development programmes in the State, by the monitoring and evaluating agencies to effectively monitor and evaluate the performance and implementation of development programmes. For so long, these agencies rely only on the information furnished by the respective Departments, which may or may not reflect the real picture on the ground.

❖ **Promotion and establishment of e-commerce networks**

Meghalaya is rich in natural resources ranging from crops to forest products to mineral resources. It is fact that most of the produce from the State are taken outside the State as raw materials. With the availability of the Internet, it is possible to add-value and sell finished goods/products even to the most remote places on earth. With the growing tendency for globalization, a global perspective to economy should also be taken into consideration. By way of e-commerce, many entrepreneurs, skilled manpower would be encouraged to take up various production systems to generate goods/products as per the growing demand via the Internet. This would also ease the unemployment problem to a great extent.

We need to promote trading on the Internet, starting with small businesses such as online shopping malls in urban areas. We need to facilitate the process of online payment such as credit card payment etc. which is one of the essential criteria for e-commerce and on-line shopping activities. E-commerce activities should be extended to the villages through the CICs to enable the village farmers sell their products directly to the end customers with the help of e-commerce applications and assistance via the Internet.

❖ **Upgrading, strengthening and supporting the Information Technology Department**

The Information Technology Department may be strengthened by merging the State Computer Cell under Programme Implementation Department. After the State Computer Cell is merged into the Information Technology Department, some of the posts may be upgraded. Besides, post of Information Technology Adviser, Research Officers and Research Assistants are required to be met. The requirement for more technical manpower may be met by outsourcing from the open Information Technology market on contract basis.

❖ **Strategic blueprint for e-governance**

The strategic blueprint for e-Governance would base on the vision, mission and strategies of the State Government as highlighted in the State's Information Technology Policy. The vision would envisage Information Technology as a tool to enter the e-Millennium for attaining all round development in the State and to fully avail of the Information Technology revolution. The goal is creation of wealth, employment generation and Information Technology led economic growth and the mission is to propel or turbo-charge Information Technology businesses and services in the state in order to attain a distinguished position and leadership in IT. In order to actualize the vision the Government's thrust should be to make Information Technology the vehicle for growth, that will enable the entrepreneurs, citizens, businesses, academicians, students and others in Meghalaya to attain their highest potential. The aim of ***digital unite and*** quality services to the people will have to be facilitated by :

- ❖ Basic Citizen Services Interface
- ❖ Basic Citizen Utilities Billing Payment Interface
- ❖ Basic Business Services Interface
- ❖ Government-Government internetworking Interface

This would be done by

- Better Government Citizen centric services and facilities.
- Better Government Citizen centric transactions and facilities.
- Better Government Office automation and facilities.
- Better Government Communication facilities.

The Community Information Centre setup will act as the grass root IT centre, which will percolate IT to the masses and take Internet to the villagers for the benefit of the common man.

Following steps are required to be taken by all departments at different levels for speeding up the implementation of E-Governance in the State:

- Preparation of the Five-Year IT Plan (2002-2007) for making Government Services citizen friendly and enable to access/transact the services, information, procedure, etc. through the Internet.
- Each department of the Government must earmark upto 5% of its Budget to implement citizen-oriented IT services with requisite back-office computerization.
- Citizen-oriented Web Centric services is required to be introduced by every department.
- Creation of infrastructure at each and every department up to the staff level and making computer literacy compulsory for the recruitment at all levels.
- Training of the existing staff of the government at all levels to attain computer literacy within the next three years.
- **Promotion of Local Language for content creation**

English is the main medium of communication in the State and government adopted English as the official language. However, for providing information, education and communication to the citizens effectively, it is necessary to covert all the information to local languages like Khasi, Jaintia and Garo. Steps shall be taken to promote the use of local languages for creation of content development for Internet and a translation of English content to local languages.

- The State Government in its efforts to promote e-governance and computerization is **yet to address the important issues of e-governance such as transparency, accountability and efficiency at the government-citizen interface.** This will involve the *detailed and comprehensive preparation of the blueprint for e-governance, development and implementation of e-governance applications, proper planning, implementation, monitoring and evaluation of development programmes and so on.*

The State is yet to address the issues of efficiency, transparency and accountability at the Government-citizen centric interface on a wider scale by way of implementing the following :-

1. Information Technology Plan – E-Govt. Project for the State to provide a workable e-governance environment, thus accelerate e-governance at all levels.
2. Remote Sensing based Planning and Management of Development Programmes to improve the efficiency of implementation of development programmes.
3. Implementation of digital file and document processing system to improve the efficiency and transparency of work.
4. Implementation of smartcard based authentication system to improve the accountability and transparency of the officers and staff.
5. Development of a detailed and comprehensive blueprint for e-governance to guide all the e-governance initiatives and implementation.
6. Development of the interface between the elected representatives and the citizens in respective constituencies to make the elected representatives more accountable to the public.

7. There is an urgent need to upgrade the Information Technology skills of government employees. Employees must be effectively trained before introducing desired changes in work processes in government departments. Citizen awareness on the potential of Information Technology services/ applications needs to be enhanced. It calls for major cultural change. We should adopt common preferably with local language interface.
8. Transactional security is highest priority.
9. Technological obsolescence must be factored in while planning and implementing Information Technology applications.
10. Common evaluation methodology must be evolved for hardware and software selection.
11. Sufficient resources (funds) must be allocated to build reliable infrastructure to avoid breakdown of Information Technology services.
12. Adoption of freeware (software) for operating system and common utilities (including local language interface) to cut down cost and permanent dependence on imported products.
13. Cementing public-private partnerships to provide citizen services.

At this juncture, the State Government does not have a State Plan Budget allocation for Information Technology Sector for the year 2002-2003 and for the Xth Five Year Plan. As such, the gap is large and the state government may acknowledge and accord priority by firm action plans in the field if Information Technology. The financial implication/investment required for the implementation of the various mentioned activities/steps will be on a conservative scale to the tune of about Rs. 200 crore.

The State with its very limited financial resources would not be able to *implement such programmes and projects without the assistance of the Govt. of India. Besides, private investment must flow for which investment friendly environment has to be created and facilitated.*

Thank you.

INAUGURAL ADDRESS

His Excellency, Shri M.M. JACOB, GOVERNOR OF MEGHALAYA

I am very happy to be here today to inaugurate this Workshop *cum* Conference, on Information Technology, at a time when India has earned the recognition of having the largest number of software professionals in the World.

Information Technology and development are inseparable concepts in today's world. Whatever be the field, the information age has developed its own all pervasive efficiency tool, that is Information Technology. There is no doubt that we are indeed the inhabitants of an information age. And this new age has come up because of a knowledge boom on explosion. This global expansion of knowledge is again an intelligent accumulation and application of information.

As you know the World is passing through a major technological revolution. More and more inventions are adding to our knowledge and pattern of life. It was about 300 years ago the human civilization looked up to see the first Technological Revolution, and inventions like locomotives, steam engines etc, were probably as a result of the Industrial Revolution. It was only about 100 years ago, we could find the 2nd Technological Revolution like Electricity, Radio, Phones and the like. Now we are in the 3rd Technological Revolution. Both the 1st and 2nd revolutions were mainly centered in Europe. But this 3rd revolution is I.T. Revolution, where India has come to the forefront. But, North-East India is very much behind in some other parts of India in this new revolution. The effort of today's discussions should bring up North East India at par with other advanced areas of our country. We have all the support and advantageous factors to make North East march forward in this march towards progress.

In this context, let us analyze and see what is happening around. The advancement in IT has cast a profound impact in the World's economy and thus the quality of human life. The convergence of computers, communications and context has created tremendous opportunities as well as challenges. Both the developed and the developing countries are today deeply committed to derive the multifarious benefits from these new frontiers of opportunities the IT revolution has opened up for the global population.

Internet which is today a limitless network of computers spread all over the world has changed the face and pace of development throughout the globe in an unprecedented manner. Whether it is commerce or industry, entertainment or education, health or healing – every facet of human activity has recieved a tremendous boost because of this convergence of computers and communication technologies. IT and IT enabled services have not only broken the barrier of geographical on political boundaries but have also been striving hard to remove the mental block of centuries that has divided human race on the basis of economic disparities, ignorance, healthcare, recreation and broad human welfare concepts. Information Technology Revolution has brought about changes which we all should agree principally approximate towards the vision of one World, one people that the World thinkers and leaders have been propagating, particularly since post-war time. The IT revolution has also been able to usher in a level of economic well-being on its opportunities to hitherto neglected on deprived areas of the third World including India and China which between them constitute a third of the World's population.

There is no doubt that the IT revolution has opened up new possibilities of economic and social transformation in India too for which both the government and the public initiatives are equally important.

The Govt. of India is rightly seized with the urgency in the smaller and several major initiatives have already been taken in this regard. The information Technology Act, 2000 has been approved by the government to facilitate growth of e-commerce, electronic communication through internet and accelerate induction of IT in critical sectors of the economy. The first National Conference of IT Ministers of various states was held on 15th July, 2000 in New Delhi to formulate a Common Action Plan to promote IT at various levels in all parts of the country. I am told that the Ministry of Information Technology has also taken up an important project to set up Community Information Centres in 486 blocks in the North-East and Sikkim for the socio-economic development of the region. The main purpose of this multi-crore project is to provide connectivity at the block level within a reasonable timeframe. It is heartening to know that a pilot project in more than 30 block has already been completed. I am happy to know the working group of I.T. aims at establishing one million internet enabled IT Kiosks / Cyber Cafes throughout the country within a short span.

We al know about the good work National Informatics Centre has been doing both to the government departments and the public at large through its vast network. In addition to the domestic service, the NIC has been activity involved in ensuring presence of various constituents of Govt. of India on the World-wide Web. Nearby 300 Web Sites covering various government departments of the country have been either developed on already hosted by NIC on its Web Services.

Any technological development should not only take place but must also show that it has actually helped people to improve their quality of living. It is also expected that the fruits of IT revolution should empower the poorest of the poor of the country to be truly meaningful. IT should not and cannot remain only an urban bubble leaving out the large traits of rural and backward India Including the country's North-East.

A farmer in the distant village of the hills should be able to know what his produce should fetch him rightly in the market in advance. A learner should not longer be confined in his classroom alone to gather knowledge. He has the latest and the fastest ways to learn and improve through IT devices. There should no longer be long queues to obtain a certificate or registration in Government on civil offices. You will be surprised to know that in some parts of the country handwritten land documents have been declared invalid. They accept only computer gererated documents.

If we really want to advance as a nation and be treated at par with the advanced we must adopt e-governance and e-education in a very big way. The IT is no longer the preserve of the rich or the privileged. Nor should it remain so. To reach the benefits of IT to not only the developing Urban centres of the North-East but also to the remotest hamlet of the region should be the concerted efforts of all well meaning agencies and institutions. This conference *cum* workshop, I am sure, will show that path alongwith its other valuable findings. Finally I wish your conference a grand success and congratulate all those who are associated with it to make it so.

Jai hind.

CHAIRPERSONS' ADDRESS AT THE INAUGURAL FUNCTION

Dr (Mrs.) M.P.R. LYNGDOH

His excellency Shri M.M. Jacob, Governor of Meghalaya, Prof. T. Chuba, Hon'ble Minister Science & Technology & Higher Technical Education, Government of Nagaland, Shri V.K. Dharmadhikari Director General, Centre for Electronics Design & Technology of India, Government of India, Shri R.K. Dutta, Vice Principal, Distinguished Scientists Scholars, Delegates and Participatns, Fellow Teachers, Students Ladies and Gentlemen.

A warm welcome to all of you to today's inaugural function. In this National Workshop Cum Conference, a number of organisations and scientific departments from the private, the central and state Government are participating. The aim of this conference and workshop is to create an awareness on the development of Information Technology in the region. The whole world infact has passed from one revolution to another in their struggle for existence. This is the age of the fast development of Science and Technology the age of information explosion and technology, which is beyond the understanding of the common man. This is the age of a revolution in Information Technology. If the Industrial Revolution has revolutionised the countries in the world in the earlier centuries the Information Technology has brought about a revolution in the present day world. Transformation and changes are brought about in the socio-economic life. The global networking has linked the whole world together, and the world is getting smaller. In this context, the Government has set up Community Information Centre (CIC's) to provide information to the rural areas in the 32 blocks in the state.

Information Technology Education must be encouraged, and the Colleges and Universities can think of encouraging and opening of under-graduate and post-graduate courses like BSc Information Technology, BCA, PGDCA, MCA, Post-Graduate in Information Technology and the relevant courses which are job oriented to enable our students to compete in the job market. Since unemployment is one of the main problems in the region.

The Region will not be able to join the rest of the country and the world if it is lacking in Information Technology Education. We need to extent the benefits of Information Technology Education to the rural and distant areas. We need trained and knowledgeable teachers.

Shillong College and Shillong College Academic Society with the help and support of the Government and different agencies has decided to organise this National Conference Cum Workshop to bring together scientists, scholars, and administrators to focus on the development of Information Technology in the region and to share their ideas in this common forum.

I hope that the discussions, deliberations in the different sessions and the exhibition that is being organised will be beneficial to all those who are interested in the development of Information Technology in the region.

Thank you.

KEY NOTE ADDRESS
INFORMATION TECHNOLOGY APPLICATIONS FOR DEVELOPEMNT OF INDIA WITH SPECIAL REFERENCE TO NORTH EASTERN REGION

Dr V.K. DHARMADHIKARI
DIRECTOR GENERAL, CENTRE FOR ELECTRONICS DESIGN & TECHNOLOGY OF INDIA
M.C.I.T., GVOT. OF INDIA, NEW DELHI

His Excellency, Shri M.M. Jacob, the Governor of Meghalaya, Chairperson Dr (Mrs.) M.P.R. Lyngdoh, Honourable Minister for Science & Technology of Nagaland, Prof. T. Chuba, Learned Participants, Students, Ladies and Gentlemen.

I think the topic that has been chosen for this Conference is an extremely good topic and very well-worded. I would like to draw our attention collectively before I start giving my ideas and suggestions to the topic 'development with reference NE', but the 'development of India' is the total focus the role of Information Technology is the level at which this development should be evident. All of us know Archimedes used the concept of Lever and envisaged its use as an implement with which we can weigh the earth provided we have the right size for the Lever and the right fulcrum where it can be supported. I think Information Technology is that kind of a Lever provided we can stipulate the conditions for it to be a useful tool. These are my observations, and by this I hope I am not offending anyone, which are in the form of frank remarks and are for sharing with each citizen of India. These are not a sharing of a Ministry representative with other Government representatives.

I would emphasize and set the focus on Development in particular of the NER, Lack of development is not due to lack of money. This awareness is the correct indication to the point [1] that the investment strategy should be better if the money spent has to have its dividends to reach out to the individual citizen to improve the **standards of living.** This is stressed by stating that Information Technology must facilitate the Per Capita Development, Per Capita Empowerment and Per Capita Self Actualisation. New paradigms are needed especially for the North East which is not only isolated geographically but also is lagging behind in performance.

The new paradigm I suggest, for your kind consideration: Hon'ble Governor and other dignitaries present, is the one that measures development in terms of

a) Energy balance and net energy Regeneration

b) Awakening the hidden human capabilities and their self expression through training and education

c) Transformation from muscle workers to "knowledge workers"

The need for measures for awakening the hidden human capabilities and their self expression through training and education as suggested in the new paradigm is the reformulation of the criteria that the efforts towards collective growth should not breed disparities [2] within the group, polarizing the group members as "development" and "underdevelopment" but the reflection at the totality must represent the Per Capita Actualities rather than a mere **calculated** numerical index for the individuals not relevant for the verified facts at the grassroot considerations.

The most wide spread examples of success for ICT that touch the lives of most people could be illustrated as

- Railway Passengers' Reservation Computerization.
- The PCO and STD booths in towns and villages, enabled through CDOT.

- A small NGO AISECT, Bhopal established 3500 multi purpose computer and Information Technology service centres. These were examples of dissipative Information Technology applications. More such Dissipative Information Technology application need to be brainstormed and carefully nurtured for the unique needs of North East.
- The Information Technology applications including electronics and digital component integration, still remain to be made into the sectors of "high value low weight agro products processing and exports" for products such as Patchouli essence, Exotic fruits, Orchids etc.

The amenities that are available as the Information Technology products must be well supported by developing the awareness among consumers about the real gains, particularly in the long run [3] from the use of these products so as to enable a consolidation of the fact that these are facilities needed for the sustainable betterment with a substantiation of how the knowledge about these products has contributed to Improve **individuals.**

His Excellency has rightly said Information Technology is the last revolution, it's indeed the last revolution, the last bus. I think he gave a warning in this gentle words, he's not as bombastic as we. His warning is very important and I think his warning needs to be taken seriously not by just hundred folks sitting in this room but by the North Eastern Council, by all the Chief Ministers and Governors of tomorrow in Assam, and the various home ministries department, by the Dept. of North Eastern Region Shri Arun Shourie and other affiliated bodies.

Today internet which made it possible for us to become like Shri Vevekanada to share and spread out informations to all people. Again for a fee, nothing is interested in charity, people who are rich can afford to pay this. The question is : are we linked to this very very key concept? If we are still divided we will fall together but if we are united we can start a massive data collection of all earth's consumption whether it is bicycle or fruit or bamboo. This market I know how to get the materials cheaper rather than getting through a contract from Delhi or Bombay. Once our data is there our software specialists who are very much in plenty can help us. But we are using software specialists only for solving problems in America and US to increase their productivity. If we can divert some of them I can help you in this area. I know people like Shri Narayan Murthy of Infosys and Shri Ajum Premji of Wipro who are eager to do some of these things if we are ready to make a forum they would be glad to divert 1% of their resources into those massive input so that the data can be used reconstructively. I think I've been spending my time and I would skip some of the points and come to a very critical conclusion that we need to decide once for all that together we swim but separately we will sink and we are already on the path unless corrected rapidly.

Transformation from muscle workers to "Knowledge Workers" [4] is a process, which can be brought about by the critical role of Information Technology. A mere access – either by way of possession or a under utilization – to the Software Technology cannot be the required transformation; nor even the production of software packages [5] (which requires the know-how) without realizing the non-relevance of certain advanced technological tools in the early stages of development. These would entail only the proliferation of the "muscle worker" analogues in the Information Technology industry. The **Disruptive Information Technology Applications** can not make the perspectives clear enough for a person to transform and to become a true "Knowledge Worker". This is emphasized by reiterating that Information Technology must cater to the "NER People Self-Actualisation Needs".

The references cited below has relevant information to substantiate the importance of the approaches suggested in the Keynote Address.

REFERENCES

1. Col. Beard Smith had stated far back in 1856 that the famines in India are not reflection of scarcity of food; they occur due to scarcity of employment. This statement is true even today because where there is employment, there is purchasing power. Where there is purchasing power, availability of food is natural consequence. *From Convocation Address Reported in University*

News, 40(32), August 12-18, 2002 page 15. ***"Education that infuses Peaceful Coexistence"*** *Hon. Shri Sharadraoji Pawar, Eighth Concovocation ceremony, Yashwantrao Chavan Maharashtra Open University, Nashik.*

2. *"Impact of Information Technology in widening the Rich-Poor Divide"* by C. Rama Chandra Prabhu in University News, 41(15), April 14-20, 2003 Pages 13 & 14.

3. The constructive learners have the opportunity "to take personal responsibility, exercise initiative, and be in control in instructional setting through a variety of learning experiences". Page 415, Wesley A. Hoover, *"The Practice and Implications of Constructivism",* SED Letter. Southwest Educational development Laboratory News Vol. IX. No. 3 August 1996, Retrieved March 15, 2002 from http://www.sedl.org/pubs/sedletter/v09n03/welcome.html Critical thinking is defined by Paul (1992) as, "the art of thinking about your thinking while you are thinking in order to make your thinking better, more clear, more accurate, or more defensible" : Paul R. (1992), *"Critical thinking: What Every Person Needs to survive in a Rapidly Changing World:* (rev. 2nd ed.). Santa Rosa, CA: the Foundation for Critical thinking. Retrieved March 14, 2002 from http://www3.sympatico.ca/lgrightmire/META.HTM These are references from the article "*Thinking and Constructivism: Classroom Approaches"* by G. Lokanadha Reddy and V. Shyamal, University New, 41(17), April 28-May 04, 2003, Pages 7-13.

4. *"India's Development as a Knowledge Society"* Dr K. Vekatasubramanian, Convocation Address, 21st Convocation of Dayalbagh Educational Institute (Deemed University) Dayalbagh, Agra: *KNOWLEDGE WORKER:-* A person who provides value generating, sharing or applying ideas. It can equally apply to eminent scientist, a skilled craftsman or to a receptionist with an expert knowledge of who's who in the organisation and where all the useful information is. Reported in: University news 41(14), April 07-13, 2003 Pages 15-19.

5. *"If you buy a kilogram of steel, 90% of it is material, while if you buy a copy of Windows 98, more than 95% of it is knowledge"* Dr R.A. Mashelkar DG, CSIR as quoted by Shri Prabhat Kumar in the Convocation address delivered at the 23rd Annual Convocation of the Indian School of Mines, Dhanbad. University New, 39(23), June 04-10, 2001, Pages 13-16.

VOTE OF THANKS IN THE INAUGURAL FUNCTION

Shri R.K. DATTA
JOINT CONVENER

Hon'ble Chief Guest, His Excellency Shri M.M. Jacob, Governor of Meghalaya, respected guest Prof. T. Chuba, Hon'ble Minister of Science & Technology, Govt. of Nagaland, distinguished scientiest Dr V.K. Darmadhikari, Director General of Centre for Electronic Design & Technology of India, New Delhi, Shri Sreeranjan, Commissioner, Deptt. of Information Technology, Govt. Meghalaya, Madame Principal & Chairperson Dr (Mrs) M.P.R. Lyngdoh, Representives of different Collaborating and sponsoring Agencies, Delegates & other distinguished guests, Teachers and Students, Members of the Electronics & Print Media, Ladies & Gentlemen present, I, on behalf of Shillong College; Shillong College Academic Society and on my own behalf offer my sincere vote of thanks.

His Excellency, Shri M.M. Jacob, Governor of Meghalaya inspite of his busy schedule, could spare some time to share his views with us and inaugurate the 3-day long Workshop *cum* Conference on the role of Information Technology in the developement of India with special reference to North Eastern Region. Sir, your gracious presence put additional emphasis & importance on our attempt. Kindly accept our sincerest thanks.

Prof. T. Chuba, Hon'ble Minister of Science and Technology, Govt. of Nagaland has come all the way. His enthusiastic presence this morning has been a source of inspiration for the organisers. Thank you sir.

Noted Scientiest Dr V.K. Dharmadhikari, Director General of the Centre for Electronic Design and Technology, New Delhi has come all the way to deliver the keynote address. Sir we are overwhelmed to see your commitment towards the cause. Your address has geared up the entire excercise. Thank you Sir, for the trouble you have undertaken.

Shri Sreeranjan, Commissioner of the Information Technology Department, Govt. of Meghalaya, has always been helpful. But for his unstinted support the conference probably could not have been organised. Thank you Sir, for the help. We hope such a helping hand will be always available.

For the entire exercise the cooperation and help from our collaborators and sponsors have been outstanding. We gratefully acknowledge the cooperation we received from our collaborators like N.E.C., N.I.C. Meghalaya, Department of Information Technology Govt. of Meghalaya, Computer Centre N.E.H.U. Deptt. of Education Govt. of Meghalaya and the sponsors like the Planning & Finance Deptt. Govt. of Meghalaya, N.E.H.U.; Mawmluh Cherra Cements Ltd., State Bank of India, Shillong, Indian Overseas Bank, Shillong, Power Grid Corporation of India Ltd., Shillong, Geological Survey of India, Kolkata, Meghalaya Co-op Apex Bank Ltd., APTECH Computer Education, Shillong, NIIT School K@12, Kolkata, Meghalaya Industrial Development Corporation Ltd., North Eastern Development & Financial Institution, Shillong, WIPRO INFOTECH, Guwahati; Rapsang Group of Industries and S.S. Netcom, Shillong.

I thank all the Members of the Advisory Committee who helped us at every step with their advice and guidance.

Thank you.

WELCOME ADDRESS AT THE INAUGURAL FUNCTIONAL OF EXHIBITION

Shri BIKASH ROY
CO-CONVENER, EXHIBITION SUB-COMMITTEE

His Excellency, the Governor of Meghalaya, Shri M.M. Jacob, Prof. T. Chuba, Hon'ble Minister, Science and Technology, Govt. of Nagaland, Dr V.K. Dharmadhikari, Director General, C.E.D.T.I., New Delhi, Distinguished Guests, Ladies and Gentlemen and my dear students.

Thank you very much for participating in the Inaugural Session of the National Conference cum Workshop on the Role of Information Technology in Development of India with a special referance to North Eastern Region.

Now, on behalf of the Shillong College Academic Society, I requeest Prof. T. Chuba to inaugurate the Exhibition related to Information Technology and I do request His Excellency, the governor of our state, Shri M.M. Jacob and other dignitaries to visit and go round the Exhibition Stalls along with all who are present here.

Thank you Sir, for being kind enough to come all the way from Nagaland to inaugurate and participate in the conference and Exhibition on Information Technology. I thank all the participants who have installed their stalls to make this Exhibition a meaningful and successful one.

Thank you.

WELCOME ADDRESS AT THE VALEDICTORY FUNCTION

Shri N.K. SARKAR
CO-CONVENER, PUBLICATIONS SUB-COMMITTEE

Respected Madam Chairperson Dr (Mrs.) M.P. Rina Lyngdoh, I take this opportunity to welcome all our distinguished guests, invitees, scholarly participants and each one of you to this closing function of our Conference and Workshop on Information Technology at Shillong College. I extend, on behalf of the Organising Committee and the College, a very warm and hearty welcome to Shri R.G. Lyngdoh, Hon'ble Minister of Urban Affairs etc. of Govt. of Meghalaya who is present amidst us this afternoon as our Chief Guest. An extremely dynamic and forward-looking young Minister, Shri Lyngdoh is a source of great strength and encouragement to us. This college as his alma mater is proud of him and we are sure that this college continues to be a soft corner in his heart. And we all know he has big enough a heart for that.

It would have been our great privilege and joy to haave Shri Sreeranjan, Commissioner and Secretary to the Govt. of Meghalaya among us today but unfortunately he is out of station and we all so miss him very much in this concluding session. There is no doubt that under Shri Sreeranjan's safe and caring charge. Information Technology development in the state has found a new surge and direction. Our brief association with him has proved to be highly fruitful and we have discovered in him a unique personality who means business but chooses to keep a low profile behind the glare and blare of publicity. The success of this conference owes a great deal to his personal initiatives and material assistance.

Shri P.K. Das, Director, Software Technology Parks of India, Guwahati has greatly enthuased us with his kind presence and we most sincerely welcome him in our midst this afternoon. We eagerly look forward to his valuable address. Then we welcome each one of you – scholars, technocrats, administrators of distinction, fellow teachers and dear students for your inspiring presence and participation in this Valedictory session of owr 3 day Conference and Workshop.

I am sure that last two and half days' discussions, demos and deliberations have created ripples in many a mind about the potential of Information Technology Revolution to create history in human development.

In our endeavour to position ourselves a s highvalue and high intellect nation, we must gear ourselves up to reap the harvest Information Technology has opened up before us. Information has no frontier and technology offers limitless opportunities to an eager and well-equipped nation. The digital divide that breeds disparities must therefore be bridged through concerted efforts. We must realise that unless technologies contribute to human welfare as a whole, it remains incomplete. What is needed today is a 'Team India' approach in which every segment of our population and each region of this vast country must benefit by Information Technology growth and expansion. And to make it possible both industry as a whole and the Govt. must join hands.

At the end I once again welcome you all to closing function of our 3 day conference and Workshop in Shillong College.

Thank you.

VALEDICTORY ADDRESS

Shri P.K. DAS
DIRECTOR, SOFTWARE TECHNOLOGY PARKS OF INDIA
GUWAHATI - 781015

Madam Chairperson Dr (Mrs.) M.P.R. Lyngdoh, Shri R.G. Lyngdoh, Hon'ble Minister of Meghalaya, Vice Principal, Shri R.K. Datta, Jt. Convener Dr. S.K. Gupta, Members of Shillong College Adacemic Society, Students, Ladies and Gentleman, I feel honoured for having asked to deliver the Valedictory Adddress to the august gathering here on the occasion of the National Workshop *cum* Conference on "the Role of Informatin Technology in the Development of India with special reference to North Eastern Region."

Information Technology associated with its efficient generation, storage, recovery and dissemination of information is occupying the centrestage today. without matter nothing exist, without energy nothing happens, without information nothing makes sense. All of us therefore have a vested interest in the progress and use of Information Technologies.

Irrespective of the questions and uncertainties surrounding the use and impact of these technologies, the opportunities they seem to promise, have caused a mad rush to embrace them. So mush so the world has been said to have moved into the information age.

The speed of revolution and appreciation of It have already caused great shifts in social orientation. The outlook on work, entertainment, interpersonal relationships, and government control, has drastically changed.

Experience in the developed countries leaves no doubt that life can be improved by innovative information systems. Already financial, insurance, transport and education activities have benefited. And increasingly, they are being intrduced into retail, by manufacturing and even agriculture, and the advent of the Internet is drastically changing the marketing of goods and services.

The information and telecommunication technologies have increased the trend towards economic globalization and it is therefore reasoned that we cannot afford to be left out.

Yet the debate have been whether IT will allow leaps in socio-ecinomic development, thereby closing the development and technological gap between the rich and the poor, both within and between countries, or whether these technologies will widen the gap, leading to more unemployment and competitive setbacks in trade.

Although studies show that evidence of the benefits and risks of investment in the ICTs is inconsistent. What appears clear is that the outcomes will depend on the capacity to design and implement policies, draft suitable regulations, facilitate education and training, and enable technological assessment programs that will build most effectively on each state technological capabilities and / or their socio economic conditions.

Nevertheless, a cursory analysis of the social and economic implications if these technologies have suggested that there are enormous benefits and risks in joining the global information society, but the graetest risk of all, apparently, is not participating and influencing the information revolution.

SITUATION ANALYSIS

Information and Telecommunications Technologies are being introduced in enterprises of all sorts, in service, manufacturing and agriculture, as well as, in public institutions and organizations.

The obvious questions to be posed then is what are the impacts of these technologies. Have efficiency been increased, have they guided decisions to better outcomes, have education become more relevant and the environment nearer reclamation and protection, have government policies, or lack thereof, contributed to these developments, and whether have average consumers in the poor countries are being provided with more and better options, due to the introduction of these technologies.

It is clear that to empower the poor to help themselves we will require more efficient ways to supply them with information to increase their productivities and marketing, to promote better health, provide more power over their lives by linking them with the center of their societies and better participation in the decision making machinery of their countries. The use of information technologies therefore to deliver distance teaching and provide more relevant medical knowledge, and install ways to voice opinions about the course of development of societies, are commendable.

We have seen that government is under stress worldwide. Our leadership have to deal with very complex problems from rapidly changing world order to intransigent problems of hopelessness and strife. Government in leading in dealing with may of these problems do so from gut feelings and common sense. The data, information and knowledge needed to make the wise decisions are often not available, and when they are, there is inefficient retrieval and dissemination.

Strategic information systems which contribute to strategic planning and management of economies, have therefore been attempted in a number of situations but the results of these attempts are not widely known and the parameters that determine success, or failure, not clearly defined and documented. Project to design strategic information systems for the public in areas of need, such as, education, health, public financial management and transportation, trade facilitation, disaster prevention and managemet, property and business registering and national statistics, would go a long way to improve weak infrastructures and address shortage of resources.

It will be appreciated that if we are to join the information society and be vibrant parteners in its evolution, we must be more than passive consumers of information hardware and software. To become serious producers of hardware, significant capital resources and market reach are necessary, so is the near future the manufacture of information hardware, may not be a commercially viable option (I am not talking about assembly jobs).

The production of software however does not have such heavy constraints and indeed in some ways fits with our labor intensive need of the poor countries. Typically some of us tried to join the Information Technology Revolution by providing low technology type services, such as data entry. Many of them are now realizing that this is not sustainable and indeed the provision of knowledge based services for the international market is perhaps a better way to proceed. Software production has been heralded as one such area.

Experiences has taught us that without proper mindset through social changes to embrace and use these technologies, meaningfully, they may cause more harm than good. Questions about the various impacts of ICTs on governance, productivity, and social cohesion among individual, the family, community and civic organizations, are to be attended to. Most of the debate about the possible impacts of ICTs have centered around developments in the industrialized and developed countries and there has been an umfortunate tendency to simplistically assume that the influnce of these technologies on the developing, or underdeveloped socities, will be the same.

To be able to harness these technologies for effective socio economic development in our societies, more precise information is required to understand the various factors involved. One good way to proceed to gain knowledge is to initiate constructive study by NGOs like Shillong College Academic Society.

Present effort through this workshop and seminar is therefore highly praiseworthy.

Thank you.

JOINT CONVENERS' REMARK AT THE VALEDICTORY FUNCTION

Shri R.K. DATTA

Respected Chief Guest, Shri R.G. Lyngdoh, Hon'ble Minister for Urban Development etc. Madame Chairperson & Principal, Dr (Mrs) M.P.R. Lyngdoh, Dr P.K. Das, Director, Software Technology Parks of India, Guwahati, Shri Sreeranjan Commissioner, Information Technology Department, Govt of Meghalaya, Teachers & Students of different Educational Institutions, Distinguished Guests, Ladies & Gentlemen, I am privileged to stand before you this afternoon to make some layman's remark on the entire exercise of this Workshop *cum* Conference. After 3-days of hectic activities we now beat the retreat. But before doing so it is necessary to make an assessment – some sort of introspection.

As you all know this Workshop *cum* Conference on the Role of Information Technology in the Dev. of India with special reference to North Eastern Region had 3 different components targeting different areas. The technical sessions including some invited lectures, the workshop for students & the exhibition by different organisations displaying their products.

The Workshop *cum* Conference was inaugurated by His Excellency Shri M.M. Jacob, Governor of Meghalaya, who in his inaugural address set the ball rolling by making some well thought of valuable suggestions on the role of Information Technology in the development of North Eastern Region and also stated the areas of I.T. to be stressed for the purpose. His Excellency suggested common market strategy covering all the North Eastern States and expressed his desire to pursue the matter in the National Informatics Cente meeting. His message was mixed with a sense of urgency.

Hon'ble minister of Science & Technology Govt. of Nagaland, Prof. T. Chuba, inaugurated the Exhibition. He along with the Governor & other dignitaries went round the exhibition stalls & showed interest. The minister in his address explained the backwardness of North Eastern Region in general & Nagaland in particular and expressed his Govt's. desire to open up for Information Technology in a bigway.

Dr V.K. Dharmadhikari, noted Scientist and Director General of Centre for Electronics Design and Technology of India in his key note address covered all aspects of Information Technology. He supported the Common Market strategy as suggested by His excellency, Governor of Meghalaya and even suggested some entrepreneurship which might be linked to such a strategy. Dr V.K. Dharmadhikari wished that students from Indidan Institute of Technology, Guwahati take care of the region instead of serving foreign countries as is generally done by those from other I.I.T.s. He suggested useful from workabe knowledge in Information Technology to be inparted to students after their general courses of studies in colleges to make them employable.

Shri Sreeranjan discussed the progress so far by the Govt. of Meghalaya in this field of Information Technology and also indicated future plan. A proposal to set up a unit of Centre for Electronics Design & Technology of India in Shillong College is being considered. It will be a joint venture of Govt. of Meghalaya Information Technology Deptt. and Shillong College. The proposal is likely to get blessings of Dr Dharmadhikari.

In his address on e-governance, Shri Timothy Dkhar of National Informatics Cente, Meghalaya, explained how this concept of e-governance can be extended upto the block level.

In his lecture on e-governance, Dr Subir Roy attempted to give an idea of the world in 2015. He explained how e-governance can change the world including the life-style of people through Smart Card. However, there may be doubt in Indian context.

Zonal head, APTECH Computer Education, Kolkata, Shri Amitabh Ghosh in his address on e-education explained how this concept is likely to mobilise the entire education system. However the concept is still under research and is gradually making inroads into the present system.

Shri S. Ghosh while deliberating of e-education explained how NIIT has contributed in the field. There were three Technical sessions chaired by eminent personalities like Prof. K. Ismail, Head, Dept. of Chemistry, NEHU; Dr K.C. Bhattacharya Director, North-Eastern Space Application Centre Meghalaya and Dr Subir Roy, Technical Director, National Informatics Center, West Bengal.

Some important and interesting revelation came out in different papers submitted. The presentors did justice to their jobs. But all the authors did not present their papers.

The students must have gained from their participation in Workshop. The Exhibition drew the attention of all.

Dr P.K. Das, Director, Software Technology Parks of India, Govt. of India, Guwahati delivered the Valedictory address and stressed the need of Information Technology for the North Eastern Region.

Hon'ble Minister of Urban Affairs, etc. Govt. of Meghalaya, Shri R.G. Lyngdoh, as the Chief Guest in the Valedictory function discussed the develoopment of Information Technology Sector in Meghalaya.

Everyone agreed in unequirvocal terms the need of Information Technology for the development of North Eastern states.

Thank you all.

PARTICIPANTS' REMARK AT THE VALEDICTORY FUNCTION

Shri TIMOTHY DKHAR
STATE INFORMATICS OFFICER, NATIONAL INFORMATICS CENTRE, MEGHALAYA
SHILLONG – 793001

Madam Chairperson, Dr (Mrs.) M.P.R. Lyngdoh, Hon'ble Chief Guest, Shri R.G. Lyngdoh, Minister of Urban Affairs, Shri P.K. Das, Director, Software Technology Parks of India, Ladies and Gengtlemen and my dear Students, I am privileged to share my experience as a participant in the National Workshop *cum* Conference.

It is very heartening to find that Shillong College Academic Socieety organized the National Workshop *cum* Conference on the role of Information Technology in the developement of India with special reference to the North Eastern Region.

It is more inspiring to note that participants like Information Technology Department, Govt. of Meghalaya, Indian Institute of Technology, Guwahati, Bharat Sanchar Nigam Ltd., Computer Centre N.E.H.U. and a host of central and state departments / organizations took active interest and participated in a meaningful manner to make this venture a success. It will go a long way in creating a consiousness in the budding young mind of school and college students who had participated in the workshop specifically meant for them. I personally consider like all other participants that the overall performance of the conference was a grand success. Besides the workshop and conference there was also an Information Technology Exhibition where National Informatics Centre, Meghalaya also participated which display the role and objective of National Informatics Centre, Meghalaya in Information Technology development for the North East. In this three days celebration, there were some recommendations which I think the society will take up with the related bodies in the near future. Such awareness campaign may also be done in other parts of the state to generate awareness so that people can derive benefits from the Information Technology development.

Finally, I would like to thank Dr S.K. Gupta and other members of the Organizing Committee and wish them more success in such venture in the near future.

Thank you.

PARTICIPANTS' REMARK AT THE VALEDICTORY FUNCTION

Shri CHRIS CAJEE
DIRECTOR, APTECH COMPUTER EDUCATION CENTRE
SHILLONG – 793001

Madame Chairperson, Dr (Mrs.) M.P.R. Lyngdoh, Hon'ble Chief Guest Shri R.G. Lyngdoh, Minister of Urban Affairs etc, Govt. of Meghalaya, Shri P.K. Das Director, Software Technology Parks of India, Ladies & Gentlemen and my dear Students, I am privileged to share my experience as a participant also as an exhibitors in the National Workshop *cum* Conference on the Role of Information Technology in the Development of India with special Reference to North Eastern Region.

The Information Technology Industry is probably the only industry whereby Meghalaya can leapfrog the various stages of industrial development and establish Meghalaya as an Industrial powerhouse of Eastern India, if not the entire country, in the least possible time.

If any technology can create new opportunities to bridge the gap between the haves and the have-nots in society today, it is Information Technology. Again, if any technology can offer immediate employment opportunities for our educated unemployed it is Information Technology.

Meghalaya is already identifiable as the "Educational capital of the North East" and has adequate supply of skilled manpower. Moreover the Literacy level in the State is also high and there is significant presence of various Information Technology business segments. Shillong, the capital of Meghalaya can be easily developed into a hub of Information Technology activities in the region due to its advantages like climatic condition, educational infrastructure, availability of power, English speaking people with neutral accents and so on.

There is therefore a tremendous potential for the State to develop Information Technology Industry and the role of the State Government cannot be overemphasized.

The key factor is the establishment of an Information Technology Park. Creation of infrastructure to the extent possible, by the Government for development and growth of an Information Technology Industry in the State is the pre-requisite for attracting the private sector, within and without, to invest in the state. Infrastructure for the Park with basic amenities like uninterrupted power supply, central air-conditioning, communication facilities, sufficient bandwidth, etc. will be a great incentive for Information Technology entrepreneurs. This park would be extremely useful to spawn the growth of Information Technology-enabled services – a sector that has the promise of providing jobs to thousands of people in the State.

In conclusion, on behalf of the exhibitors, I wish to thank the Shillong College Academic Society for having organized this workshop. The personal contribution of Prof. S.K. Gupta in organizing the workshop is worth mention.

Thank you.

PARTICIPANTS' REMARK AT THE VALEDICTORY FUNCTION

Shri P.P. DE
COMPUTER CENTRE, NORTH-EASTERN HILL UNIVERSITY
SHILLONG – 793003

Honourable minister of Urban Affairs Shri R.G. Lyngdoh, Dr P.K. Das, Director STPI, Guwahati, Shri Shreeranjan, Commissioner Information Technology Deptt. Govt. of Meghalaya, Dr MPR Lyngdoh, Principal, Shillong College other dignitaries and delegates.

I have some comments as an observer to this conference.

On the day of inauguration Dr Dharmadhikari, Director General CEDTI, New Delhi, made a very important comment. It should be taken as very seriously. The people of this region has to catch up with the Information Technology revolution in which the rest of country are already far ahead. Otherwise we are going to be left behind for ever.

Invited talk by Shri Timothy Dkhar explained the role of NIC in building up Community Information Centres in the rural areas of this region. This particularly being done for North Eastern Region and only of the rural areas. So that the rural people can take the advantage of Information Technology in their day to day life.

Shri Ashok Singh of IIT Guwahati explained the schemes provided by ERNET India for setting up internet access facilities in educational institution upto the level of school and colleges. I hope the School and Colleges of this region will try to take the advantage of this facility.

Dr Aravamudhan's through his seminar has clearly explained to us how Information technology can be used to improve teaching techniques. The class room lessons which are difficult to teach a student can be very easily explained through such animated graphs. It is also important for the teachers to learn some of these techniques to make best use of technology as tool for teaching. Dr. Aravamudhan's ideas can be used for training the teaching community in the use of computer as a tool for enhancing the their teaching capabilities.

Ms. Shazia's paper on VOIP explained the intricacies of this technology. VOIP is a boon for low cost voice communication with some compromise on quality. To use VOIP we also require good quality uninterrupted internet connection.

An interesting paper "LOG IN – Ms Housewife" was presented by and Ms. Ayasha Ashraf Ahmed. They have suggested how a housewife can be a part of this Information Technology revolution as a meaningful player. If a housewife is familiar with the information technology she will as well impart it to her children.

We have had papers presented on e-Education by Dr T.K. Sinha, Dr A. Chattopadhyay, Dr D.L. Buam, and an invited lecture by Mr. Amitaba Ghosh. e-Education is beneficial for a very large group of learners who need to be trained in a short span of time sitting at his / her own geographical location. But for the learners of this region e-Education through the net provides a very bad experience due to the slow internet access. But the suggestions by Mr. Amitav Ghosh for mixed mode of learning i.e., both class room complemented by e-learning ought to be adopted. Mr. Chattopadhaya's remark against the use of e-education that it is meant only for the rich and the urban population is debatable. But his warnings of abuse and misuse of internet by the teenagers should not be ignored for a healthy society to grow.

Shri Debopriya Deb through his paper "Information Technology in North-East" has emphasised the requirement of infrastructure from Govt. of Information Technology Education. NASSCOM report sidelines the Information Technology scenario of North Eastern Region, which is very unfortunate. Only about

6% of Information Technology professionals are absorbed from eastern India. There is also a kind of mis-representation by the media about the North Eastern Region which has retarded its growth and discouraged investments by various business houses in the North Eastern Region. Media has a great responsibility to project the positive of North Eastern Region which will invite people from rest of the country to invest here.

As pointed out by Shri Zulfi, Medical Transcription an Information Technology enabled service require motivated, highly trained manpower, one who has very good listening capability and very good command over English. Call centres are another very effective Information Technology based service which can be started in this capital city of Meghalaya to provide employment opportunities.

On e-Governance we had only one paper being presented by Shri Timothy Dkhar of NIC which was read out by his colleague. We also had a lively invited talk on e-governance from Dr Subir Roy of NIC, W. Bengal. As stated by him e-governance in our country is still in its infancy. The leaders must be fast enough to decide about going for e-governance by confirming Information Technology policy for enhancing its overall development through the use of information technology. The sooner the better. e-governance should be application driven and not vendor driven. We also need earth station to increase the bandwidth for net access so that Information Technology enabled services can be initiated.

On data mining, we have papers presented by Mr. S. Ghosh and Shri Dibyajoyti Chautia. These are highly technical and academic in nature. Probably in distant future this technology could be used for the development of this region.

It is interesting to note how Information Technology is being effectively used in Power Grid for various activities of the organisation such as Planning, Resource Management, Websites Maintenance and monitoring of the electrical grid of better load dispatch.

There was also an ongoing workshop conducted by the computer teachers of Shillong College on Internet Awareness. The exhibitions showcased some of the recent developments in computer technology and learning solutions with a focus on the North-East in particular.

This morning there were some demonstrations by Tata InfoTech, APTECH and NIIT on animation, internet & computer aided lessons for school students.

Finally I would like to make some personal comments. I remember those days few years back when Dr S.K. Gupta talked to me about his desire to organise a conference on Information Technology. His dream has been fulfilled through this conference. Despite of various limitations, it has been organised very well.

The hospitality was excellent and every small details was meticulously looked after. Finally let us all not forget about our experiences gathered from this Conference. Rather we should try to organise more such conferences in the days to come.

Thank you.

VOTE OF THANKS AT THE VALEDICTORY FUNCTION

Dr S.K. GUPTA
JOINT CONVENER

Madame Chairperson Dr M.P.R. Lyngdoh, Shri R.G. Lyngdoh, Hon'ble Minister for Urban Affairs etc. Govt. of Meghalaya, Shri P.K. Das, Director, Software Technology Parks of India, Guwahati. Shri R.K. Datta, Vice Principal, Destinguished Guests, Delegates, Members of the Media and Press Corps. Students, Ladies and Gentlemen. On behalf of the Organisers of this National Workshop *cum* conference, it is my proud privilege to sincerely thank you all for your kind presence, patronage and Co-operation towards the successful completion of three day long Workshop *cum* Conference and Exihibition on the role of I.T. in the development of India, with special reference to North Eastern Region.

A Workshop *cum* Conference and Exhibition of such scale and of such large participation was possible because we the organisers-Shillong College and Shillong College Academic Society recieved unstinted support of men, material and financial assistance from every conceivable sources-Governmental, Private Educational Institutions, Teachers, Students and Members of the public in general. The list indeed is endless and it will need pages to name all of them individually, we do remain extremely grateful to each one of them.

We are extremely grateful to our Chief Guest this afternoon, Shri R.G. Lyngdoh who has always been very kind to us and stood by us in any meaningful endeavour we approached him with, we are grateful to Dr P.K. Das, Director, Software Technology Parks of India, who is also chairman of N.I.E. T.A., who took trouble of coming from Guwahati to grace the valedictory function and made us greatly happy with his most illuminating Validictory Address, we are thankful to you Sir.

This 3-day spectacle on the Role of I.T. was mainly possible because of the financial support of North Eastern Council, University Grants Commission (N.E. Regional Office), Guwahati, Meghalaya State Planning Deptt., North Eastern Hill University, Meghalaya Industrial Development Corp. Mawmluh Cherra Cements Ltd., State Bank of India, Indian Overseas Bank, Shillong, North-Eastern Development and Financial Institution, Geological Survey of India, State Council of Science, Technology and Environment, Meghalaya, Power Grid Corp of India Ltd, APTECH Computer Education Center, Shillong, S.S. Netcom Pvt. Ltd., Wipro Infotech, Meghalaya Co-operative Apex Bank Ltd, N.I.I.T School @K-12, Rapsang Group of Industries and many others.

A large number of Entrepreneur of I.T. Sector came forward to make the grand exhibition programme highly successful through popular show of their Exhibits, and most interesting demonstration, we remain grateful to them.

While we acknowledge every organisation's support and assistance, whether small or big, as most valuable, I would be failing in my duty if I do not mention the generous and multifarious support of

Dr A.K. Verma of North Eastern Council, Shri Timothy Dkhar of National Informatics Centre, Shri Chris Cajee of APTECH Computer Education Centre and Shri Debopriya Deb of S.S. Net Com (Pvt) Ltd.

Dignitaries who graced the Inaugural and the other interim sessions by their valuable presence have made us indebted to them for ever. The dignitaries are His Excellency, Shri M.M. Jacob, the Governor of Meghalaya, Prof. T. Chuba, Hon'ble Minister of Science & Technology etc. Govt. of Nagaland, the learned Scientist Dr V.K. Dharmadhikari of Centre for Electronics Design and Technology of India for their constant guidance and encouragement.

We are very much grateful to Dr Dharmadhikari for choosing Shillong College as the C.E.D.T.I Centre for Meghalaya.

Shri H.W.T. Syiem, former Secretary, N.E.C., Shri P.J. Bazeley Principal Secretary, Shri G.P. Wahlang Commissioner, Education Deptt. and Shri Sreeranjan, Commissioner, I.T. Deptt, Govt. of Meghalaya, who are advisory committee members, gave tremendous psychological support by their active presence and encouragement.

Eminent Scholars, who chaired the different Sessions Prof. K. Ismail of N.E.H.U. and Dr K.C. Bhattachajee, North Eastern Space Application Centre, Invited Lectures by Sri Timothi Dkhar. S.I.O of National Informatics Centre, Shri A. Singh, I.I.T. Guwahati, Dr Subir Roy, Technical Director, N.I.C. West Bengal, Shri Amitav Ghosh, Zonal Head, APTECH Computer Education. KolKata, Shri S. Ghosh of NIIT School @K12 and learned participants representing different organisations raised the deliberatians to a high level of excellence, we are grateful to them.

We are very grateful to the media including the Regional and National Press, AIR Shillong, DDK Shillong DIPR, Govt. of Meghalaya and others for their wide coverage of our plans, Programme and various sessions.

The teachers, staff and students of Shillong College feel rewarded for the hardwork and dedicated service they rendered towards making the whole excercise over whelmingly successful. We feel equally rewarded by the encouraging presence and patronage of numerous Students, Teachers, Principals from different educational institutions during all the days of Workshop *cum* Conference and Exhibition.

Finally we owe an enormous amount of gratitude to the college Management, and our Principal Dr (Mrs.) M.P.R. Lyngdoh, who was the principal source of our encouragement & conviction.

Thank You once again.

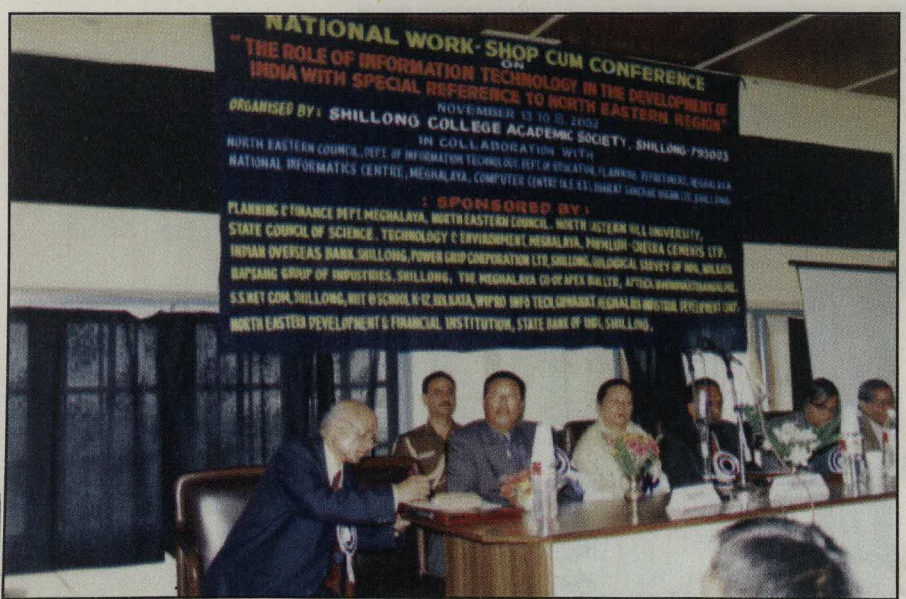
Chairperson Dr. (Mrs.) M.P.R. Lyngdoh and Jt. Convener Dr. S. K. Gupta welcoming His Excellency, Shri M. M. Jacob, Governor of Meghalaya

Shri Sreeranjan, Commissioner, I.T., Meghalaya and Shri B. Roy, Co-Convener, welcoming Prof. T. Chuba, Minister for Science and Technology, Nagaland

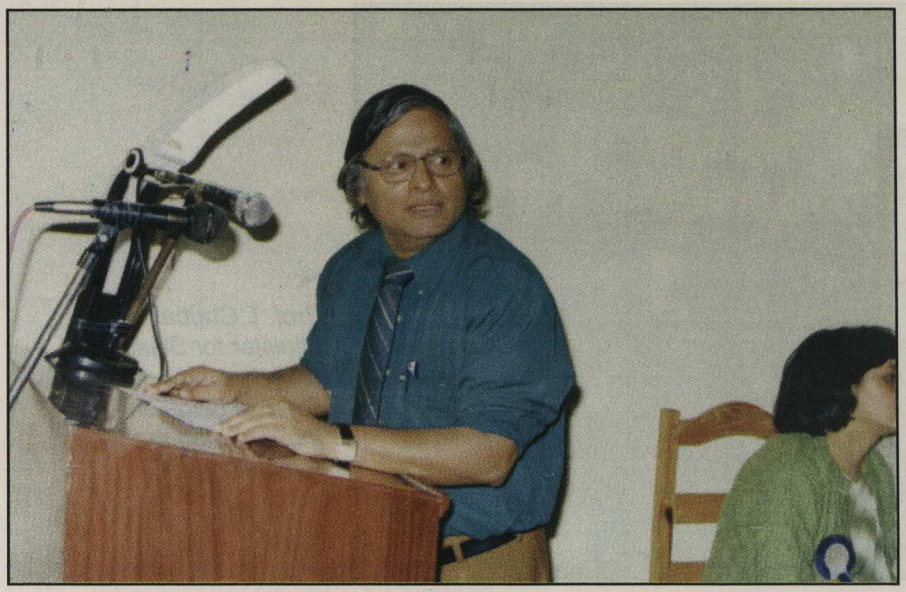
Inaugural Session of National Workshop cum conference on I.T.

Chairperson Dr. (Mrs.) M.P.R. Lyngdoh delivering the Address at the Inaugural Session

A view of the August gathering during the Inaugural Session of I.T. Workshop



A view of the Guests on the Dias during Inaugural Session



Dr. V. K. Dharmadhikari, Director General, C.E.D.T.I., New Delhi delivering the Key Note Address during the Inaugural Session

A view of the August gathering during the Inaugural Session

Shri B. Roy, Co-convener, Exhibition Sub-committee welcoming the Guests during the Inauguration of the Exhibition on I.T.

Prof. T. Chuba, Minister for Science & Technology, Govt. of Nagaland, Inaugurating the Exhibition on I.T.

His Excellency, Shri M. M. Jacob, Governor of Meghalaya, Prof. T. Chuba, Minister for Science & Technology, Nagaland and Shri Sreeranjan, Commissioner, I.T. Visiting the Exhibition on I.T.

His Excellency, Shri M. M. Jacob, Governor of Meghalaya and Dr. V. K. Dharmadhikari, Director General, C.E.D.T.I. Visiting the Exhibition on I.T.

TECHNICAL SESSION – I

ROLE OF I.T. IN INDIAN CONTEXT – AS ASSESSMENT

INVITED LECTURE

ON

COMMUNITY INFORMATION CENTRE

T. DKHAR
NATIONAL INFORMATICS CENTRE, MEGHALAYA
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COMMUNITY INFORMATION CENTRES (CICs)

The Prime Minister announced a plan for the establishment of Information Technology facilities at the block level in the North Eastern Region in February, 2002. In April 2000, the then Ministry of Information Technology launched a project to establishment Community Information Centres (CICs) in all blocks in North-Eastern States. Under this project CICs have been set up in all 487 blocks of the North-Eastern States. The pilot project covering 30 blocks in these states was inaugurated on 12 August 2000, by the Hon'ble Union Minister for Information Technology.

The establishment of the CICs constitutes a tremendously challenging task in view of the remoteness of the area and the difficult mountainous terrain. In a region where good communnication is lacking, satellite based links to the world outside will usher in a revolution in socio-economic development. The estblishment of Community Information Centres (CICs) has been envisaged as a means to use the benefits of Information Technology (IT) to raise the socio-economic conditions of the people of India particularly those in the remote areas of the North-Eastern states. This project is planned as a major initiative to utilize Information Technology as a cutting edge tool of develoopment for the state by establishing Community Information Centres. Out of 37 Blocks, 32 have been covered under the project implemented during 2000-2002. These CICs will help the region avail the benefits of global connectivity through Internet and will also help the state government to plan for Information Technology based citizen-centric applications making government services available through CICs. Under the project, computers, peripherals along with VSATs for satellite communication have been placed at designated locations in each block in the State.

OBJECTIVES OF CICs

- To establish IT infrastructure at the block level
- To create IT awareness amongst the local populace
- To provide Internet services such as e-mail and web access
- To conduct computer based training programmes
- To provide citizen centric services
- To provide access to socio-economic databases
- To facilitate distance education
- To use Information Technology tools for sustainable regional development

SCOPE OF CICs

Computer and communication infrastructure have been set up in each block and are located in Community and Rural Development building. In order to ensure uninterrupted communication, the Centres are connected through a satellite based computer communication network. Each CIC is equipped with VSAT, computer systems, printers and networking equipment.

The CICs will not only facilitate the region to avail the benefits of global connectivity through Internet, but will also bring the region closer, emotionally, to the national mainstream by enabling more efficient and faster information flow amongst the people, State Government and the Central government.

Establishment of CICs will help bridge the digital divide between the North East and the rest of the country. Local language interfaces are expected to be provided for Citizen Centric services. The services will entail an Information Technology-enabled interface for public dealings of the government. Some examples are Comprehensive House Hold Survey, MPLAD Schemes, Schemes for the Underprivileged, Local Market Information and so on. There will be an increased awareness of Information Technology especially under the IGNOU programme where a course on Computer Literacy Programme (CLP) was launched in almost all the CIC centres. The project create a knowledge based society and skill enhancement in the Blocks. Internet access will tremendously benefit college goers and professionals among others.

IMPACT OF CICs

The experience from the Pilot Project has been very encouraging. Many of the CICs receive over a 100 visitors every week who use e-mail facilities, word processing applications, browse the Web, attend Training Sessions and generally improve their familiarity with computers and awareness of Information Technology. The public and state governments have appreciated the CIC concept. Most of the CICs are able to generate modest revenue by charging nominally for these services. The CICs are eventually expected to become self-sustaining.

One of the Pilot CICs is in the Raha block of Assam. This CIC in providing path-breaking services to the local community through Web access, e-mail, Word-processing, etc. A user received information over the Net from the Neurological Research Institute, Guwahati for treatment of his father's illness. Another user used the Internet to order medicines from Apollo Hospitals, Chennai. A third accessed the Web to obtain a comparative price list of computers in order to purchase one. A bank officer received the result of his correspondence course in Banking. A filmmaker planning to register his entry for the film festival received the entry rules from the Web.

Tourists seeking directions for traveling from Imphal to Mandalay in Myanmar visited a CIC in Manipur and got details on the route for traveling by bus to their destination on the Indo-Burma Road. The CIC operators downloaded the information from the Internet. CIC, Khowai, Tripura has organized special Training Programmes for students from various local schools and colleges. This effort has been undertaken in many other CICs as well.

Earlier this year, the school Board results were disseminated over the Web and could be accessed by users at the CICs in the states of Meghalaya, Mizoram, Manipur and Nagaland. In addition, the All India Entrance Examination results for various Engineering and Medical colleges were accessed at the CICs. State Bank recruitment results were also searched at several CICs.

The CICs constitute a unique opportunity for the North-Eastern region of India to avail of cutting-edge Information Technology to give a fillip to the development of the region.

The State Government started the implementation of the CIC Project in two pilot Blocks viz. Mylliem Development Block in the East Khasi Hills and Umsning Development Block in the Ri- Bhoi District. The CICs have now been established in all the Blocks of the State. Efforts are also being made to create the required content in the CICs, which would be interactive with the rural masses. E-governance applications would also be incorporated in the CIC project for the benefit of the people in the rural areas.

Currently, the State Government is implementing the CIC Project through the Community & Rural Development Department and technically assisted by the National Informatics Centre, Meghalaya State Unit.

Some of the G2C services, which are proposed to be disseminated from the centers, are –

- Web site containing information about the block, educational facilities, health facilities, places of interest, etc.
- An Education Portal listing the various opportunities in Education Institutions in North Eastern States & outside

- A Job Portal containing various employment opportunities in the State & outside.
- Prices of agricultural products and essential commodities on the Web
- Downloadable standard forms on the Web
- Web enabled appointment schedule for various medical facilities
- Telephone Directory
- Government tenders
- Newspaper headlines
- School Board Results
- Block Projects Information System
- Generating payslips, maintaining personnel information of Government employees at the block offices
- Public Information Facilitation Center
- Public Grievances Redress and Monitoring System
- Comprehensive Survey of Households
- Gramodaya Database to be created
- Vehicle Registration System
- Rural Bazaar
- Web enabled Electricity Bill Payment System
- Cause list for the courts.
- Arms License Issuance System
- Issue of Certificates to Handicapped persons, Rural Area certificates, Caste certificates, Birth & Death certificate, Character Verification certificate, Certificate of Residence, Succession Certificate for Legal Heirs
- Issue of Licenses to Cinema Halls, Video Parlours & Guest Houses
- Financial Assistance Schemes of the State Government
- File Movement System for all the Branches of DC Office

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INVITED LECTURE

ON

INFORMATION TECHNOLOGY PROVIDES INNOVATIVE TOOLS TO IMPROVISE TEACHING AND INFORMATION TRANSFER

S. ARAVAMUDHAN
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SHILLONG – 793022

Mostly, teaching is the technique by which stored information are rendered accessible for assimilation by way of explanations, repeated rendering of the same content with different expressions and elaborating on specific details depending on the on-the-spot inferences while communicating the textual contents. In all the subjects, the above methods of information transfer constituting the "Teaching of the Subject matter", oral articulation has played an important role aided by well-prepared illustrations. On the spot "sketching" for illustrations and drawing of diagrams (including mathematical graphical plots) were not applied as frequently as required. Even if, on one or two occasions or by a few individuals, adroitly exploited there have not been techniques by which these improvisations can be adapted by learners without much effort and demand on their individual skills. This becomes the limiting factor in determining effectiveness of information transfer particularly the 'expertise'.

Hence from the early days emphasis on predomintly the "Oral-audio" skills, the Information Technology could revolutionize into the present days of 'multi-media' capabilities being available for any individual who is capable of audio to visual and visual to audio transcriptions and expressions, by the mere simple operations of an equipment. These equipment's are prototypes with well defined Objectives and Specifications. The advantages of such transformations in teaching methods in the schools and colleges particularly for the teaching of Science subjects would be demonstrated in this presentation with illustrative examples.

The emphasis will be on how these improvised ways (of rendering) bring the lessons to be learnt into such a memorable from that the students can find it easier to recapitulate the study materials during the examinatin hours to aid them to answer the questions objectively to the point.

But, as it can be justifiably pointed out by critics, 'using' of these equipment just for the sake of their availability and getting used to them- so much that the learners cannot be depended upon for the improvement in their personal skills and, abilities to grasp the importance of the information could become an epidemic drawback.

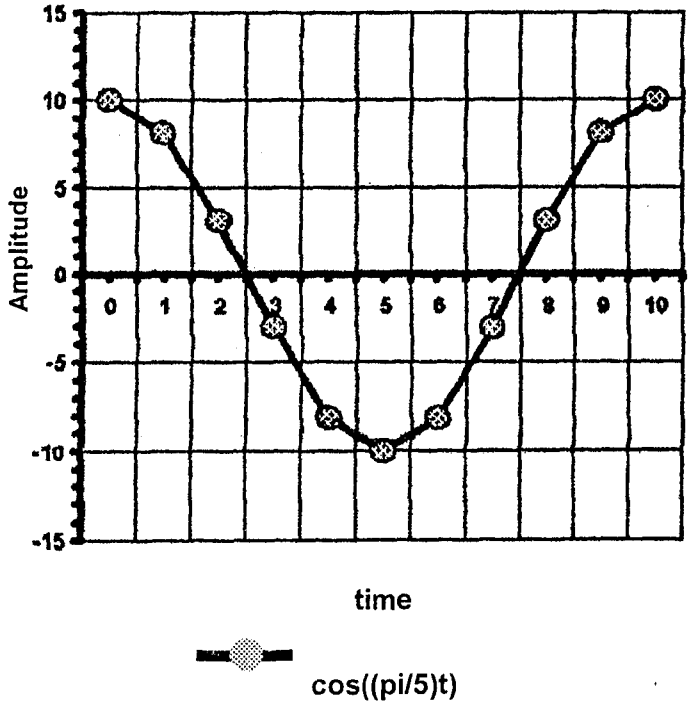
The learners should be weaned away from such use by giving enough training on becoming conscious of what really are the gains while gaining the experience at the equipment. This means that there should be a proper orientation for the exercises.

The simulations on observations, which become possible, must be supported by coaching the learners on how to base these simulations on a formulation of a requirement while interpreting factual data. It is necessary to recognize that the results of such simulation studies must be related to the realities and the laws of natural phenomena, which is to be understood to gradually weed away the unconducive natural elements springing up which downgrades the quality of the learners' effort to become objective and independent of the un-understandable.

Excerpts From the SLIDE SHOW Presentation with Comments appear in the next few pages to Instill Interest in Getting Access to the Web Site and view the Actual Slide-show Presentation

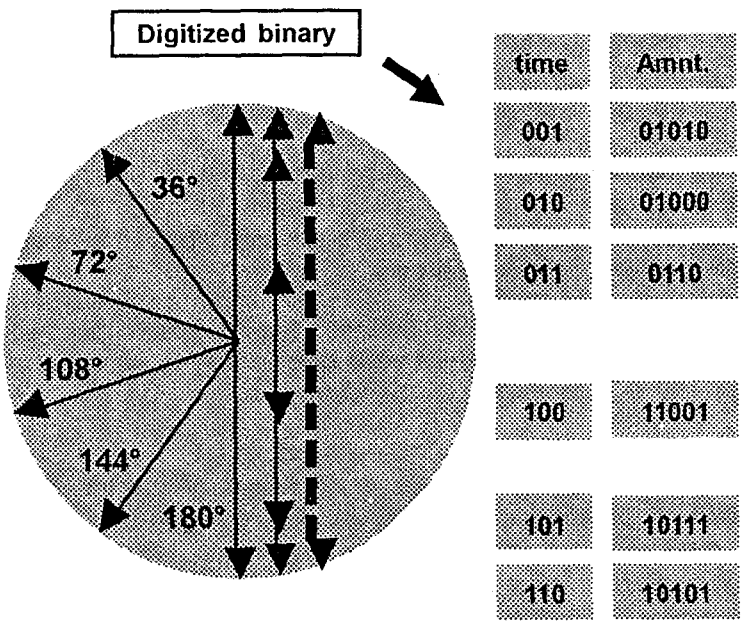
SINUSOIDAL FUNCTIONAL FORM AND ITS SHM PERSPECTIVE

COSINE CURVE

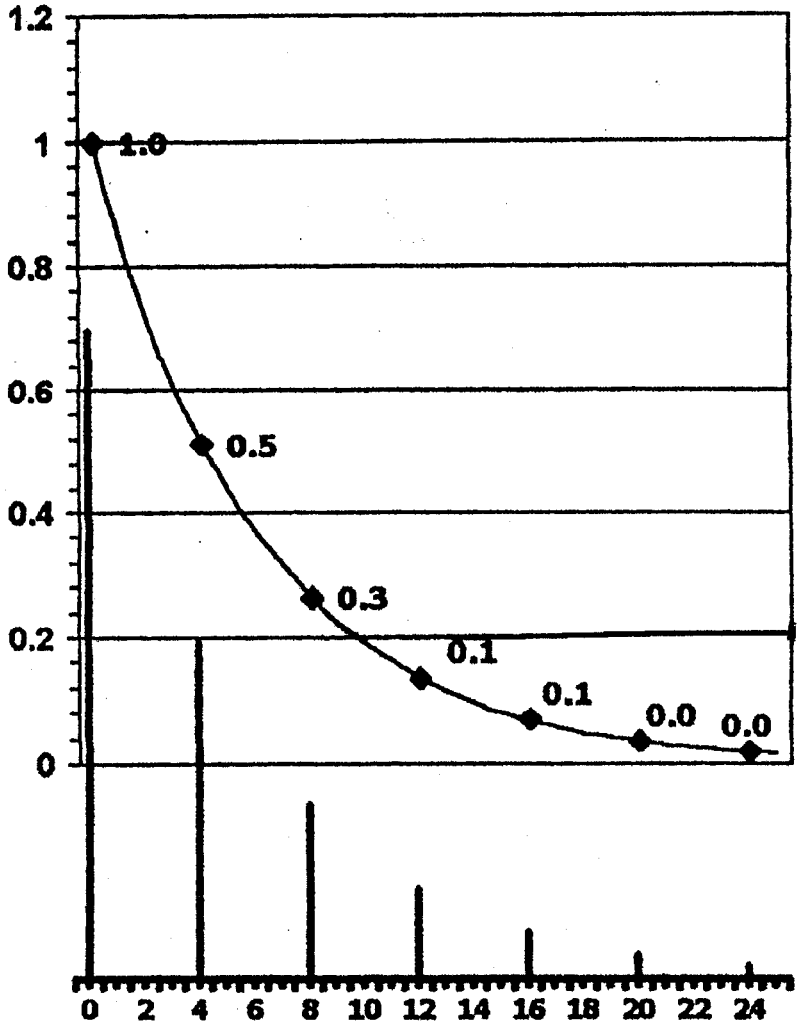


- This cosine curve would be represented as a consequence of a synchronized constant-amplitude-vector-rotation. This leads to the perspective for the simple harmonic motion associated with the sinusoidal functinal forms.

Time-wise synchronized animation of the Graphical Plot above and the Vectorial diagram on the RHS makes a Comprehension of the Perspective much simpler since the animated version reduces the effort required in Visualising a time-synchronised simultaneous variations.

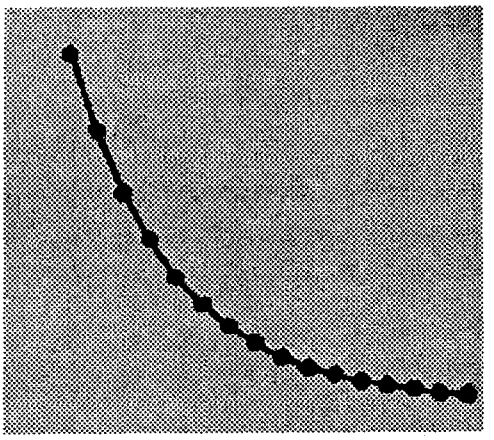


DIGITIZING ANALOG SIGNALS AND PROCESSING DIGITAL DATA IN DIGITAL COMPUTERS

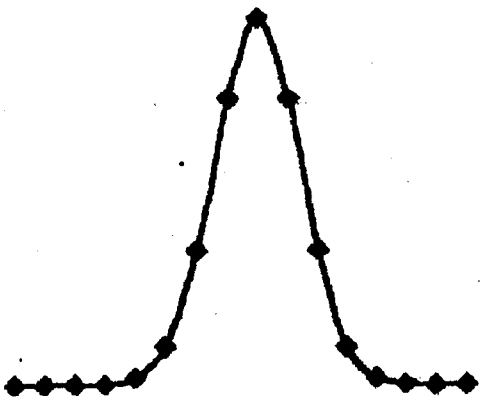


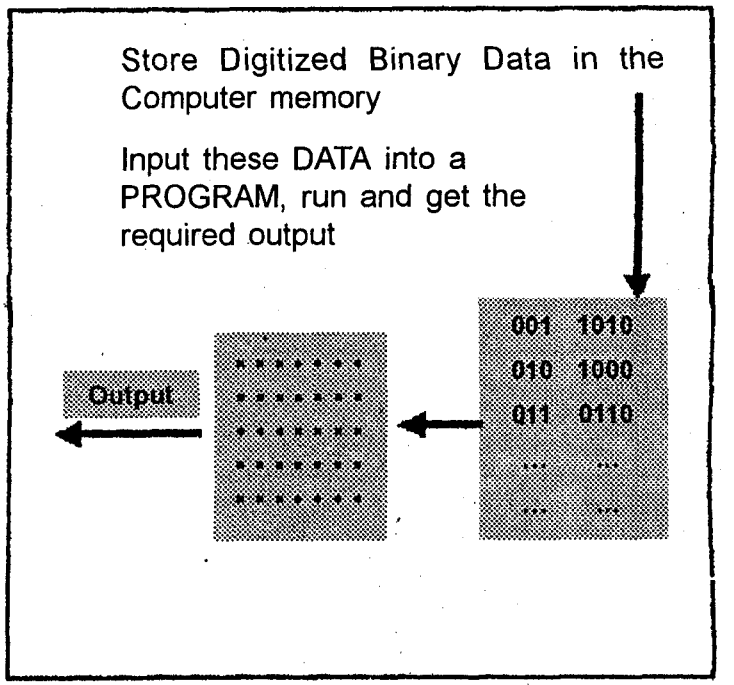
In this slide of the presentation. The timing sequences indicated below are animated along with the appearance of the Digital Values on the Specified Points of the Exponential curve simulating the actual timing and effects in the Digitizer.

AFTER DIGITIZATION ?



The Animated version is more Effective in Conveying the Procen-dural sequences





The materials, presented at the National Workshop *cum* Conference on the ROLE of INFORMATION TECHNOLOGY, are available for downloading and viewing from the Web Site :
http://geocities.com/amudhan_nehu/it_classroom_tools.html

For more particulars than what is available below VISIT the Web SITE.....it_classroom_tools HOT LINKS for viewing/downloading

Abstract a MS WORD doc
Read the abstract carefully

Link 1 A MS Power Point 2000 file

Link 1 contains a presentation wherein the simple cosine function plotted is used to illustrate a digitization process and simultaneously depicting the Simple Harmonic Variation of the amplitude with time which can also be expressed as a function of the phase angle. After digitizing how this digital signal is processed can also be viewed as a sketchy animated display. The last slide of the file is an animated illustratin of the Concerted reaction mechanism of a chemical.

Link 2 MS XP powerpoint file

Link 2 This presentation consists of the animated demonstration of few principles and laws of Electricity and Magnetism in PHYSICS. This is made with a Microsoft XP Office application which is XP powerpoint, this XP version has the most versatile animation facilities for such depictions and is not as much time consuming to prepare the files as with other versions. Hence these features can be viewed and animated only when the PC is installed with XP powerpoint and the application is resident in the PC.

Link 3 MS powerpoint2000 slideshow

Link 3 is a simple slide show feature illustrating how popular show-feature can be made for general viewing.

A HOT LINK means that the viewer has to simply place the cursor on the **link line** and click. Depending the system being used the downloading may take upto several minutes to complete and for the doc/file to be availabel to be viewed.

Read the abstract carefully

Trying to make a Floppy disk Version of the Web SITE Contents? go ahead with the following Instructions.

The Link 1 Abstract which can be now down loaded fromt he website
http://geocities.com/amudhan_nehu/it_classroom_tools.html
contains informatin about the above website and once the reader displays this website all the other instructions are stated therein for using it tools. In additin, you may download the Abstract MS WORD Document and save it in your disc and then edit as follows to include the instructions –

- Downloaded abstract can be saved as Manuscript.doc
- In that document there is a HOTLINK to the Web Site

  http://geocities.com/...../it_classroom_tools.html
- CLICK on the hotlink and display the website in another window
- Then read the information about the particulars of the Links 1, 2 & 3 and other instructions and exercises.
- Whichever is relevant may be copied from the webpage by selecting that portion.
- Paste this at the end of the ABSTACT (Manuscript.doc) and Edit the WORD document to be displayed easily.
- Copy & Paste as many of the texts from the Web Page as possible and required to make it a self contained write-up with indications and references to the Web Page for further exercises to the READER.
- Make it the first document in a FLOPPY.
- Copy all the Powerpoint Presentation files and with convenient numbering and naming copy it after the MSWORD Abstract document in the floppy.
- The XP file can be downloaded and saved and copied and it can be displayed also but animations would be effective only with XP Power Point Application and not with PPT 2000.

IT IN INDIA – WITH REFERENCE OF POWERGRID

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ABSTRACT

IT, being the heart of much technological advance of today, may be adopted as a powerful tool for overall improvement of efficiency & accuracy with higher degree of stability & consistency, better resource sharing etc. for providing quality of service to the customer in a cost effective way. The Government is bent upon developing a strong and reliable infrastructure, which should help in the growth of such industries in the country and in turn strengthens the Indian economy. India has tremendous potential both in opportunity and revenue earning in this sector given its talent in software engineering. India's efforts towards setting up broadband infrastructure with technologies such as DSL/ADSL. Ethernet or fixed wireless are commendable.

POWERGRID, the "*Central Transmission Utility*" of the country operates and maintains one of the largest transmission network in the world. POWERGRID has also diversified into telecommunication and has obtained *Infrastructure Provider – II (IP – II)* license.

Apart from its specific and extensive application in Load Dispatch and Control function, IT in POWERGRID is being utilized in dissemination of Enterprise Wide Information for Project Management, Strategic and Pro-active Decision making on Planning, Implementation & Operating of System, Grid Management, Human Resources Management, and Financial Management etc. The significance among efforts put on by POWERGRID in development of IT infrastructure are established of Local Area Network at various offices spread all over the country, interconnecting them over VSATs forming POWERGRID Wide Area Network (WAN) and establishment of video conferencing system. An Intra-organizational Wide Area Network has been established interconnecting Corporate with all the RHQs and RLDCs over 64 kbps TDMA VSAT connectivity. A group video conferencing system has been established in all RHQs Corporate Center and Ministry of Power with multipoint conferencing features supporting IP and ISDN mixed environments.

A web site www.powergridindia.com is available on the internet, covering various business activities with salient features on success stories, projects profile, diversification areas, technical excellence and expertise, future business plans, appointments and tender notification etc. The Web based 'Grid on line' system, provides every minute update on the 'Grid frequency' of all the regional Grids of the country. To fulfill these objectives of creating an IT enabled work environment, an exclusive IT department has been set up at Corporate, all the RHQs and RLDCs POWERGRID's IT network being vast the network management experience and know how is quite unique.

INTRODUCTION

IT revolution is sweeping through and has changed the whole process around us unbelievably, leading to an age of Information technology. Information technology is a spectacular techno synthesis of Electronics, Computers and Telecommunication and is an Enabling Technology. This unique enabling feature IT made its application potential universal. IT being the heart of much technological advancement of today may be adopted as a powerful tool for overall improvement of efficiency & accuracy with higher degree of stability & consistency, better resource sharing etc. for providing quality of service to the customer in a cost effective way. But no doubt prior to that we require a revolutionary change in our infrastructure backbone as well as suitable manpower development program for smooth and proper running of such delicate technologies.

PROSPECT OF IT IN INDIA

The National advisory committee meeting on information technology discussed the Government strategy for strengthening the Hardware industry, raising the quality and quantity of IT manpower and implementing "IT for the masses". A modification was demanded in the Export Hardware Technology Park (EHTP) scheme, where the firms will neither have any export obligations nor will be required to have any positive net foreign exchange obligation. The meet also expressed concern over the growing need for IT manpower and the related need to plug the bottlenecks in IT education fill the need for quality IT professionals. The growth of IT-enabled services and availability of quality manpower gives India the advantage in the IT business, which gets reflected in the continuous growth of IT sectors such as Software–Hardware manufactures, e-commerce services, Data centers, ISPs, Web hosts and developers etc. in Indian market economy. This not only strengthens the Indian economy but plays a vital role in

reducing the growing financial as well as employment crisis in India. These apart, the Government is bent upon developing a strong and reliable infrastructure, which should help in the growth of such industries in the country. Today, the Indian IT sectors are not just addressing the Indian clients but also customers from across the globe.

It was a three-point agenda set by John T. Chambers, President and CEO of networking major Cisco Systems Inc., for his India visit. The first was focused on the development of the IT infrastructure here since India was emerging bigger in terms of software industry and would be leading the global market in the coming years. The second objective was to initiate a partnership with the Government in it's growth effort in the IT sector. The third agenda on his visit was leveraging applications of information technology and building up skills in the country. Even Bill Gates, the chief of Microsoft Corporation, in his recent visit has emphasized on the role of the Government in development of IT infrastructure in India.

India has tremendous potential both in opportunity and revenue earning in this sector. It has the chance to become a leader in IT, software and the networking world given its talent in software engineering. But for that India has to skip a generation and that's why the initial focus should be on Internet and education. India should not build an old model network. Highways, harbours and roads were the network of the first Industrial Revolution. Similarly, the Internet is the network of the second Industrial revolution. Why build one network for data communication, one for voice and one for video communication separately? Why not combine them? Besides the financial constraints also comes in picture to build all of them. The broadband growth is happening here, but it is going to such a small number! Skip a generation and build the network of the future. The Net and education are two greatest equalizers in the present global economy. India has the potential to not only surpass its neighbors but also to emerge as the main country supplying network engineers, given its string education system keeping in view the predicted shortage of 2 million network professional by 2005.

The Network effect is changing all. Even the economic development of a country is related to this effect. The growth of the GNP and infrastructure investment has a 1:1 correlation. Every firm will soon be an E-company. E-commerce in Asia was $2.2 billion in 1999 and will be more than $51 billion in 2003 as predicted by IDC. That's going to be off by at least 10 times. The net change all. The four major net trends in 1997 were: everything would be connected; voice will be free; consolidation of voice/data applications; and consolidation of data networking firms. However, the net trends in the next five years are – everything will be cheaper; economies of networking will determine prosperity; in an education revolution, e-learning will take place; and ecosystems would replace value chains (horizontal and vertical). India expects to have 50 million Internet users by 2004 but China will have 60 million. Where is the competitive advantage then? What really needed is to have three or four times more than that to catch up with the rest of the world. If we continue to do what we have done before we will naturally get the same results. Except that we will be another 10 years behind. Why not use this phase of transition as an opportunity to build the infrastructure of the future? India's continuous efforts towards setting up broadband infrastructure are commendable. DSL/ADSL, Ethernet of fixed wireless are all different technologies. But in India, it's possibly not the best technology that will win but the one that gets the Government support. When Government talks of a new project, various firms with different technologies apply. Leaders of some Government organizations are where private leaders were 2 or 3 years ago. This is required to be changed at the first step. Digital divide in a nation is only created by the extent of infrastructure. Remember, the Network effect turns the Internet pace into competitive advantage. The Net is the network of networks.

With the continuous and sustainable growth in India Power Sector, complexity of Power system operation as a whole increases sharply with every capacity addition. Adoption of advanced technology is becoming indispensable for management of such complicated network for attaining the business objectives in this competitive environment. It has become necessary for the utilities to consider various alternatives for an effective management system to improve its efficiency. In this direction IT may be used for collecting, processing, storing and communicating information using electronic means in every step of our office operation.

IT IN POWERGRID

Power Grid Corporation of India Ltd. (POWERGRID), the ***"Central Transmission Utility"*** of the country operates and maintains one of the largest transmission networks in the world. The corporation has its establishments all over the country, divided into seven regions. The mission of the corporation is establishment and operation of Regional and National power grids to facilitate transfer of power within and across the regions with reliability, security and economy, on sound commercial principles.

Powergrid has also diversified into telecommunication and has obtained ***Infrastructure Provider – II (IP-II)*** license. Powergrid is in the process of establishing nation wide backbone network to provide Broad Band Capacity to various telecom service providers like ISPs, cellular operators, basic service providers, paging operators, call centers, telemedicine, government departments, broadcasters etc. for voice, data and video also other higher value added telecom services.

POWERGRID started its activities in North Eastern Region with its regional headquarters at Shillong, Meghalaya from 11th November 1991 when the transmission assets of NEEPCO was transferred to POWERGRID. Subsequently the transmission asset of NHPC was also transferred on 19th November 1991.

Since its inception POWERGRID has adopted Information Technology (IT) in its various facets of functional areas. IT in POWERGRID extends far beyond the routine office activities to support core business functions. While the use of IT for general office supports improve productivity, quality of office work and cost-effective communications, greater level of diffusion of IT into the core business process can further add value to the investment and realize tangible benefits. Apart from its specific and extensive application in Load Dispatch and Control Function, IT is being gainfully utilized in dissemination of Enterprise Wide Information for Project Management, Strategic and Pro-active Decision making on Planning, Implementation & Operation of System Grid Management, Human Resources Management, Financial Management and various other core and allied functions.

IT plays a very significant role in POWERGRID enabling quicker and reliable exchange of information among its various offices, substations and units, project sites etc. spread across the country to meet the organizational mandates. The major challenges before POWERGRID to undertake the future Transmission System development projects effectively includes execution of the projects with utmost efficiency within tight time frame & cost and operation of the system after completion with higher reliability and availability. Being a highly information intensive activity a strong and Integrated Information System is an essential prerequisite to meet the above challenges. Operational assets management and management of inventory spread across the country is another thrust area where IT serves as a key enabler and integrator in the corporation.

MISSION And OBJECTIVES

The mission and objectives of Information Technology Development in POWERGRID aims at utilizing Information Technology for ***'automating'*** its offices for a more productive and knowledge based work environment, ***'informating'*** for creating a culture of information sharing and improved decision making and ***'transformating'*** where Information Technology would lead in business furtherance/innovations. In line with this mission and objective, a corporate IT plan has been formulated covering the various aspects of development such as Infrastructure Development, Application Development / Deployment, Information Security, Technology Migration, End User Development etc., the salient features and the present status of which are –

Infrastructure Development

The development trend in the field of IT has been characteristically different during the formation of POWERGRID compared to its peer organisation or other public sector organizations, most of which are relatively old. While in the 70s and early 80s the focus has been on host-based systems, centralized transaction processing and centralized EDP functions, the late 80s and early 90s faced a wide paradigm shift towards desktops/personal computers. Incidentally POWERGRID's formation stage witnessed the latter technology trend i.e. the one towards Personal Computers. Information System Planning study was

conducted after its formation and subsequently a distributed Personal Computer based computing architecture was adopted.

With the gradual increase in IT awareness and literacy and increasing use of IT tools for office supports, the IT infrastructure has also undergone gradual change. With its establishment spread across the country, the need for a networked environment is a prerequisite for organizing and integrating the information available at scattered locations into a common platform for ready access of information on demand. The significant among such efforts are development of Local Area Network at various offices spread all over the country and interconnection of them over VSATs forming POWERGRID Wide Area Network (WAN) and establishment of Video conferencing system.

Wide Area Network

An Intra-organizational Wide Area Network has been established interconnecting Corporate Center, New Delhi with all the Regional Headquarters (RHQ) (Faridabad, Jammu, Patna, Shillong, Nagpur, Hyderabad) and the Regional Load Dispatch Centers (RLDC) (New Delhi, Mumbai, Calcutta, Bangalore, Shillong) over 64 kpbs TDMA VSAT connectivity leased from ITI with hub at ITI, Bangalore. This forms the POWERGRID INTRANET, which is capable of handling Data and Voice transfer. The INTRANET now forms an information web enabling Web based Information exchange and Electronic mail communication across its various offices. As part of the INTRANET infrastructure, Web and mail servers are established at corporate center, RHQs and RLDCs. Keeping in view the future application scenario and requirements and in order to ultimately achieve a complete data communication backbone for the organizations, development actions are planned and actions initiated accordingly to extend the connectivity to other offices, substations, project sites etc.

Local Area Networks (LAN)

Each location at the corporate center, RHQs and RLDCs have their own application and file servers servicing clients on the respective LANs. The key applications currently deployed include Finance Payroll, Online Grid Monitoring system, specialized software tools for Engineering and project management, Enterprise wide Electronic Messaging; Intranet based MIS and information dissemination and various other functional reporting systems. POWERGRID's IT network and INTRANET based information system is one of the largest and most extensive as compared to its peer organizations in the sector. Some of the significant features are –

- Fully switched LAN with optical fiber backbone at corporate center, Katwaria sarai connecting about 300 nodes. LAN of similar size at Nehru Place office, Corporate Center.
- LAN at all RHQs and RLDCs
- Servers and PCs of latest configuration with fully network centric computing architecture.
- One of the largest Thin Client implementation (recent trend in graphical terminal based platform for cost effective infrastructure deployments) in the country with more than 150 clients.
- Separate high capacity (2 Mbps) link through dedicated leased line between Katwaria Sarai and Nehru Place.
- Dedicated 128 kbps leased line for Internet access at corporate offices (Katwaria sarai and Nehru place). Dedicated leased lines access has been / are being established at RHQs and RLDCs as well.
- Connectivity with Mop and other CPSUs through NICNET over 128 kbps SCPC VSAT link.

Video Conferencing

Keeping in view of the geographical spread of POWERGRID's offices, a group video conferencing system has been recently established in all the RHQs, Corporate center and Ministry of Power totaling 10 locations with multipoint conferencing features supporting IP & ISDN mixed environments. Some of the major objectives / benefits of the project are –

- Cost effective and on-line interactive communication among various geographical spread locations for regular reviews and meetings thereby eliminating the need for travel by the participants. This in turn will ensure reduction in associated cost while enabling the meetings to be organized in short notices.
- Facilitate discussions and deliberations among corporate functional heads and senior management level on matters of critical importance, thus enabling efficient and quick decision making without disturbing the busy schedule of key executives.
- Provide real time collaborative environment enabling document exchanges and presentations during video conferencing among distant locations.
- Provide a platform for increased participation in discussions.
- Provide a cost effective platform for distant learning and corporate training programs and enable greater participation on such programs.

Application Development & Deployment

Efforts have already been taken to deploy a host of IT enabled business applications in order to streamline the business process and build a productive and knowledge based working environment and ultimately bring in a complete integration of core functional areas in the corporation. The most significant is the development and deployment of web based POWERGRID Corporate Intranet through a series of in-house efforts enabling information dissemination and access across departments at corporate center, RHQs and RLDCs. The Intranet inter-connecting 13 locations spread across the country forms a common interactive platform for integrated organizational knowledge management; communication and collaboration. A web site with **www.powergridindia.com** is also available on the Internet, covering various business activities with salient features on success stories, project profile, diversification areas, technical excellence and expertise, future business plans, appointments and tender notification etc. Some of the salient features of the organization's INTRANET are –

Power Infonet

POWERGRID Intranet web based information interchange is one of the largest network in power sector with the widest span of connectivity including remote locations and with a large client base about 1000 users spread across 13 locations. It supports easy and user-friendly access of data by end users and serve as an integrating tool for heterogeneous computing platforms, reporting tools. It is a well secured information portal providing web based front end, providing customized view of various used based on their access right and privileges. The system facilities publishing of functional information which are required to be generally interchanged amongst various departments / regions for routine operational support / reporting and enables direct and prompt access by end users. These information resides in respective source web pages / site address and regularly updated by the respective departments / regions. Some of the features presently available are –

- General information on various departmental activities.
- Information on projects.
- Daily operational reports.
- Project monitoring reports.
- Directory information.
- Manuals/guidelines formulated by various functional groups.
- Technical papers.
- HR information.
- On line grid parameter monitoring
- General utility information.

- Help desk
- On line complaint management system
- General information / circulars

Web Based 'Grid online'

It is a unique feature and is the first among the power utilities in the country. *'Frequency'* the most significant parameter, *'the pulse'* of electricity grid represents the health of the grid and the supply / demand balance. The Web based *'Grid online'* system provides every minute update on the *'Grid Frequency'* of all the regional grids of the country. The Intranet system is interfaced with the real time SCDA (Supervisory Control and Data Acquisition) system of various RLDC who control and monitor the electricity grid of the country. The key parameters collected right form source points and transmitted online through SLDC (State Load Dispatch Centers) to RLDCs monitoring and control system. This system is further interfaced with a supra-system over the Intranet through a web-based interface for monitoring at corporate level. This system runs round the clock with automatic data refresh every one minute. The most unique feature in the system is that from a single console, the key *'health indices'* of the entire power system of the country can be monitored and used for proactive decision support and trend analysis.

Electronic Messaging System

POWERGRID has its own electronic messaging system using exclusive organizational domain address @powergridindia.com, which can be utilized by all the employees with their individual e-mail ids in the form <username>@powergridindia.com for communication, globally without any restriction. Various specific interest mail groups have also been provided for knowledge sharing.

Major Initiatives Planned / On Going

Besides the above features presently available on the corporation's Intranet, some of the major initiatives planned as per the corporation IT road map are –

- Development of Integrated Project Management System for monitoring and reporting on Construction progress, Fund utilization. Engineering details etc.
- Specialized Engineering design tools.
- Electronic Documentation Management system.
- Database Application for core functional areas enabling systematic organization and processing information in various functional areas. Separate application development efforts are already in progress / made available for Cost Engineering, QA&I, Complaint Management, Grid parameter monitoring, financial accounting and Vigilance information.

Information Security

With the widespread Information Technology facilities and application for inter / intra organizational information exchange, possible security threats and loss of sensitive information concerns are of utmost significance. It is imperative to formulate and implement comprehensive information security policy, strategy and procedure in order to enable safe and secure computing and communication environment and thus imbibe confidence among users to facilitate proliferation of information culture. Moreover in the context of POWERGRID's key role in Indian Power Sector and the extent of its operation across the country; information security in the organization is of strategic importance to the nation as well.

Considering the above, an Information Security Task Force has been constituted for formulation of Corporate Information Security Police and guide implementation of security measures. The organization Security measures is envisaged to be based on three tier approach as follows –

- *Infrastructure level* – with technical provision and network system.
- *Department level* – with strategic steps of restriction.
- *User level* – with fool proof working practice.

The implementation of information security would cover the following areas –

- Identification and classification of information based on their criticality.
- Deployment of access control mechanism (physical, network, application, Internet / Intranet, e-mail)
- Anti-virus deployments.
- Enterprise Network management solutions.
- Intrusion detection systems.
- Data backup policy.
- Deployment of storage solution for critical and voluminous data

TECHNOLOGY MIGRATION

With the rapid change in the technology, hardware and software products changes very frequently demanding a proactive approach from the users to effectively deal with technology obsolescence. In order to bring about uniformity, compatibility and inter-operability within the organization, a Technology Migration Plan has been formulated. This plan aims to address the following issues –

- Standardization of Hardware and software platforms across the organization.
- Common guidelines on Infrastructure requirement and set up at various establishments of the corporation.
- Standardization of procedures for procurement of hardware and software to cut down the procurement time and cost of procurement.
- Regular review of IT facility upgrades requirements and phased upgrade / procurement to maintain a judicious balance of configuration as well as progressive diffusion of IT.

END USER DEVELOPMENT

In order to realize the benefit of efficiency of the technological advancement, adequate level of IT awareness and acquaintances at the level of the user has to be developed through out the organization. A Multi-pronged approach in this direction has been adopted in the organization as follows –

- IT training programs and workshops on basic office productivity tools, awareness workshop etc. as per schedule of HRD calendar.
- In house publication and information bulletins.
- IT awareness, help desk, user support etc. through INTRANET.

ORGANISATIONAL SETUP

To fulfill the objective of creating an IT enabled work environment within the organization in a time bound and conspicuous manner to facilitate faster and cost effective information exchange across the organization not only for cost reduction but also to create efficiency and speed in decision making, an exclusive IT department has been set up at all the RHQs, RLDC in addition to Corporate center.

CONCLUSION

Information Technology is traditionally being considered as a cost center where regular investments are made in deployment of new technologies and application or upgrade of the infrastructure to keep pace with the technology developments. Every functional department and the business in general are highly dependent on IT services and resources for routine office works, specific functional applications, inter / intra office communication, inter / intra organizational communication, internet / intranet services for specific information updates etc. Some of the tangible and intangible benefits of these services can be accounted in terms of productivity, time saved etc. Through proactive direction and support from the management has lead to such IT linkages with business decision thereby reinforcing the organizational IT capabilities to effectively support the business problems and strategies. In the process, the improved IT capabilities can turn out to be one of the organizational competencies.

The in house IT activities of IT planning, network planning and design, Intranet design and development etc. which requires adequate technical proficiency as well as knowledge of business priorities/ demand of the organization and the sector has been developed by POWERGRID over a period of time. POWERGRID's IT network being vast and covering almost all geographical areas of the country, the network management experience and know-hoe would be quite unique.

POWERGRID's business proportion of diversifying into telecom also relies to a great extent on the Information Technology know-how and technical strength. The strength and competence of the IT department of the organization in rendering internal network services, Intranet services, data management / administration, video conferencing services etc. to a target number of users in POWERGRID is to be further reinforced and gainfully leveraged to complement the future business modules of telecom.

VOICE OVER INTERNET PROTOCOL

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ABSTRACT

VOIP or Voice Over Internet Protocol technology is the latest buzzword in Internet telephony. As the tern says VOIP tries to let go voice (mainly human) through IP packets and, in definitive through Internet. VOIP can be use-accelerating hardware to achieve this purpose and can also be used in a PC environment. Hence using this technology it is now possible to dial up friends anywhere in the world and talk for hours without ringing up long distance charges. It is one of the fastest growing parts of the communication industry. In general, it means sending the voice information in digital form rather than in the traditional circuit.

INTRODUCTION

Internet telephony is cost effective as compared to the traditional telephone system PSTN (public switched telephone network) which we have today. In Internet telephony voice data is carried in the form of data packets and each packet traverses the network independently by using different paths. Whereas in the conventional PSTN system data travels as a stream of binary data. In PSTN, one communication channel holds one call i.e. one communication at a time. In packet networks several calls can be mixed into one communication channel to increase the efficiency. This offers much higher bandwidth efficiency as compares to the existing telephony system.

Hence, the overall cost of maintenance is also significantly low in case of VOIP technique.

VOIP also enhances the computer telephony integration (CTI) services.

WORKING OF VOIP

Every internet wide corporate telephone network has the same basic components, including end-user equipment (telephones, premises, wiring) and back-end gear (PBXs, trunk lines). VOIP devices generally fall into these same two camps, with IP centric equipment replacing analog handsets and writing, and IP based equivalents filling in for PBX and / or interconnect wiring.

Internet telephony are made up of three main elements –

- The end devices
- The gateway, and
- The proxies

Each *device* can be traditional telephones, audio-equipped personal computers, or single use appliances.

The *gateway* is used if a traditional telephone is used on their side of the call to translate the call's transmission format to or from the format required for the transport over the Internet.

Proxies or gatekeepers provide centralized call management functions like call admission control, bandwidth management, address translation, authentication and user location.

These components implemented as hardware or software communicate with each other over signaling and voice-transporting protocols which are inter-operable through internationally accepted standards like ITU-T H323.

STEPS INVOLVED IN SETTING UP VOIP COMMUNICATION

- First ADC converts analog voice to digital signals (bits)
- Then the bits are compressed in a good format for transmission for which number of protocols are used.

- Then the voice packets are inserted in data packets using a real-time protocol (typically RTP over UDP over IP)
- A signalling protocol: ITU-T H323 is used to call users.
- At RX we have packets are disassembled, data is extracted, then converted to analog voice signal and sent to sound card (or phone)

The steps defined above are illustrated in the Base Architecture.

BASE ARCHITECTURE OF VOIP

Voice)) ADC - Compression Algorithm - Assembling RTP in TCP / IP----

Voice((DAC - Decompress. Algorithm - Disass. RTP from TCP / IP-----

SECURITY ISSUES

As companies increasingly replace aging PBXs with IP telephony equipment, they are uncovering a host of security issues that not have applied to the old-world phone technology.

While switching over to IP telephony, basic security of IP PBX and phones should not be overloaded. This is especially true because much of the VOIP gear on the market is based on commodity operating systems and commonly used hacked software.

For the most part, IP PBXs from vendors such as 3Com, Cisco, Avaya, Nortel, Alcatel and others are servers at the core. The boxes run call control software on top of the operating systems such as Linux, Unix, Windows NT. All of the products have standard IP stacks, which make them susceptible to denial-of service or hacker attacks. The steps taken to manage the security of VOIP over a data network are –

- Separate IP PBXs on the LAN by putting the devices in different domains from other services.
- Isolate voice traffic onto a virtual LAN.
- Limit administration access to the IP PBXs among IT staff, allowing only a few to have access to the core operating system on a VOIP server.
- Limit the type of protocols that can touch the IP PBX or IP telephony network when possible.
- Encrypt voice traffic where possible. IP voice should not be sent over an unmanaged or public network.

THE CHALLENGES AHEAD

VOIP is not without challenges. The main broad areas are quality of service, quality of voice, interoperability and loss of packets. Quality of service (QOS) refers to the issue of maintaining an adequately short delivery time when delivering data packets over the net. The delay is caused due to processes like conversion of voice to data packets, travelling of data packets over the receiving end. Attempts are being made in this field to reduce the delay.

Maintaining the voice quality is another big challenge in VOIP technique. Efforts are underway to reach a good level of voice quality during transmission. If one end sends data packet using one speed coding algorithm and the receiving end lacks the ability to decode it then it is no use. Hence, interoperability is must.

Packet loss is common phenomena in packet switching networks. It is due to insufficient link bandwidth. It can be overcome by using some techniques such as packet interpolation, network upgrade or even packet repetition.

MARKET SCENARIO IN INDIA

VOICE on IP (VOIP) is becoming an important topic as fixed telephony operators face the prospect of their profitable market being eroded by substitution, both by the use of mobile phones and by VoIP. In corporate networks, IT managers and communications managers are looking at VOIP as a means of simplifying their networks by combining voice and data and reducing the costs of new equipment, calls and network operations. VOIP also has the potential to open up the SME and residential markets to greater competition once broadband connections become widespread.

India is expected to emerge as a very important market in the overall VOIP space in the next 12 months because the telecom sector in India offers huge business opportunities. Despite the collective efforts of DOT and VSNL to discourage voice calls over the Internet and private-leased circuits, Net telephony was popular among Internet users. The overriding reason was, of course, the cost. While users paid close to two dollars for a minute of voice call to the U.S., Internet calls were free (when the service becomes legal, Net telephony users may have to pay less than a dollar for an hour!. All that they needed to do was login to the sites offering such services, such as Dialpad, Net2Phone or Media Ring for making computer-to-computer or computer-to-phone calls. Eventually, VSNL did resort to blocking these services too, but not before users had a taste of what IP telephony could do for them. Interestingly, even before the Government made its stance on VOIP clear, companies, such as STD Booth.com India had already begun to set up the infrastructure for offering net-to-phone services.

As an emerging outsourcing destination for call center services, India has the potential to realize tremendous gains from VOIP. The IP convergence in call centers can ease the cost, complexity, and manpower constrains in call center operations. The migration to IP will help call centers to graduate from offering low-end call forwarding services to integrated voice and customer relationship management functions.

With its low teledensity, India is potentially a huge market for IP telephony. When the service does really take off in India, incumbent monopoly players like the VSNL may witness a drop in revenues from their traditional sources, but the new revenue streams and markets are expected to more than compensate for the losses. As for the end-user, it would mean exciting services, such as unified communications and voice portals.

EDUCATION TODAY - PROBLEMS AND SOLUTIONS

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ABSTRACT

The explosion in our population is affecting almost all aspects of our society. One area, which has been critically affected, is education. The numbers of students are continuing to grow at an exponential rate while the number of seats in schools and colleges continue to remain very much the same. This has led to the mushrooming of hundreds of schools of colleges whose affiliation and worthiness are at best questionable. Yet with no foreseeable option students' rush to these colleges, even paying atrocious capitation fees. The real problem comes after college when students look for jobs and literally find very few. In this paper we propose a unique IT solution to this problem. We propose IT based education system, which will bring uniformity both in structure and evaluation. Next we link education with real time problem solving with Industry input where possible. Students will be encouraged to do something, prove themselves and earn their degree.

INTRODUCTION

The Problem

India's exploding population has created manmoth problems for our educational system. Briefly, the number of students far exceeds what the system can handle. This is true from the KG to the Postgraduate level. We propose here an IT based method where this problem can be addressed.

To get some idea of the magnitude of the problem consider the following statistics –

- Approximately 20,000 four year olds competed for about 150 seats in the KG at South Point, Calcutta, last year. The situation is the same or worse in all Metro Cities.
- Approximately 10 lac students nationwide competed for 2000 seats in the IIT's.
- Approximately 1 lac students competed for about half a dozen seats in the general category in the MCA examination, Jammu University.
- Approximately 1 lac doctors will compete for half a dozen seats in Lucknow Medical College, for PG studies.
- It is clear from the even the sparse statistics given above that our educational system cannot handle the avalanche of students whose numbers are growing every year. Any solution to this problem requires a system which
- Should be available to all who satisfy the minimum requirements
- Should be able to handle exponentially increasing number of students without sacrificing quality and at the same time maintaining uniformity (in student evaluation)
- Be available in the local language as well as in English
- Should not be too expensive to implement
- Should be able to the pace of the fast as well as slow learners
- Should provide sequential learning as well material for the advanced
- Should require minimum of teacher intervention

The Solution

A system which satisfies these criteria, is an IT based solution. Briefly the idea is to let education be computer based and to let the students be taught via educational software. Such a system has the following features –

- It can handle any number of student. Increased student load can be handled by incorporating additional servers.

- The lessons can be made available in the local Indian Languages.
- Its own self-assessment module follows every module. The software allows progress to other modules after successful completion of the self-assessment. In case of errors, the assessment program automatically directs the student to the appropriate modules for review.
- As the same software will evaluate all the students, grading will be uniform

Such a course system will be an appropriate solution for the problems besetting our educational system. Even Western countries are adopting such an educational system. The problem in those countries is lack of teachers not an overload of students as it is in our case. For proper curriculum design they have invested millions of dollars. It is imperative that we start formulating our own web based courses as our pronlems are more acute.

MODULE ORGANIZATION

From Text Books to Web Based Courses

What is required at this point is Governmental approval for this sort of a project. Education being at least a 1000 crore industry, it is clear this is a niche market for IT consultants and entrepreneurs. It is very easy to design web pages. One does not have to be Tech savvy to design web pages for course materials. We give below the steps involved in making the web pages –

- Isolate the material you want to present
- Organize the material conceptually into modules
- Present the material
- Write the evaluation material for each module
- Allow a test criteria of minimum pass mark to allow the student to graduate the next module

Now one does not have to sit for hours in the Library to prepare the material. Fortunately we have Internet and search engines such as Google which will allow us to collect and organize the material.

COURSE ORGANIZATION AND PATH CHOICES

For elementary courses tight coupling of modules is followed giving the students very little choice. Links given are for illustrative purposes only. As one progresses higher the coupling between the modules becomes less and less. The student chooses his or her own path (of course the default path being the sequential connection of the modules). Thus a student studying Differential Equations find the applications of Differential Equations very interesting. So the student can next take the module covering applications of Differential Equations. Thus in the High School Level it is successful completion of the modules which is important. At the graduate or the Post Graduate Level it is the number of accumulated credits, which is important.

EVALUATION

A word about the evaluation procedure is necessary. while evaluations of science questions, which involve only numeric answers is straight forward; the evaluation of literature questions is not so straight forward. It requires a technique called categorization of texts using category vectors. Thus the evaluation software actually constructs the categorization vector for the answer, for example an essay. Thus a good essay has a number of points connected logically. This is reflected in the categorization vector.

CONCLUSION

A good teacher in a classroom cannot be replaced. But we have an almost epidemic like situation. IT based solution proposed here is possibly the only solution. The silver lining is that it represents a wonderful opportunity for IT consultants.

INFORMATION TECHNOLOGY AND THE VIRTUAL UNIVERSITY

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ABSTRACT

The paper is written in the form of an extended note. It attempts to view Information Technology from educational and specifically Distance Education perspectives. This paper is divided into two parts. The first part is a general discussion of Information Technology boom with a plea that it must integrate into the economic and social disparities of a nation, otherwise the benefits will accrue only to the privileged few. The second section elaborates on how there has been a paradigm shift in the education thought processes today. The *real* classroom has been transformed into *virtual* one. The replication of such models means that education is becoming more accessible and flexible.

INFORMATION TECHNOLOGY AND EDUCATION

Today education is most professionally geared; students think vocation and job orientedness before choosing their areas of specialization. We have 'progressed' a long way from the emperical sciences, and the liberal arts to computers and management; and now to the much-in-demand field of Information Technology. In other words the knowledge of computers is not enough, we have to access information about other areas through the computers. And what we learn we have to apply or better still sell. This is professionalism. The man and the machine are no longer corollaries to one another, the machine is indeed dependent on the technical an utilitarian skills of man. On-line teaching is making the pedagogical processes more virtual and information technology is 'learnt' virtually via such models.

If the above is taken to posit changes and the introduction of innovative techniques in the context of education, then let us take an insight into what is happening visa-vis such changes. Meghalaya is already saddled with such change, call it professionalism, call it innovativeness. The IT market we are told is ready to absorb the growing demand and the incessant clamour for professional jobs. In other words, education is understood today in terms of certain market realities; the demand and supply graph but above all its saleability or to coin the term: **'buyability'**. Course have value, more significantly so in terms of money: the dollar or the rupee. You complete the courses which cost a fairly big amount then your job absorption is more or less guaranteed. In the earlier days this no doubt happened in the form of campus recruitment, but these courses were open to those highly talented individuals who passed a written entrance test in the midst of stiff competition. Nowadays the supply is there, provided of course one has the ability or the willingness or both; to pay. The consumerism of the times has fortunately or unfortunately entered educational domains; the 'economics' of education. However institutions like the Indira Gandhi Open University insist on an entrance test for admission into its Information Technology programmes designed and type-cast into modules. That these programmes are a collaborative effort between the IGNOU and EDEXCEL, London give to them a touch of internationalism. The job prospects are thus anywhere in the world and about 70% of the first batch of the ADIT (Advanced Diploma In Information Technology) products of the IGNOU were absorbed abroad. Mind you, another aspect of professionalism is also its foreign element i.e. the brain-drain, the predilection decidedly towards the foreign market. In India, this is associated closely with status and of course the dollar.

Information Technology then broadly speaking has two dimensions One, is the access to it to be literate: in this sense, to have the world at the tip of your fingers and the other is specializing in such areas to be professionals. Shillong is now feeling the onslaught of technology where the young and the old compete with one another to be computer savy. Once the demand has set in then the supply automatically comes, in the shape of cyber-shops, courses etc. the question, one pauses to ask is how will the society benefit? Are we anticipating a situation where will be only e-learning an expression which is the buzz word today? If so we might have educational shops and not institutions. Courses covering the gamut of disciplines will be freely sold. The problem then is back to square one, reaching the point of saturation where there will be too many and two few. The dichotomy here is between people and jobs, the demand and the supply.

Meghalaya and Shillong in particular, is now under the brunt of a technology-heavy way of life and education. That is good as this makes the world 'one place' to use C.E.M. Joad's rather futuristic

expression. The prognosis however is: When the rest of the country exacerbates towards more automation, then will it be able to keep pace? Meghalaya is termed as a backward state of India, has it become forward today due to the incursion of such a technology wave? In other words, what do we look to for the future of development?

Computer Literacy is no doubt a must, this means being not only computer literate but also being literate in an international language. The Community Information Centers are fully operational. These CICs as the Vice Chancellor of IGNOU Prof. H.P. Dikshit recently said should be viewed as community enabling centers, where the access to computers should, ideally speaking enhance the quality of life. And as, the UNESCO document on education in the 21st century states with calrity –

- Learning To Know
- Learning To Do
- Learning To Be and
- Learning To Live Together.

One of the missions of the IGNOU is to spread computer knowledge especially in rural areas, in association with the Community Information Centers. Here we may pause once again and ask which I think is a pertinent question: can we take the help of such community extension centers to make people literate? In other words can e-learning be used as a tool of communication for the masses? Since the 1980s, we had been looking forward to the 21st century, now let's look towards the 22nd atleast. In other words, we may think of using the different levels of technological realities to educate the people. If technology is advancing at a breakneck speed, let us not forget the hapless victims of poverty and literacy. This is then nothing to feel euphoric about, the true meaning of Information Technology in the third world economy points to wards developing rural areas and when people have easy and cheap access to it. Therefore, the utility of it has to be comprehended specifically in this context– that it is a media to educate and create impromptu classrooms in the villages and the remotest towns, let alone only the cities. Otherwise once again as of before, the yawning gap between the 'haves' and the 'have nots' will continue to persist. What about primary schools, do we ever give a consideration to the abyamal state of affairs there in Meghalaya? Technology as the Vice Chancellor of the United Kingdom Open University Sir Daniel once pointed out, is also disruptive. What can we do to attenuate such a lopsideness especially in places where there is a lack of development? Even in this area that is, Information Technology one see a comparable lack of development in other places, apart from Shillong in our state.

A word of caution too. Let us not forget the other kinds of technology in our frenzied rush towards modernity and all that is new. If education has to be holistic we have to identify its different strands into a composite whole. We are forgetting the printed word, we are forgetting the radio and the television in our frenetic search for CDs. Let us please not suffer from amnesia of sorts in our bid to catch up with the times, to tune ourselves to the cosmetics of the western World. Let us not forget that our realities are totally different from theirs, call them economic, call them social.

Let there be more Information Technology trained professionals in Meghalaya but let them also be geared towards altruistic causes. Further, let IT be an independent tool to enlighten and educate our masses to train people so as to train others. Let it in the final analysis unleash the power and force of cybernetics.

THE VIRTUAL UNIVERSITY

Universities such as the Indira Gandhi National Open University have a virtual campus for some of its academic programmes where, learning is online, but today we also have the newest model in distance educational heuristics that of the Virtual University. Web Based Instruction (WBI) has graduated into virtual campuses. This is a radicalization of travelling to a physical place, a campus integrated closely by time and place to that where the constraints of space and time are relaxed by Information Technology. We then begin to wonder whether based on classroom pedagogy will then continue to the relevant, in the face of such contemporary models of university learning (Duderstadt, 1997)

What then is flexible learning? How does the flexible processes of learning integrate themselves into this new technological era? Learner autonomy is one such area which makes learning more and more flexible and by implication *virtual*. The *real* classroom, something that we have been accustomed to for years, has now been *simulated* into the *virtual* one, where learning modes are both synchronous and asynchronous. The four elements of flexible learning are –

- Accessibility
- Choice and control
- Responsibility and
- Support (Hudson, Muslin, Oates 1997).

The first is that Universities should enroll more students, have a diverse range of academic programmes and constantly gear towards specific target groups with an eclectic range of courses cutting across barriers of age-group, sex as well as for employed target groups. The second is learner autonomy. Learners should be allowed to study at their own place and pace: "when they want, what they want and how they want". (Peters 2000). The third is independent learning, and the fourth is the student support services.

When we speak of virtual learning what we will have to comprehend is that what is real but there are learning spaces, aided and abetted by " optical and acoustical signals in virtual spaces" (Peters 2000) **"Distance is dead!" (Negnoponte 1997).** It is not only that the constraints of distance are relaxed, but also that of time and space. Net based learning is undoubtedly a real experience, it is not a phantasmagoria or an unreality but strengthened perhaps by learning which is experiential, and where also there is the scope for new pedagogical models. The simplest way of beginning in this kind of an approach, would be to download learning material, submit assignments on line, examinations on line can also be conducted. However if we are thinking of a Virtual University then even the classroom and its appendages must be simulated. There can be a library a *virtual* library for example. But simply delivering learning material to students is not teaching (Daniel 1998). Otto Peters (2000) says "In my opinion web-based education is distance education and must also embrace more teaching and learning activities than just delivering, namely virtual tutoring, virtual group work, virtual seminars, virtual practice in simulated companies, laboratories and excursions. A Virtual University must be able to provide for these services. More even– It must develop new pedagogical approaches which exploit the unique potential of on-line teaching". In such a post-modern critique there is the withering of the learner where learning goals or outcomes are self-directional, as opposed to teacher directed learning. (Knowles 1975). Learning is an individual process the epistemic devices in this context are technological. Some of the examples of Virtual Universities are the Internet Universities in Sydney and the Virtual University in Hagen, Germany. So what we are doing in effect is replicating models, transplanting "conventional models of teaching and learning from real spaces into virtual spaces". (Peters 2000). What are the pedagogies involved here? Are they only parallels to lectures, seminars and practicals? Chat sessions will further enhance learning modes making this asynchronous. Learning by doing and discovery (Delors 1996, Bruner 1961) is another aspect of self-learning which a digitised learning environment can help to discover. Pedagogical models such as interactive learning both between teacher and taught, as well as among peer group, quizzes and role plays can perhaps be devised in this new digitised ambience. What are learning outcomes here? Will be another epistemological question. The courses should be web-based rather than web-enhanced (Daniel 2000). These are I know open-ended questions but given the matrix of learner autonomy and contiguity that we are speaking about then the web must enhance learning in a creative and resourceful manner. What are the course to be taught is another question (Daniel 2000). How do we re-structure our educational system and get ourselves out of this degree bias? How do we subvert educational hierarchies? In a country like India, education is highly rigid and structured. The Indira Gandhi National Open University has taken a giant leap in this direction towards restructuring by asseverating the rights of Certificate and Diploma courses which are need based and professional in their own right. Hopefully the virtual campus of the University will expand and ramigy into a Virtual University an University within an University or will the Virtual University remain as the only pedagogical model? These are futuristic questions and at this point in time it might be premature to ask them, but one thing is certain that the *real / virtual* debate in Universities has been initiated in the Indain context. If we are also able to integrate the other technological aspects such as tele-learning / visuals, two way audio and video etc. into a holistic model in our Virtual

University systems we will then have a complete model of integrated pedagogy. It is pedagogy which must drive information systems and not vice-versa.

The University within an University model (Peters 2000) can capture our imagination in the 21st century if we are to radicalize any systemic thinking, and bring innovation or change in this regard. The traditional Universities can give a serious thought here – introducing both on campus and off-campus dichotomies via Web Based Instruction. The pedagogy in such traditional set ups will have to be re-defined, but the very people involved in the conventional system will have to acclimatize themselves to such changes, which in effect must be *attitudinal.* The *real / virtual* debate is not only that of 'change for change's sake', but rather it is the question of convenience, flexibility and accessibility. Learner autonomy is in consonance with the very philosophy of life long education, the opportunity also to 'sandwich' courses between working time and studying time (Delores 1996). What about literacy? Can Information Technology be a role model in this regard? The internet is gradually changing the concept of education in India thanks to the Open Universities. What they can do for the physically and mentally challenged with the help rapidly proliferating technology is another question which needs critical addressal.

Distance Education has rapidly progressed from the printed word to what may be termed as the visually word ensconced in time-space continuum or realities. This inexorable leap into time and space has given it the much needed access as computers are available even in middle-class homes today. Distance Education has also exploded its own myth – that of separation of the learner from the teacher. Speaking of 'distances' on the one hand, it has in actuality reduced distances. Such de-mythification is an example of its many complexities and even paradoxes!

HIDDEN INFORMATION RETREIVAL FROM VERY LARGE DATABASES

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ABSTRACT

Informatin has assumed a place of paramount importance in this fiercely competitive age. Till very recently valuable information embedded in routine day-to-day business transactions and other mundane activities lay undiscovered and untapped by their immediate beneficiary owing to on-existence of handy tools. Such tools came into the market with the emergence of Data Mining as a subject as a consequence of falling hardware cost to store voluminous data. Several algorithms hitherto studied by mostly statisticians to aid in processes like CLUSTERING and CLASSIFICATION were found to be useful for mining information and association rules concealed in such large databases forms the basis of the recent endeavor to unravel the nuggets of gold hidden in a mountain slag of data. A survey of some of the most common algorithms like Apriori, Incremental, CLARA & CLARAN and techniques employed by them are looked into and a possible solution for their betterment is outlined.

INTRODUCTION

In many organisaitons one common question arises, why do people store so much of data? The solution to this question is, people data because they think some valuable assets are implicitly coded within it. This type of valuable information is needed to improve the desision-making process of an organisation in near future. Traditionally people used to extract information by statistical technique i.e., one or more analysts would become intimately familiar with the dataset. However such an approach rapidly breaks downs as the quantity of data grows and the number of dimensions increases. Who could be expected to understand millions of cases each having hundreds of fields?

To cope with this a community of researchers and practitioner became interested in the problem of automating data analysis under the umbrella "Data Mining(DM) and knowledge discovery in databases(KDD)". The knowledge discovery in databases process includes some preprocessing steps aimed at facilitating the application of the data mining algorithm and postprocessing steps aimed at refining and improving the discovered patterns.

Hence we say that KDD refers to the overall process of discovering usefull knowledge from data, while Data Mining [1] refers to the applications of algorithms for extracting patterns from the data without the additional steps of KDD process. [2]

Increasingly, with this rapid growth in size and the number of available databases, mining knowledge or high-level information from data becomes essential to support decision making and predict future behaviour[3]. Data Mining techniques can be classified into the following categories – Classification, Clustering, Association rules Sequential patterns, time-series patterns, link analysis and text ming. Due to its undirect nature, Clustering if often the best technique to adopt first when a large, complex data set with many variables and many internal structures are encountered.

Clustering is a process whereby a set of objects is divided into several clusters in which each of the members is in some way similar and is different from the members of other clusters. The most distint characteristics of clustering analysis is that it often encounters very large data sets, containing millions of objects described by tens or even hundreds of attributes of various types (e.g. Interval-scaled, binary, categorical etc.) This requires that a clustering algorith be scalable and capable of handling different attribute types. However, most classical clustering algotithms either can handle various attribute types but are not efficient when clustering large data sets (e.g. PAM algorithm) or can handle large data sets efficiently but are limited to interval-scaled attributes (e.g. the k-means algorithm).

Several fast clustering algorithms haave been proposed in the literature including CLARA, CLARANS and genetic algorithms based clustering methods. [2][4]

An improvement of CLARA

CLARA (Clustering Large Applications) is a combination of a sampling approach and the PAM algorithm. Instead of finding mediods, each of which is the most centrally located object in a cluster, for

the entire data set, CLARA draws a sample from the data set and uses the PAM algorithm to select an optimal set of mediods from the sample. The quality of resulting mediods is measured by the average dissimilarity between every object in the entire data set D and the mediod of the cluster, defined as the following cost function –

$$\text{Cost}(M, D) = \frac{\sum_{I=1}^{n} \text{dissimilar ity}(O_i, \text{rep}(M, O_i))}{n}$$

where M_i is a set fo selected mediods, dissimilarity (O_i, O_j) is the dissimilarity between object O_i and O_j and rep(M, O_i) returns a mediod in M which is closest to O_i.

To alleviate sampling bias, CLARA repeats the sampling and clustering process multiple times and, subsequently, selects the best set of mediods as the final clustering. Assume q to be the number of samplings. The CLARA algorithm is given below –

Set mincost to a large number
Repeat q times
Create S by drawing S objects randomly from D
Generate the set of mediods M from S by applying the PAM algorithm
If Cost (M,D) <mincost

Then
    mincost = Cost (M,D)
    bestset = C;
End if
End-repeat;
Return bestset

Since CLARA adopts a random sampling approach, the quality of its clustering results depend greatly on the size of the sample as well as the frequency of the sampling. When the sample size is small, CLARA's efficiency in clustering large data sets comes at the cost of clustering quality.

We have developed a grid-based sampling technique that improves the quality of the solution. Instead of the random sampling employed by CLARA, which at times leaves out the best possible solution, a grid based method captures the profile of the data space uniformly and extract dense and sparse regions for effective data mining. Grid based sampling is already been extensively used for Soil Sampling. The analysis of phenomena that fluctuate in space is referred to as geostatistics. For example, in precision farming, geostatistical procedures can be used to estimate the value of a soil property in an unsampled aea based on neighboring sampled areas[5].

GRID BASED SAMPLING

For the sake of clarity we explain this method in one dimension. It can be easily generalized to higher dimensions. Let the sample have a distribution from -h to +h. Here -h corresponds to the minimum value of the parameter with respect to which we are plotting. Similarly +h represents the maximum value of this parameter. We start sampling from -h to +h in steps of say 2h/10 i.e. at each step we count the number of points in the feature space. Supposing from -4h/10 to 5h/10 we find a higher density of points. Thus in the second iteration we sample only the region -4h/10 to 5h/10 with a step size of 9h/100 (i.e. the step size is decresed by factor of 10). Here again if we encounter regions of higher density of points we again rescan that region with a smaller step size. The process is continued until the sampling finds no further features.

With falling costs of storage and enhanced speed of processing resulting from the tremendous development in computer technology recently, the paramount importance hitherto attached to cost is no longer as vital a consideration in choosing algorithms that demands a greater cost in these respects. Hence, Grid based Sampling would be a far better technique in extracting relevant information from very large databases for out benefit.

CONCLUSION

And last but not the least, in the North-East Data Mining techniques can be employed to improve medical diagnosis, it will prove handy for various departments of academic institutions, State Resource Centres and with increasing computer awareness Data Mining can be utilised by the business coummunity for their own benefits.

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LOG IN–MS HOUSEWIFE

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ABSTRACT

The world today is a small place. With the virtual world at the fingertip, one can do anything under the sun. The information technology is changing life fundamental the world overincluding in India. While the number of women going online in increasing and more and more are choosing a career in IT, the housewives are inevitably left out. The housewife community still falls on the wrong side of the "digital divide". Efforts should be made to overcome this digital divide and strengthened housewife community for digital exploitation to enhance their quality of life and self esteem. IT world is a much exciting and promising for women as it is for man. The housewives are still apprehensive of computers and do not feel the need for using such technologies. Housewives of North Eastern region also, must realize that they have to adopt accordingly in order to keep up pace with time.

Internet has become a fashionable word and a major component of IT industry. Internet connects people in millions across the world. A computer with Internet facility can make a difference to the life of a housewife. Housewives will find a lot more informations on the Internet and become more broad-minded and confident. Government intervention would help housewife community going online. Digital technology would definitely make housewives into new expressionists.

INTRODUCTION

Technology is the most important force shaping society and culture today. Now the world is a small place. It is well known that development of Information Technology (IT) is advancing at a rapid pace. With the IT revolution, no one is more than a few keystrokes away.

While the number of women going on-line is increasing in India as in other parts of the world, efforts are still very much needed to promote greater internet awareness among women, specially among the housewives. There are many women who stay home out of compulsion or who have given up jobs to be full time housewives.

In this techno-age, women specially housewives feel isolated. Relationship between technology and women is still at its nascent stage. These women, the so called 'Housewife Community' are inevitably left out of the technology sphere for want of exposure to it. There is no doubt that they suffer from computer-phobia, and do not dare to exploit the advantages of the IT age. This community fall on the wrong side of the 'digital divide'. Steps should be taken to overcome the digital divide and strengthen the housewife community for digital exploitation. In this 21st century, it is necessary to enhance their quality of life and self prestige.

One thing for sure, technology has never eliminated housework and probably never will. In fact, it will contribute to a re-definition of how that work should be re-organized and done. It will definitely usher in anew role for the women at home and bring changes in family life. In return it will have a positive impact on her children.

A housewife, even without higher education, can take full advantage of development in the digital age. To connect oneself with video on-line, one needs a personal computer (PC), with a modem (most modern computers have the in-built modem) and a telephone line. Technically, video on-line is apiece of the great global network called internet. Internet connects people in millions of homes. It is fun, enjoyable and affordable. One does not have to be a great computer expert. The services offered have been designed to be used by anyone. The monitor provides text and even pictures for easy comprehension.

ADVANTAGES OF GOING CYBER

A computer can make a difference to a housewife's life in so many different ways.

A housewife will find many useful informations, ideas and services on the internet which will be of help to her in maintaining her home.

E-mail is an wonderful tool to communicate with children away from home. E-mail has many advantages. It is very fast. The recipient receives the mail as soon as it is sent out, regardless of how

far apart in the world the sender and the recipient are. E-mail also provides an opportunity to send personalized message to all your friends, relatives at an absolutely affordable price and more importantly without taking more than a few minutes of your time. Comparing this with the traditional method of going out and spending time to choose a card and then posting, more and more people would prefer to shift to e-mail for its convenience factor. E-mail can also contain images. One can send Greetings card or even virtual presents through web.

Chat rooms are also very popular on the internet. A mother can chat with her children or chat with her husband who are away from home.

E-learning is emerging as the most significant response to the Individual learning. This technology is creating an opportunity to undertake self-placed anytime, anywhere learning. Websites like *gurukool.com, learning start.com* or *e-learners.com* provide on-line educational materials including those for college courses.

A housewife with no higher education can also set up an on-line shop-front to market her home made pickle or tailored goods or any other home made items.

Now we hear about stay- home women getting hooked on e- shopping. E- shopping is the on-line market place. On-line shopping is fast. No need to run from one store to other store with list in hand. Instead go on-line and visit the internet malls. Thousands of people worldwide are doing it everyday over the internet, bringing everything from potato chips to household appliances. One can buy dresses, books or even cars. India's city based housewives order even vegetables cut and packed on-line from the comfort of their home. Keeping track of household items that need to be replaced can be quite a headache. With the conventional shopping list, housewives tend to forget one or the other item. 'The solution to this is the Pocket Shopper, which can not only keep track of the things to be replaced by a simple scanner of the bar codes but also mail the list to the internet shopping service when it is connected to a computer. There are on-line auctions like *bazee.com,* where one can buy products and services or even can sell one's own surplus stocks.

On-line air, railway booking and even booking of cinema ticket can be done, if you have a credit card.

Housewives can also enjoy the benefits of working at home by signing up for any of the 'work at home programmes'.

Through internet, people learn the latest news and keep abreast of the happenings around them. With the steep rise in the prices of books and magazines, it is cheaper to browse those in the web.

OTHER BENEFITS

- Some sites like on-line pharmacists are there to give information about the side effects of drugs.
- Websites offer hobby courses like cookery , gardening, interior decoration , beauty care, etc.
- Housewives can find various recipes from the web and even place order for cooked food.
- Log in to *Saranam.com* for performing *puja* from home only. Websites like *blessingsonthenet.com* provide informations on on-line donations, reservation of accommodation facility etc.
- In this way, one can use internet for education, fun and family and hobby pursuits.

DIFFERENT WAYS TO BRING HOUSEWIFE INTO IT FOLD

In the knowledge and information based society of the 21st century , women's active participation is necessary. In north east a good number of people specially the housewives still do not realize the importance of computer and the internet in today's world. Such a situation can seriously limit a country's growth and productivity .In the social context, the refusal to accept these technologies also widens the generation gap. Housewives should look forward and move along with the wide world of advanced technology. First and foremost, housewives and other women must develop a positive attitude. Women should show willingness to accept technology as part of their everyday life. They should not be left behind in IT world. Because IT world is as much promising for women as they are for men.

Quality information and community training is needed to develop housewives potentiality. To inspire them, Government's intervention is needed as has been done in Karnataka and in other cities. Govt. should offer subsidy and give loans to buy computer and necessary paraphernalia. Other family members, NGO's and other community's intervention would help more women to get on-line. Efforts should be made to reduce the information gap to provide real advantage to this community, alienated from the benefits of IT.

Publication of women related websites should be done. Touch-screen information kiosks should be set up at traditional gathering place, women's activity center, near children's school. The kiosks should have the facility to be connected to internet by using pre-paid smart cards. Internet classes can be arranged to reach out and harness as many housewives towards the establishment of a community i.e. 'IT Literate Housewife Community'.

CONCLUSION

In this Information Age, technology advances at an exponential rate. Social and commercial activities are becoming extremely reliant upon computers and the internet. Although the younger generation has integrated computers and the internet into their lives, housewives are yet to develop this mentality .A positive mind and efforts would definitely help housewives of the north east to overcome their initial apprehension towards computers. Cyber-culture is blossoming. Cyber- feminism and techno-culture should go hand in hand, in a world driven by IT. Sooner in a changing world scenario, we will say 'good bye to traditional, subdued, depressed, bored housewife' and we will say 'welcome to modern dynamic housewife', a housewife who can hold her head high even in today's world. Digital technology will potentially make housewives into new e-xpressionists.

VIRTUAL OR CYBER CAMPUS

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ABSTRACT

The virtual learning is one of the most important methods of future University activities and it seems necessary to study and analyse all aspects of the above mention problem, in order not to be surprised with upcoming changes. The more so it is worth describing current activities of the virtual-campus-despite the limited scale-may significantly enrich our knowledge about possibilities and limitations of modern global tele-informatic system, treated as distinguishing marks of modern information society. In this paper we will focus on the following issues –

- What is a virtual or Cyber campus?
- What's in it for learner?
- What's fueling the virtual fire?
- Know what you want in cyber learning?
- The view from Outside.
- Interaction in the virtual classroom.
- Tips from a virtual student
- Frequent asked question about cyber campus.

Network, Electronic access to library resources not only will be conductive to quicker, cheaper and more comfortable distribution of scientific information, but also will make easier the acquisition of the continually increasing information recourses of the mankind. The rapidly increasing supply of information in all forms makes it more and more difficult to be collected, classified, analyzed and made accessible. Memory resources of computer systems are undoubtedly attractive alternative to classical stores, though for sure the cost of electronic collection of information (especially that multi-medial, i.e. including apart from text also pictures and images) are not low. Thinking rationally, it might be expected that such a modern system of electronic circulation of information influence the structure of the supply of written materials.

WHAT IS VIRTUAL OR CYBER CAMPUS ?

It is used to be synonymous with campus. But not anymore. Now you don't have to go to a campus to take classes, get a degree, or obtain a certificate. Now, the campus can come to you. In virtual campus you access the courses when you want as well as where you want. No matter what kind of situation are you in or whatever situation you're in, if you want to change careers, sharpen your competitive edge, finish high school, make more money, earn a degree, or get a Ph.D., virtual or cyber campus can help you accomplish your goals. You can reengineer yourself for the career you really want or the one you really want to keep and advance in. You can go to school and keep your life, too, because convenience and flexibility are the hallmarks of virtual or cyber campus.

There are more than five million peoples a year get their education through virtual or cyber campus. Did you know that you can attend campus dozens of ways, without ever sitting in a campus classroom? It's true. Today "name" universities offer two-year, one year, master's and even Ph.D. programmes-all from a distance. Of course, "new ground" also means an intensive research trail. Any educational institution using technology to enable you to break out of the time and space barriers traditionally associated with learning and studying is a virtual or cyber campus. Technology can be as simple as pen and paper, as in correspondence study, or it can be highly sophisticated, as in course delivered live over satellite networks.

There are a number of terms are used to describe virtual or cyber campus. The most common phrases include distance learning, distance education, home study and correspondence study.

The expert's "Distance Learning is a system and a process that connects learners with distributed learning resources. While distance learning takes a wide variety of forms, all distance learning is characterized by –

- Separation of place and/or time between instructor and learner, among learners and/or between learners and learning resources.

- Interaction between the learner and the instructor, among learners and/or between learners and learning resources conducted through one or more media; use of electronic media is not necessarily required.

Virtual of cyber campus is not a second-rate learning option. A virtual or cyber education is not low quality, lower quality, or second best in anyway.

Because it is so closely scrutinized, distance education programmes often end up offering higher quality than same courses in an on-campus setting. You can be proud of any degree or certificate you earn through virtual or cyber learning.

Virtual campus is not just about technology. Distance education gives you more options, more flexibility, and more educational opportunity. Virtual or cyber campus is all about what you're learning and how what you learn improves and changes your life. After an initial adjustment period, the technology you use becomes invisible. Think of virtual or cyber campus technology as a film projector in a movie theater. When you go to a movie, you focus on the film, not on the equipment delivering the film. It's the same with virtual or cyber learning. It's the course that matters, not the technological bells and whistles.

Today, the situation has changed. Instantaneous communication takes place via e-mail discussions with professors, class discussions, and team projects conducted over the internet or via phone conferences. All of this allows student to interact on a regular basis with classmates and the instructor.

What's in it for you?

What's the bottom line for you?

- The prize of skills and knowledge. The most obvious benefit you gain from grabbing your education from a distance is the education itself. If you do your job and the virtual college does its, you will acquire new knowledge, insight, and skills.
- Convenience. Many students who attend classes at a distance do so because they must. Barriers such as a hectic work schedule, children at home, geography, or weather conditions create the need for a virtual rather than a physical campus setting.

Convenience can take many forms in distance education. It can meant not having to drive a long distance, or perhaps no having to go out of the house during the winter. It may be the ability to fit a class into the corners of a very hectic schedule. Or the luxury of being able to slow down the pace of a class to meet your learning curve.

- Marketability. You're heard the adage "It's not what you what you know but who you know". Well not anyone. Who you know may get you an interview, but landing the job depends on a robust resume and corresponding work experience.
- Virtual learning helps bolster your resume's weak spots. It also allows you to "report" yourself into a better soil and a bigger space so that you can spread your roots out into new areas. Even if you don't have work experience in an area you want to grow into courses or a certificate can make the difference between a "maybe" and a "yes".
- Pay scale potential. Most employers still reward you for additional education by giving you a raise, a better job title, or both.
- Access to top-rung experts in highly specialized disciplines. You already know today's telecommunications technologies allow teachers and students to engage in a meaningful dialogue despite the distances involved. Taken to the next step, the technology also enables you to connect with hitherto inaccessible experts.

WHAT'S FUELING THE VIRTUAL FIRE ?

Technology

The Internet and other advanced telecommunications technologies (such as live desktop video conferencing over computer networks) are luring formerly reluctant educators into the virtual learning arena. The technology gives educators the flexibility they need in their increasingly hectic schedules.

More available educators means more courses and programmes for you. More courses means more competition between institutions, and more competition means lower costs. Many of the current exciting advances center on what can be done with computer technology, including the Internet, Finally, technology now allows live, interactive education over long distances at a very low cost.

Computers aren't the only technological force moving distance education forward. Another is live, interactive video delivered via cable or satellite, allowing you to see what's happening, not just read about it on a computer monitor.

Population Trends

We just don't do things the way we used to say the experts. We aren't going to college straight out of high school, as we used to. We're taking longer to finish college, and we're often returning to school while working full or part-time. The older part-time learner is the new majority, and that means educational options need to fit into working people's lives. To do this, colleges are employing an increasing array of virtual college options.

Workplace Needs

It's no secret that today's workplace is tremendously competitive and volatile, and it doesn't look like things will be calming down anytime soon.

Most people can't plan on sticking with one career for their entire live. It just isn't feasible in today's workplace. To get the career flexibility you want, you need continual infusions of education over a lifetime; not just once at age 18.

This means people need high-quality education specifically tailored for a life already bursting with responsibility. Since few midcareer professionals are in a position to drop out of a career for a few years of educational relief, the virtual option is very compelling indeed. With virtual college, professionals can get the education they want without leaving the job they need.

Globalisation Of The Marketplace

The increased demand by business and industry for workers who have a global outlook and, ideally, some kind of global training also fans the fire of distance education. Other than spending time overseas, distance technologies are the optimum for making a truly global education possible for time-and geography-bound students.

Now, instead of hopping on a plane, you can hop on-line, hook up to a live vide conference, or use other distance learning techniques to share a class with peers from all over world. And distance ed won't give you jet lag.

KNOW WHAT YOU WANT

- What do you want to gain from your education?
- What are your career and personal goals?
- How does a virtual or cyber education fir into your short and long terms plan?
- Which courses will benefit me most for the majors I may want to pursue?
- Does this course make me more marketable in my profession? If so, how?

It's important to know the answers to goal-oriented questions before you begin any of your educational forays. If you don't have any plans or goals, sit down and figure them out now. Only you can decide what you want from your education. The biggest benefit you get from virtual or cyber campus is education. You get to explore a new career path, learn a trade, or update your skills. But along with the education, there's often a "paper" benefit-that is, a degree to add to your resume.

Traditionally, tests or examinations are used to determine how well you have learned a concept or a skill. They are a time-honored way of proving knowledge. But tests of examinations have their limitations. Think about it: Does one test or exam (particularly a standardised test or exam) tell the whole story about you? No way.

THE VIEW FROM OUTSIDE

You know the adage: You can't judge a book by its cover. How its cover. How does distance ed stand up to the critical "cover" tests – on the job, in interviews, and in pursuit of further schooling?

On the Job

Distance education's image in very good on the job. In today's world, if you have a degree or a certificate, you have more points in your favour. It's always to your advantage to have a degree, whether you earned it at a distance or traditionally. In some instances, your distance degree may be just the impetus your employer needs to give you that raise or promotion you've been waiting for. Also, don't overlook the fact that you can translate the telecommunications skills you learned as a distance learner to value-added business benefits. For instance, you can introduce a business programme in which you use your polished teleconference and vide conference skills to serve remote customers more effectively and at much lower costs.

Earning education credits while working shows that you're keeping your skills and knowledge current. In today's fast-moving world, makerability is as much about how well you keep up-to-date as about what you've done in the past. And everyone knows that it takes discipline and motivation to earn a degree, especially when you're already working full or part-time. When you pursue a degree while working, you demonstrate those positive qualities to your boss while bringing new knowledge to the job.

Employers by and large look favourably upon degrees earned at a distance. Unless you make a point of it, the main thing employers notice is not how you earned your degree but whether you have the degree or the training. A survey conducted by the Distance Education and Training Council reveals some specifics about how employers feel about training and degrees earned at a distance –

- 94 percent of employers surveyed said that distance graduates compared favorably in skills, knowledge, and attitude with graduates of traditional programmes.
- 97 percent of employers said they would encourage others to enrol in distance ed programmes to increase their job competence.

Quick Quality Facts

While looking at the studies and speaking with several admissions officers, programme coordinators, professors, and education experts, I gathered some facts about how distance ed stacks up –

- On tests, papers, etc., the majority of distance students score as high as or higher than their peers in on-campus classes.
- Learning at a distance allows students to forge new, positive learning patterns in line with today's ideas about education.
- Distance students typically interact more in their distance courses than do students in on-campus courses. The increases participation enhances learning in many subtle ways that don't always show up on tests (for example, higher self-esteem, better social skills, better problem-solving skills).
- In the workplace and when interviewing for jobs, it's not unusual for distance graduates to have to explain what learning at a distance entails.

But the effort is worth it; some job hunters report that distance ed helped distinguish them positively from other candidates and peers.

- Employers working with distance graduates rated distance learners positively.

INTERACTION IN THE VIRTUAL OR CYBER CLASSROOM

You're not in the virtual or cyber classroom alone. First of all, in a virtual or cyber classroom you'll always have a facilitator to keep you on track, point out the pitfalls, and help you navigate odd twists and turns.

You'll also have company from your fellow classmates, who will work with you in teams or on an individual basis. Hiking along the virtual or cyber path is not a quiet walk. It's more like a lively tour with lots of talking, explaining, and networking going on at once. The reason is simple: instructors often can't see you, so they want to make sure you're with them and that you understand the lesson. Without the usual visual clues, such as eye contact, increased verbal communication is necessary. In this way distance students most often report that they feel they are better able to communicate with peers and instructors in distance classes than in traditional ones. The same advice holds true for positive distance interaction as it does for positive on-site interaction – be patient with others, and when there's a problem, try to bridge the gap by increasing communication.

TIPS FROM A VIRTUAL OR CYBER STUDENT

It's never too early to get a dialogue going with your professors. As soon as you know which professors you'll working with in your first courses, contact them, just a simple, schmoozy "Hello, I'm your new student, and I'm looking forward to the class" will open the doors and set a good tone your entire course.

- Before the class ever starts, get organised.
- Communicate with facilitators and classmates frequently to keep up motivation via e-mail. Extra communication will personalise your learning and help keep you on target and motivated.
- Never, ever procrastinate research papers. In your mind, get over the hump by separating that giant project into small tasks, just do one small thing at a time.
- Since starting homework is usually the hardest part, think to yourself. "I will give it 5 minutes". Often, you'll be able to continue longer once you've gotten over the start barrier.
- Use public libraries for your research project and it will differ vastly depending on what kind of a programme you're in. You may need to research, to you may need to research constantly.
- Set a routine and stick with it. If you work during the day, set a time every evening when you still attend your virtual or cyber class.
- Set deadlines for yourself, even if the instructor doesn't set for you.
- Be flexible, we're on the frontier of distance education, so expect a few bumps in the ride from time to time. Take them with humor and an adventuresome spirit.
- Don't skip the daily practice exercises just because you can get away with it.
- Don't let your energy level drop because you're not in a live setting. In your mind, make whatever distance learning environment you're in as energetic and as important as a "regular" class.

FREQUENT ASKED QUESTIONS ABOUT VIRTUAL OR CYBER CAMPUS

1.Q Is it going to be too impersonal?

A Your experience as a distance learner will be studded with all sorts of personal interactions. Learning–at a distance just as in a classroom–is all about discussing, questioning, getting feedback, comparing notes, and clarifying ideas.

You'll definitely interact with a teacher-facilitator. You'll also interact with classmates. With so many people in the picture, it's pretty difficult for a virtual education to be impersonal.

More often than not, you'll discover that you get to know teachers and classmates better through distance education than in face-to-face education. The distance requires everyone to communicate extensively and effectively in order to succeed; you actually end up communicating more in a distance programme than in most on-campus programmes.

2.Q I've been out of school for a while. Can I learn at the same pace I used to?

A It is highly likely that your time away from school has made you a better, more able student. Even though you may feel rusty, distance education researchers have discovered that nontraditional students fare extremely well in their distance courses. Your work experience, life experience, emotional maturity, and independence will serve you very well, enhancing your ability to achieve academic success.

Distance teachers say that your first days back in the classroom are the most critical for building self-esteem and academic confidence. Communicating with instructor early on will help get you over your fears and into the class.

3.Q Can I succeed if I'm not a super technical type?

A Who is? In today's world, as soon as you master one brand-new technology, there's a never gizmo being touted as the latest thing. Even those who think of themselves as technical types secretly admit that they aren't wizards in every area.

If you're non-technical, don't worry about it. You should obtain some level of technical proficiency, but don't let a fear of technology stand in the way of your education. Some distance classes simply require proficiency with the telephone. Others that require a little more expertise are still within your reach. Most important, many programmes offer training, take advantage of it!

4.Q Will I ever interact with a real person, or will I be sending my material into a void?

A Distance education is not the black hole of the education universe. You do not fax, e-mail, mail, phone, or otherwise send material "out there" only to have it sucked into a deep unknown. You will always have a human contact in your virtual education. Even when taking courses in which you are being graded by computer (which is rare), you'll still interact with a human being at many points in the course.

5.Q When can I access course information and take classes?

A Some virtual colleges allow students to access courses and class information on demand. Others operate at a distance but on a regular schedule, like that of a traditional campus. You can expect to find the entire range of options.

If accessing a class at flexible hours is important to you, make sure that's the kind of course or programme you sign up for. In general, video, on-line, and correspondence programmes have the most flexible schedules; the least flexible programmes involve interactive courses delivered live.

6.Q I'm a people person. Will I get the personal feedback I need?

A If you're a people person, make sure you're taking distance classes via a people-oriented medium that allows for lots of talking, working in teams, and frequent instructor contact. Your best bets will be live, interactive mediums such as video conferencing and audio conferencing. Another good possibility is on-line classes with telephone conferencing backup.

7.Q Will distance education cost more and take longer?

A Distance education doesn't have to cost more or take longer than traditional education. Time- wise, your education will take as much or as little time as you want it to. Just as in traditional education, you can hasten or delay your graduation or completion date by taking more or fewer classes per semester or quarter. It's up to you.

8.Q Is there such a thing as "life experience" credits for virtual college?

A Many virtual colleges grant credit for life experience-for military training, work experience, specific life experiences, and more. You won't be able to earn a complete degree with life experience credits, though. Typically, institutions set a credit ceiling of about 45 to 60 semester units. Still, that's a lot of credits to earn in one swipe

9.Q As a distance ed student, can I use my school's career counseling center?

A Yes. If your institution has a resident career counselor or a career placement service, by all means take advantage of it. I know how easy it is to skip this step when you're getting ready to finish up your education, but if you find a good career counselor, that one phone call can significantly improve your chances of finding the job you want.

Good career counselors are like walking libraries of resume, interview, and job-hunting information. They're paid to be up on the latest resume trends and tricky interview questions. And career placement services are pipelines to good opportunities in your field of study, particularly when you're attending a vocational school. In fact, many vocational schools pride themselves on their ability to place their graduates in jobs.

10.Q How do I list my virtually earned credit on my resume?

A You do not need to differentiate your degree, certificate, continuing education courses, etc., from the rest of your education by writing "earned off-campus" or another such phrase. Unless you want to play up the way in which you earned your certificate or degree, just list your distance-earned degrees or credentials as you do all other education. Otherwise, you may find yourself spending more time answering questions about your education " than about your skills in interviews.

However, if you work in a technology-related profession and you feel the skills you developed as a distance learner contribute to your ability to do the job, consider playing up those skills – especially if you earned you education on-line or via other advanced technology. On your resume, list the distance education you earned with your other educational history. But in cover letters, discuss the special skills you gained from your distance learning and how they will be an asset to prospective employers.

11.Q How should I handle questions about my virtual question in interview situation?

A It's unlikely that you'll need to explain your distance education credentials unless you want to. But if an interviewer (or peer or employer for that matter) asks you about your education, don't get defensive. Remember– distance education is not second best. Maintain a confident attitude. You should be proud of your education. You have worked hard for it, and you know how much you've gained from it.

If interviewers or prospective employers don't understand the mechanics of your distance education, educate them. Bring them up-to-date and show them why they should snap you up in a hurry. Show them you bring special skills and qualities to the job as a result of your distance education.

Here are some suggestions for responding to questions and comments about your distance - earned education in interview or other work-related situations. Use these responses to turn a potentially negative situation around.

If an interviewer remarks, "I see you've earned your degree through independent study" or "Why didn't you get a regular degree?" You can respond with anyone of these :

- Distance learning is an extremely viable method of education. Distance learning is recognised by the American Council on Education and many other higher education organisations as completely legitimate. (You can also mention that you attended a fully accredited programme, if this is the case.)

Since I didn't have a teacher in the same room with me for motivation, I had to be particularly self-disciplined and self-motivated. As you can see by the fact that I completed my course, I bring these and other positive qualities to the job. As a distance learner, I worked with the latest technology, I earned my education, and I also became well versed in technology that brings my skills into the twenty-first century.

- Since distance education requires more participation than an on-campus education, I gained a great deal of experience articulating complex ideas efficiently.
- Distance education is an effective way of continuing my education while still working. If you hire me, you know that I have the means, the skills, and the drive to stay competitive and up-to-date.

If your interviewer still doesn't budge, then go someplace where your distance education will be appreciated!

E-GOVERNANCE

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ABSTRACT

Every government has to be prepared to meet the challenges and opportunities presented by the new millennium. A knowledge-based economy would be a vehicle for growth in this millennium. The state government has to provide the thrust to implement the Information Technology task force recommendations of Government of India. Government has to be made more transparent, responsive, accountable and citizen friendly. Information and Communications Technology (ICT) tools have to be introduced in those activities of the Government, which have a great impact of the citizens. Rapid deployment of Community Information Centre tools right from the National, State to block levels is becoming relevant in the present context of e-Governance.

INTRODUCTION

Every government has to be prepared to meet the challenges and opportunities in this millennium which stretches before us into a distant horizon, passing through the Knowledge Revolution which brought a paradigm shift in the world economy, societal chages and in the manner of governing various activities of the Government. Knowledge based economy would be a vehicle for driving the next generatin governance and help in poverty alleviation through employment generation and wealth creation. Even though the Central Government has taken various steps like implementation of the Information Technology Task force recommendations, Information Technology for masses, setting up of Community Information Centre (CIC) throughout the North East, etc. but the thrust from the State Government has to be on carrying out those activities which are needed at the State level and required by the people at grass root level with great amount of responsibility and sincerity.

DISCUSSION

Today's objective is to make Government more transparent, responsive, accountable and citizen friendly. Government bodies should gear up to be sensitive to the needs of the citizen and no longer to the whims and fancies or personal desires of the staff. To meet this goal, it is necessary to prioritize various activities of the government which have a great impact on the citizens as a whole and to enhance these activities by Information Communication Technology tools to facilitate greater flexibility, accessibility, wider reach, interaction in a cost effective manner. The Knowledge revolution will enable the Government functioning to meet the needs and demands of the citizen by means fo carefully selecting, evaluating and adapting the most appropriate, latest Information Communication Technology tools available in the world.

Rapid deployment, development of Web enabled applications with broadband facilities like satellite and wireless technology, high speed, high performance communication facilities, strategic alliances to support and guide the implementation of e-governance down the line, adopting the best approach and practice of e-governance in the country (NIC is the main provider of various ICT services and has built-up tremendous infrastructure and domain knowledge over a decade) right from National or State level upto Block level has become more relevant in the present context of e-governance.

E-GOVERNANCE MODEL

E-GOVERNANCE INITIATIVES TAKEN BY NIC IN MEGHALAYA

Preparation of E-GOVERNANCE Action Plan

Preparation of the Project proposal and system study for Departmental Computerisation has been done where the activities of the Department have been outlined for computerisation with a budget indicating the amount required in this regard in their Plan size which shall be covered in phases over a five year period.

Preparation of the Draft IT Policy of the State Government

A Draft Information Technology Policy of the State has been prepared and the State Government is finalizing the Information Technology Policy. It has been kept in the Meghalaya Website.

INFRASTRUCTURE

SCPC VSAT, Video Conferencing, Mail Server, Proxy Server, Web Server, Rf-Link for intra building connectivity, LAN at three Secretariat buildings and NEC, RAS and Router for Dialup connectivity.

CITIZEN SERVICES COMPUTERISATION

Computerisation of Registration of DTO Office, Library Computeriastion, Community Information Centre.

DATABASE

Comprehensive HouseHold Survey for Citizen in the State, LiveStock Census, Budget Information System of State Government, 4th Economic Census, etc.

BACK OFFICE COMPUTERISATIN AT SECRETARIAT

Finance Budget, Personnel Department, Account & Treasury, DRDA, SECTT. ADM. DEPTT., ETC.

DIRECTORATE COMPUTERISATION

Promotion of Information Technology culture in Agriculture Department, A H & Vetty., C & RD, Land Record, Economics & Statistics, Arts & Culture, Education, etc.

DISTRICT ADMINISTRATION COMPUTERISATION

Arms & Registration, Food & Civil Supplies, Issue of SC & ST certificate, Isssue of Domicile certificate, Election Computerisation.

TRAINING

Training on ICT related activities is being imparted to the State and Central Government Officials on monthly basis which covered MS Office, Internet and e-mail access, Video Conferencing, etc.

TELE-CONSULTATION

Every month a Video Conferencing is held for the State and Central Government Doctors for Tele-consultancy with various experts in the country.

INFORMATION TECHNOLOGY IN INDIA – WITH REFERENCE TO NORTH EASTERN REGION

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ABSTRACT

Information Technology is a wide term broadly covering the areas of Computer Sciences, Electronics and Telecommunications. Over the last few decades there has been a tremendous growth in Information Technology in India, which is almost revolutionized the very outlook of India. The North Eastern Region of India is known for its vast resources. However, the overall pace of development in this region is less than that of the rest of India. Due to the pace of advancement of information, comminication and Internet Technology elsewhere, the North Eastern Region will not be in a position to join the race with the rest of country if the required facilities / centre are not made available for the purpose.

INTRODUCTION

Information Technology is a wide term broadly covering the areas of computer sciences, electronics and telecommunications. Over the last few decades there has been a tremendous growth in Information Technology, which has almost revolutionized the very outlook of the Indian. The economy of any country is no longer measured by strength of traditional industries, but by its technological advancement. It is estimated that knowledge based business would contribute two third of the growth in global GDP in the next ten years.

Unlike the traditilonal industries, the Information Technology sector is people intensive and creates vast employment opportunities. It is estimated that the total size of Information Technology industry in India will cross US $ 1000 billion by 2008 and become the single largest contributor to the GDP. There are presently about 3,00,000 computer professionals working in the country, and as per a NASSCOM study this number is expected to grow and reach 22 lacs by 2008.

As per the Dataquest report, 1,80,000 new jobs are available in 2001 alone against an available supply of 1,21,000 only. Compare this huge requirement with that of the yearly intakes of engineering colleges (like IITS, IIITs, IISs) which stands at 7,000 nos. only which produces engineers in computer science.

It is pertinent to note here that Information Technology is not the domain of only the engineers, those with humanities and commerce background can as well pursue various technical courses from private vendors and enter the sector as professionals. Even professional from other areas like accountancy, arthitecture and applied arts, etc can learn computer skills, to enhance their career prospects and create a niche for them. However, it is always better to start when one is young i.e. undergoing graduation in some college or just passed 10+2 exams. Incidentally, it is the undergraduates segment which takes-up computer courses in large numbers to find an alternative career option to their main line education.

Personality development workshops enable students to face interviews, and adapt and effectively compete in the highly demanding professional work environment of their industry. STG courses incorporate a special feature called SPEX – Software Project Experience – which simulates the experience of working in a real life environment in order to instill the discipline of real-time programming. This creates awareness of the dos and don'ts programming practices and helps to inculcate the habit of adherence to quality standards and documentation methods. The outcome is that, on completing the course, the student emerges as quality software professional – equipped with the skills to be productive from day one.

The impact fo Information Technology is yet to be properly understood by the policy-makers, especially from northeast India. Although attempts have been made in terms of policy-making, setting up of Information Technology parks and computerization of various departments in some states, no state has come forward to be as dynamic in terms of development of Information Technology as compared to other states in India, most prominent being the state of Andhra Pradesh. The masses of this region need

to be sensitised towards the vast potential of Information Technology and a strong message needs to be sent through various media such as Seminars, Workshops, etc., so that people have a better understanding of how Information Technology can assist them in various fields if applied correctly. In this respect, Meghalaya stands a much better chance because most people of the state speak English fluently. the local dialect being in the Roman script makes the computer language easier to grasp and thereby making this new technology acceptable. At present many educatinal institutions, have made Information Technology curriculum compulsory and the percentage of computer literates especially in the urban areas is fast growing and the establishment of various Information Technology training centres in the region has contributed immensely. Students need to be assisted to keep abreast of the latest technologies and how to harness it for their needs by imparting them skills, which are aimed at catering to the needs to the requirements of this region.

CONCLUSION

Skilled manpower in Information Technology is available in the state. However quite a good number of Information Technology professionals have left the state and are working in other places in India and abroad due to lack of opportunities in the state. In order to ensure growth of quality Information Technology professionals and success of the Information Technology industry in the state and also for the support fo various services, the Government has to facilitate and play a pro-active role for spreading the computer education in all the institutions in the State and seek the help of the Central Government and private training institutes for universalization of computer education in the institutions in the state.

INFORMATION TECHNOLOGY SCHOOL EDUCATION PROGRAMME IN NORTH EASTERN REGION

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ABSTRACT

NEC is implementing Computer School Education Programme from 1994-95 onwards in order to promote Computer Education at Secondary and Higher Secondary levels. There are more than 5,000 Higher Secondary and Secondary Schools in the North Eastern Region. NEC has provided infrastructure support which includes computers and peripherals, furniture, renovation of computer room and class room as well as adequate training to school teachers which were selected under this programme. At the end of the 9th Plan, 429 schools have been covered. During the 10th Five Year Plan, NEC has kept the provision to cover 1,000 schools so that at the end of 10th Five Year Plan approximately 1,500 schools will get this benefit in order to develop approximately 1,25,000 to 1,50,000 manpower at Secondary and Higher Secondary level from the North Eastern Region, which can further pursue their higher studies in the Information Technology area. There are very few institutions involved in higher and IT education to develop area. there are very few institutions involved in higher end IT education to develop IT professional in NER. In view of the above, NEC has made an effort to link IT School Education programme with IT College/University education for higher level IT course by providing IT infrastructure in the selected colleges and University in order to develop manpower for IT industries and IT enabled service. NEC has made in initiative in this direction for the 10th five year plan for working out the IT education strategy plan for development of IT manpower in the NER.

INTRODUCTION

Information Technology has emerged as most promising technology to have a revolutionary role in the Indian economy in terms of production and export. The government has resolved to make India a global IT super power and front runner in the age of Information revolution and poised to transform our country as a knowledge based society using IT as a main vehicle. Government has given recognition to IT sector by setting National Task Force during 1998 and also accepted the recommendation of IT action plan submitted by the task force which covers wide spectrum of issues relating to finance, infrastructure, commerce, education, HRD, electronics and impact of IT for rural development. The need for the information infrastructure, internet access, software development and export, manpower training and education have been stressed in order to achieve the target of export of US 50 billion by the year 2008 from USD 8.6 billion during 2000-01. The projected requirement of the manpower in the IT hardcore required in India is more than 11 lakhs and IT applications and IT services are more than 9.0 lakhs as per NASSCOM studies. The present infrastructure in order to develop the manpower required for IT is inadequate and does not contribute significantly in the IT industry. There is a need of developing the infrastructure from the school level to University level by introducing professional courses at different levels to meet the demand in various IT sectors. Inorder to achieve the need and demand, NEC has prepared a strategy for the 10th five year plan to develop manpower from school levels by introducing the IT infrastructure in the schools. Similarly, infrastructure will be provided in the Colleges / University of the NE states for starting different course from diploma levels to higher levels.

INFRASTRUCTURE PROVIDED UNDER SCHOOLS

NEC provides a set of 5 PCs / 10 PCs to the selected schools based on strength of students, level of education (Secondary or Higher Secondary level) in a school, category of town and population. Latest configuration of the system (PC) is being provided for computer school education programme along with uninterrupted power supply (UPS), dot matrix printer, anti-virus software, academic software for the school level, floppy disc, computer papers. Multi-media kit along with sound card and speakers are provided in built in the PC.

NEC also provides adequate infrastructure for furniture for the computer room depending upon the number of PC systems being supplied to the selected schools. This includes computer table, printer table, teacher table, chair, shoe rack, front door and other related items. Electrical works and carpeting to the computer rooms are also a part of the infrastructure.

NEC provides fund to a school for renovation of the computer class rooms and electrical works including the purchase of almirah and computer books.

Six months training in the computer applications are being provided to the teachers of the selected schools at St. Anthony's College, Shillong. The syllabus of the training is up-to PGDCA level which also covers the syllabus of Secondary and Higher Secondary level of computer subject. Requisite fund is being provided to school teachers to meet the expenses during the training period. One teacher / schools are selected for computer training. Earlier, schools were provided necessary fund for training of school teachers in computer education. Similar training is being arranged in Manipur University, Tezpur University, CEDT, Imphal, IEE Guwahati in addition to St Anthony's college for providing six months training to school teachers selected recently under this programme. Faculties at St. Anthony's college are qualified as per AICTE norms and this college is already involved in the different courses at degree levels.

GUIDELINES FOR RECOMMENDATION OF SCHOOLS BY THE STATE GOVERNMENT

During the l0th Five Year Plan, State Governments have to furnish detail existing infrastructure and other parameters such as, availability of teachers, strength of the school, performance of students (results), availability of room in the approved format of NEC. However, following terms and conditions have to be taken into account while recommending schools by a State Govt. to be covered under this programme.

The following are the Term and conditions and Eligibility criteria for recommendation of schools:-

- It should be either a Govt. school or Govt. aided or Govt. recognized school.
- The pass percentage during the preceding 3 years should be 60% or above.
- The school should be able to spare two teachers to be utilized as teacher in addition to their existing work load.
- The teacher so identified, should preferably be a graduate with mathematics, or physics or statistics preferably below 40 years.
- The school should be able to spare the teacher for training in computer education for a period of 6 months at the cost of NEC at the approved/selected NEC Computer Training Centre and to attend short term orientation computer training courses every year thereafter or user interaction meeting if organized by the NEC.
- Necessary TA / DA for training of computer teacher shall be borne by the NEC.
- The school should have a pucca motorable road for easy access for installation, maintenance of the system and for inspection etc.
- The school should have one room with sufficient space for installation of computer and computer lecture hall for use as computer room. It should have proper electric supply and with adequate security system."
- The school should be willing to raise fund for maintenance of computer in future.
- In case of Govt. school, the computer, teacher, shall not be transferred without the replacement with another trained / qualified computer teacher. If such Inter-transfer is not possible, the person proposed to be posted in place of the trained teacher should be trained at the cost of the State Govt. for posting as computer teacher to ensure that the computer classes may not be dislocated, due to transfer of computer teacher.
- The Govt. / school authority will be responsible to work out suitable working system so that the computer teacher may not be unreasonably overburdened i.e. no of classes to be taken may be regulated either by reducing the other classes to be taken by the concerned computer teacher.
- Students from class IX to XII will be given more importance for computer education as a part of their preparation for future skill development in addition to their normal academic education.
- The Govt. / school authorities concerned should agree to run computer classes even outside their normal school hours to provide the facilities to more students and also to function as Information Technology Centre in case such decision is taken in future.

- In those schools, where the number of students between classes IX to XII exceed one hundred students per class, such school will also be eligible to apply for additional computer support under the scheme for upgrading their infrastructure facilities.
- The school should follow the syllabus of either ICSE or CBSE or State Board, if available from Class VIII to XII.
- The school should furnish the information in the format given by NEC to State Govt.
- A school should be ready for providing computer awareness programme to the public of that location after school hour by introducing a nominal fee for this purpose.
- Few schools may be selected to act as a IT Centre for which additional infrastructure may be provided by NEC.
- School should generate a minimum of Rs 60,000/ per year by introducing computer fees in school, which can be utilized *for* maintenance of system after warranty period of three years, up-gradation of systems if required in due course, engagement of additional computer teacher. Schools already benefited under this scheme other than government schools have utilized this concept, which has given employment to competent manpower having DCA, BCA and PGDCA degree.

Total No of Schools Covered under NEC Computer School Education Scheme

States	No. of Schools During year 1994-95 to 1999-2000	No. of Schools During year 2000-2001	No. of Schools During year 2001-2002	No. of Schools During year 2002-2003	Total
Assam	31	20	23	60	134
Arunachal Pradesh	27	–	13	16	56
Manipur	29	21	21	33	104
Meghalaya	31	18	27	20	96
Mizoram	30	19	15	22	96
Nagaland	29	10	12	20	72
Tripura	28	12	12	21	73
Total	**205**	**100**	**124**	**192**	**621**

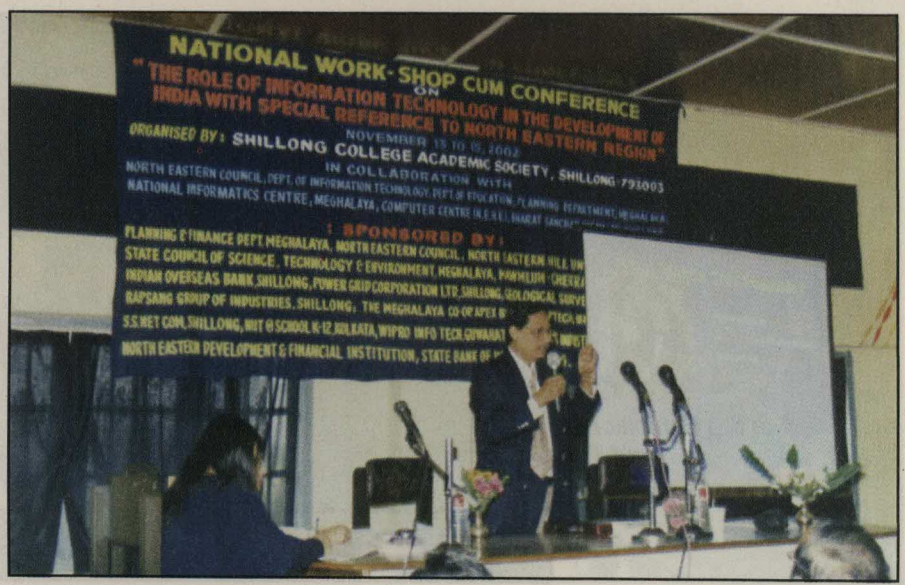
BENEFIT OF THE IT SCHOOL EDUCATION AND FUTURE PLAN

NEC has already covered 621 schools of NER. There is a plan to cover a minimum of 600 schools so that approximately 2.0 lakh students should pass out every year with computer as a subject at secondary and higher secondary levels. At present, more than 2.0 lakh students are enrolled in the schools covered under this programme which is expected to increase to 5.0 lakh at the end of the 10th FYP. There are three training centre established for training of computer teacher for six months duration' in the premises of the St. Anthony's College, Shillong, IIE, Guwahati, and CEDTI, Imphal. Few more centres are expected to be established for this purpose.

CONCLUSION

This programme has become self sustaning in the manner that schools selected under this programme are generating resources by introducing computer fees which are being utilized for recruitment of new computer teacher and maintenance of the IT infrastructure including the up gradation of the system. This resource varies from Rs 1.0 lakhs to Rs 4.5 laks which depends upon the strength of the school and its location. With the conservative estimate, this scheme has generated more than 1000 employment as a computer teacher in the region.

His Excellency, Shri M. M. Jacob, Governor of Meghalaya visiting the Exhibition on I.T.

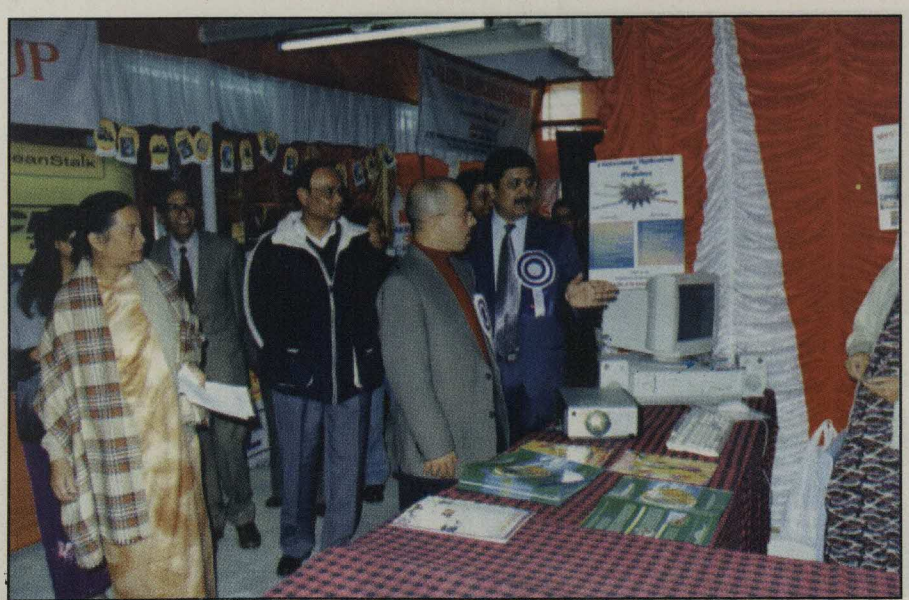


Dr. Subir Roy, S.I.O., National Informatics Centre, W. Bengal, delivering the Chairmans' Remark during the Technical Session

A view of the Technical Session (II)

A view of the Exhibition on I.T.

A view of the Exhibition on I.T.



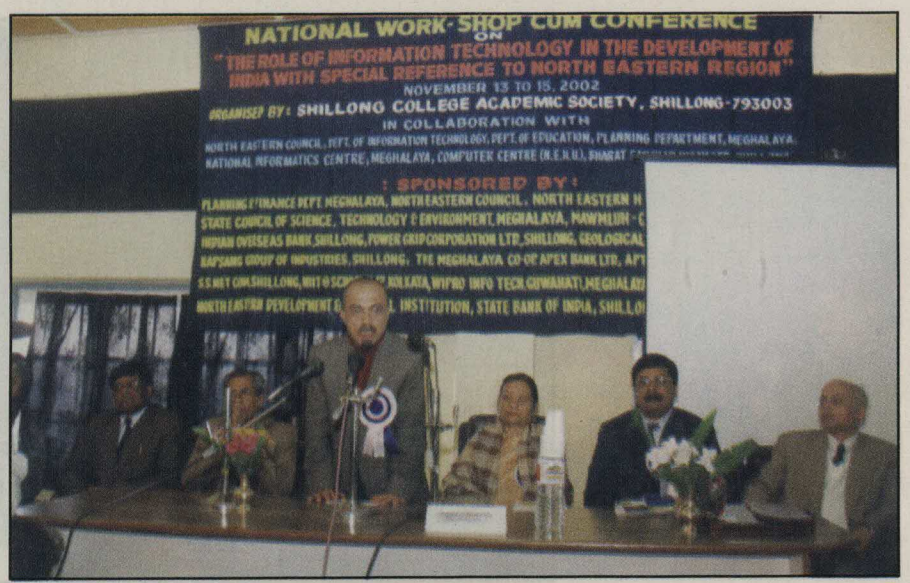
Shri R. G. Lyngdoh, Minister for Urban Afairs etc., Meghalaya visiting the Exhibition on I.T.

Shri R. G. Lyngdoh, Minister for Urban Affairs, Meghalaya and Shri P. K. Das, Director, S.T.P.I. Guwahati, visiting the Exhibition on I.T.

A view of the Exhibition on I.T.

A view of the August gathering during the Valedictory Session

Shri P. K. Das, Director, Software Technology Parks of India, Guwahati, delivering the Valedictory Address



Chief Guest, Shri R. G. Lyngdoh, Minister for Urban Affairs etc., Meghalaya Addressing in the Valedictory Session

Shri P. J. Bazeley, IAS, Chairman, Recommendation Committee, is presiding over the Meeting

TECHNICAL SESSION – II

APPLICATION & IMPORTANCE OF I.T. (I)

INVITED LECTURE
ON
ERNET INDIA – LINKING INSTITUTIONS OF N.E. REGION

Shri ASHOK SINGH SAIRAM
INDIAN INSTITUTION OF TECHNOLOGY, GUWAHATI – 781001

INTRODUCTION

New technology and fast access to information has radically transformed the concept of education Learning and dissemination of information has become the order of the day. In order to better equip the education and research community to face these new challenges, the then Department of Electronics had initiated a project "ERNET-Education Research Network" with funding from the Government of India and UNDP. The objective was to progressively set up a nation wide network and to provide relevant informatin to the researchers and educationist of the country. The project was implemented with the participation of five IITs (at that time there were only five), NCST, IISc Banglaroe and DoE.

ERNET India was registered in 1998 and it took over the activities of the ERNET project. It was started in collaboration with the major academic and research institutes of the country with an initial funding from the Ministry of IT (MIT). Focus of ERNET India is not limited to just providing Internet connectivity, but to meet the entire needs of the educational and research institutions by hosting and providing relevant information to their users. Research and Development and Training are also integral parts of ERNET activities.

ERNET INFRASTRUCTURE

The infrastructure of ERNET India includes satellite hub in C-Band and Ku-Band, the largest nationwide terrestrial network connecting metro cities and point of presence (PoP) located at the premiere educational and research institutions. International 'connectivity is achieved through multiple gateways leased from VSNL, STPI and Thaicom. Today ERNET India provides judicious mix of terrestrial and VSAT (very small aperture terminal) based Satellite network that spans almost the entire country.

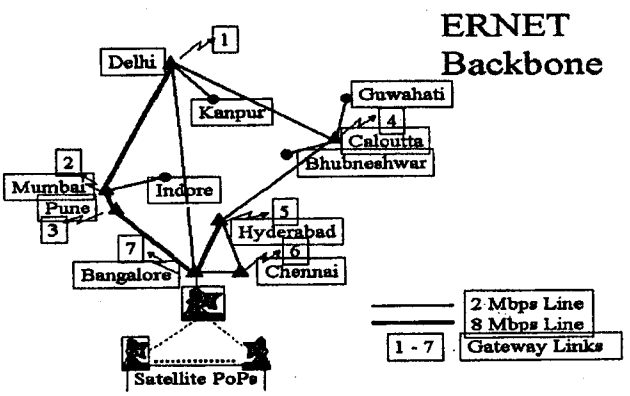


Fig. 1: ERNET Backbone

VSATs

The satellite WAN, using VSAT technology facilitates reliable and quick access from remote areas. A VSAT system consists of a satellite transponder, central hub or a master earth station, and remote VSAT terminals. The VSAT terminal has the capability to receive as well as transmit signals via the satellite to other VSATs in the network. Depending upon the access technology , used the signals are either sent via satellite to a central hub, which is also a monitoring centre, or the signals are sent directly to VSATs with the hub being used for monitoring and control. ERNET uses the former with its central

hub located at Bangalore and operates in a two-way star architecture using C-Band transponder on INSAT-3C satellite.

At the user end the VSAT terminal consists of a small satellite disc antenna (hence the name small aperture) with a transceiver and an indoor unit (IDU) that is used to interface to the users local network. The size of the antenna varies from 1.8 metres to 3.8 metres.

A VSAT TERMINAL CONNECTING TO A CENTRAL HUB

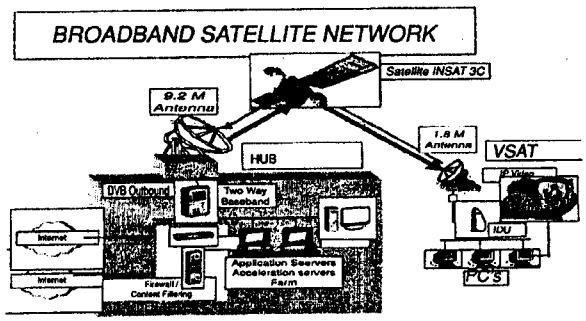


Figure – 2

VSATs are recommended for organizations where distance to ERNET backbone is large or remote inaccessible areas where leased lines are not practical. Thus VSATs are a lucrative option for institutions of the North Eastern Region. VSATs can provide high speed of 64 Kbps to 2 Mbps. An interesting feature of broadband satellite network is that it can allow maximum speed for burst connection though the sustained data rate will be what the user has paid for. For example a user may have subscribed for 64 Kbps but the speed may go up to 2Mbps for short data burst though the average date rate will remain at 64 kpps. VSAT are also relatively inexpensive to purchase and install. ERNET already has a large number of VSAT installations in the North Eastern Region (Fig. 3).

VSAT SCPC NETWORK OF ERNET IN NORTH EASTERN REGION

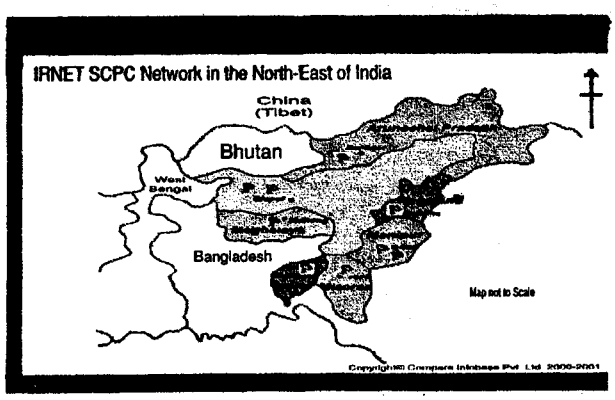


Figure – 3

The ERNET broadband VSAT network uses both time division multiplexing (TDM) and frequency division multiplexing (FDM) to access the satellite resources. SCPC (Single Channel Per Carrier) is a variant of FDM. In this a single satellite carrier is used for carrying a single channel of user traffic. In a SCPC network each VSAT is allotted a pre-assigned frequency for connecting to the central hub. This permanently assigned frequency channel provides dedicated bandwidth, through which you can send data, voice or video.

SCHEMES

The Union Ministry of Information Technology (MIT) is currently supporting a number of schemes/ projects/ centres for development of IT sector in the North Eastern Region, one among them is ERNET connectivity to all the N.E. institutions. Under the North East Promotion Programme, ERNET in consultation with the North East Council also planned to set up high, speed links in universities of the NE region. In order to provide one time grant for setting up the necessary infrastructure ERNET has taken up a number of new initiatives. The various schemes along with their salient features are:

a. **MoU with AICTE**

- Provide connectivity to AICTE recognized colleges and Regional Centres
- AICTE provides one time funding of Rs 3.00 Lakh
- Installation in progress for 14 institutions

b. **MoU with UGC**

- MOU signed on 4th April 2002
- 170 Universities to be connected in the beginning
- UGC to provide full funding through the Universities
- Expansion to affiliated colleges in the next phase
- Provide scaleable Network Architecture
  - Integrated Campus LANs
- Provide terrestrial / VSAT based connectivity
- Setup dedicated data center
- Provide multimedia capabilities for video conferencing and distance learning

c. **Gyan Vahini**

- Provide Intranet and Internet for Institutions of Higher Learning
- Phase I: Universities, Engg. And Medical Colleges (Total 565 Institutions)
- Phase II: Polytechnics, Degree Colleges and Dental Colleges (Total 11837 Institutions)
- Total bandwidth requirement estimated to over 10 Gbps
- Requirement of funds about 911 crores. The funds will be provided by
  - Ministries of CIT, HRD and Health
  - International Funding Agencies
- Implementation Period – 3 Years
- The services that will be provided also include video conferencing, digital library, distance learning, on-line learning and databases
- The scheme will be Implemented by ERNET, DOT, ISPs, MCIT, MHRD, Health and State Governments

d. **Vidya Vahini**

- Technological layover the existing CLASS scheme
- Provide Intranet and Internet for Schools
- Phase I: IT infrastructure for 60,000 Govt. Schools
- Phase II: Gradually cover all other Schools
- Basic Model:
  - LAN with 10 nodes and two servers
  - Color TV with PC
  - 64/128 Kbps Internet Connectivity

- Pilot Project with 140 Schools
  - the pilot project covers 7 Districts
- Lucknow, Allahabad, Hazaribad, Chittoor, Gandi Nagar, 24th South Parganas, Parli Vaijnath
  - One time Funding of Rs 15 Cr from DIT
  - Recurring cost from State Govts and Schools
- Setup a Teacher's Training Lab
- Implementation by ERNET, State Governments and MHRD

CONNECTIVITY OPTIONS

Though VSAT connectivity is one of the most feasible and economical solution for users of the NE region, ERNET also has a range of other connectivity options. The various connectivity options available under ERNET along with their salient features are as follows –

- **Dial-up UUCP (Unix to Unix Copy)**

  This is the most basic service and can be used for e-mail and news group services. This type of service is no longer used and if at all used it can be used for small user sites.

  Requirements: Telephone connection, modem, a PC running Windows / Unix.

- **Dial-up IP**

  Using this connection the whole range of IP service starting from e-mail to Internet is available. This is the most common connectivity used in homes and small offices. This connection is usually slow and though it may suffice the need of a single user, the link is too slow to be .of use in educational institutions. It can be used as a stop gap arrangement before a leased line / VSAT / radio link becomes operational.

  Requirements: Telephone connection, modem, a PC running Windows / Unix.

- **Leased Line**

  A leased line is a dedicated connection between two points set up by a telecommunications common carrier. Like dial-up IP the whole range of IP services is accessible using this connection. In the previous two options a connection must be setup before the actual data flow can take place but this step is not required in the case of leased lines.

  Requirements: A leased line between the site and the nearest ERNET backbone, a pair of high performance modems for analog lines, or a CSU/DSU pair for digital lines, a router to provide access to LANs interconnected at user site.

- **VSAT**

  VSAT can also provide the whole range of IP services. VSATs have already been explained in detail in the preceding sections.

- **Radio Link**

  A radio path like a microwave connection between two points is called a radio link. By radio we mean transmission/emission of signals by modulation and radiation of electromagnetic waves. This is recommended for large sites where high level of reliability is required and distance to the ERNET backbone is well within the line-of-site.

  Requirements: Radio modems, router, System running Windows/Unix with TCP/IP.

ROLE OF COMMUNICATION IN THE DEVELOPMENT OF INFORMATION TECHNOLOGY WITH SPECIAL REFERENCE TO NORTH EASTERN REGION OF INDIA

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ABSTRACT

The fast development and growth in the fields of Telecommunication during the later part of the last century together with the invention, rapid development and growth of digital computers has revolutionized the world and have made great in roads in our every day life, activities and thinking, The whole globe has now become a virtual small village where any person from any remote part of the world can communicate and exchange information with any other person(s) even at the other remotest part of it. The technique and flow of this huge and ever increasing volume of information through the various complicated communication networks is generally termed as Information Technology and the very fast development and growth in this field especially the internet, e-mail, e-education, e-governance, tele medicine, internet telephony, mobile telephone, etc., together with multimedia and many other new technologies has created an information explosion. This paper briefly mentions the role of communications in the development and growth of information Technology in our country with special reference to our North Eastern States.

INTRODUCTION

It is an accepted fact that availability of good and efficient Telecommunication system and networks is a basic infrastructure for the development and growth of Information Technology. In the modern world, Telecom Networks become part of a global network providing access to anyone for transporting information in the form of voice, data or video to anywhere in the world. The later part of the last century has opened up the flood gates of transition of the society from the agro-based and industrial society to the information society. This is possible due to the rapid growth of Information Technology and the fantastic development of communication network and technology, which together is known as Information and Communication Technology (ICT)). The growth of ICT boost the integration and penetration of computation, communications and multimedia technologies amongst the masses, which in turn transforms the day to day lives, activities and thinking of the people. While various steps are being taken to promote the growth of the IT industry especially in the developing countries like India it is equally essential that these developments do not create a division, which is generally known as 'digital divide' in the society between those who have access to IT based services and those who do not. It is therefore necessary to see that the benefits of ICT do not remain confined to the higher classes of society only but has to be used as an instrument to provide new opportunities to all segments of the society to improve the quality of life for all. Towards this end the role of the various communication networks and technologies, which only a few important ones are mentioned and very briefly described in the succeeding paragraphs, can be made use as effective tools to address age-old problems in the field of education, distance learning, health care, banking, business, employment, rural development, poverty alleviations, etc. .etc., and become the major facilitator for information transparency, good governance, empowerment and participative management.

TELEPHONE NETWORK

A Telephone Network called PSTN (Public Switch Telephone Network) is a Network of Telephone Exchanges to which individual telephones are connected through separate individual lines called Local Loop using underground cable pair. Telephone calls are switched and connected over specific lines or channel for voice communication. Modem Telephone Exchanges, mostly of digital types, are inter connected via Trunk Automatic Exchanges (TAX) by means of a sufficient number of long distance voice channels using various types of transmission systems and media such as Microwaves, UHF (Ultra High Frequency), Satellites and Optical Fibre Cable (OFC). In case of a long distance STD or ISD Telephone call, a specific dedicated channel is allotted and the user has to pay for the duration of the time he engages that channel. It is something like a car has been allotted a dedicated lane on the high way so that it does not face any obstruction but for a large part of the time the lane will remain free. In the case of a Telephone call also, during conversation there is enough time in between where no information is passed and the channel remain free during these moments. Over the years, especially in the last few decades, the Switching and Transmission portions of the PSTN have been modernized with state of the art

technologies and the Local Loop with the traditional copper pairs, which is the weakest link, is being replaced with new technologies such as Wireless in Local Loop(WLL) and many other types of Digital Subscribers Lines(XDSL) which will eliminate the problems presently face by Users of PSTN.

MOBILE TELECOM SERVICE

Mobile Telecom Service (MTS) means Phones on the move. It allows people on the move to communicate from anywhere at any time to anybody at any place. A mobile phone call from any mobile station (mobile phone) to any other mobile station or fixed telephone station (normal telephone) can be set up with the help of radio channels through a network of Mobile Switching Centres (MSCs), Base Station Controllers (BSCs) and Base Trans Receiver Station (BTSs). MTS can also have interfaces with the Public Switch Telephone Network (PSTN), Public Switch Packet Digital Network (PSPDN), Integrated Service Digital Network (ISDN), and Remote Area Business Message Network (RABMN). At present, all around the world, various cellular mobile systems are working such as GSM, DCS, PDC, CDMA & DAMPS. Every country can have its own air interface standards at different frequency spectrum. This means that international roaming may not be supported due to incompatible handsets between different regions with differing air interface. This difficulty was overcome for the third generation (3G) mobile system by means of a single unified standard which allows seamless services across different networks and technologies under the common umbrella of the ITU's (International Telecommunication Union) IMT-2000 which includes both terrestrial and satellite applications in 2 GHz frequency band.

With the help of a mobile phone anybody at any place can communicate at any time while a WAP (Wireless Application Protocol) enabled cellular phones can access the WEB and surf the Net. In fact a mobile phone will combine the features of a telephone, a computer, a television, a newspaper, a library and a personal diary. The handheld shall be able to meet the needs of Information, Communications and Entertainment (ICE).

INTERNET

In simple term, Internet is a network of networks of computers. The computers at a location could in themselves can form a smaller network of their own such as Local or Wide Area Network (LAN or WAN) and in turn be connected to the Internet through Servers and Routers and in that sense, it is said to be a network of networks of computers. Many Internet Users have the Impression that Internet is a part of the Public Switch Telephone Network (PSTN) because they avail or access the Internet through their telephone lines using Dial-up method. In fact PSTN and Internet platform are two different networks. As mentioned earlier, PSTN is a network of Telephone Exchanges to which individual Telephone are connected while Internet is a network of networks of Computers. In fact, it is possible to access Internet Nodes directly through leased lines without using PSTN. The different computers in different networks communicate with each other using different protocols, a sort of language in which computers communicate with each other, something similar to different people of different countries communicating with their own countrymen in the language of their own country .However when they have to communicate with persons of different countries they have to use a language which is known to both of them, say English or French, etc. Similarly, if a computer in a network has to communicate with the computer of a different network via the Internet both these computers must use a common protocol such as TCP / IP which means Transmission Control Protocol and Internet Protocol respectively.

Internet is really a wonderful and a very powerful tool that has great potential to revolutionised our lives. The technology like WAP (Wireless Application Protocol) which allows access to Internet, e-mail through mobile phones would give a fillip in spreading the Internet. It is now in such a great demand with a huge growth potential especially in developing countries like ours. It could change the way we communicate especially through Voice Over Internet Protocol (VOIP), the way we study and spread the education through distance learning the way we do business through e-commerce and e-business, the way we entertain, conduct discussions and meetings through Video Conferencing and many other web-enabled facilities. The cost of communication can also be brought down. For achieving this, use of Internet has to be encouraged and a number of measures need to be taken. First and foremost, the access cost for Internet has to be brought down within the reach of common mass and legal frame work

has to be instituted to suit the electronic society. Another factor which restricts penetration of Internet amongst the masses is the language of the contents on the Internet. Different group of people at different geographical areas on this globe use different languages. For mass penetration of Internet amongst all groups of proper the contents on the Internet must be made available in all Worlds' major languages. The world will attain the Internet age only when every person on this planet can get access to Internet at affordable rate and in the language understood by the individual.

VOICE OVER INTERNET PROTOCOL (VOIP)

Traditionally all Telephone calls (local, trunk, STD or ISD) are switched and connected through telephone exchanges and telecom transmission network (PSTN). With the advent of the Internet and multimedia PCs, Telephone calls can also be made through computers over the Internet Protocol platform and this is known as Voice Over Internet Protocol (VOIP). In this method the speech or voice information is converted and arranged in digital packets form and transmitted over the IP networks to their destination in packages. This type of telephone calls is very cheap compared to the traditional trunk calls or STD/ ISD calls. Earlier VOIP was not permitted in India but very recently the Government has withdrawn the restriction and permits the use of VOIP and Internet Telephony. The ITU (International Telecommunication Union) and the IETF (Internet Engineering Task Force) have set certain standards for provision of infrastructure and mode of operation of VOIP. With the withdrawal of restriction and growing number of Call Centers and Internet Dhabas all over the country, including our North Eastern States, it is certain that the volume of voice and data traffic over IP networks will increase sharply in the near future.

INTEGRATED SERVICE DIGITAL NETWORK

Integrated Service Digital Network, in short ISDN, is a powerful network which provides cost effective end to end digital connectivity to support different services like voice, data and video transmission over the same telephone line through the Telephone Network. ISDN uses special signaling and transmission protocols and the line is digital line up to the customer premises. ISDN supports a variety of applications and services such as video conferencing, videotext, telefax, etc., and many kinds of electronics equipments can be connect to a single ISDN line, hence the nomenclature as Integrated Service Digital Network. There are two types of ISDN connections, namely, Basic Rate Access ISDN with two B channels of 64 Kbps for speech or data and one D channel for signaling or data, and Primary Rate Access(PRA) ISDN with 30 B channels of 64 Kbps for speech and data and one B channel of 64 Kbps for signaling. ISDN line can be used for high speed Internet connection.

INTELLIGENT NETWORK ARCHITECTURE

Over the last 30 years, one of the major changes in the implementation of PSTN has been the migration from analogue to digital switches. Coupled with this change has been the growth of intelligence in the switching nodes. For cost effective and risk free introduction of new features into the network, special purpose computer system are installed at certain locations to perform the special tasks to enable Users to avail the following types of services –

- Free Phone Service.
- Virtual Card Calling.
- Virtual Private Network.
- Universal Access Number.
- Televoting.
- Change In Number.

EMERGING TRENDS IN PERSONAL COMMUNICATIONS

Recognizing the technological progress and the benefit that Global Mobile Personal Communication Systems (GMPCS) through Satellites can offer to the society at large, especially in the areas where terrestrial infrastructures are limited or non-existence, particularly in the least developed or developing countries, the ITU encourages cooperation of member countries and private operators for setting up PCS

(Personal Communication Service) using Catellites and Satellite Phones. The number of Satellites placed in the different orbits should be such that the whole surface area of the earth are covered at all times. A number of Companies such as Motorola Iridium (already started functioning since October 1998), Inmarsat, Loral's Global Star and TRW's Odyssey have taken up their projects.

Another PCS project called IMPCS (Indian Mobile Personal Communication System) meant for India, using GSM based Cellular Network meant for the country have been taken up by the BSNL. In this project the India is divided into 4 Zones. The Network roll out for 4 million lines planned in two phases. In the 1st phase 15 lakhs lines will be commissioned followed by another 25 lakhs lines in the 2nd phase.

CONCLUSION

The development and growth of Information and Communication Technology (ICT) transforms the whole Globe into a virtual small village where all sections of the society become just like one big knowledgeable information family. It provides a platform for interaction and Integration of various ethnic groups in the society. ICT also enhances economic growth and development of the country and of all its citizen. It is now up to each one of us to avail, make use and spread among the masses the benefit that we can get from the Information & Communication Technology.

APPLICATION OF DATA MINING IN CONTENT-BASED INDEX GENERATION

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ABSTRACT

Current indexing practice for images relies largely on text descriptions or classification codes, supported in some cases by text retrieval packages designed or adapted specially to handle images. User satisfaction with such systems appears to a vary considerably. The increasing availability of digital images has created the need for *Content-Based Image Retrieval (CBIR) system.*

This paper intends to discuss an efficient content-based index generation by utilizing appropriate *data mining technique.* Here an image is recursively decomposed into a spatial arrangement of distinct features to preserve the spatial information of image objects. This scheme is independent of image size, translation and rotation and is essentially domain independent.

Clustering algorithms are attractive for the task of class identification in spatial database. However, the application to large spatial database raises the following requirements for clustering algorithms: minimal requirements of domain knowledge to determine the input parameters, discovery of clusters with arbitrary shape and good efficiency on large databases. This paper uses the clustering algorithm DBSCAN that relies on a density-based notion of clusters. The key idea of a density-based cluster is that for each object of a cluster, the neighborhood of a given radius has to contain at least a minimum number of data objects. DBSCAN discovers all clusters (i.e. objects of interest) and detects the noise objects from the entire sample database. Once all the clusters are computed, next, the features (more specifically its spatial properties, shapes, colour features etc.) of each cluster are extracted individually.

Then each object of interest is represented as anode, in a dual graph. The main significance of this graph dual is that it remains invariant under any kind of transformations. All of these features are then represented as a collection of data that is small, for efficiency, but rich enough to reproduce the essential information. We summarize the feature distributions by a small collection of weighted points in feature point where the number of points adapts to capture the complexity of the distributions. Then we store this feature point information as an index in a variant of R-Tree, which allows efficient searching of that image.

INTRODUCTION

The digital revolution has made digitized information easy to capture and fairly inexpensive to store [1,2]. With the development of computer hardware and software and rapid computerization of business, huge amount of data have been collected and stored in database. The rate at which such data is stored, is growing at a phenomenal rate. As a result, *traditional ad hoc* mixtures of statistical techniques and data management tools are no longer adequate for analyzing this vast collection of data.

In case of image database, raw data is rarely of direct benefit. Its true value is predicated on the ability to extract information useful for determining decision support or exploration, and understanding the phenomenon governing the data source. In most domains, data analysis was traditionally a manual process. However, such an approach rapidly breaks down as the size of data grows and the number of dimensions increases. When the scale of data manipulation, exploration and inferencing goes beyond human capacities, people look to computing technologies for automating the process.

The ability to manage large image databases has been a topic of growing research over the past several years. Imagery is being generated and maintained for a large variety of applications including Remote Sensing, Art Galleries, Architectural and Engineering Design, Geographic Information Systems, Weather Forecasting, Medical Diagnostics, and Law Enforcement. Content-based image retrieval (CBIR) represents a promising and cutting edge Technoloy that is being developed to address these needs. Unlike traditional database techniques, which retrieve Images based on exact matching of keywords, CBIR systems represent the information content of an image by visual features such as colour, texture, and shape and retrieve images based on similarity basis.

When discussing the indexing of images, one needs to distinguish between systems, which are geared to the formal description of the image and those concerned with subject indexing land retrieval. The former is comparable to the bibliographical description of a book. However, there is still no one standard in use for image description [3].

When indexing images, it may be necessary to determine which attributes provide useful groupings of images; which attributes provide information that is useful once the images are found; and which attributes may or even should be left to the searcher or researcher to identify .When it comes to

describe the content of images, respondents in our own survey seem to include a wide range of descriptors including title, period, genre, subject headings, classification and captions (although there was some variation by format). Virtually all maintain some description of the subject content of their images. The majority of our respondents maintain manual collections of images, so it is not surprising that they also maintain manual indexes.

The present report discusses a Content-Based Index generation technique using Data Mining Approach. Knowledge mining from image database can be viewed as a case of spatial data mining. Data mining in image database may be viewed as similar to Image Processing.

The system is composed of three basic components: Data Focusing, Feature Extraction, and Classification Learning. Like all other data focusing techniques, the first component increases the overall efficiency of the system by first identifying the portion of the image being analyzed that is most likely to contain a volcano. This is achieved by comparing the intensity of the central pixel of a region to the estimated mean background intensity of its neighborhood pixels. The second component system extracts interesting features from the data. Clustering algorithms are useful for the task of class identification in spatial databases. However, the well-known algorithms suffer from severe drawbacks when applied to large spatial database. In this, we present the clustering algorithm DBSCAN [4] for the detection of spatial features.

Once all the clusters are computed, cluster features (i.e. spatial location, shape, colour, histogram) of each cluster are extracted individually. We summarize the feature distribution for each of the cluster by a small collection of weighted points in feature tuple where the number of points adapts to capture the complexity of the distributions. Then we store this tuple information as an index in a tree structure [5], which allows searching of that image. It seems to offer better prospects of success, is the use of similarity clustering of images, allowing hierarchical access for retrieval and providing a way of browsing the database as a bonus.

OVERVIEW OF CONTENT-BASED IMAGE RETRIEVAL

The traditional indexing for image retrieval is text-based. Although text annotation is a practical technique, however, this task is labour intensive, language dependent, and vocabulary controlled and human subjective in nature. In some cases, it is rather difficult to characterize certain important real-world concepts, entities and attributes by means of text only. The shape of a single object and the various spatial constraints among multiple objects in an image are examples of such concepts.

The term Content-Based Image Retrieval has been widely used to describe the process of retrieving desired images from a large collection on the basis of features (such as colour, texture and shape) that can be automatically extracted from the images themselves. The features used for retrieval can be either primitive or semantic, but the extraction process must be predominantly automatic. Retrieval of images by manually assigned keywords is definitely not CBIR, as the term is generally understood -even if the keywords describe image content.

CBIR differs from classical information retrieval in that image database are essentially unstructured, since digitized images consist purely of arrays of pixel intensities, with no inherent meaning. One of the key issues with any kind of image processing is the need to extract useful information from the raw data (such as recognizing the presence of particular shapes or textures) before any kind of reasoning about the image's contents is possible.

CBIR draws many of its methods from the field of image processing and computer vision, and is regarded by some as a subset of that field. It differs from these fields principally through its emphasis on the retrieval of images with desired characteristics from a collection of. significant size. Image covers a much wider field, including image enhancement, compression, transmission, and interpretation. While there are gray areas (such as object recognition by feature analysis), the distinction between mainstream image analysis and CBIR is usually fairly clear-cut.

The ultimate goal of automatically computing efficient and effective descriptions, which symbolize various properties of images, recent research on image retrieval systems has been, directed towards the

development of content-based retrieval techniques for the management of visual information such as colour, texture, shape and spatial constraints. As colour plays an important role in image composition, there are many colour-indexing techniques. Although global colour histograms and moments have been proven to be very useful for image indexing, they do not take colour-based spatial information into account. Thus when the image collection becomes very large, many false bits frequently occur. In order to incorporate both colour and its spatial layout for image retrieval, the latest work attempts to characterize finer details of the colour distribution, so called Spatial Colour Indexing [6].

Practical applications of CBIR

A wide range of possible applications has been identified. Potentially fruitful areas include: Geographical Information and Remote Sensing Systems, the Military, Medical Diagnosis, Crime Prevention etc.

Geographical Information System (GIS) and Remote Sensing (RS)

Commercial GIS systems such as ArcInfo have provided the capacity to search spatially referenced data by location or attribute for many years. This is an extremely useful function, but whether it can be considered a form of CBIR is moot point.

The Military

Military applications of imaging technology are probably the best developed. Recognition of enemy aircraft from radar screens, identification of targets from satellite photographs, and provision of guidance systems for cruise missiles are known examples.

Medical Diagnosis

The increasing reliance of modem medicine on diagnostic techniques such as radiology etc. has resulted in an explosion in the number and importance of medical images now stored by most hospitals. While the prime requirement for medical imaging systems is to be able to display images relating to a named patient, there is increasing interest in the use of CBIR techniques to aid diagnosis by identifying similar past cases. Most development work in the in the PACS (picture archiving and communication systems) area is still directed towards providing basic functionality (ensuring that medical images can be successfully digitized, stored and transmitted over local area networks without loss of quality) and usability (providing user-centred interfaces and integrating image storage and retrieval with wider aspects of patient record management).

Crime Prevention

Law enforcement agencies typically maintain large archives of visual evidence, including past suspect's facial photographs, fingerprints, tyre treads and shoeprints. Whenever a serious crime is committed, they can compare evidence from the scene of the crime for its similarity to records in their archives. This is an example of identity rather than similarity matching, though since all such images vary naturally over time, the distinction is of little practical significance. Of course relevance is the distinction between systems designed for verifying the identity of a known individual (requiring matching against only a stored record), and those capable of searching an entire database to find the closest matching records.

DATA MINING

Data mining, extraction of the hidden predictive information from large databases, is a powerful new technology with great potential to analyze important information in the large dataset. Two important goals of data mining are Prediction and Description. Prediction involves, using some variables or fields in the database to predict unknown or future values of other variables of interest. Description focuses on fmding human interpretable patterns describing the data. In the context of knowledge discovery in the

database, the description tends to be more important than prediction this is in contrast to the pattern recognition & machine learning applications (such as speech recognition) where prediction is often the primary goal.

The more common model functions in current Data Mining Practice [7] include:

Classification – classifies a data item into one of several predefined categorical classes.

Regression – maps a data item to a real-valued prediction variable.

Clustering – maps a data item into one of several clusters, where clusters are natural groupings of data items based on similarity matrices or probability density models.

Rule Generation – extracts classification rules from the data.

Discovery Association Rules – describes association relationship among different attributes.

Summarization – provides a compact description for a subset of data.

Dependency Modeling – describes significant dependencies among variables.

Sequence Analysis – models sequential patterns, like time-series analysis. The goal is to model the states of the process generating the sequence or to extract and report deviation and trends over time.

Spatial Data Mining

Knowledge mining from image can be viewed as a case of Spatial Data Mining. Spatial data mining is the branch of data mining that deals with spatial location, or geo-reference data. The knowledge discovery tasks involving spatial data include fmding characteristics rules, discriminant rules, associations rules or deviation and evolution rules. A spatial characteristic rule is a general description of spatial data. A spatial discriminant rule is a general description of the features discriminating or contrasting a class of spatial data from other classe (es). Spatial association rules describe the association between objects, based on spatial neighbored relations. We can associate spatial attributes with spatial attributes, or spatial attributes with non-spatial attributes.

Clustering

Clustering is a method of grouping data into different groups, so that the data in each group share trends and patterns [8]. Clustering process can discover intentional structures in data and extract new knowledge from a database. Clustering analysis has been widely applied to in many areas such as medicine, chemistry, economic science, social studies, pattern recognition, image processing, spatial data analysis, and so on. For spatial data analysis, different types of spatial clustering algorithms are proposed. Clustering algorithms are attractive for the task of class identification in spa~ial databases. However, the application to large spatial database such as image database raises the following requirements for clustering algorithms: minimal requirements of domain knowledge to determine the input parameters, discovery of clusters with arbitrary shape and good efficiency on large databases. The well-known clustering algorithms offer no solution to the combination of these requirements.

In this paper, we discuss one robust clustering algorithm DBSCAN [4] that relies on a density based notion of cluster. This algorithm can be used for content-base index generation for image database.

DBSCAN (Density Based Spatial Clustering of Application of Noise)

The key idea of a density-based cluster is that for each object of a cluster, the neighborhood of a given radius has to contain at least a minimum number of data objects. In other words, the density of the neighborhood must exceed a threshold. The critical parameter here is the distance function for the data objects.

DBSCAN discovers all clusters and detects the noise objects from all the sample databases. The following concepts are introduced here in the context of DBSCAN.

∈– Neighborhood Of An Object

For a given non-negative value ∈, the ∈-neighborhood of an object O_i, denoted by

$N\epsilon(O_i)$ is defined by $N\epsilon(O_i)= \{Oi \in D | d(O_i, O_i) <= \epsilon\}$

Core Object

An object is said to be Core Object if $| N\epsilon(O_i) | >=$ Minpoints. A Core object is an object, which has a neighborhood of user-specified minimum density.

Directly-Density-Reachable

An object O_i is directly-density-reachable from an object O_i with respect to ∈ and Minpoints, if O_j is a core object and O_i is in its ∈-neighborhood.

1. $O_i \in N\epsilon(O_j)$
2. $| N\epsilon(O_j)| >=$ Minpoints. (In other words, O_j is a core object)

Density-Reachable

An object O_i is density-reachable from an object O_j with respect to ∈ and Minpoints in D if there is a chain of objects $O_1, O_2, O_3, ..$ on such that $O_1=O_j$, $O_n=O_i$, such that $O_e \in D$ and O_{e+1} is directly-density-reachable from O_e with respect to ∈ and Minpoints in D.

Density-Connected

An object O_i is density-connected to an object O_j with respect to ∈ and Minpoints in D if another object $O \in D$, such that both O_i and O_j are density-reachable from O, with respect to ∈ and Minpoints.

Cluster

A cluster C with respect to ∈ and Minpoints is a non-empty subset of D satisfying the following conditions:

For O_i, $O_j \in D$, if O_j is density-reachable from O_i with respect to ∈ and Minpoints, then $O_j \in C$.

For all O_i, $O_j \in C$, O_j is density connected to O_j with respect to ∈ and Minpoints.

Noise

C_1, C_2, C_3...Ck be the clusters of D with respect to ∈ and Minpoints. Then, we define the noise as the set of objects in D which do not belong to any cluster C_i as Noise = $\{O \in D | \forall\, I,\ O \notin C_{i+1}\}$

There are two different kinds of objects in a DBSCAN – core objects and noise objects. Non-core objects, in turn, are either border objects or noise objects. Two border objects are possibly density-reachable from a core object. A noise object is non-core object, which is not density-reachable from other core objects. DBSCAN's procedure for finding a cluster is based on the fact that a cluster is uniquely determined by any of its core objects. It can be seen that

1. Given an arbitrary object O_i for which the core object condition holds, the set $\{O \in D$: O is density-reachable from $O_i\}$ forms a complete cluster C and $O_i \in C$.
2. Given a cluster C and an arbitrary core object $O_i \in$ C, C inturn equals the set ofall objects, which are density-reachable from O_i in D.

The DBSCAN algorithm maintains the set of objects in three different categories. These are: classified, unclassified and noise. Each classified object has an associated cluster-id, indicating the cluster in which it is included. A noise object may also have an associated dummy cluster-id. For both classified and

noise objects, v-neighborhoods is already computed. The unclassified category of objects does not have any cluster-id and their neighborhoods are not computed. The algorithm converts an unclassified object or a noise object.

Algorithm: DBSCAN (D, ϵ, Minpoints)

Input: database of objects D

Do for all ϵD

If OϵD is unclassified

Call function expand_cluster (O,D,ϵ, Minpoints)

End do

Function expand_cluster (O,D,ϵ, Minpoints):

Get the ϵ-neighborhood of O as Nϵ(O)

If|Nϵ(O)|<Minpoints,

Mark O as noise

Return

Else

Select a new cluster-id and mark all possible objects of Nϵ(O) with this cluster-id and put them into candidate-objects.

Do While Candidate-Objects Is Not Empty

Select an object from candidate-objects as a current-object

Delete current-object from candidate-objects

Retrieve Nϵ(current-object)

If|Nϵ(current-object)|>= Minpoints

Select all of the objects in Nϵ(current-object) not yet classified

Or marked as noise, mark all of the objects with cluster-id; include the unclassified objects into candidate-objects

End do

Return

The average time complexity of DBSCAN is O (nlogn).

CONTENT-BASED IMAGE RETRIEVAL TECHNIQUE USING DATA MINING APPROACH

Image indexing refers to the preliminary organization of the image data that must be accomplished prior to image retrieval through the query process. The indexing process begins 1 by scanning all the available imagery in the database and building a table of image features, i where each row in the table corresponds to one image. Several features vectors are maintained for each image that describes independent characteristics of the scene. Once the table is generated, a process takes place that organizes the data into a tree structure that allows for rapid indexing of the imagery during the query process. Both the feature vector table and the indexing structure are maintained for use during the query process. As new images are added to the database, the feature vector table and the indexing structure must be updated accordingly.

The indexing generation scheme is designed upon the following fundamental concepts:

- Colour Histogram processing
- Euclidean shape features
- Computational geometry & Graph Theory

Colour Histogram Processing

A Histogram { h_i } is a mapping from a set of d-dimensional imager vectors I to the set of nonnegative real. These vectors typically bins (or their centers) in a fixed partitioning of the relevant region of the underlying feature space. The associated real are a measure of the mass of the distribution that falls into the corresponding bin. For instance, in a gray-level Histogram, d is equal to one, the set of possible gray values is split into N intervals, and { h_i } is the number of pixels in an image region (for which the Histogram is computed) that have a gray value in the interval indexed by I (a scalar in this case).

To construct the Histogram we can use a K-mean clustering algorithm [9] on colour distribution, resulting in clusters, which were used as the Histogram prototypes that show the proportion of the pixels of each colour within the image. Once the Histogram is computed for the image then it is stored in the database. The matching process then retrieves those images whose colour Histogram match those of the query most closely. The matching technique most commonly used is Histogram matching.

Euclidean Shape Features

For effective image retrieval, the indexing of suitably extracted features should capture the 1 all-possible relationship among the images being search for. This should be in such awaythat transformation of the objects does not affect the result. Shape is a fairly well defined concept and there is considerable evidence that their shape primarily recognizes natural objects. A number of features characteristics of the object shape (but independent of size or orientation) are computed for every object identified within each stored image. Queries are then answered by computing the same set of features for query image, and retrieving those stored images whose features closely match those of the query. Two main types of shape feature are commonly used- global features such as aspect ratio, circularity and momentum invariants [10] and local features such as sets of consecutive boundary segments [11].

Kyung-Ah Han et al proposed a method, which uses five features that had been introduced in the image processing literature. Since analysis of an image object shape can be affected significantly by a scale, translation, or rotation of the object, it is important to be able to describe the shapes consistently regardless of their position, sizes, and orientations. They use five-feature vectors for each image shape, which are quite independent of various transfonnations.

For each image data, the nonnalized image feature vector consists of five elements:

Form factor: To measure the surface area of irregular regions.

Bounding factor: This shows how well a region approximated by a rectangle.

Ellipticity: This measure calculates the degree of Ellipticity by using the major and minor lengths of the object and its area.

Eccentricity: This gives the measure of how elongated an object is.

Bending Energy: This is another attribute associated with the curvature and measure irregularity of the shape of the object.

Computational Geometry And Graph Theory

The spatial relationship of image objects can be represented by an image object. Then dual graph is constructed using image objects as the nodes and the edges are the lines joining the image objects. It

produces a Delaunay triangulation [12] of image objects. The angles of the triangle remain the same under unifonn translations, scalings and rotations [12].

The features extracted from this graph consist of number of nodes, number of triangles, number of faces and number of edges. The concatenation of all these features servers in more efficiently generating the index.

The whole index generation process can be divided into three major phases, as follows –

Phase I

This phase exploits a density based clustering for image segmentation. Here, the image is clustered using the algorithm DBSCAN [4] that relies on a density-ba ed notion of clusters. Each cluster is treated as an object of interest. In the successive phase, each of these objects of interest (i.e. cluster) is regarded as a node towards the construction of a dual graph. The main significance of this graph dual is that, it remains invariant under any kind of transaction (such as scaling, rotation, translation or composite).

This phase is also dedicated in the extraction of all the relevant features in the frame level, such as number of objects, number of colours and hue and saturation values of each object of interest.

Phase II

This phase deals with the property of extraction of the image in the object of interest level. It is further divided into following steps –

- The colour histogram based property extraction as well as spatial property of deriving for each image of object of interest.
- The shape feature extraction of each image object.
- Next phase considers these features and organizes it for the construction of the index.

Phase III

This phase is associated with the index generation of the image. The features are extracted in the frame level as well as the object level and represented as a tuple of features values of these. Thus the entire image is represented by a set of labeled feature points {p0, p1, p2.....pk} where p0 represents the frame level feature and p1, p2...pk are the features point representation of the k-object of interests in the image. The various feature types in the frame level as well as in object level are shown in Fig 1.

Index Construction

The index contracted for the image is the set of labeled feature points {p0, p1, p2...pk} where p0 represents of the frame level feature and p1, p2...pk are the feature point representation of the k-object of interests in the image. The value of p0 is the concatenation of all the features values extracted in the frame level. These way values of p1, p2...pk are the concatenation of all the feature values in object level for k-number of object of interests. The Fig 2. Shows the necessary bit representation for all these features values in frame level as well object of interest level.

We consider that an image may be anyone of eight categories viz., painting, drawing etc. and maximum of eight themes. The image may be either indoor or outdoor. The search over an image database is initiated in two levels i.e., image or frame level and object level In this case, searching consists of calculating the similarity between feature points from query and stored images, a process of numerical computations. Searching essentially co.nsists of category, theme, and number of colours and geometry accordingly in frame level. Ultimately, the matching of object-level similarly searches the image in the database.

Due to content rich, high dimensional feature data, image retrieval queries can be solved adequately using the traditional indexing techniques. It demands for sophisticated class of indexing algorithms, such as R-Tree, R*tree, R+ tree [2], etc.

THE FEATURE TYPES

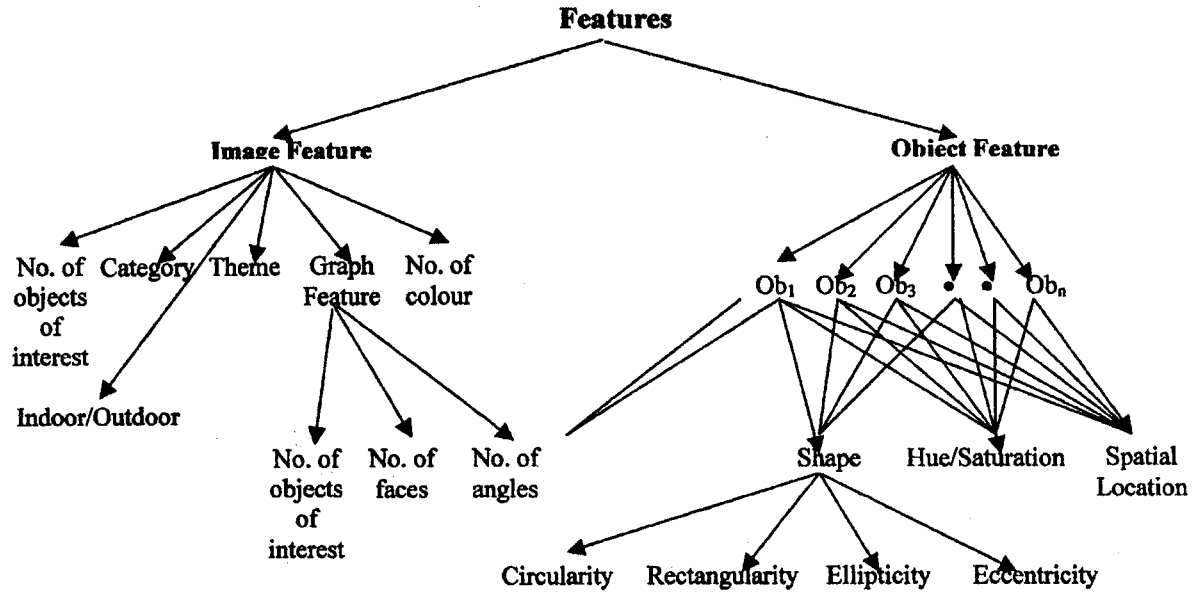

Figure – 1

BIT-REPRESENTATION FOR INDEX GENERATION

No. of Col.	No. of Obj. interest	Cate	Theme	Indr/ Outdr	Geometry			Sp. Loc.	Colour		Shape			
					Fac	Ang	Edg		Hue	Sat[a]	Cir	Rect	Ell	Ecc
8	3	3	3	1	6	6	6	4	3	3	3	3	3	3

Figure – 2

To index the dimensional subspace, it calls a variant of R-Tree [13]. During initiation, the module is invoked and it organizes the whole subspace once for a session. This module provides responses entirely based on the number of features provided qualitatively and quantitatively.

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INFORMATION TECHNOLOGY IN NORTH EAST

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ABSTRACT

Information technology is a revolution, which has touched each and everyone of our lives, directly or indirectly. In the past IT had created such a hype where one would see a new software company, medical transcription unit, e-commerce web site or even an ISP come up almost every day. The dot com era, as many call it, had created waves which finally saw the futures of a number of individuals changes in matter of days. Samir Bhatia, the founder of one of the most popular , and the first free web based mail, Hotmail, was given a staggering $ 400 millions (approx. Rs. 1600 crores) for it by Microsoft. Many individuals, like Samir Bhatia were lucky enough to take their share at the right time, as the party did not last for long.

Infrastructural problems is one of the main hurdles that is coming in the way of development of IT in the North East. Telecom infrastructure which is the backbone of IT services is being totally neglected. To have quality IT services, telecom backbone has to be solid, since it acts as the highway for the information that is being transmitted. Till the point strict measures are not taken to improve the quality of telecom infrastructure and services, IT industry will not be able to pickup in the region.

Human resource development has also taken the back seat in the North East, where high end technical institutions are limited and not up to mark like they are in other parts of the country. Initiative will have to taken by both the government and the private.

Another very important factor is regulations and policy decisions by the state and the central government, which will have to put more incentives and stress on the development of IT in the North East. Till date a number of states in the region still do not have an IT policy, where the government should lay down it goals, objectives, incentives and financial, in regards to IT development in the state.

INTRODUCTION

Information technology is a revolution, which has touched each and everyone of our lives, directly or indirectly. In the past IT had created such a hype where one would see a new software company, medical transcription unit, e-commerce web site or even an ISP come up almost every day. The dot era, as many call it, had created waves which finally saw the futures of a number of individuals changes in matter of days. In the middle of IT revolution, North East India, is lacking far behind, where it most probably does not even contribute 1% to the fast growing IT industry. Computer penetration and Internet usage is not even half of what the standard is in the rest of India. There are a number of hurdles and reasons for this state of affair of the IT industry in the North East India.

The sweet and rosy financials that were shown on the papers became hard to prove in real business. In the year 1999, Amazon.com, one of the first e-commerce sites, which was valued in the stock market in billions of dollars was running losses in millions and till date it has not shown any sign of profit.

Software companies which heavily rely on a few key sectors for major part for their income have also seen a significant decrease in growth. This has been a result of overall slow down of the global economy. In the recent past, bigger software companies have announced reduction in jobs and reduced their projection of profits.

So is the IT revolution really over? Has the bubble burst? And in all this mess where is North East India?

As the expression itself states, Information technology is a REVOLUTION. It has changed the way we manage and do things and the process is still going on. The bubble may have burst for the dot corn companies, but in a way it was necessary to bring about a certain stability in the industry and like any other industry, the rule of economics had to apply. India also saw its share of medical transcription units come up at a very aggressive rate, where these companies paid little attention to quality and mass production and a basic failure to understand the working of the industry which led to many of them shutting down within months of their start up.

Far from being over, the IT revolution has gone through a phase of stabilization, setting of standards and over all a 'clean up' of the industry as a whole, where only the best survived.

But with so much happening in the rest of the globe, the North East part of India has practically been oblivious to the entire revolution. Where the rest of India is trying to catch up with the rest of the world in terms of IT, North East is trying to catch up with India.

Through the course of the paper we will be going through the opportunities that exist in IT, why North East has lagged behind, what are the advantages that we have and what do we need to grasp those opportunities.

DISCUSSION

Information technology, which started of being seen as something for a specific sector or group of individuals is now becoming a part of every individuals day-to-day lives. Almost every sector, be in the government or private, have now realized the importance of IT and are taking initiative to computerize their systems of working. This has created immense opportunities for companies that provide different kinds of IT related services. Over 15% of India's exports currently are software, which are being provided to companies from allover the world. India has established itself well in the global software market, with companies like Infosys, TCS and Wipro being one of the top players in the world today. Apart from International market the domestic software market has also started picking up, and Indian Companies have started realizing that if they have to compete in the global economy they have to also computerize their operations. In 2001 the domestic software was close to 10,000 crores. Apart from software development, and other basic IT services, IT enabled services are contributing in large to the growing IT industry. IT enabled services range from Medical Transcription to Call Centers, to back Office support, where Information Technology is being used to provide customer care solutions. Due to the high availability of qualified human resource, speaking well-polished English, India is becoming a destination for global players in the IT enabled sector. In the year 2000, the market size was close to Rs. 4000 crore and grew a staggering 70% to cross over Rs. 7000 crores in the year 2001. This trend in the IT enabled sector is expected to continue for the next few years.

In the middle of this revolution, North East India, is lacking far behind, where it most probably does not even contribute 1% to the fast growing IT industry. Computer penetration and Internet usage is not even half of what the standard is in the rest of India. There are a number of hurdles and reasons for this state of affair of the IT Industry in the North East

Infrastructural Problems

It is one of the main hurdles that is coming in the way of development of IT in the North East. Telecom infrastructure which is the backbone of IT services is being totally neglected. To have quality IT services, telecom backbone has to be solid, since it acts as the highway for the information that is being transmitted. Till the point strict measures are not taken to improve the quality of telecom infrastructure and services, IT industry will not be able to pick up in the region. There is not a single Earth Station in the region which is the supplier of the main raw material for the IT industry , Bandwidth. The region has two HUB Earth Stations, but are not sufficient for the entire North 'East. Government regulations in the past have not allowed private bodies to set up Earth Stations in the region, due to defense reasons. But this restriction has in turn only contributed to the slow growth of the industry in the region. The IT software and service sector alone is employing over 500,000 individuals and if IT were to have developed in the region, the problem of unemployment would have been much lower today.

Human Resource Development

It has also taken the back seat in the North East, where high end technical institutions are limited and not up to mark like they are in other parts of the country. Initiative will have to taken by both the government and the private sector to set up institutions which will encourage research and high end technical studies. Though we have one Indian Institute of Technology, one Regional Engineering College

and few other engineering colleges but these are not adequate to fulfill the gap of demand and supply. Also the infrastructure in these colleges in terms of IT left much to be desired.

Regulations and Policy Decisions

Another very important factor is regulations and policy decisions by the state and the central government, which will have to put more incentives and stress on the development of IT in the North East. Till date a number of states in the region still do not have an IT policy, where the government should lay down it goals, objectives, incentives and financial assistance, in regards to IT development in the state. As without proper policy in place and entrepreneurs or corporate houses will not be attracted towards this region. Private Participation in e-Governance implementation is negligible due to various government policies.

CONCLUSION

To conclude, the IT industry, in the past few years has gone through a phase of stabilization or filtrations process, but is far from over. It's a revolution, which is changing the way we manage things, be it in the government, private sector or even our day-to-day lives. The industry is growing at a very fast rate, internationally and domestically and India has been a major player. But the North East part of India has failed to participate in this revolution till date due to Infrastructural, Regulatory and Human Resource problems. If things are to change and if this region is to share the IT pie, actions will have to be taken in all the above-mentioned areas, by both the government and the private sector.

INFORMATION TECHNOLOGY AS AN IMPORTANT SUPPLIMENTARY INPUT FOR EFFECTIVE SCIENCE EDUCATION IN INDIA

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ABSTRACT

A scientifically literate population is the most important work force for the social, economical, cultural and all-round development of the developing countries like India. Unlike Western countries, where education in science is afforded a high priority and where scientists and technologists are trained to contribute to national economies, the developing countries are lying far behind to make even primary education compulsory for each and every citizens of the nation. This is also true that the rapidly growing population of developing countries needs an alternate mode of education, since the number of educational institutions are not sufficient enough to provide them space, facilities and proper environment for an effective learning and teaching of science. All these factors lead the science educators to search for new methods in teaching and learning of science and several newer concepts have emerged as a result of their researches.

Few such concepts worth mentioning like "Active teaching and learning concept", "Collaborative learning", "Learning to learn", "Life long learning concept" and particularly the concept of distance education are emerging as a suitable alternative to the age old classroom based teaching of "Chalk and talk" method. All these alternative methodologies depend heavily on the use of Information Technology. Educational differences underlie different rates of penetration of Information and Communication Technologies and Internet usage. The science education reform task now becomes a matter of connecting instruction to the new information highway. To meet the education challenge means figuring out how to access, synthesize, codify and interpret science information into a working knowledge that can be used in personal and civic contexts – a lived curriculum.

The growth of communication and information technologies will be able to record and transmit information in digital form to make video, graphics, sound and text interchangeable and accessible almost anywhere at any time. Information storage, retrieval and manipulation and the speed of transmission are reducing in cost and increasing in sophistication.

In schools, learning will be transformed. Teachers need mastery of and access to infonnation technology to manage the learning of their students. Virtual classrooms and the ready access to student support will provide much wider learning options for the students.

It should also be noted that there is a risk involved in the misuse and abuse of all the technologies including Information Technology for which proper safe guard has to be worked out and implemented.

INTRODUCTION

Science Education and its role in the development of human resource, economies, social and cultural values and above all the human values perhaps is one of the most important issues of concern for all the countries all over the world.

The concern have some differences among the developed countries and developing countries along with its commonalties, which need to be studied and analyzed accordingly and separately. We need to think clearly, what are the challenges faced by India in terms of its educational requirement, existing problems and possible approaches to answer to those problems using information technology.

Challenge in Science Education with reference to India

Among the many different issues of educational aspects in general and Science Education in particular we can enlist a few important ones as follows –

- The constitutional provision of making education compulsory and free for all the citizens of India up to the age of 14, the reality is, even today half of our population are illiterate.
- The number of schools are far too less to provide primary education to every child.
- The existing infrastructures are poor, inadequate and primitive for quality education.
- The existing curricula in general and particularly in science are out dated, has little relevance to the interests and needs of the students at present and the whole process of teaching-learning is becoming a futile exercise to motivate, educate and produce students, as scientifically literate work force and human resource for the development of the country.

- As a result of the lack of interests and application of mind of the students, the teaching society is loosing the motivation in sincere teaching, resulting into a great danger to the whole teaching-learning process.

Possible Mechanism of Action

- Expanding distance education, open-learning and open-institution systems. In such mass education programme, to reach the remote areas, Radio, TV, mass media, computer etc. can play a very important role.
- Curricular reforms is another most important aspect particularly in developing countries like India. The structure and nature of science curricula in developing countries including India followed their colonial forebears. This resulted into highly deconextualised and theoretical curricula. The importance of indigenous approach, emphasizing the importance of cultural and traditional values and linking the education to face immediate problems of the society by using its own technology has lately been realised by the developing world.

Many of the developed countries have taken the curriculum reform task to provide the opportunity to obtain comprehensive, balanced and equitable education. The main focus is on the nature of sciences, science as inquiry, scientific applications and links to student's daily lives.

Even in India several education commissions were set up since 1951 for improving school education. In the recent 'National Curriculum Frame Work for School Education' (NCERT, 2000), one of the important curricular concern has featured as "Meeting the Challenge of Information and Communication Technology".

How Information Technology Can Bring Change In The Present Educational System?

The scope and prospect of information technology is enormous. It can bring a revolution in the existing educational system. The monopoly of the classroom based institutional teaching system will face tremendous challenge by the flow of information through Radio, Telecommunication, Television and Computer. The interested learner will have instant and easy access to the latest information and they can judge the quality of the classroom-based teaching, which has its own limitation mainly due to lack of infrastructure.

Consequently the relationship between the teacher and students will change. The teacher will no longer remain the gatekeeper of knowledge, rather will serve as a facilitator and partner of knowledge accessing and sharing. The ability of handling computers, information retrieval from internet will become compulsory for both teachers and students. School will be connected through network, which will bring homogeneity in the curriculum development. Flexibility to update the existing curriculum on regular basis will get high priority.

Computer will become an integral part of school system. Computer literacy will become compulsory. Computer aided learning, through courseware development will become a major challenge for the educators. Learning to learn concept and life-long learning attitude will become necessary for exploration of knowledge, logical approach of problem solving and developing decision-making capacity. Teaching learning will become participatory, decentralized and group based.

All these will bring a change in the assessment and evaluation system also. Logical interpretation and algorithmic strategies for problem solving will become more important for assessment and the traditional test system will be replaced by comprehensive student portfolios.

Development Of Courseware, An Important Aspect To Meet The Challenge

The concept to change the system of conventional teaching-learning process revolves round the fascinating machine-the computer. Computers have entered the Indian society and Indian schools in a big way particularly in the urban and semi urban areas. The next step to take up is to venture into rural areas. All these lead to the educators to develop programmes using the textbook knowledge and the computers to frame a new method of education–the Courseware.

Basically a courseware literally means software on course material. However it is much more than simply converting from textbook pages to software packages. It is conceptual, subtle and a matter of perception. It needs a depth of comprehension, imagination, creativity and understanding of a teacher.

The courseware development has two broad components –

- The "transformed' material to be rendered into program and
- The programming technique itself that takes care of characteristic features of different machines.

Group Of People needed For The Development Of An Effective Courseware

A group of people including teachers, curriculum developers, system analysts and courseware producers need to work in a concerted manner for developing an effective courseware. The basic aim is to instill scientific attitude into the minds of the students and to encourage their creativity. The excitement of exploring knowledge and the logical approach in problem solving immediately attracts students who play an active role in the learning system. The teachers with his comprehension, conviction, imagination, creativity and understanding can reach the mind of the students to frame an effective courseware.

It should be noted that many countries including developed and developing countries have started projects in developing courseware. Few are already available in the websites (e.g. SemNet). India should take up initiative in this field to provide an appropriate courseware for its own students as well as for others.

A word of education in using ICT in educational

All technologies have some good and bad sides. IT is no exception. Today the websites are flooded with pornographic sites, which are growing day by day. We should remember the age group of students, particularly the adolescent, teenagers are the most vulnerable group to be trapped by these sites. So, effective measures are needed to preempt the accessibility of such sites by the students. If that can be done, then only we can dream of a revolution in our educational system.

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UNIFIED LOAD DESPATCH & COMMUNICATION PROJECT FOR THE NORTH EASTERN REGION

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ABSTRACT

Monitoring of the Electrical Grid on the basis of real time data is essential for ensuring optimal system operation and for minimising system disturbances. The North Eastern Region Power System has little redundancy in Generation capacity as well as in transmission facilities which makes it vulnerable to system disturbances. Reliable & optimal operation of the system therefore calls for the establishment of modern computerised load despatch facilities.

The major benefits of the scheme would include substantial reduction in time for restoration of the grid in case of failures, improved control & monitoring of inter regional power exchanges, minimise occurrences of equipment damages arising out of abnormal running conditions and improving the quality of supply by way of better control of frequency & voltages.

Power Grid Corporation of India Ltd. is currently executing the "Unified Load Despatch & Communication Project for North Eastern Region " in close coordination with the constituent state electricity boards / departments of the region. The scheme encompasses a composite communication, load despatch and SCADA (Supervisory Control And Data Acquisition) system. Real time data from all major generating stations & substations of the region would be gathered and transmitted to the State Load. Despatch Centres and the Regional System & Coordination & Control Centre to provide real time information on system condition and equipment status for monitoring & controlling the system.

Communication system supporting speech and data transmission would be based on PLCC and wide band, high capacity Microwave and Fibre Optic equipment. Computer hardware and software would facilitate both real time and off line load flow studies, stability analysis and reliability studies to analyse and optimise the system operation.

Operational philosophy has been conceived of as a two tier hierarchical set-up viz. Regional System Coordination & Control Centre (RSCC) at hierarchy I and State Load Despatch Centres at hierarchy II At the Control Centres a distributed LAN based architecture has been adopted. With this approach, major subsystems are distributed to different processing units and all processing units are interconnected using a standard dual LAN. With this approach each processing can be replaced or upgraded without affecting the functionality of other subsystems residing on other CPUs. All application software also is transparent to the hardware so that hardware can be replaced or upgraded with a functionally similar device not necessarily manufactured by the original manufacturer.

INTRODUCTION

The North Eastern has an installed capacity of 1,675 MW and an average peak demand of around 1000 MW. This region has connectivity with eastern region and inter regional power exchanges also takes place. However, because of the low availability of the generation and relatively weak interconnections, the system is vulnerable to system disturbances and grid failures are fairly common.

The State Load Despatch Centres (SLDCs) coordinate the operation of the power system by appropriate generation & load management within the respective state and the Regional Load Despatch Centre (RLDC) located at Shillong coordinates between the SLDCs and the Central Sector Generation & transmission network. The SLDCs & RLDC are presently ill equipped to deal with the complexity of real time grid operation and suffer from poor communication facilities and a total absence of real time system data. Since the state of the system is not known to the operators appropriate action cannot be taken by them to ensure operation of the grid within operational limits in an optimal manner .

Past experiences shows that some of the grid disturbances, which caused not only revenue loss to the power sector but also considerable losses to all other sectors of economy as well, could have been averted if better load dispatch & communication facilities had existed both at the state & regional levels. Further, the North-Eastern Region has a power potential of 30,000 to 40,000 MW which, if harnessed, can meet the growing demand of power for the rest of the country. As the power system grows it becomes more complex, proper system control would assume an even greater importance. Establishment of the proper facilities for real time grid operation is therefore an operational necessity.

Power Grid Corporation of India has taken up the creation of such facilities to enable the system operators to handle the complex decision-making process. The benefits from this scheme the "System

Coordination & Control Project for North Eastern Region" would be substantial, although these may not be directly quantifiable in economic terms. The scheme will lead to fewer system collapses, faster restoration of the system following grid disturbances, better frequency & voltage control, less equipment damage due to abnormal conditions and a more dependable power supply, relieving consumers of the cost of outages, standby facilities etc. It will also enable realization of better operational efficiency in day-to-day operation and improved monitoring and control of inter-regional power exchanges, including delivery of shares from central sector generating stations to the beneficiary systems.

PROJECT OVERVIEW

Under the scheme, a composite load despatch and communication system will be implemented where real time data from all the major generating stations and substations of the region will be gathered and transmitted to the State Load Despatch Centers (SLDCs) and the Regional System Coordination and Control Centre (RSCC) to provide, real-time indications of system conditions and equipment status for system monitoring and control Advanced application software will permit both real time & off line load flow, stability, economic dispatch and reliability studies for optimization of power system operation.

The communication system which will support voice and data transmission will be based on a well-knit backbone network comprising a combination of wide band high capacity digital microwave and optical fiber systems supported by Power Line Carrier Communication (PLCC).

OPERATIONAL REQUIREMENTS

The Coordination & Control System is required to meet the requirements for both operational planning and real time coordination & control of the power system. To attain these objectives, appropriate system functionality will be implemented at various levels of the control hierarchy both for operation planning activities and real time monitoring and control.

The operation planning activities involve –

- Planning for the most economic and reliable operation of the system.
- Load forecasting & generation scheduling.
- Collection of data regarding weather forecast which serves as an input for load forecasting.
- Ensuring equitable distribution of central sector shares to the beneficiaries. Scheduling the interstate & inter regional exchanges.
- Updating maintenance schedules for generators, transformers and transmission lines.
- Computation of spinning reserve requirements and its allocation.
- Analysis of system performance under disturbances and devising remedial actions to minimise their effects.
- Collection of system operational statistics.
- Computing of tariffs for inter system exchanges based on predetermined , guidelines.

Real time monitoring & control activities involve –

- Data acquisition and monitoring of system parameters.
- Control of frequency, voltage, generation and tie line flows, load management & Var management schemes.
- State estimation and contingency analysis.
- Operating procedures under emergency conditions e.g. load shedding and islanding.

CONTROL STRUCTURE

There will be a hierarchical control structure with the Regional System Control Centre (RSCC) located at Shillong at Level I and the State Load Despatch Centres (SLDCs) of Assam, Meghalaya and Tripura at Level II. Arunachal Pradesh, Manipur, Nagaland and Mizoram will be provided with Remote Consoles with system monitoring facilities which can be upgraded to full fledged Control Centres as and when the system grows (Fig. – 1).

SYSTEM HARDWARE ARCHITECTURE

The system uses a hardware & software distributed open architecture. The total processing power of the system is distributed among various computers and servers that communicate with each other through a real time and dedicated Dual Local Area Network. The distributed architecture adopted has the benefit that the various servers require less processing power than in a centralized architecture which helps in optimizing the hardware configuration, thus minimizing cost. A high level of redundancy can also be achieved by providing back-up servers for critical functions. 'Openness' also enables software & hardware upgradation since each processor can be replaced or upgraded without affecting the functionality of other subsystems residing on other CPUs. All application software also is transparent to the hardware so that hardware can be replaced or upgraded with a functionally similar device not necessarily manufactured by the original manufacturer. Use of standardized hardware and communication protocols allows an easier approach to expansion and maintenance.

The Energy Management software complies to the following non-proprietary standards –

- IEC 870.5.101 Communication protocol with field RTUs
- IEC 870.6 Inter Centre Commuication Protocol (ICCP)
- POSIX Operating System
- X Windows User Interface
- SNMP Network Management

The functional requirement of the system will be realized with the Supervisory Control & Data Acquisition (SCADA) system and the Energy Management System.

SCADA system

The SCADA function involves collection & transmission of data from the power stations and substations to the SLDCs & RSCC. The data tele-metered at each station are:

- Status of switching devices.
- Power flows on lines and feeders.
- Voltage & frequency of the grid.
- Protection tripping.
- Faults & alarms of the system.

The data collection & transmission function is performed by Remote Terminal Units (RTUs) at the remote stations which are connected through a dedicated communication network to the SCADA Communication Front End (CFE) at the Control Centres. The CFE includes serial channel controller cards for polling the RTUs. It also provides an accurate time signal to the RTUs derived from a GPS clock for synchronisation required for time tagging of data transmitted by the RTU. The SCADA server in the control center controls the SCADA function and maintains the required SCADA database (Fig. – 2)

Energy Management System

The Distributed Hardware Configuration at the control centers include the following subsystems (Fig. – 3):

- The SCADA / EMS Server supports the SCADA, real time dispatching and power I system analysis functions. The SCADA / EMS servers operate in a primary-standby relationship for redundancy purposes with the software being active only on the application server assigned the primary role.
- Communication between the Control Centres utilize ICCP (Inter Control Centre Protocol) as per IEC 870-6. The ICCP Servers support intersite exchange between the RSCC & SLDCs. These servers operate in a primary-standby redundancy.
- The Historical Information Servers are used to perform Information Storage & Retreival functions. These operates in a primary-standby redundancy.
- The Development Server and its associated development consoles provide software utilities used to develop & maintain the SCADA / EMS software, displays and databases.
- The Operator Consoles handle the man-machine interface for system control & supervision operations.
- The network management console provides the configuration management, fault management and performance monitoring capabilities.
- The WAN routers allow connections to the other Control centers and Remote consoles located in SEB headquarters using 4 lines of 64Kbps in a load sharing basis between control centres. The routers are connected to the ICCP servers via the LAN with dual Ethernet interfaces.

The Energy Management Software is a modular, layered, distributed set of software .comprising the operating system layer, real time control system environment layer and the application layer (Fig. – 4).

The operating system layer utilizes the Open VMS operating system for all servers and includes language compilers, linkers, GUI support and communication protocols like DECnet and TCP / IP.

The Real Time Control System Environment layer contains the real time database management system (HABITAT product), configuration management and user interface tools, communication software & utility libraries.

The Application Layer contains the functions that implement the EMS. The major subsystems are SCADA, Generation & Network.

- The SCADA subsystem gathers real time data from the RTU located in the field sites and enables operators to control field devices from their consoles.
- The Generation subsystem functions are related to the control of energy production with the objectives of satisfying the demand and transaction commitments and minimizing the cost of generation.
- The Network Subsystem models the equipment in the electrical transmission system The functions which reside in the network real time subsystem uses the model to compute bus voltages & component flows and include components like state esimator, network topology processing and contingency analysis.

Other applications required for operational planning are also provide. These include the Study Subsystem for security & contingency analysis, economic dispatch etc.; Operation Scheduling Subsystem for load forecasting, generation and interchange scheduling; Historical Information Management Subsystem for sampling data form the real time database and storage using a relational database (ORACLE). Communication System.

The dedicated communication system being set up under the scheme comprises a trunk system consisting of digital microwave radio and fiber optic communication links with tributary PLCC links. The communication system will link together the RSCC, the seven SLDCs and 63 nos of the substations and generating stations of the Region (Fig. – 5). The system will provide –

- Speech connections between all the RTU sites from the RSCC and respective SLDCs and between RSCC & SLDCs.
- Data connections to all RTUs from the RSCC and respective SLDCs.
- Telecontrol where needed.

- Data connections between computers at RSCC with those of SLDCs.
- Grid status on call at the Remote Consoles at Itanagar, Imphal, Aizawl and Dimapur.

The Optical fiber links will be implemented mainly with OPGW (**O**ptical **P**ower line **G**round **W**ire) cable which will provide a rugged and reliable system A total of 964km of OPGW will be retrofitted on existing power transmission lines replacing the existing "ground wire which will serve the dual purpose of communication and for shielding the, transmission line from lightning strokes. The installation process on the power transmission lines will not cause any disruption in power supply, as this is being done on live lines without taking any shutdown. The OPGW is provided with 12 optical fibres of which 4 fibres will be utilized under this scheme. The balance fibres will be utilized to provide commercial services under POWERGRIDs telecom diversification program.

Digital Microwave links are being provided mainly in the system of ASEB which together with the fibre optic links will form the wideband backbone of the network.

Power Line Carrier Communication (PLCC) has been the traditional communication medium used in Power system networks. This system which utilizes the power lines as the transmission medium is both economical & reliable. However, having a limited bandwidth it is being used only as tributaries to the wideband Fibre Optic & Microwave trunks.

The Fibre Optic links will utilise SDH (Synchronous Digital Hierarchy) multiplexing structure operating at STM-1 level which provide an aggregate transmission rate of 155 MB/s (equivalent of 2349 voice channels). The Digital Microwave network provides a transmission rate of 8 MB/s (equivalent to 120 voice channels). Primary multiplexers will be provided at all wideband locations to enable drop/insert of the required data & speech channels. A centralized network management system will be provided at the RSCC for management of the communication network.

CONCLUSION

The project is now (Nov 2002) at an advanced stage of implementation and will be operational in phases starting with the system for Meghalaya and Tripura in November / December and will be completed by mid 2003. With this system in place an essential tool will be available for optimal operation of the North Eastern Regional Grid to enable improvement of the Quality of Power Supply to the region.

HIERARCHICAL CONTROL STRUCTURE FOR THE SC & C PROJECT

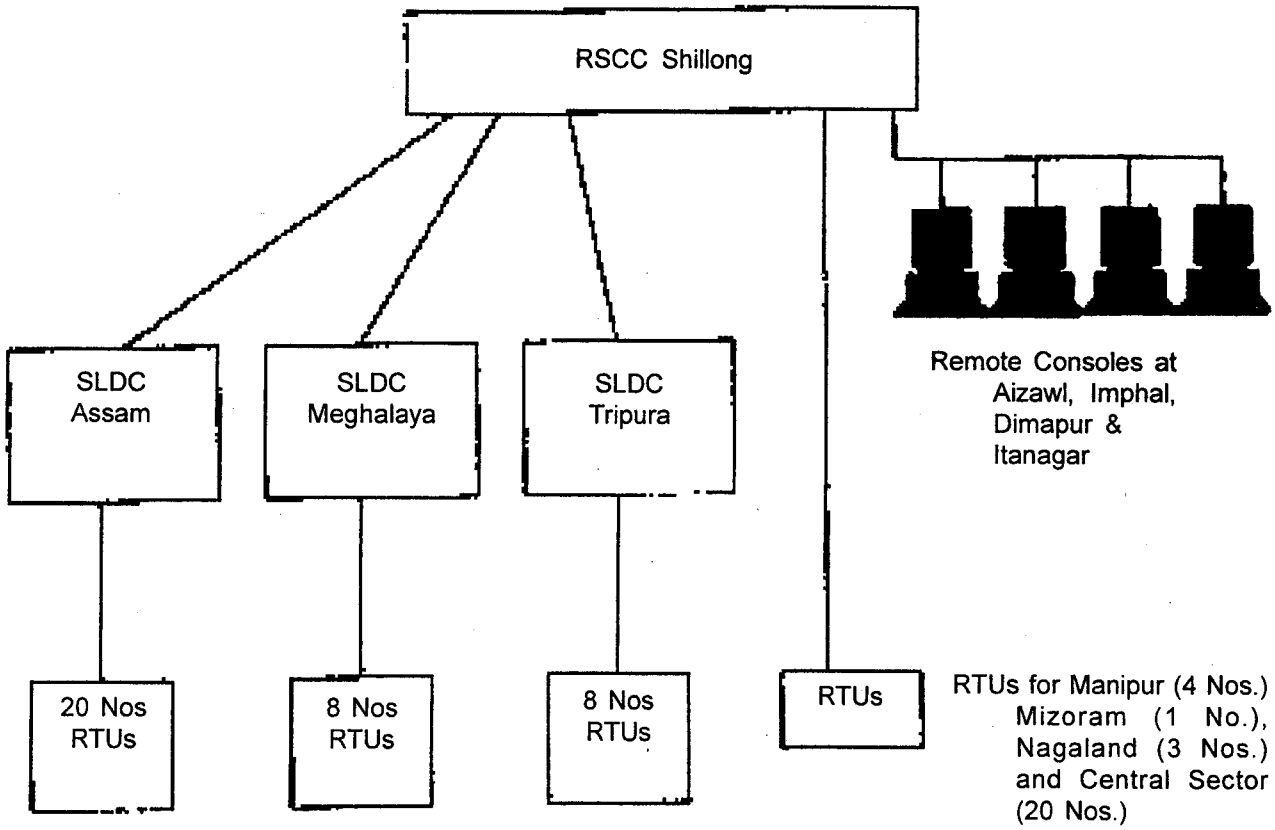

Figure – 1

DATA ACQUITIN (TYPICAL SCADA SYSTEM)

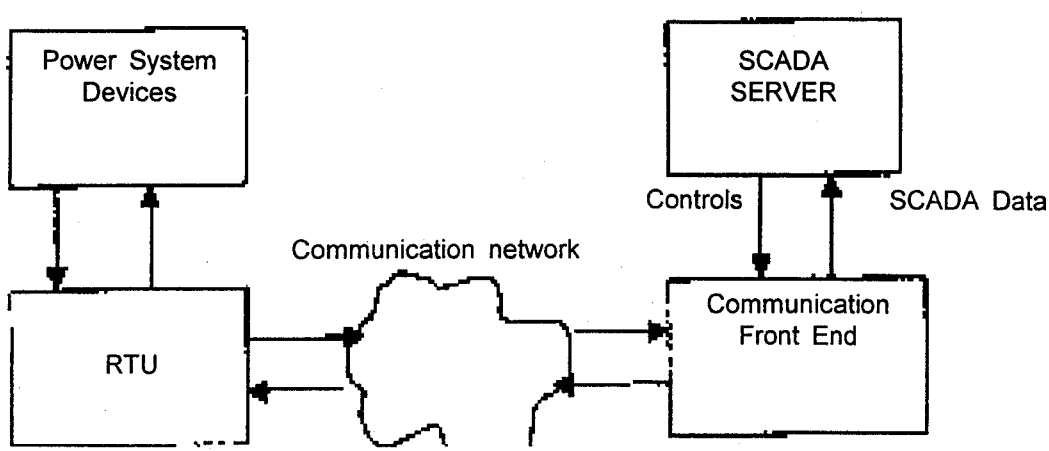

Figure – 2

HARDWARE CONFIGURATION FOR RSCC

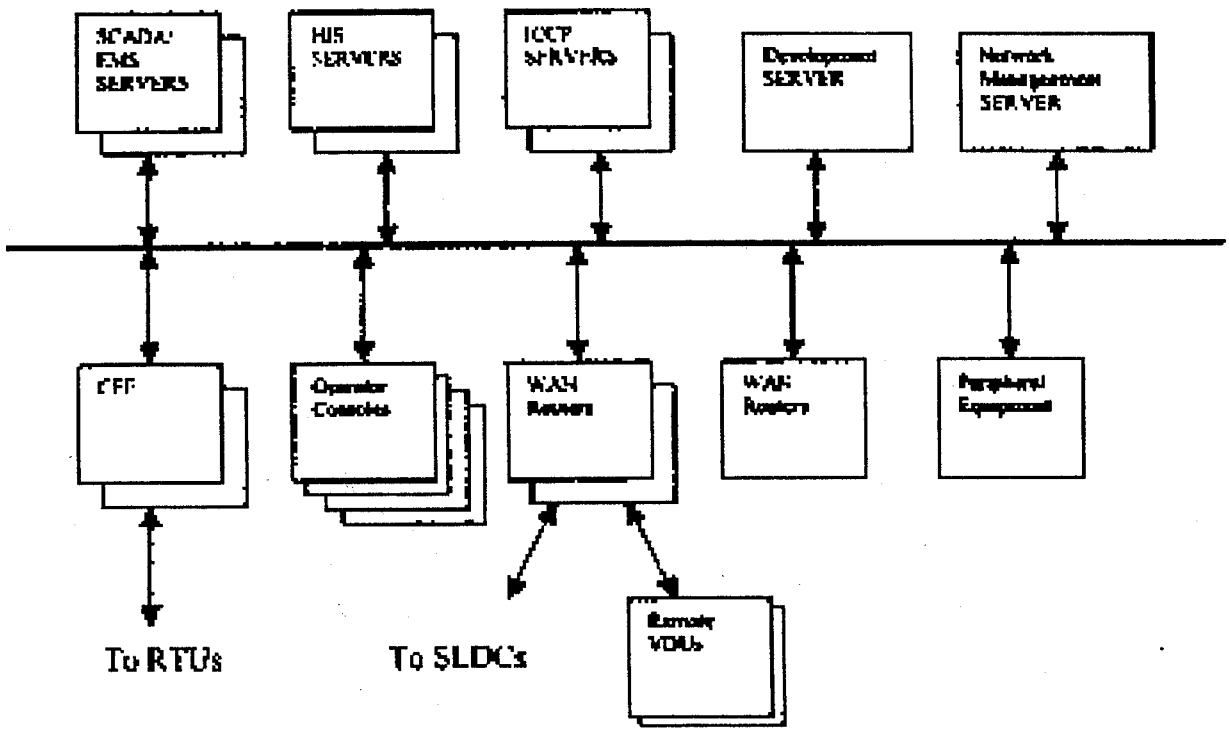

Figure – 3

SOFTWARE SYSTEM LAYERING

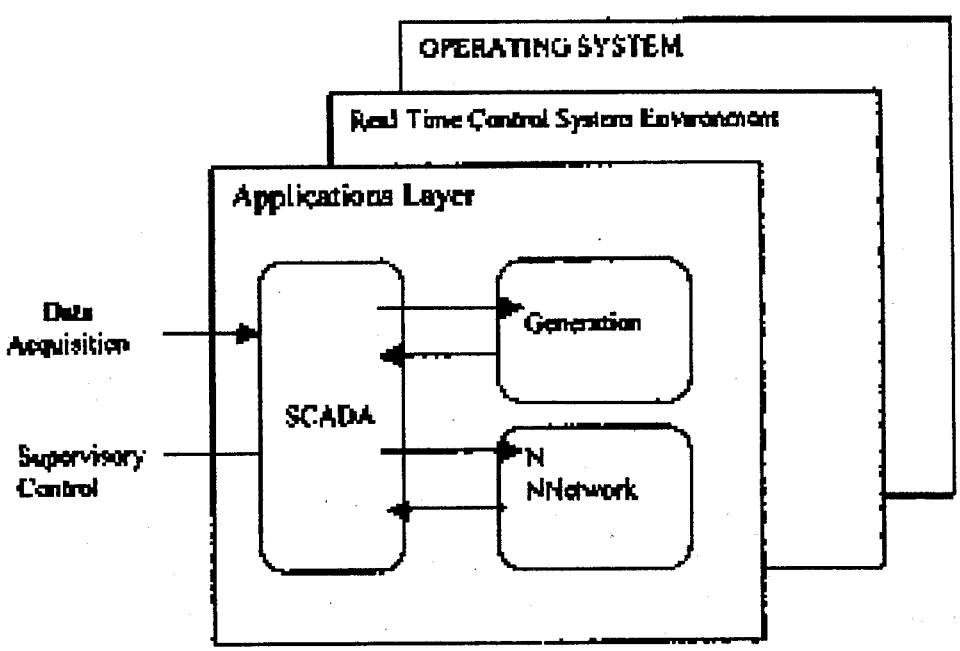

Figure – 4

SC&C NETWORK NORTH EASTERN REGION

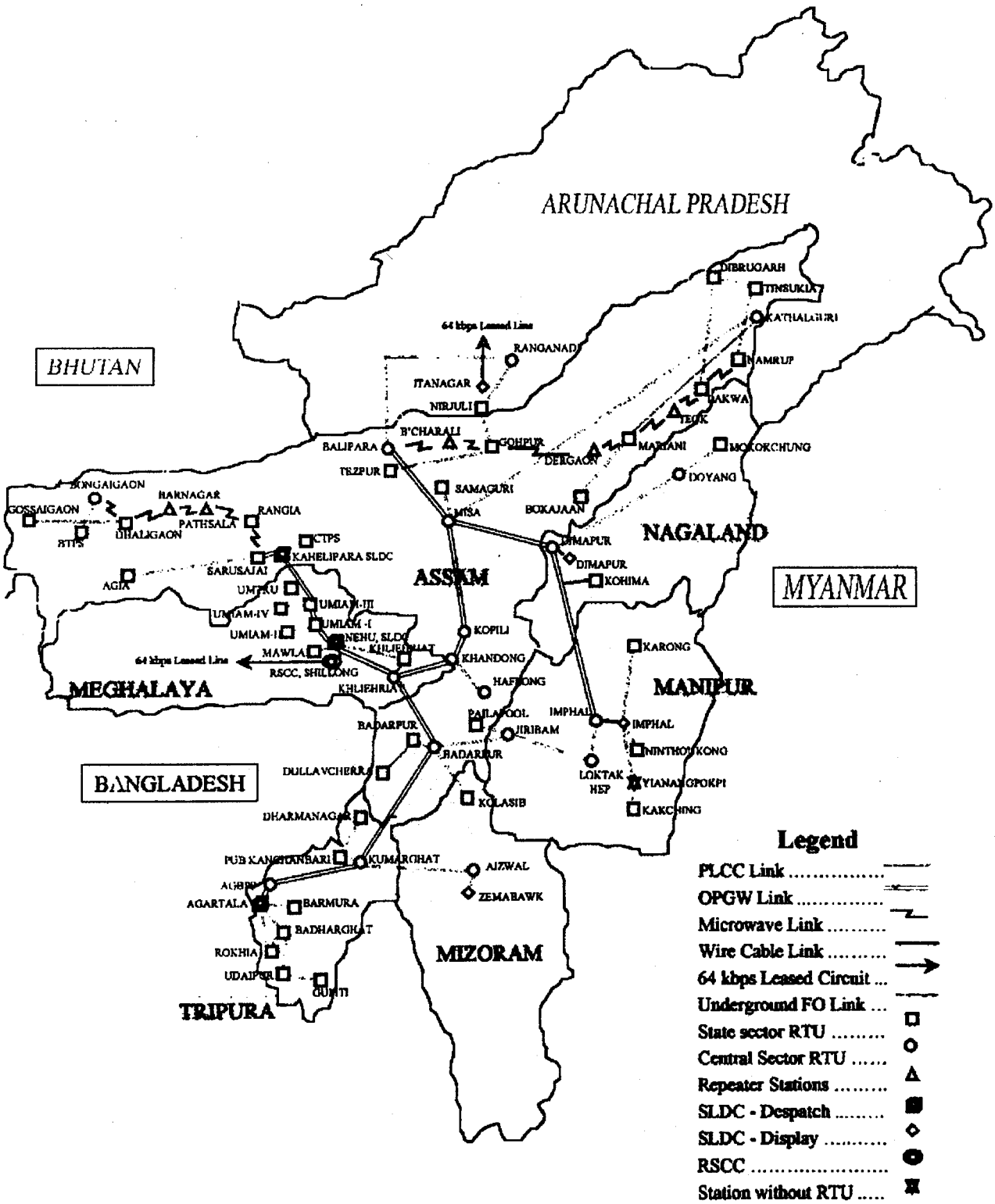

Figure – 5

INFORMATION TECHNOLOGY, THE LIBERATOR OF UNDERDEVELOPMENT IN MEGHALAYA

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ABSTRACT

It has been thirty years since the inception of the State that one realizes that Under-development is instead, posing a great or even greater challenge to Development in the State of Meghalaya. The root causes of Under-development in the State are varied in nature. It is outside the scope of this paper to deal with all the causes; as such reference is made to the causes. which are technical in nature directly or indirectly responsible for Under-development in the State. Based on the statement and analysis of such causes, Information Technology based solutions are presented with a view to catalyze the process qf development in its strive to overcome Under-development in the State.

INTRODUCTION

The present State of Meghalaya, formerly a cluster of districts in the State of Assam has a glorious past to be proud of Shillong, its capital was once known as the Scotland of the East also known for its highest quality of ethics and civic sense and also known for quality education in the North Eastern Region. The State Government and even the Central Government has, year after year, devised and implemented development programmes with a view to root out Under-development being manifested in the form of illiteracy, poverty, mal-nutrition, ill health, unemployment, low productivity, poor sanitation, depreciating work culture and so on. The implementing arms of the Government through the Government Departments / Directorates etc. have sincerely been taking necessary steps towards the development of the State but often end up in poor results and performance. With the passage of time, the Government is taking even more rigorous steps to overcome Under-development but only land up into a more difficult situation. Collectively, one would conclude that there is practically no relative increase in development in the State since its inception. As a result and most often, there is a common tendency to put blame on a particular category of people / community without realizing the complexity of the situation. It is the complexity of the situation that is going to be stated, analyzed and discussed in this paper before IT related solutions capable of enhancing the process of development are broadly presented.

To understand the complexity of Under-development, a starting point of reference will have to be set. This point of reference need not be the standard of reference but an acceptable state of reference through which successive states can be scaled and measured. The starting point of reference taken for discussion is the situation of United Khasi & Jaintia Hills District (with a special focus on Shillong its headquarter), now a set of districts in the State of Meghalaya, just after the Independence. One can perhaps imagine how spacious roads were, how good sanitation was, how well maintained were the Government and Mission Hospitals, how ethical the people were that spitting on the road was just unimaginable, how efficient and diligent the public servants were and so on. This was the era in which the human population was just a tiny fraction of today's human population in the State of Meghalaya. With the passage of time, the human population has increased and is demanding more and more resources from the mother earth *(mei ramew)* etc. At any juncture of time, when the resources generated are insufficient to the needs of the human population, the state of Under-development is always taking over. As a result, Under-development and Development are not only relative in nature but are also ongoing processes or states. One should also keep in mind that human needs, both necessity and luxury, do keep on changing with the state of Development or Under- development, not necessarily in volume but in types as well. Such a situation is complex that it is impossible to have a reliable long-term plan for development. It is therefore a challenge posed to the political leaders, the statesmen, the bureaucrats, the technocrats, the academicians and it is also a challenge to a common man.

Taking into consideration the current state/point of reference where the scenario seems so different from that in the initial point of reference, it is noticed and observed that the current human population is becoming the multiple of the human population in the initial point of reference. It is also observed that science and technology was not a primary essence at that juncture of time as it has been now. Man is now becoming more and more dependable on the Science and Technology implements. The style of living at this juncture is no longer a simple and a low profile one where resource requirement and

demand are now comparatively much higher and more of a variety. This is the juncture where one would speak of untapped resources, that were once considered as of no value at all. We are living in a generation where sustainable development is of great concern, perhaps the right key for this generation's and future generations' development. Today's generation sees the need for high end productivity such as the synthesis and use of high yielding variety crops and food to cater to the emerging needs of the growing population but also sees the adverse side effects of genetically modified foods for human consumption. Today's roads in the city of Shillong are becoming relatively less spacious than the same roads of same dimensions in the past because of increasing number of vehicles plying to and fro. Houses are also on the increase with depreciating level in sanitation. To many, education seems to be the culprit for the increasing migration of people from rural areas to urban areas due to attractive jobs in the service sector in the urban areas. In the process, many have been blessed but many are jobless and unemployed and the rural scene is pitiable.

As we compare these two junctures of time i.e. the starting point of reference and the current point of reference we see that even though resources are being multiplied, on the increase and more of a variety in the later, yet due to insufficient resources to meet the emerging needs of the growing human population, the current point of reference has the property and features of Under-development. The complexity of this current state of affair can be analyzed by exploring the perspective and possible causes contributing to this state of Under-development.

DISCUSSION

To start with, let us view the situation from the perspective of growing population. It is noticed that when population grows in an under-developed set up/environment, high percentage of the population simply use up much of the resources of the mother earth without contributing in anyway to resource generation. It is often and rightly concluded that resources are therefore endangered with non-productive growing population while resources are enriched with productive growing population. As Under-development has to do with availability of resources for human needs, one of the major causes of under. Development is non-productive growing population. To achieve productive growing population is a great challenge. Strategies and policies will have to be formulated so as to effectively plan, implement and monitor the productivity of the growing population i.e. the human activities. Human activities are varied in nature and to keep track of each and every activity one would have to devise systems to capture data related to these activities. Such systems are very complex in nature that it is impossible through traditional and manual methods to operate them.

Let us now take the perspective of untapped resources. There is a vast amount of untapped resources with the mother earth. No matter how productive the growing population is, the untapped resources would independently remain unutilized unless ! explored. The factors governing usage of untapped resources include primarily human intelligence. Man throughout the ages, learned to tap the energy sources from cattle, wind, water, wood, coal and so on and not long ago also learned to tap energy resources from other minerals such as uranium, from the sun's radiation, from the ocean waves and may soon learn to tap energy from thunder and lightning and so on. There are also innumerable examples of untapped resources such as ocean water for drinking; and for cultivation purposes, which are yet to be explored. The potential for hydroelectric power generation based on the altitude of a place, the reliable source of water and the feasibility of setting up dams etc. would have to be scientifically determined. To make such determinations, it would require one to really understand the topographic set up of the geographic location. Each and every point on the surface of the geographic location would have to be mapped and this makes the task almost beyond reach using the traditional and manual methods. Such determinations are also applicable to most of other untapped resources.

There is another viewpoint, which is the perspective of development with respect to implementation of Government's development schemes and programmes. The Government has from year to year been pumping so much financial resources for implementation of schemes in the State with the objective of getting rid of under. Development. In the process, there are innumerable types of problems encountered in the implementation of such development programmes. There is practically no traditional or manual methods and means, which can effectively monitor such problems being encountered/caused in the field and especially in most of the rural and remote places. This inability to establish monitoring systems in the field led the development programmes astray. It is a gossip saying there is a common tendency that

a development programme exists in paper only which may be true. Perhaps this is the most important view point of under-development in the State for Government's development programmes can really play a significant role in the development of the State. All the processes of formulation, planning, implementation, monitoring and evaluation of development programmes should begin from the field. Though the top-down approach is also important, yet things should begin with bottom-up approach. The State Government needs to acquire accurate data and information directly from the field instantaneously and accurately at any juncture of time. Using such data and information, development programmes can be effectively planned, implemented, monitored and evaluated. It is beyond the reach of the traditional and manual methods to develop systems capable of capturing such highly reliable data and information.

Let us take a narrower perspective but worth considering, which is the perspective of efficient usage of resources. Tapped resources though available in surplus at this juncture, yet they may not do so in the near future because of the way we wastefully use them. For example, it is a common tendency that almost everybody wishes to have an owned vehicle, though the basic need does not actually compel to do so. It is a common tendency for people to live luxuriously but people living in developed countries do not necessarily live a luxurious life. There is presently no system to effectively monitor the wastage of resources. Though attempts also being made to recycle most of the wasted items such as plastic bags, waste papers etc. yet most wasted items and valuable resources go to the drain. The need to monitor and control the usage of resources is becoming more and more prominent as the resources are being used up. Starting from the market place where each and every item is required to be identified, the quantity of wasted materials such as packaging materials etc. can be assessed. Based on data and information retrieved from such scientific systems, the Government would be in a position to effectively introduce regulations on production and usage of certain products and items.

Let us take another perspective whose observations are not directly responsible for under-development but yet a significant one. This is the social and moral value perspective. Greediness, lust, selfishness, jealousy are one of the social and moral characteristics which have the indirect impact on the under-development. A society with good social, religious and moral values is always struggling with such undesirable characteristics. In a society where wastage is a social taboo, one would observe that the resources are efficiently utilized. If one thinks that such a society does not exist anymore, perhaps it is high time to introduce a new type of society, which has a great concern for the future availability and sustainability of resources. There is an urgent need to build a global society and to get rid of the localized societies for the need of the hour is to have common social and moral characteristics, which will support for efficient usage of resources. A global society was unthinkable in the pre-Internet era, so was the Global Village.

Next is the perspective of topological disadvantage of a place. In the state of Meghalaya, the most important drawback is the non-existence of the railway line. The topographic set up of the State with too many hills and valleys makes the setting up of the railway line almost next to impossible. This is one of the examples of topological disadvantages which has direct impact on the economic activities in the State. In the worst scenario where there are no alternatives to overcome topological disadvantages, economic activities having direct link to such topological disadvantages should be avoided and alternatives should be adopted. Accurate and scientific identification of topological disadvantages is no easy task as it involves thorough study of the topographic nature in the State as well as feasible solutions to overcome avoidable topological disadvantages.

There is another perspective pertaining to under development in the State. This perspective sees that wealth is being accumulated in such an easy and inhumane manner that it becomes almost inevitable or inescapable once tasted and get used to. This perspective sees that such a characteristic leads to acts of corruption and terrorism. According to this perspective, there is no other solution to corruption and terrorism than the human conscience. This is somewhat similar to the social and moral perspective stated earlier with the only difference being the focus on illegal acquisition of resources and lack of humanity. This perspective sees that illegal acquisition of resources by one section of the society leads to lack of humanity in another section and vice versa. Both need to be dealt with seriousness, forbearance and caution. An approach to a solution based on this perspective would be the development of a system to monitor and counter against illegal acquisition and possession of resources. This perspective would also support the perspective that an identification of a person needs to be authenticated, as this will have the links to the individual's database of personal information etc. There is also a perspective

subscribing to the concept that imbalance consumption and generation of resources leads to the state of under development. For instance, this perspective sees that there is no integration of the developmental activities in the State. Schools, colleges and universities are targeting to education for all and their achievements are generation of educated youths, skilled persons and professionals, while the consumption or intake of the generated human resources is not enough to provide employment to most of them. In this case, consumption of resources to generate more resources is inadequate. It is therefore a challenge to the planners as how to tackle this ! problem. Population structure and related information, identification of the various types of resources capable of being generated and their potential/prospect, identification of various types of economic activities capable of absorbing, take in or consume the generated resources with a view of producing more demanding resources are few of the inputs to the system which will take care of the state of resource generation and consumption imbalance.

Indeed there are an innumerable number of perspectives worth discussing, which are highlighting the genuine facts and causes for under-development in the State but since they are outside the scope of this paper, they have to be omitted.

CONCLUSION

Based on the statement, analysis and discussion of the perspectives mentioned above, it is understood that in most of the cases, systems would have to be devised afresh almost from scratch. Indeed, such systems might have crept into the minds of the people in the past but ended only in dreams for the reason that it would mean that all the human resource would be engaged only in the operation of these systems. Dreams of the past are becoming the realities of the present and of the future with the breakthrough in the Information and Communication Technologies. Indeed with the breakthrough in other IT related fields such as bio-informatics, biometrics, DNA and molecular computing and other fields, dreams of the present would soon become the realities of the future.

At this juncture of time, we see that remote sensing technologies are used to capture data from the cameras attached to the remote sensing satellites so as to enable us to get very high-resolution pictures of a location under observation and understand the physical condition and activities on the ground. Such technologies will be useful for formulating, planning, monitoring and evaluating the development programmes being implemented by the State Government as nothing can be made hidden what is visible on the ground.

Authentication of identity of persons can also be aided with the help of Information Technology. Presently, smart card technology has been used to authenticate the identity of persons. The Election Commission of India through its EPIC scheme has managed to authenticate the identity of voters to a great extent. However, such a system does not provide access to individual's personal information etc. but it was really a good start towards better authentication of identity. Perhaps one day it would be imperative for the Ministry of Home Affairs to develop a system, which will authenticate all the citizens of the country using the best possible technology available at that juncture of time. Authentication of identity has many advantages as it would not only help solving the problems as stated in the various perspectives above but also help control crime to a larger extent, provide e-governance services in a better way and so on.

The establishment of the Community Information Centres in all the Block Headquarters in the State is one step ahead towards providing citizen services to all the villages in the State. Perhaps one day, the Information Centres or such services can be extended to the respective villages. The Information Centres may not necessarily be the means for citizen services but also to bring the social ethics and moral values to all the citizens of the state, the claim that one of the perspectives stated said they (social and moral values) are also responsible to the development of the State.

These are just a speck of the Information Technology based solutions that would certainly catalyze the process of Development in its strive to overcome Under-development. With the advancement of this technology in the near future, there is no doubt that much could be dreamt and the dreams could soon become the realities.

IT ENABLED SERVICES – AN ANSWER TO THE RISING UNEMPLOYMENT IN THE NORTHEAST REGION

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ABSTRACT

One of the biggest questions that is in the minds of all educated Indians today is that of the rising unemployment in our country. The conventional job prospects are fast becoming saturated and the job options limited. The current global slowdown has introduced a degree of uncertainty in some of the areas of the IT (Information Technology) sector and most of the students are finding it increasingly difficult to find placements after the completion of their courses. It has become difficult to shape the course curriculum in tandem with the continuously changing requirements. An inherent uncertainty in the IT -sector has become fundamental and cannot be ruled out in the near future. Albeit, the current slowdown may reverse itself throwing open a flood of opportunities the routine software programming will have to be replaced by product based software and this will require a lot of creativity and an ability to conceive and create entirely new applications.

However, with the emergence of the IT-enabled service sector availability of jobs can be looked up in a global perspective. These job requirements can be fulfilled by exporting services without physically being present at the site of work. To be able to provide these types of services one requires global competence, consistent quality, cutting edge professionalism, and high-speed data communication and connectivity. IT enabled services are important services that have come into being because of information technology and the way this technology creates or enables new and specialized services like customer information services, back-end office operations, digital content, online education, human resource services, and website services. Medical Transcription is one of the important services in a set of Information Technology related services known as IT enabled services. Medical Transcription is the process of taking a health care provider's dictated notes turning them into accurate, readable records. The transcribed records serve for reference, archives and legal proof The industry lends itself to telecommunications, both nationally and internationally.

INTRODUCTION

The future looks bright for Medical Transcription and other related IT - enabled services in the North East. Shillong is ideally suited for this kind of IT related industry with its congenial climate and large English speaking population. The telecom bandwidth is becoming more available with the entry of the private sector and increasing competition and investment. The setting up of an STPI (Software Technology Park India) here at Shillong has become relevant and urgent to be able to guide connectivity, as these IT enabled services will grossly depend upon uninterrupted connectivity. At present medical transcription companies are entirely focused in providing services to foreign hospitals. However, the opening of the health insurance sector in India, which will force hospitals to maintain a great deal of documentation for processing claims, offers significant scope for providing medical transcription services to hospitals within India itself in the coming years.

Each of the past centuries has been dominated by a single technology. The Eighteenth century was the time of the great mechanical systems accompanying the Industrial Revolution. The nineteenth century was the age of the steam engine. During the twentieth century, the key technology has been information gathering, processing and distribution. Among other developments, we have seen the installation of worldwide telephone networks. The invention of the radio and television, the birth and unprecedented growth of the computer industry, and the launching of communication satellites. Today these areas are rapidly converging, and the differences between collecting, transporting, storing and processing information are quickly disappearing. The merging of computers with communications has brought in a revolution in the way we think, interact and learn unleashing unlimited possibilities. IT (Information Technology) has transcended geographical boundaries and changed the lifestyles of people the world over and now making inroads into the Northeast. It is one power, which can change the regions image.

One of the biggest questions in the minds of all educated Indians today is that of the rising unemployment in our country .The conventional job prospects are fast becoming saturated and the job options limited. The current global slowdown has introduced a degree of uncertainty in some of the areas of the IT - sector and most of the students are finding it increasingly difficult to find placements after the completion of their courses. It has become difficult to shape the course curriculum in tandem with the continuously changing requirements. An inherent uncertainty in the IT - sector has become fundamental and cannot be ruled out in the near future. Albeit, the current slowdown may reverse itself throwing open

a flood of opportunities the routine software programming will have to be replaced by product based software and this will require a lot of creativity and an ability to conceive and create entirely new applications. R&D services are less vulnerable to slowdowns and earning more revenue.

The emergence of the IT - enabled service sector becomes significant in this back drop and has brought in a global availability of jobs. These job requirements can be fulfilled by exporting services without physically being present at the site of work. To be able to provide these types of services one requires global competence, cutting edge professionalism, consistent quality and high-speed data communication and connectivity. IT - enabled services are important services that have come into being because of information technology and the way this technology creates or enables new and specialized services like –

- Customer information services,
- Back-end office operations,
- Digital content,
- Online education,
- Human resource services,
- Website services.

MEDICAL TRANSCRIPTION

Medical Transcription (MT) is one of the important services in a set of Information Technology related services known as IT-enabled services. Medical Transcription is the process of taking a health care provider's dictated notes turning them into accurate, readable records. The transcribed records serve for reference, archives and legal proof. Doctors in the US record their findings into a sound files through a Dictaphone or some such device. These sound files are then sent through datacom lines to far off low cost destinations to overseas companies that employ medical transcriptionists who hear these recordings, transcribe them into reports and send them back electronically through datacom lines. The Turn Around Time (TAT) is sometimes as low as 2 hours. The current size of the Medical Transcription industry is estimated at US $ 6.6 billion. Out of this about 50% is currently outsourced with small and medium sized business doing 80010 of the out sourced work.

Medical Transcription was initially an in-house affair completed within the four walls of a doctor's chamber or hospital. The advent of high-speed satellite links and lower costs of outsourcing have brought MT industry to countries like India and Mexico. Over the last two years India has become the hub of global MT industry, which is currently classified as an IT-enabled service sector. In 1998 alone, the Indian MT industry generated Rs. 140 crore worth tax-free foreign exchange. The industry lends itself to telecommunications, both nationally and internationally. While most transcriptions related to patients in the US continue to be done within its boundaries, much of it is done across state lines and increasing amount is done off-shore (e.g. India, Philippines, Ireland. Bermuda) through telecommunication systems, including the internet. According to the American Association for Medical Transcription (AAMT), medical transcription is a $ 15-17 billion industry with double-digit growth rate. The establishment of high speed telecom and satellite linkages in India and the proliferation of the internet are enabling our people to make major contributions to the healthcare sector in industrialized countries by transcribing medical records. Besides costs, the 12-hour time difference between India and the us is a major competitive advantage. The voice data that flows in during us business I hours can be transcribed in India when it is night in the us and the transcribed data sent back by the next us working day.

Medical transcription apart from good hearing skills and an excellent command over English requires total commitment, inclination for medical sciences and terminologies, and a lot of enthusiasm while on an intensive training. One has to prove beyond average to become a successful medical transcriptionist, otherwise placement will be difficult. In short, mediocrity is hardly tolerated in this industry. As quality plays such a vital role in this career the following are a must.

- High quality training which is the key to a successful career in Medical Transcription
- A constant learning process on latest drugs to details of critical surgical procedures.
- Regular research with extensive use of resources.
- Each day a learning experience with stimulation to learn more.

CAREER PROSPECT

Based upon specific training an MT (Medical Transcriptionist) can venture into any area of medicine, surgery and technology.

India is poised to develop into the largest offshore remote processing centre in the world. The unbundling of the largely labor intensive activities is driven by cost advantages, making India the hottest outsourcing destination worldwide. Setting an offshore remote processing centre in India and executing the project involve cost savings up to 40 percent. India has the additional advantage of being the second largest English speaking IT manpower in the world. The removal of trade barriers has added the needed impetus to the offshore outsourcing services.

The potential of Medical Transcription business has attracted a large number of Indian companies, most of them small and medium sized enterprises. There are currently two major foreign companies namely CBay systems and Healthscribe Information Services. According to Donald Conover, president of CBay Systems, India is currently the number one destination for medical transcription for American hospitals outside the US, followed by the Philippines. However, the amount of work currently done by overseas companies is estimated at less than 0.2% of the total; thus there is enormous potential for expansion.

A recently constituted IT-enabled services forum of National Association of Software and Service Companies (NASSCOM) has included medical transcription as one of the sectors for attracting foreign investment in the country. The forum is visiting the US, Europe and Japan to promote the establishment of MT centers in India soon. Also, recently the labor department elevated the status of medical transcriptionists in the US. In the revised Standard Occupational Classification (SOC) medical transcription has been included as a separate job in the arena of health care. The American Association for Medical Transcription (AAMT) had been fighting for an elevated status since its inception 20 years ago. The separate classification is truly noteworthy, according to AAMT. At the same time the demand for medical transcription services in the US is growing about 20 percent every year largely due to the rising health care needs of an ageing population This makes the medical transcription industry recession proof and not vulnerable to slowdowns. Recently, the emergence of voice recognition software made the people a little apprehensive of the MT industry. However, the voice recognizing software is not suitable to grasp and analyze the human voice and the English language with all its diversity. Medical transcribers continue to be the best qualified to discern the nuances of human speech indeed, the ultimate speech processors.

CONCLUSION

The future looks bright for these kinds of IT-enabled services and Shillong becomes ideally suited for this kind of IT-related industry with its congenial climate and large English speaking population. The telecom bandwidth is becoming more available with the entry of private sector and increasing competition and investment. The setting up of an STPI (Software Technology Park India) here at Shillong has become relevant and urgent to be able to give connectivity, as these IT-enabled services will grossly depend upon uninterrupted connectivity. At present medical transcription companies are entirely focused in providing services to foreign hospitals. However the opening of the health insurance sector in India, which will force hospitals to maintain a great deal of documentation for processing claims, offers significant scope for providing medical transcription services to hospitals within India itself in the coming years.

However, a ground-up approach is important i.e. to have feet firmly planted on the ground to understand these concepts in depth and in detail. The levels of professional and technical expertise

required coupled together with a consistency in quality while exporting these kinds of services is not an easy task. It is important to realize the significance of quality control in order to be able to survive in the international market. There is no single parameter) which is the key to success in this industry. A host of parameters must work optimally to be able to complete the cycle. Live projects from the US will be difficult when one is remote triggering. The physical presence of a company in the us is much needed and is necessary. Direct marketing with an understanding of the resources and potential we have here will help bring in good projects. It does take a lot of time in getting to understand the key words of excellence in professionalism and quality control and takes a greater effort in putting them into practice. The path though arduous, is worth the effort as it can definitely provide our unemployed people innumerable jobs. This is one way to harness our huge human resource potential by exporting software and IT-enabled services to the US and other European countries.

A seminar on the role of IT in the North East is pertinent providing an excellent way to become introspective about ourselves and about the growth and problems of the North East. It is definitely a significant step towards a big awakening.

DEVELOPMENT OF TELEMEDICINE NETWORK FOR NORTH EASTERN REGION

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ABSTRACT

The project has been initiated by North Eastern Council with an objective to establish technology based infrastructure for alternate health care facility in North Eastern Region. The proposed infrastructure is based of the convergence of different technology such as Satellite Communication, Medical Technology, Medical Information Communication, Image Processing and Analysis, Diagnostics Information from the remote location to the expert locations and interactive video communication in order to provide required expert consultancy / treatment to the patients at remote location of NER without their physical movement to the specialist hospitals outside the region. The project envisages to establish the reliable and efficient dedicated VSAT Communication based Telemedicine Network connecting all district hospitals of NER and specialist expert consultants as telemedicine service providers. Indian Space Research Organization, Bangalore will be providing space segment required for the network through SPACENET. The telemedicine site developed at district hospitals will be connected to different diagnostics equipment through proper interface to the telemedicine systems and interoperable application software for transferring electronics medical data under health care environment to the expert site (Telemedicine Service Providers) such as Asia Heart Foundation and other identified by NEC. Under this project, 75 telemedicine sites would be developed including 7 mobile telemedicine systems in order to cover the region upto district level for providing OPD services in the first phase of implementation. In the second phase, 25 telemedicine sites developed under the first phase would be upgraded to provide 24 hrs (ICU) services. In the third phase, one telemedicine site for each state of NER would be upgraded as a specialist site to provide the telemedicine services to their telemedicine sites developed at district level. The proposed telemedicine site at district hospitals have been identified in consultation with the north eastern states for implementation. Doctors and Nurses identified by the state government for the proposed telemedicine site of concerned district hospitals would manage the telemedicine site for providing better health care services to the patients without their physical movement to the specialist / consultants outside the region. It is envisaged that the telemedicine infrastructures developed under this project may be able to save approx Rs 300 Cr per annum and would be saving to the patients of the region. The project is being implemented by Project Group (Telemedicine), North Eastern Council in close coordination with Development & Educational Communication Unit (DECU) / ISRO and Asia Heart Foundation.

INTRODUCTION

The concept of the Tele-medicine is to transfer of medical data in the electronic from one location to another which are geographically apart from each other, through the communication media such as, telephone lines, VSAT-Satellite channel media. Tele-medicine involve (a) conversion of medical data like ECG, EEG, Pathological slides, X-ray, sonography, angiography, etc. into electronics form (b) transmission of electronic data from patient end (remote hospitals) to expert end (medical colleges and expert institutes) (c) reception, reproduction and manipulation / analysis of patients data by expert doctor (d) transmission of expert doctors observation / recommendations / prescription back to patient end. Hence Tele-medicine infrastructure requires communication, equipment for converting analog data into electronic form for interacting to the data network and associated medical equipment for transfer of information by bi-directional mode. It will have 3 major components like Tele-Medicine Transmitting Centre, Receiving Centre and Expert Doctor System.

CONCEPT, NEED AND BENEFIT

Today precious lives of many Indians are lost due to lack of proper and timely interventions related with specialty health care problems. Despite India's many large cities with extensive medical facility, many States have remained deprived of decent specialty health cafe facilities. Taking into the consideration the socio-economic and geographical conditions of North East Region and taking into advantage of advancement in the Information and Communication Technology to deliver a specialty health care facility to the North East Region Tele-Medicine may act as adynamic engine to provide these facilities on cost effective manner at par with the developed health care facilities available at Metro cities. The recent experience of Tele-medicine project initiated by Asia Heart Foundation in collaboration with ISRO has helped in saving thousands of lives. The model adopted in the pilot project involving information and communication technology driven health care is the only sustainable answer to meet the need of our largely deprived rural and remote mass. The

replication of the ICTE driven care that is the Tele-Medicine Network within the North Eastern Region may be able to bring the region in to the main land with all latest facilities. Asia Heart Foundation in association with ISRO has provided Tele-Medicine Network to different sites especially to the Governments of Karnataka, West Bengal, Andhra Pradesh and Gujarat.

Tele-medicine is a use of Telecommunication to provide medical services or information between patient and specialist. A local physician at a Primary Health Care Facility can admit a patient suffering from health problems. After investigation if he finds that an expert should be consulted immediately, can take a help of Tele-Medicine services. The physician may take digital image, with a digital camera of X-rays, CT Scans of entire medical record of the patient and forward to the expert site by transferring the information from that location to anywhere in the world using the information and communication technology. The same technique can be used during an operation. The expert site can also discuss the patient case face to face through video conference facility and can exchange their views immediately online for the remedy.

The patient in the rural / remote area can avail the facility of a specialist without having to travel to the city. Thus the patient has access to pre-surgical and post-surgical evaluation of a specialist which is not possible with a traditional health care facility. In order to provide such a useful facility with stress to economise the health care facilities and timely intervention for better services to patients by using the modern communication technology on which information can be transferred from one end to another end using satellite through VSAT is a noble approach coming up in the globe.

IMPLEMENTATION STRATEGY PLAN FOR TELE-MEDICINE NETWORK

Phase-wise Implementation Strategy

The implementation of the Tele-medicine site to cover all districts of North Eastern Region including the State Headquarters (68 sites) would be undertaken into three phases which will be further divided into three parts for full operation of the Tele-Medicine Network.

Phase-I

Part-I – 9 (Nine) Tele-Medicine Sites with Tele-Medicine Consultancy (OPD) for 8 hours operation a day would be established.

Part-II – 21 Tele-medicine sites with Tele-Medicine consultancy (OPD) for 8 hours operation a day would be established as per the following strategy:-

3 (Three) District Hospitals each State of N.E. Region. One Mobile Tele-Medicine system per State.

Part-III – 38 remaining districts of N.E. Region would be connected for Tele-medicine Consultancy Service like OPD.

Phase-II

After the successful operation of one and half year of each Tele-Medicine Site with consultancy services (OPD), 33% of the existing Tele-Medicine site would be converted into Tele-Medicine health Care Facility (24 Hrs) with intensive care environment along with 6 to 10 beds identified by the concerned District Hospitals. Hence altogether 23 sites of the N.E. Region would provide 24 hrs Health Care Facilities through Tele-Medicine Network.

Six months will be required for implementation of each part. Hence a Total of one and half year will be required for implementation of 23 sites.

TELE-MEDICINE SYSTEM PLANNING

Site selection for Tele-Medicine System

The implementation of the project will be carried out in three phases such as Phase-I, Phase-II and Phase-III. During Phase-I, 68 Tele-Medicine sites and 7 Mobile Tele-Medicine Systems would be developed to interface with the expert sites for Tele-Medicine services for 8 hours duration a day (OPD). This phase is divided into three parts such as Part-I, Part-II and Part-III. During Part-I; 9 Tele-Medicine Sites, Part-II; 21 Tele-Medicine Sites, Part-III; 38 remaining sites would be developed and each part will take 6 months implementation period. Hence all district hospitals would be connected with Tele-Medicine facilities within one and half year. During the Phase-II, 33% of the site i.e. 23 Tele-Medicine Sites would be converted into 24hours Tele-Medicine Health Care facilities with Intensive Care Environment (ICU) after successful operation of one and half year of the concerned Tele-Medicine Sites developed in Phase-I. This will take another one and half year period for implementation. During the Phase-III of the project each State will have Super-specialist sites at State Headquarters which will provide Tele-Medicine Services to the district hospitals and RIMS Tele-Medicine sites will act as a Regional Level super-specialized Tele-Medicine Site. Based on the above implementation strategy District Hospitals have been selected in consultation with the State Governments during the meeting for establishing Tele-Medicine Systems in the concerned hospitals. Following are the details –

Part-I

Assam	–	Jorhat Civil Hospital, Tezpur Civil Hospital, Tezpur
Arunachal Pradesh	–	General Hospital, Naharlagun
Manipur	–	J N Hospital, Porompat, Imphal, District Hospital Temenglong, RIMS, Imphal
Meghalaya	–	Civil Hospital, Shillong
Mizoram	–	District Hospital, Aizawl
Nagaland	–	Mokukchung Civil Hospital, Mokukchung
Tripura	–	Sub-Divisional Hospital, Dharmanagar

Part-II

Assam	–	Diphu Civil Hospital, Kokrajhar Civil Hospital, North Lakhimpur Civil Hospital Dhubri Civil Hospital
Arunachal Pradesh	–	General Hospital, Pasighat, General Hospital, Tawang, General hospital, Khonsa, R.K. Mission Hospital, Itanagar
Manipur	–	District Hospital, 'Churachandpur, District Hospital, Thoubal, CHC Jiribam
Meghalaya	–	Civil Hospital, Willliamnagar, Civil Hospital, Jowai and Civil Hospital, Tura, NEIGRIHMS, Shillong
Mizoram	–	To be decided in consultation with State Govt
Nagaland	–	Dimapur Civil Hospital, Phek Civil Hospital, Zunheboto Civil Hospital
Tripura	–	Kailasahar Civil Hospital, District Hospital, Udaipur

Part-III

Assam	–	Gauhati District Hospital, Nagaon Civil Hospital, N.C. Hills .Civil Hospital, Cachar Civil Hospital, Karimganj Civil Hospital, Hailakandi Civil Hospital, Golaghat Civil Hospital, Sibsagar Civil Hospital, Dibrugarh Civil Hospital, Tinsukia Civil Hospital, Dhemaji Civil Hospital, Mangaldoi Civil Hospital, Marigaon Civil Hospital, Nalbari Civil Hospital, Borpeta Civil Hospital, Bongaigaon Civil Hospital, Goalpara Civil Hospital

Arunachal Pradesh – General Hospital, Along, General Hospital, Tezu, General Hospital, Roing, General Hospital, Changlang., Seppa, Ziro, Koloriang, Daporijo, Bomdila

Manipur – District Hospital, Senapati, District Hospital, Bishnupur, District Hospital, Ukhrul, CHC, Moreh

Meghalaya – Civil Hospital, Mairang, Civil Hospital, Baghmara, Civil Hospital, Nongpoh, Civil Hospital, Nongstoin

Mizoram – To be decided in consultation with State Government

Nagaland – Tuensang Civil Hospital, Wokha Civil Hospital, Mon Civil Hospital, Kiphire Civil Hospital, Peren Civil Hospital

Tripura – Kamalpur Sub-Divisional Hospital, Khowai Sub-Divisional Hospital, Sabroom Sub-Divisional Hospital, Amarpur Sub-Divisional Hospital

Phase-II

Arunachal Pradesh – General Hospital, Naharlagun, General Hospital, Pasighat

Assam – Jorhat Civil Hospital, Tezpur Civil Hospital, Kokrajhar Civil Hospital, Diphu Civil Hospital, and North Lakhimpur Civil Hospital

Manipur – JN Hospital, Porompat, Imphal, District Hospital, Churachandpur, District Hospital, Thoubal, District Hospital, Chandel, RIMS, Imphal

Meghalaya – Civil Hospital, Shillong, Civil Hospital, Tura, Civil Hospital, Williamnagar, Civil Hospital, Jowai

Mizoram – To be decided in consultation with State Government

Nagaland – Civil Hospital, Phek, Civil Hospital, Wokha, Civil Hospital, Zunheboto, Civil Hospital, Mon

Tripura – Sub-Divisional Hospital, Dharmanagar

Phase-III

Regional Super Specialty Hub: RIMS, Imphal, NEIGRIHMS, Shillong

State Level Super-Specialty Hub: Tele-Medicine Sites of the State Headquarters in case of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Nagaland. State Level Super-Specialty Centre for Tripura will be decided at a later stage.

Phase-I

Modalities

The Tele-Medicine facility will provide following consultancy –

- General Medicine
- General Surgery
- Paediatric
- Diabetic
- Pulmonary
- High Risk Pregnancy
- Cardiology
- Nephrology
- Neurology.

Diagnostic Equipment provided to each telemedicine site

- Online ECG
- X-Ray Digitizer
- Ultrasound
- Glucometer
- Portable X-Ray Machine
- PFT Machine
- Fetal Heart Rate Monitor
- Tele-Pathology Microscope.

Manpower

- Two Nurse
- One Doctor
- One Technician

Phase-II

23 sites would be converted for 24 hrs health care facilities and would be connected to the expert site. For this the site has to be upgraded as per the following norms to meet the purpose and objective.

Diagnostic equipment - Tele-Medicine Site

- Pulseoxy monitor
- Trans vaginal probe (Obs & Gyne)
- Blood Gas Analyzer (critical care)
- EEG (Neurology and Neuropsychiatry)
- Ventilator (critical care)
- Spirometry (Pulmonary medicine)
- Central Oxygen System
- Cardiac Monitor
- Defibrillator
- Temporary pace maker (non- evasive)
- Some additional minor cost equipment as is where is required.

Manpower

Each site will require following manpower to support the ICU facilities for 10 bedded unit. This manpower is in addition to the reflected in the Phase-I:

- 7 Nurses
- 4 Technician
- 2 Doctors

It is proposed that the existing nurses of the concerned hospital having Tele-Medicine Site would be trained at the expert site along with doctors engaged to that site.

DELIVERY OF HEALTH CARE AT DOOR-STEP MOBILE TELE-MEDICINE SYSTEM

The North East is predominantly a terrain region where transportation is a problem. The patients at remote of the remotest place most of the time are not able to reach hospital in time. It is hence planned to provide health care to these patients at their door-steps through the mobile van. Each State will have at least one mobile van which will have in-built communication capability as also the essential diagnostic equipment and other general facilities like stretcher etc. This will enable transmission of the patients data on line from the patients house or from the panchayat level where van can be parked, to super-specialty end. It will have minimum basic Tele-Medicine equipment hardware and software as also diagnostic equipment. The van will have communication capability to work with VSAT, ISDN, POTS as also through mobile phone.

INFORMATION FLOW ALGORITHM FOR THREE LAYER TELE-MEDICINE NETWORK

It is proposed that a total of 68 sites would be developed for the North East Network with the following tasks –

- RIMS, Imphal, and NEGRIMHS, Shillong will act as a both patient and doctors sites, and will deliver health services to Tele-Medicine Network to District Hospitals of N.E. Region.
- RIMS, Imphal and NEGRIMHS, Shillong will also cater the need of seven States as an expert site.
- Medical Colleges of Assam, if able to deliver the expert consultancy, will cater the need of the District Hospitals within Assam and the adjoining States of N.E. Region through Tele-Medicine Network as an expert consultant.
- One Tele-Medicine Hospital in each State will be developed both as doctors and patients site for Tele-Medicine after successful operation of four year based .on the assessment by the expert team of Tele-Medicine consultants and they will provide Tele-Medicine consultancy to their respective districts within the State and also provide the services to the adjoining districts of other States.
- Referral Hospitals and Medical Colleges of N.E. Region will be connected to outside N.E. Region with specialist centre such as Asia Heart Foundation, and other Tele-Medicine service provider.
- It is expected that once the network is operational then different district hospitals may be sending the signals to the expert Tele-Medicine Site in the random order and it may be difficult to the expert site to handle simultaneously the information or connectivity to the remote site from where signals are coming. Hence it is proposed that a software for access of the expert site (within the North East) should be developed in a auto haunting mode from the District Hospitals 'Tele-Medicine Site so that the free expert site will be connected automatically if their own expert site assigned above are not available due to their connectivity to the other patient site of some other district.

Similarly, a auto haunting software for connecting to the expert site of North Eastern Region from the Tele-Medicine Site of expert of the North Eastern Region has to be developed. Hence the connectivity of algorithm in such a way that a traffic congestion should be avoided in order to provide effective Tele-Medicine health services.

TELE-MEDICINE SYSTEMS AND SOFTWARE

North Eastern Council, Department of Development of North Eastern Region, under this project will be connecting District Hospitals, Medical Colleges of the region to the Expert Consultants sites through Tele-Medicine network using VSAT technology. Indian Space Research Organization will be providing the space segment capacity in INSAT system for the programme. The services of the captive hub of ISRO, which is currently used for other Tele-Medicine connectivity, will also be provided. It is also envisaged that remote locations are linked with major cities / towns for bringing the connectivity between District / Block Hospitals and General / Super-Specialty Hospitals to provide better health care services of the remote locations of the North Eastern Region and treatment in various areas of Cardiology, Pathology, Radiology, General Medicine, Surgery, Pediatrics etc. The Tele-Medicine system configured for the above functions consists of at least two locations; one is termed as patient site (District / Block Hospitals) and

other one as the Expert Doctor's site (Super-Specialty Site / Medical Colleges). Generally the patient end is located in the remote areas and the expert doctors in the Town / City Hospitals.

A Tele-Medicine system configuration envisaged consists of patient diagnostic image and data processing hardware and software located at both patient and doctors end, whereas the essential diagnostics instrument are generally located and interfaced at the patient site. The processing is done using international standards identified for such purposes. The connectivity between the patient and doctors end is established through the satellite links provided under ISRO's Space-net hub located at Bangalore using 384 Kb/s VSAT in a point to point / multipoint closed user group connectivity.

TELE-MEDICINE SYSTEM SPECIFICATIONS

All the Tele-Medicine Platform shall be PC based with –

Essentials

- State-of-art processor (Intel Pentium-IV 2 GHz (Minimum) with Intel chipset mother board/AMD Athelon 2 GHz (Minimum) with Gigabyte mother board

Optional

- Image/video switching unit
- ISDN interface card which supports up to 384 KBPS

Tele-Medicine Software

The Tele-Medicine software shall be based on Window operating system. However other OS may be considered based on the evaluation of performance.

Tele-Medicine software shall be capable of handling / supporting all the functions related to the following requirements –

Patient file / data / image management, using international standards (HL 7), details on Diagnostic data, reports generation & images related to at least the following –

- **Radiology:** Still images (X-ray data, direct from x-ray machine or film scanning, Mammogram) and moving images (CT, MRI, Ultra Sound,. Angiogram, Eco-Doppler)
- **Cardiology:** 12 lead ECG with base line control with long duration lead operation (no analysis), Holter and Event recorder.
- **Pathology:** Standard Slide Processing.
- **Neurology:** EEG (16 Channel)
- Image processing functions like: brightness, contrast, zoom, pan, rotate, enhance, filter, pointer, measurement of gray level, distance, size and volume estimate.
- Report and prescription generation using Text files.
- It Datal file/ image transmission and reception.
- Video editing, video files / clips generation.
- Such files should automatically get inserted in patient folder.
- Loss less image compression and de-compression, using the international standard DICOM 3.0. Software should also be capable *of capturing data from existing non DICOM equipment* and convert the images into DICOM ready images with appropriate interface which can be viewed using standard DICOM viewers.
- Data security, encryption / decryption, patient privacy etc.

- Different type of communication / network interfaces and protocols like PSTN, LAN / Ethernet connectivity with a minimum of 70% throughput of the channel rate of 64 to 512 kbps on a satellite link.

VIDEO CONFERENCE SYSTEM

Stand alone Video Conference system based on ITUT# 323 upto 384 Kbps with FCIF and QCIF picture format, 25 frames per second with required PC add on or built-in hardware, camera, coded hardware with appropriate driver software, and microphone along with Video and audio input and outputs.

Tele-Medicine System Related

Patient end – The essential equipment will be located in a Tele-Medicine room. The required optional equipment may have to be located in other nearby rooms, through appropriate cabling etc. These equipment also need to be interfaced through the drivers / cabling to Tele-Medicine room so that the modalities are available in the DICOM 3.0 standard. The cable length / driver may have to be appropriately worked out on case to case basis.

Super-Specialty end – The modalities need to be available on the existing LAN. It should be possible to route the modalities to the identified Super-Specialty room on the LAN. The present requirement is for point to point patient to super speciality network. The capability of system to operate in the multipoint environment will be an added advantage and provision to be kept.

Interoperability And GUI

- The system should be interoperable / compatible with systems of different platform. The Tele-Medicine system should have a user-friendly display (GUI) of applications, activities and functionalities on screen to the extent possible, so that the system is operable by non specialty in a remote environment.
- Such integration should be icon based so that all the data of a single patient like; patient history, images, doctor interaction etc. gets integrated into a file, automatically and is retrievable at the click of a button.
- The Tele-medicine terminal may be configured as, hub, expert doctor's terminal or patient's end terminal, any special requirements for this should be clearly brought out and mentioned.
- The relevant details of events will be covered under HL-7.

Interface

- All the software loaded on the machine / offered shall be provided with the licensed media with complete operating manuals.
- Shall have physical interface / slots available for all the peripherals / instruments listed above either built-in or with optional add-on hardware as and when required.
- Shall provide connectivity from 64 Kbps and at least up to 384 Kbps on LAN / Ethernet and ISDN (Optional).
- Shall have minimum capability to receive calls from at least "5", diverse patient ends simultaneously on Ethernet, LAN, ISDN, POTS lines, if required with modem & Ethernet hub etc.
- Tele-Medicine system and all the instruments / equipment shall work on 230V ± 10% AC, 50Hz.

TELE-MEDICINE VSAT SYSTEM

- Highly sophisticated and programmed solution -as it enables automatic selection of medical equipment according to the data to be transferred. VSAT equipment and 3.8 metre antenna.
- **Frequency:** Extended C-band : **ISRO** Transponder

GUIDELINES FOR THE STATE GOVERNMENTS

To develop the Tele-Medicine site in respective Colleges / Institutes / District Hospitals, following may be required as a pre-conditions

- The concerned College / Hospital should provide built-in space required for this purpose.
- The doctors available in the College / Hospital should be identified by the State Govt. so that a proper training can be provided for using Tele-Medicine Systems. Similarly, the Technicians already existing in the College / Hospital are required to be trained by the consultant.
- Whenever a Tele-Medicine site is also providing services to connect 6/10 beds hospital, the existing built-in space may be provided or the beds may be located for this purpose from the existing space. The 6 beds can be identified by the College / District Hospitals for converting Tele-Medicine site.

OPERATION AND FUNCTION OF THE TELE-MEDICINE SITE

The Tele-Medicine Site (patient's) or site (referral medical colleges / hospitals) has to be managed by a dedicated, devoted and qualified doctors who really wants to serve the society and people of the North-East. Hence it is suggested that a motivated doctor who wants to join in the high-tech venture of the Tele-Medicine network and its services are only required to join in this noble work.

- This site will be manned by technicians round the clock who will be working with Tele-Medicine Service provider under the control of Tele-Medicine project group at N.E.C.
- The availability of medicine at Tele-Medicine site and its management will be the responsibility of the respective hospitals so that a consultancy followed by medicine can be achieved effectively.

CONCLUSION

It is a social sector projects and envisages to improve the health care services in the N.E. Region, which will improve the economy conditions of the common man and also reduce the expenditure of N.E. state government towards sending their employee for specialized treatment. It will act as an alternate health care infrastructure to provide better health care services for North-Eastern Region.

IMPACT OF INFORMATION TECHNOLOGY IN HIGHER EDUCATION OF 21ST CENTURY

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ABSTRACT

We are now in the midst of a period when human society is being transformed and these changes are brought about mostly in our physical, educational, social and economic environment, There is no aspect of our existence which is untouched by the technological changes. Change and management of change have become the catch words in this 21st century. The 21st century faces information explosion and so information professionals have a task ahead in processing, storage and retrieval of informations for they have never been exposed to such a changing information scenario in the past. Our educational system is now facing an unprecedented challenge of defining its vision for the 21st century. Information plays a vital role in this information age and as the world is entering into an Information Age new developments in communication, information and technology will open up new and cost-effective approaches for providing the reach of higher education to the youth as well as to those who need continuing education for meeting the demands of explosion of information, fast-changing nature of occupations. The world is changing too fast and information technology is forever going to change the way we live. IT has spread to diverse fields of society and so human society is undergoing a phenomenal change.

INTRODUCTION

Information Technology (IT) is a multidisciplinary field emerging from computer technology, software technology, database technology, and Internet technology. The 20th century witnessed several developments in natural and physical sciences, humanities and technologies. Technology is the application of the scientific techniques in various spheres of our everyday life. Today human race has gone through a systematic sequential and steady process of biological evolution coupled with technological developments which give rise to biotechnology which includes genetic engineering. In the field of agriculture, medicine, transportation, communication, technology finds many applications as in diagnosis and treatment of diseases, in increasing food production, in telephone service etc. But one of the outstanding revolution that is well known to us is the rise of Information Technology which is a convergence of technologies in personal computers, telecommunication and television. Information technology is fast changing our information society to a global society and is really dominating in this 21st century. Information Technology (IT) plays the prime role in information processing, storage and access with a view to providing improved services to the consumers. In the history of civilization, no scientific work has ever made an impact on the course of human development as IT. It has succeeded in breaking old barriers and building new interconnections in the emerging global scenario. The rapid development in IT has removed the constraints of time and space. The IT action plan launched by Government of India in 1998 aims at transforming every facet of human life in order to create a knowledge-based society in the 21st century. Knowledge no longer remains static but will be fast transmitted without any geographical barriers. Networks will be the powerful tools for delivering educational services that may be available to anyone at any time in any place. The global knowledge and learning industry will be freed from the constraints and bondages of the traditional learning.

In India this change is fast picking up and academic institutions are taking lead in the utilisation of internet resources. The cyber age is a forced dispensation of the Indian educational system which is already accepted in the Vision 2020 as conceptualized by Dr A.P.J. Abdul Kalam. India has to catch up with the other nations in educating a sizeable percentage of population. In the near future, India may become a front runner in the age of information revolution to be a global IT superpower. In order to maximise the benefits of IT we must analyse its implications for our Universities and Colleges. There is a primary need of teachers to be educated in this technology so that they can teach through computers or access informations through them as most of the modem information sources will soon be unavailable in print form. The Universities and all the educational agencies must assume a special rote in training teachers in Colleges and Universities in the next few years so as to make educational institutions gradually cyber age compliant. Training of teachers is an important component of any policy, which aims at maintaining high standards of teaching in the universities and colleges. The role to be played by the Universities to meet these challenges cannot be undermined. Students today are members of the' digital generation' in which they are highly affected by the exposure to internet technology and are thus far from the traditional sequential learning. Teachers may have to work more to satisfy more to the needs of the

students and the society than to satisfy their own needs and impulses. It is time that an introspection of the present academic culture is made compatible with the needs and aspirations of Indians in this vibrant age of information superhighway. The advances in information and communication technology provide great opportunities to enhance teaching and learning in higher education by both on-campus and distance education. Even disabled students who are denied access to traditional institutions, and all those who require updating of their knowledge and life-long education can now be benefited by the modern facilities of communication. They also provide increased access to information sources and facilitate communication among researchers and teachers and the building of networks of institutions and scholars. In India the Open University (IGNOU) has demonstrated that modern communication technologies can be effectively harnessed in providing access to educational opportunities and that high technology need not necessarily be a high cost medium. The University has, at its inception, set up Audio- Video production facility with the generous support provided by the Governments of UK and Japan. These facilities were substantially augmented with a major grant given by the Government of Japan. The media packages of the university are transmitted on the nation-wide television network as well as through selected radio stations. A dedicated, satellite-based teleconferencing network is being developed on an experimental basis in cooperation with the Indian Space Research Organisation for providing interactive teaching-learning support to distance education programmes offered by open universities in India.

DISCUSSION

Higher education, according to the 1986 Policy, provides people with an opportunity to reflect on the critical social, economic, cultural, moral and spiritual issues facing humanity. It contributes to national development through dissemination of specialised knowledge and skills. It is, therefore, a crucial factor for survival. Being at the apex of the educational pyramid, it has also a key role in producing teachers for the education system. The policy urged that in the context of the unprecedented explosion of knowledge, higher education had to become dynamic as never before, constantly entering uncharted areas, and it proposed that the large number of universities and colleges in the country needed all-round improvement and that the main emphasis in the immediate future should be on their consolidation and expansion. India has been in the forefront to adopt the new 'information society' technologies such as distance education and the internet to bridge the gap between itself and the advanced countries. International cooperation in education is seen in this context of partnership where countries assist each other by sharing their successful experiences, technologies, material and financial resources and learning to appreciate each other's cultural heritage. The definition of literacy is fast shifting to computer literacy at least among the younger generation. The higher education is bound to shift from the culture of print to a culture of digital technology. The educational institutions should try to convert their libraries to information centers which are cyber age compliant. Several successful ventures have been made through the rapid changes and development of network systems for online and off line access to databases, in fact the launching of databases in India has been provided since the past decade. In a virtual library, a user can access information from a remote location and can feel as though he or she is physically present there. In fact, internet has been described as the 'library of libraries' where information retrieval is possible 'online' throughout the day.

CD-ROMs with a storage capacity of 1.6 GB of data have been instrumental in fast 'offline' information retrieval and access. Many journals with their content pages, articles and reports are available on internet and interestingly most of the informations available on internet are fast disappearing from print media. The so-called electronic journals are not available in print form. The educational institutions should catch up with the changed scenario and try to extract such resources through networking systems. If we are not able to provide access to cyber space to all the institutions of higher education by 2005 we better forget about the global competition.

In North East, there is a large growing potential for IT because of its climatic conditions which could have an advantage in the development and setting up of infrastructural facilities for large scale information technology .Shillong, the capital of Meghalaya is an important educational centre which attracts students and especially teachers from outside the State who can enhance the quality of education. Computer education is introduced in most of the schools and colleges and some have their own computer division. The Computer Center, North East Hill University offers diverse courses for college and university students and also short-term training courses for technical persons and provides good computing facilities for

long-term research projects. The Bio-informatics center has been set up lately in North Eastern Hill University, provides the students and researchers with latest information in their respective fields and bring them closer to the rest of the world as far as scientific advancements are concerned. The centre will be a part of the national bio-information network and function as an information base in various areas of biosciences. Besides, there are private institutes like APTECH, NIIT, BDPS, STG which provide software and hardware courses to impart quality computer education and now computer awareness is increasing in the different sectors. Some private software development units like NIIT, APTECH, Grace Systems, STG and others have also come up.

The role of IT in the development of North East would make an impact if the development covers not only in the urban areas but also the rural areas where large masses of people are still isolated are not aware of the global changes. Thus in an effort to take Information Technology to every doorstep, an ambitious programme has been drawn up by the government to establish Community Information Centres in 446 blocks in the seven North-Eastern states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura). Another 40 such centres will be set-up in Sikkim. These CICs have been set up taking into consideration the convenience of the rural masses of the region. They are located in the block development office complex and in schools and libraries. The government has implemented a Rs 242 crore Community Information Centre (CIC) Project comprising of setting up of computer rooms in all 487 blocks of the North-eastern states and Sikkim. Under this project computer and communication infrastructure is being setup in each block. The centres are being located in local schools, colleges, libraries or suitable government buildings. In order to ensure uninterrupted communication, the Centres are connected through a satellite based computer communication network. Each CIC is equipped with a VSAT connectivity, computer systems, printers and networking equipments. The CICs will not only facilitate the region to avail the benefits of global connectivity through Internet, but will also bring the region closer, emotionally, to the national mainstream by enabling more efficient and faster information flow amongst the people, other State Governments and the Central Government. The level of literacy and poverty alleviation also has direct bearing on mass media and here again IT applications would have fast reaching impact. If technology is advancing at a breakneck speed let us not forget the hapless victims of poverty and illiteracy. On 17th May 2002, the World Telecommunication Day was celebrated and observed in Shillong on the theme "Information and Communication Technology for all" empowering people to Cross Digital Divide coinciding with the date of signature in Paris in 1865 of the International Telegraph Union, which set up the International Telegraph Union. The impressive function was organised by the Institution of Engineers (India), Shillong. The main objective of the celebration on the said theme was to cross the digital divide among countries, within countries, between urban and rural, rich and poor, educated and illiterate, between men and women and also the geographical divide, in the use of technology and access to various information by providing them telephones, WLL, Mobile Telephones, Satellite Telephones, Data, Internet Telephones, FAX, Computer etc., through different programmes and schemes formulated by the Government and Industrial Units etc.

CONCLUSION

In conclusion, Information Technology can bring about far-reaching impact and fast development in the North Eastern states if it not only provides access for the villagers, the poor, unemployed people who cannot afford to get such infrastructural facilities but also to see that these people will continue to avail and reap its benefits. What we need is co-operation and network between the Government, the public and the private sectors which can speed up the development in the urban and the rural sectors.

WORKSHOP / TECHNICAL SESSION – III

APPLICATION & IMPORTANCE OF I.T. (II)

INVITED LECTURE
ON
E-LEARNING : THE GAP BETWEEN THE POTENTIAL & REALITY

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INTRODUCTION

A lot has been written and said about the Web as a means of information discovery and retrieval tool and as a foundation for electronic commerce. Education has been one application that has been touted as having a great potential on the Web. Everyone concurs with this since Education and learning is all about discovering, retrieving, disseminating and imbibing knowledge. And the Web is the new wonder medium that makes all this so easy! Virtual classrooms, chat-rooms, bulletin boards, on-line tutoring – all of it is happening everywhere. The World Wide Web and other Internet-based collaborative tools have significantly enhanced the ability to train and educate electronically. It is clear that the Internet, with its ability to connect people and information around the world, is already having a significant impact on education at all levels. But the major question still looms in the minds of people as to its effectiveness and impact.

Both the computer technologists and the educationists agree on the fact that the e-learning is possible, efficient and is the future. However, the course charted by e-Learning till now does not give the confidence to the students and the learner that e-Learning can replace the traditional form of learning. Why is this so? Where are the gaps? What needs to be done to bridge these gaps?

THE CLASSICAL GAP

One needs to understand the evolution and the growth of Internet to understand the Gap Analysis. In fact, e-Learning today is facing the same dilemma and acceptance problems that other applications on the net are facing – whether it is e-Commerce, ASP, CRM, SCM or Knowledge Management. The Internet has grown at the incredible levels in the past decade because of the high expectations created by Internet and dot com enthusiast and protagonists. The power of the Internet is credible; everyone got carried away by the stories about its potential. The expectations that this created for all the applications mentioned above, including e-Learning made people eager to try the Internet and gauge its effectiveness.

The computer and Internet technologists took each of these applications and put them on the Web to prove its effectiveness. In their eagerness, the applications got created with minimal or no understanding or inputs by the experienced professionals in the field. Without really analysing and understanding the fundamentals of the applications the technies and dot-comers did a wonderful job of populating the Web with enormous content and faulty applications. As a result, the customers experienced serious shortcomings, lacunae and inefficiencies in their delivery. The story with e-Learning is not very different.

THE e-LEARNING EXPERIENCE

What is e-Learning?

e-Learning encompasses the complete delivery of training and education using technology as opposed to the common view that online learning and CD based learning are the same. The entire teaching learning process spanning the following delivered using technology can be classified as Online education.

Delivery of curriculum through structured and unstructured techniques.

Collaborative learning environment.

Explorative learning.

Learner facilitative mechanisms – solving queries, seminars, assignments etc. Assessment (Formative and summative) and Counseling. Rigid and robust content and instructinal architecture.

ONLINE EDUCATION – GLOBAL SCENARIO

- On line learning currently generates $ 600 million annually will exceed $ 10 billion by 2002 – IDC.
- 92% of large organizations in the U.S. are implementing some form of on line learning – IDC.
- 85% of schools will have some form of on line learning by 2002.
- Over 2 million students expected on line by 2002 – IDC.
- Colleges are moving into Cyberspace – Stanford, Columbia, University of Phoenix, University of Maryland to name a few...
- Publishing Companies.
  - Virtual Campus to sell training course.
  - Ziff Davis University, UOL, Coopers & Lybrand.
  - Courses available ranging from $10 to $1000 / course.
- Taining Companies, Universities.
  - As a supplement / alternative to Instructor-led training.
  - Wave Online University, Digital Think, Pace.
- Corporates.
  - For delivery of customuised / standard training.
  - Through Corporate Intranets.
  - Boeing, Siemens, Goldman Sachs.
- Portals.
  - Learn2.com, Click2learn, university.com etc...

Market Size (contd.) Source : Training Magazine, IDC &WR Hambrecht Co. estimates (1999 data)
To show trend
Corporate Training market size by Product & delivery

IT Training	Soft Skills		($billion)
Total Corporate	Training Market	$ 31.19	$ 31.31
Outsourced		$ 9.45	$ 5.55
Technology based	Training market	$ 2.27	$ 0.72
Web based	Training market	$ 0.87	$ 0.20

Trends in 2002 and 2003

- IDC recent forecasts anticipate Technology based learning revenue to reach $ 11.4 billion by 2003 up from $ 234 million in 1997 83% annual growth.
- Previous estimates was corporate e-learning market would reach $ 5.5 billion. Revised estimate for e-learning revenue is $ 7.1 billion in 2002 and rising to $ 11.4 billion in 2002.

CONCEPT & FEATURES OF e-LEARNING

1. MM rich web pages present content
2. Additional reading materials - Digital libraries & references
3. Assignments
4. Course tutor support through email for clarifications , consultants & assignment corrections
5. Tutor support at study centres.
6. Dynamically growing FAQ
7. Specific context oriented discussions in the chart rooms initiated by the teacher or student - Teacher controlled

8. Intra-group discussions , problem solving , mutual support , sharing information through New groups
9. Self assessment and formative evaluation thro' Web
10. Summative evaluation online

ON-LINE TRAINING COMPONENTS

- Sound Instructional Design Model
- Learning architecture
  - Simple HTML / Object Repositories
- Appropriate Delivery Mechanism
  - Browser Based / Proprietary Application
- Learner Tracking System
- Evaluation & Learner Feedback
- Standards based interfaces to encourage multi-vendor solutions
  - Storage of Learning Objects
  - Learner Data Formats

WEB EDUCATION FORMATS

- Synchronous
  - Facilitated Learning
  - Applications conferencing
  - Video/Audio conferencing
  - Cohort of learners
- Asynchronous
  - Web based
- Multi-modal
  - Judicious mix of media based on pedagogic requirements

WHY LEARN THROUGH THE NET

- Just in time learning
  - On the Job . Just what you want training
  - Learning Objects.
  - Chunking to make courses
- Ease of evaluating effectiveness of training
  - Learner tracking mechanisms
  - Integration of training results with performance evaluations
- Reduced oppotunity cost for trainees
  - Fewer productive hours lost
  - Eliminate outstation training overheads

SUCCESS RECIPES

- Future- Proof Online learning Architecture
  - Open Standards , Objects Based
  - Universal Client (Web Browser)
  - Database repository

- Network
  - Corporate Intranet
  - Public Intranet
- Content
  - Critical Mass , Relevant
- Appropriate , engaging content based on a sound instructional design methodology
- Efficient user tracking
- Objective performace evaluation
- Measurable training effectiveness parameters
  - Cost, Cost-Effectiveness and Cost Benefit

OPPORTUNITIES & CHALLENGES

- Merge IT with job skills
- Education as a new center
- Imaginaion engineer
- Choose your own adventure
- Intelligent indexing
- Performance support design & content

IMPLEMENTATION

- Identify the Training Oppurtunity
  - Business landscape
  - Training needs analysis
- Select an appropriate architecture
- Establish a content group
  - Internal training division, External content partners
- Technology deployment
- Pilot training applications
- Evaluate feedback & Audit affectivity
- Build on online training application portfolio

DELIVERY ISSUES

- Nature of content
- Bandwidth availability
- Media mix (text, graphics, video, animation, voice)
- Development strategy and technology
  - Media element creation
- Conversin approach
  - Redevelopment / – Repackaging

This is not to say that all efforts on the Web, as far as e-Learning is concerned, are of no significance. There are serious attempts by sound Educational and Learning Institutions to leverage the net for imparting education. But these are out-numbered by the majority that have attempted to pass off the conglomeration of electronic page-turners, chat-rooms and bulletin boards as virtual classrooms.

However, the reversal is happening. The technologists are giving way to educationists to lead the e-Learning revolution. And rightly so too! e-Learning is all about designing content, laying down instructional design and methodologies, creating supporting and facilitating environments for learning on the Web and building virtual communities that are based on pedagogic strategies. In fact, e-Learning can use peer tutoring to elevate the learning experience to levels that cannot be experienced by the traditional classroom settings.

RE-ENGINEERING EDUCATION

There are still issues in e-Learning that are being grappled by educationists the world over. How true adaptive learning can be achieved through technology is still a research. The biggest single design consideration that remains for effective e-Learning with international learners is a careful reading of the culture prevailing in different geographies and recognition of the severe limits on the ability of information technology to cross boundaries and transient cultures.

Virtual communities are an important component of new pedagogical strategies based on information infrastructures that can dramatically improve learning outcomes. Learning is social as well as intellectual. Individual, isolated attempts to make sense of complex data can easily fail unless some larger group that is constructing shared knowledge encourages the learner. Moreover, formal education comprises only a small fraction of how students spend their time. No matter how effective the schooling, students are unlikely to make major gains in learning if the other parts of their lives are not educationally fulfilling. Virtual communities can help bring about close cooperation and shared responsibility for learning among all the educational agents of society, social service agencies, workplaces, mass media, schools and higher education.

CONCLUSION

The majority of the capabilities discussed above are slowly becoming functional in the classroom. Universities like University of Phoenix have become leaders in applying technology to education for learning and for collaboration. University administrators and Corporates need to begin to chart the 21st century vision of their institutions to building a knowledge-based economy through a journey that will include information technology and collaborative learning and teaching.

INVITED LECTURE

ON

ROLE OF INFORMATION TECHNOLOGY IN SCHOOL EDUCATION AND IT'S IMPEDIMENTS IN IMPLEMENTATION

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INTRODUCTION

Today Information Technology has left no sphere untouched. Banking, Healthcare, Communication, Entertainment, Research, even Education too has been strongly influenced by the IT revolution that is spearheading us into the future. The days of being taught have given way to the days of learning by exploration, discovery and adventure. With the advent of multimedia and the proliferation of the Internet, Information Technology can be used as a creative and effective tool to improve the performance of students, teachers and schools, leading towards the creation of Smart Schools.

A Smart School is a school where all stakeholders, viz. students, teachers, parents, principals and schools administrators use technology to improve their effectiveness and efficiency.

Smart Schools will provide a learning environment where, pupils will be autonomous learners. All pupils have this ability. It can be enhanced by the use of computers, internet and other learning technologies. Smart Schools recognise that "learning how to learn" is the ultimate skill for the future. A Smart School fully leverages the benefit of IT.

The following are the possible benefit of IT in School –

- **IT Skills** : Students and teachers can be skilled in using IT.
- **IT Enabled Education** : The power of multimedia and the Internet can be used to provide a new experience of learning to students.
- **Administration & Automation** : The school records can be automated so that all data related to Studying, Teaching, Class and Financial data are available.
- **Collaboration** : The physical boundaries of the school can be broken using the Internet. Parents can be brought into the system and they can keep track of their ward's performance via the Internet instantaneously. The usage of the Internet effectively enables Off-Campus learning by the student.

A SCHOOL MUST TAKE CARE QUALITY AN ISSUE

A school needs an instructional model for learning that spans the different classes in school. The process of learning starts with the teachers and takes on an experimental model where the students can explore and discover concepts and information themselves.

A school should take into account the following theories to create the perfect model –

- **Pedagogy** : Education is teacher-focused, where teachers decide what will be learnt, when it will be learnt and how it will be learnt.
- **Cognitive Psychology** : Information is learner-constructed, relevant and built upon prior knowledge. And .learning is experiential and through discovery.
- **Instructional Design** : This takes into account the visual learner, the auditory learner and the kinesthetic learner and creates educational models that would be beneficial to them.

Today, parents are keener than ever that their children perform well and opt for a professional stream that would launch them into a successful career. Children would rather explore, create and do all those things that would provide them with fun and entertainment, according to Child Psychologists. Computer Aided Education (CAE) provides the perfect solution to both as it uses interactive multimedia packages to make learning explorative and fun.

These multimedia packages interactively aid in educating students, covering key topics ("hot spots") in various subjects like English, Mathematics, Science and Social Science and conform to the syllabi set by various boards in different cities and states. CAE is not targeted at replacing or duplicating the profile of a teacher in schools. It serves as a tool for the teacher to make a topic or a subject come alive, so students can understand it better. Teachers playa big role in imparting CAE to the students. They should be trained continuously to appreciate, understand and implement computer based education.

HOW TO BUILD A SMART SCHOOL

It is desired to chalk out a step-by-step process to make a School a "Smart School". It is also required to give a careful consideration for the following issues before embarking on a Smart School.

PEDAGOGY & COGNITIVE SYSTEM

The school authority needs to create an audience profile and workout a complete teaching framework. It also requires to have a measurement of learning that will help the school in gauging how effective their teaching methods are and how they can improve.

INFRASTRUCTURE CREATION & MANAGEMENT

The school can start from the basics of creating a Center layout and build their complete infrastructure on it. They can also manage the setup, as the model will help them in session planning and scheduling.

CONTENT DEVELOPMENT

The school need to map their syllabus and identify hot spots (those topics that need to be covered using *CAE).* The hot spots thus identified can be covered through the multimedia component. The school can also take into account the visual learner, the auditory learner and the kinesthetic learner and create educational models beneficial to them.

FUNDING FOR LABS & OPERATION

The school needs to have access to education funding and can design special purpose vehicles that will help the school to balance their funds. The school must also ensure that the investment brings in more revenues to the school during holidays and after school hours, by utilising the existing infrastructure.

CURRICULUM DESIGN & EDUCATION DELIVERY

The school needs to design their CAE in close relevance to the curriculum that conforms to their board. The management needs to decide on the courses and topics to be covered by Instructors (Instructor Led Training); those that will be computer- based (CAE) and those that the students can learn online (Web Based Training). This will also help the management to decide on the hours spent by students on the computer and those spent by teachers so that the school can plan schedules and timetables accordingly.

FACULTY RECRUITMENT / TRAINING DEVELOPMENT

It is extremely important to choose the right faculty. The School Management needs to look at the right qualification, right motivation, and update their knowledge with the latest technology change.

TECHNICAL RESOURCES SELECTION, INSTALLATION & MAINTENANCE

Making a School a Smart School will take years to implement. The school management can view this complete process as a project. The school authority need to bring together the various stakeholders involved -students, teachers, parents and the school management in outsourcing the project. When the school is outsourcing, they need to look at an expert who can complete the job on a turnkey basis, from planning to execution. A company that has got proven projects management skills and is also pioneer in education.

It is not an impossible task to set up a Smart School. If schools like **Sherwood College,** Nainital; **DAV Public School,** Hyderabad; **Delhi Public School,** Mathura & Numaligarh, Assam; **The Scindia School,** Gwalior can set up a Smart School, why not it can be done in the North East Region of India.

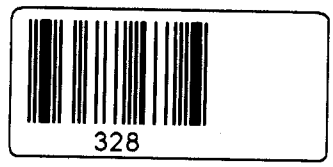
The only things, which the school management requires, are –

Have a Vision - Quality must play a key role in influencing the school's vision for the school. They need to make sure that quality is not an optional parameter and is absolutely mandatory in every aspect of IT implementation.

Focus on People - People are the most important factor when it comes to IT implementation.

Do Not Delegate Decision-Making - You need to be the driving force and should make sure that it is your responsibility to ensure that IT implementation takes place in your school. So while you can delegate implementation, make sure that you do not delegate decision-making. Even in large organizations equipped with an army of technologists, the critical success factor is the involvement of the top management. (You here stand for the Principal of the school).

Your Imagination Is The Limit - While the Information Technology implementation model clearly outlines the steps and procedures to become a Smart School, it is clearly one's imagination that needs to take flight for one to scale the heights. So make sure that the school collectively gives nothing but its best in the IT implementation process, because IT affects every aspect of school life.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