ISSN: 0974-2115
www.jchps.com Journal of Chemical and Pharmaceutical Sciences

Environmental informatics: An important and possible domain for building a sustainable world

P. K. Paul[1], Kiran Lata Dangwal[2]
[1,] School of Community Science and Technology, Indian Institute of Engineering Science and Technology [IIEST], Shibpur- An Institute of National Importance, WB, India,
[2] Department is Department of Education, University of Lucknow, Uttar Pradesh, India Email: kldangwal@yahoo.co.in
***Corresponding author: E-Mail:prancloud@outlook.com**

ABSTRACT

Environment is one of the major concerns these days. Today many organizations, institutions and enterprises are working for the betterment of environment and society. Artificial tools and technologies are many ways responsible for environmental pollution. Hence today technologists and scientists are moving towards design, development along with implementation of environmental friendly system for sustainable society. Environmental Informatics will be the best alternative and required to keep both manual and computational information systems ecofriendly and sustainable. Informatics practice including the information system designing and building with Green Technology support is very much essential. This paper talks about such aspects in brief manner with its need and future possibilities. This paper is the enhanced version of IDM-14 conducted by the NRI Group of Institute, Bhopal, India. Several aspects of environmental informatics including issues, challenges are included in this paper.

KEY WORDS: Informatics, Information System, Informatics, Green Technology, Green Computing, Environmental Science, Environmental Informatics, Green Information System

1. INTRODUCTION

Informatics is one of the important interdisciplinary domains responsible for the design, development, and implementation of Information System and similar facet and dealing with the help of several technologies and manual tools. Hence, for building Informatics or more clearly Information System we need to use and implement so many technologies such as Database Technologies, Web Technologies, Multimedia Technologies, Computing Technology and so on and thus so many tools are essential such as computer, networking tools, hardware, devices and so on; and many of these are needs heavy power and energy (P.K.Paul, 2012a; P.K. Paul & M.K. Ghosh, 2012; P.K. Paul, 2013). Thus, we need to implement the Informatics practice which will be environment and eco-friendly.

Objective: The main aims and objectives of this paper includes but not limited to—

- To know basic about Informatics and its main characteristics and features;
- To learn about the tools and technologies used for Informatics Practices;
- To know about the Eco–friendly and Environmental Friendly Information and Information System , its principles and requirement;
- To know main policies and strategies for implementing Eco-Friendly Information System
- To learn about need and possibilities of launch of Environmental Informatics or Eco Informatics or Energy Informatics based academic and research programme.

2. MATERIALS AND METHODS

Informatics: Fundamentals: Informatics is one of the important interdisciplinary domains responsible for information activities such as collection, selection, organization, processing, management and dissemination with the help of healthy and sophisticated information system building and development. Informatics, however may also deals with the help of several tools and techniques for official documentation and information management (P.K. Paul & M.Ghosh, 2013, P.K.Paul, 2013).

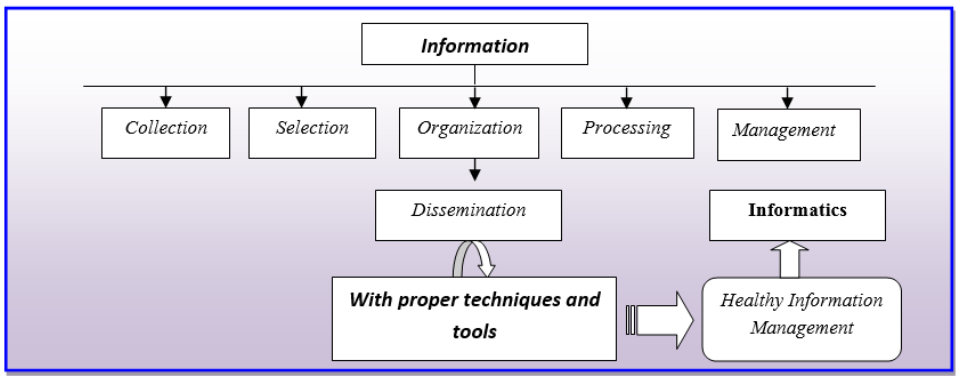

Figure.1.Showing fundamental of Informatics as practicing domain

Informatics is closely related with IT and Computing; but it also focuses on computing and manual knowledge management rather than design and development of software, programming and intelligent system development.

Eco Friendly Informatics: Informatics may be classified into two ways, Domain based and functional. Domain wise, Informatics may be Bio Science related and Pure Science related. As far as Eco Friendly Informatics is concerned it falls under the functional category which is responsible for design, development, building, evaluation and modeling of information system and complete information infrastructure building. Virtually, such system may reduce the energy consumption. Environmental Informatics is approach term than Energy or Environmental Computing as Environmental Informatics will deal for both computational and manual information management. The main aim and objective of Environmental Informatics is improving environmental condition and cost management by power management, though finally it is responsible for reducing toxic materials (Paul PK, 2012b; Paul PK, 2013).

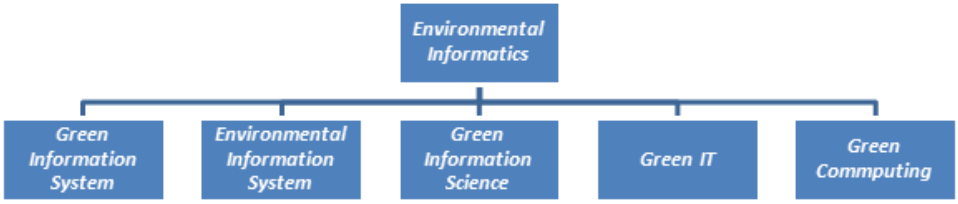

Figure.2.Showing similar nomenclature of Environmental Informatics

Hence, today practice of Environmental Informatics *[or similar devices such as Green Computing, Green Information Science, and Energy Informatics]* is helpful for managing or minimizing e-waste and other non-toxic chemical as much as possible. Environmental Informatics should be field based and of practicing domain that will deals with following:

- Design and Development of Information System which will be power consumed and energy star rating and helps in cost management of the organization, helpful in preparation of tools and technological devices that consume less power and run with minimum voltage.
- Most of the electronic equipment and computational devices, such as display system give out higher heat and Greenhouse gas or Carbon emission and hence it is better to implement E-waste management practiced with Environmental Informatics.

Stakeholders of Environmental Informatics: Environmental Informatics deals with some stakeholders which are helpful for design, development of environmental friendly, less toxic chemical and are less power consuming information processing and management system. Most of the Data Centre located in the wealth, medicine, transportation and agriculture section take healthy amount of power, money and consumption of energy and heat and gases, such tools and technologies are harmful as they releases harmful chemical, CFC and thus responsible for the diseases and are responsible for floods, melting glacier, and thus increasing of sea level and so on [12, 19, 24].

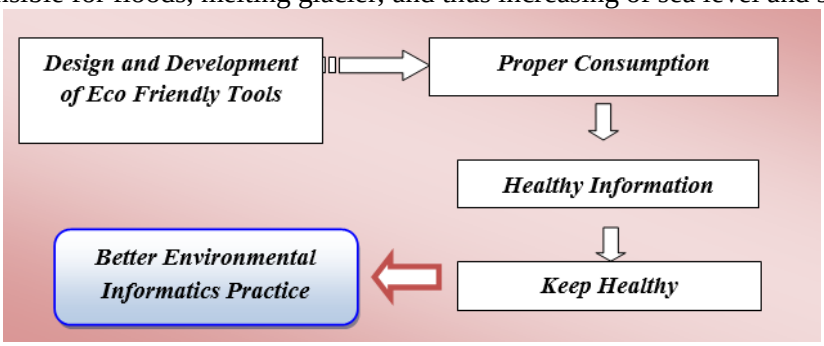

Fig.3.Showing Environmental Informatics and its requirement as a policy

As far as stakeholders are concerned, Environmental Informatics deals with technological tools, user or consumer and authority or data centre professionals. As far as technology is concerned, it is essential to use only those technologies and tools which are cost effective, energy star rating, less power consumption and releases less toxic material, less carbon emission and other harmful chemical. Apart from core computing devices such as computer, laptop, display unit, networking devices-hub, switch, router, servers, database system, Eco friendly web system and so on, it is essential to use other electronic weapon and devices which consume less power and are less harmful to environment. Data Centers need to take care for the use of AC machine, refrigerator invertors, UPS, and Analog computing systems. Apart from technologies another important stakeholder is user and they include general user of the Data Centre or Common people in case of shopping mall, organization and institutions such as front office executive, back office executive and general public, if the services are offered by mobile based services (P.K. Paul, 2013c; P.K. Paul, 2013d; P.K. Paul, 2013e).

Another important stakeholder of Environmental Informatics is system and which is mainly responsible for the design and manufacturer of system which is environment friendly and less power consumed and hence companies and IT firm need to use only such sensor which maintain a standard parameter, use of wireless information system is another important tool need to maintain for power management. If we academically look to Environmental Informatics; then we can find out three main stakeholders these are- Environmental Science, Information Studies and Computer Science. Logically stakeholders are people, technology and environment (P.K. Paul, 2013f; P.K. Paul, 2013g).

3. RESULTS

Requirement: Implementing Environmental Informatics need some essential facets that are as follows:

Building awareness about energy consumption and power management and for that we need to keep switch off, of such devices which are not needed currently. As display unit basically consume one third of total energy by a computer and thus, 'turn off' mode or 'switch off' mode is better.

During design and development of new products and electronics gadgets it is essential to consider energy management principles and do as much as possible. Designing sensor and network devices are also very much important with VLIS and modern embedded system basis (P.K.Paul, 2012b; P.K.Paul, 2013).

Use of such devices is better which are 'Energy Star Rating' and comes with less carbon emission and other harmful chemical output such as Methane [CH_4], Nitrous Oxide [NO_2], Fluorocarbon [CCI_4] and other lead material; hence use of small devices like laptop, LED/ LCD display unit may be helpful (P.K. Paul, 2013, P.K. Paul, 2013h).

Use of such architecture, platform and technologies which are much more cost effective and based on energy management principle. Hence, wireless technology may be helpful for complete information system building.

As Environmental Informatics is mainly responsible for the Eco Friendly Information System and Infrastructure building thus it is better to use modern display unit for power management and eco friendliness than that of manual and conventional information display and information transfer cycle and thus use of projector, LED based display unit may be helpful.

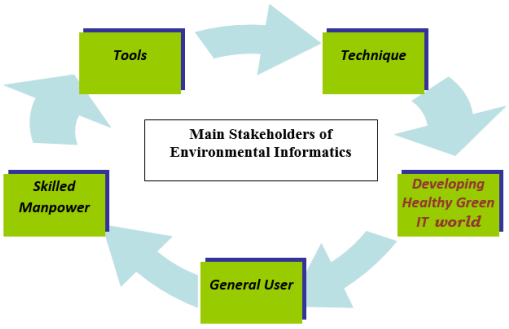

Figure.4.Showing the key player for the development of Environmental Informatics

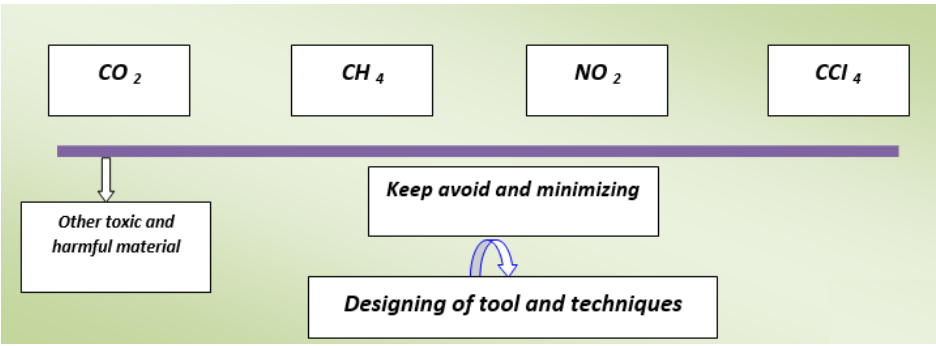

Figure.5.Showing harmful chemical and material for healthy Green Informatics practice

4. CONCLUSION

Environment is one of the major concerned now days; thus each and every organization is moving towards Green agenda to their corporate system. Green Computing, Cloud Computing are the major tool and weapon for the Eco Friendly Information Infrastructure building and complete energy management through the use of appropriate tools, technologies and devices. Many Governments take proper initiatives towards sustainable organization and society and thus Green Computing and more advance domain may be helpful and needed.

REFERENCES

Cohen, Eli B and Nycz Malgorzata Learning Objects and E-Learning: an Informing Science Perspective. Interdisciplinary Journal of Knowledge and Learning Objects, 2(02), 2006, 20-23

Martin SB, Information technology, employment, and the information sector: Trends in information employment 1970–1995. Journal of the American Society for Information Science, 49(12), 1998, 1053–1069.

Michael Buckland and Ziming liu, History of information science, Annual Review of Information Science and Technology, 30, 1985, 385-416.

Paul PK, Sarangi BB and Dipak Chaterjee, Cloud Computing and its strategic and technical application in Information Networks in Indian Scenario in IEEE sponsored procedings of National Conference on Information and Software Engineering [NCISE-12], 2(02), 2012, 146-149.

Paul PK, Dipak Chaterjee and Bhaskar Karn, Cloud Computing: Issues and challenges with probable solution in Indian Perspectives, IJIDT International Journal of Information Dissemination & Technology, 2(01), 2012, 31-33

Prantosh KR, Pau1 KV Sridevi, Minakshi Ghosh, Ashwina Lama, Education Technology: The Transparent Knowledge Delivery through QPN and Cloud Computing, IJSD-An International Journal, 12(02), 2012, 455-462.

Paul PK, Ajay Kumar, M Ghosh, Cloud Computing: the 21st Century Friend for Virtualization, Procedinngs of International Confernce of Computer Applications and Software Engineering, CASE-2012, 1(1), 2012, 37-40.

Paul PK, Ghose MK, Cloud Computing: Possibilities, Chalenges, and opportunitities with special reference to its emerging need in the academic and working area of Information Science, ICMOC, Procedia Engineering, 38, 2012, 2222-2227.

Paul PK, Dipak Chaterjee, Ashok Kumar, E Learning: New Age Knowledge Model Delivery through Advance Information Technology and Cloud Computing: An Overview, BRICS International Journal of Educational Research, 3(1), 2013, 22-25

Paul PK, S Govindarajan, Dipak Chaterjee, Cloud Computing: Emphasizing Hybrid Cloud Computing on Android Computing Platform-An Overview, International Journal of Applied Science and Engineering, 1(4), 2013, 21-28.

Paul PK, M Ghosh, Cloud Computing and its possible utilization in Health and Hospital Administration" Journal of Business Management [JBM]- An International Journal, 5(02), 2013, 147-152

Paul PK, Cloud Computing: Its Opportunities and Advantages with Special Reference to Its Disadvantages- A Study, in International Journal of Neural Network Application - IJNNA, 6(02), 2013, 84-88

Paul PK, M Ghosh, D Chatterjee, Cloud Computing Utilization in Food and Nutrition Sector- Empowering Information Transfer:Challenges and Opportunities, International Journal of Soft Computing Bio Informatics-IJSCB, 2013, 04(02), 90-95

Paul PK, Cloud Computing Based Green Information Infrastructure: The Future of Eco Friendly Information Science Practice, PARIPEX Indian Journal of Research, 2(11), 2013, 122-124

Paul PK, Jhuma Ganguly, Green Information Infrastructure: Stakeholders-A Study, International Journal of Pharmaceutical and Biological Research (IJPBR), 4(4), 2013, 159-164

Paul PK, Jhuma Ganguly, Green Computing: The Emerging tool of Interdisciplinary Environmental Sciences-Problems and Prospects in Indian scenario, International Journal of Pharmaceutical and Biological Research, 05(04), 2013, 210-214

Paul PK, Jhuma Ganguly, Dipak Chatterjee, Green Information Science [GISc]: Journey towards Environmentally Friendly Information and Technological World, in The Sci-Tech International Journal of Engineering Sciences, 1(1), 2013, 80-87

Paul PK, Cloud platform and the Virtualised World: Take a look, International Monthly Refereed Journal of Research in Management & Technology, 2(09), 2013, 112-119

Paul PK, Distance Education and Online Education empowered by Cloud Computing: the Proper Information Infrastructure, Abhinav National Journal of Arts and Education, 2(09), 2013, 1-8

Paul PK, Digital Repositories: some Tools, Technique and Technologies and Social issue" International Monthly Refereed Journal of Research in Management & Technology, 2(10), 2013, 63-68

Paul PK, Virtual World: Empowered by Cloud Computing- A Conceptual Study, International Monthly Refereed Journal of Research in Management & Technology, 2(10), 2013, 82-89

Paul PK, Education 2.0: Promoting Technological Knowledge Delivery, Abhinav National Journal of Arts and Education, 2(12), 2013, 43-49.

Paul PK, BSc-Information Science: Need, Value with Special Reference to a Proposed Curriculum with Multi Entry and Multi Exit System, Abhinav National Journal of Science and Technology, 2(12), 2013, 01-11

Paul PK, Green Computing and Informatics: Way to Green and Energy Consumed World, International Monthly Refereed Journal of Research in Management & Technology, 02(13), 2013, 70-77

Paul PK, Digitization: Establishment and Some Requirement in Cloud Age, Scholars Journal of Engineering and Technology (SJET), 1(4), 2013, 257-260

Paul PK, Green information science: Information science and its interaction with greencomputing and technology for eco friendly information infrastructure, International Journal of Information Dissemination and Technology, 3(4), 2013, 292-296

Paul PK, KL Dangwal, Cloud Computing Based Educational Systems and iits challenges and opportunities and issues, Turkish Online Journal of Distance Education-TOJDE, 15(01), 2014, 89-98

Paul PK, K Kumar, D Chatterjee, R Rajesh, Usability engineering and user interface design for electronic information systems and its subsystems: Overview, 20(01), 2014, 23-32

Reichman F, Notched Cards. In R. Shaw (Ed.), The state of the library art, New Brunswick, NJ: Rutgers, The State University, Graduate School of Library Service, 4(1), 1961, 11-55.

Saracevic T, Relevance reconsidered. Information science: Integration in perspectives. In Proceedings of the Second Conference on Conceptions of Library and Information Science, Copenhagen, Denmark: Royal School of Library and Information Science, 1996, 201-218.

Saracevic T, Relevance: A review of and a framework for the thinking on the notion in information science. Journal of the American Society of Information Science, 26(6), 1975, 321–343.

Saracevic T, An essay on the past and future of information science education. I. Historical overview. Information Processing &Management, 15(1), 1979a, 1–15.

Saracevic T, An essay on the past and future of information science education. II. Unresolved problems of ‘extemalities’ of education Information Processing & Management, 15(4), 1979, 291–301.

Vickery BC & Vickery A, Information science in theory and practice. London: Butterworths, 1987.

White HD & McCain KW, Visualization of literatures. Annual Review of Information Science and Technology, 32, 1997, 99–168.