Effective Software Requirement Elicitation Designing for Indian Rural women

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Abstract: The paper research focuses on information technology dissipation in rural areas. Highlights a variety of challenges related to rural areas. We aim to bridge the gap between the rural community and technology to improve their socio economic growth. To improve the acceptability of IT with respect to community we combine human computer interaction and software process.

*Keywords***:** Software engineering, Requirement gathering, human computer interaction, rural women.

INTRODUCTION

This study analyzes the problem of requirement elicitation process to elicit requirements from Indian Rural women. Rural development is based on economical social and human development; however software requirement engineering focuses on proper elicitation of requirements for a better usable end product. Due to cultural issues men's control and social boundaries woman rarely have access to information.

Rural community is based on their local knowledge instead of global knowledge. Rural areas need to bridge between this local and global knowledge.

The lack of basic information of technology forces women to stick to their traditional methods in this IT era .Because of the cultural and social conditions women in rural India are deprived from the information which can help to enhance their lives and improve their children's cognitive development

This bridge can be built by providing information by their preferred mode. By gathering data from some selected areas of Maharashtra we can provide a framework which can serve as a guideline to design interface for rural women of India. Software requirement gathering techniques and Human computer Interaction evaluation techniques can be used to increase its acceptability.

Requirement engineering is the fundamental aspect of software process development. it is modularized into various stages of elicitation, analysis, validation and documentation. Elicitation is the process of gathering requirements from the end user to recognize what the software system should consist, if an error occurs in the elicitation stage then quality product will not be produced. Thus realizing the importance of requirement elicitation stage we aim to discuss requirement elicitation process to elicit requirements from Indian rural women.

By literature review, we observe that that adoption of technology is a barrier between rural and remote places in India specifically women. It is difficult to understand the perception of messages of illiterate women. This study aims find a solution for this barrier by designing software for Indian women. Results are expected to be in form of frameworks so that they can be applied to build systems meant for rural women.

BACKGROUND

Neils [4] proposed 7 C s, i.e., Connectivity, Content (Static and Dynamic), Context, Cash, Culture, Community and Communication for rural areas. He did not consider rural culture in general specially developing countries. He also ignored the role of tacit and explicit knowledge. We need to understand rural areas' norms, their values and diverse dynamics. Nonaka and Takeuchi's [5] model can be helpful to achieve successful result. The tacit knowledge of a rural community needs to transform into explicit knowledge.

Davenport and Prusak [6], cited by Hess, [7] proposed principles for knowledge sharing. His principles emphasis on good relationship shared knowledge by training, meeting places and times to exchange the ideas and incentive for those who share knowledge etc. According to [7] rural knowledge can perform better if all are agree on same objectives, interest, contribute their experience and a place to share all these.

Requirement engineering is supposed to be the key to successful completion of any project, as mentioned in [8], Requirement engineering (RE) is an initial activity of a software development project and it can affect the entire software development activity if not properly executed. Various studies in the past has shown that majority of the errors in the software functionality are directly linked to the mistakes done at the time of requirement gathering and elicitation phases. Further mentioned in this paper are phases on which RE models possibly depend:

a. Requirement elicitation and development

b. Documentation of requirements

c. Validation and verification of requirements

d. Requirement management and planning

Some of the input/output of software requirement gathering phases are:

a. Existing system information

b. Stakeholder needs

c. Organizational standards

d. Regulations

e. Domain information

Requirement Elicitation is the process of gathering, collecting, acquiring and de-tailing the needs of the customers to build up a quality product, as discussed in [9]. The major goal of this phase is to satisfy customer's needs according to cost and budget. According to some authors, requirements are of two types: known and known. Known requirements are known by the customers and unknown are not known by customers or they are not aware of it.

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The main challenge of the software engineering community is to satisfy the customer needs and possibly exceed his expectations in an economic, rapid and profitable manner. Requirements engineering can help organizations develop quality soft-ware systems within time and budget constraints which are true reflection of customer needs [10-11]. The paper further stated that the primary success factor of requirements elicitation is that requirements meet end user needs. This outcome is difficult to achieve because users often have trouble identifying and articulating their needs and because those needs often change as a result of system implementation. Mistakes made in elicitation have been shown many times to be major causes of systems failure or abandonment and this has a very large cost either in the complete loss or the expense of fixing mistakes

Requirement Elicitation:

There are number of requirement elicitation techniques available in literature. There are five categorizes of elicitation techniques [8].

a. Traditional techniques

b. Cognitive techniques

c. Group elicitation techniques

d. Modern elicitation technique

Contextual technique:

Some of the techniques discussed [11-13] by various authors are presented in table below:

Techniques	Details
Interviews	Conducted from groups of people with pre-defined agenda
Workshop, focus groups	To create/review high level features of desired products
Questionnaires	During early stages of requirement elicitation
Brainstorming	generates broad and large list of ideas
Prototyping	A version of software which is incomplete
Win-win approach	Stakeholders negotiate to resolve disagreements about candidate requirements
Repertory Grids	To identify and represent the similarities and differences between different domain entities
Card Sorting	To sort a series of cards containing the names of domain entities into groups according to their own understanding
Joint Application Development	Stakeholders discusses the problems and all possible solutions

Problem statement:

The issues of Indian rural areas are different than areas are different than other places like, load shedding (power infrastructure), illiteracy, cultural and languages variations. Illiteracy problem is main issue, therefore rural community does not get any benefit from ICT [14-15]. They also purposed that illiteracy problem can be solved by voice instruction [16-18] and icons. Here lack of previous experience is another hurdle, therefore voice instruction and icons are not really useful. However, images [17-19] can be easily understood. The lack of basic information forces rural women to stick with their traditional method in IT era. Therefore, this study investigates the constraints of the rural women in accessing information. This research starts to find answer the question. "What are the constraints that rural women, encounter to access information?"

Because of the cultural [20] and social [21] conditions in these rural communities, women are deprived from information to enhance their living standard and foster their children's cognitive development. In this research we are using requirement gathering techniques along with Human computer evaluation techniques to design to accommodate rural women's need.

Requirement Elicitation in Rural Areas:

It is necessary to understand the current scenario of requirement elicitation in rural settings in order to know the evolving technology. The hesitation is more pronounced with the rural users because they are not exposed to new technologies. For requirement elicitation, the author has discussed in [10],

there are influential people in the villages like doctors, teachers, rich farmers and the elderly who are trusted sources of information for the village. These are the people accessible to almost all the villagers and can influence individual and collective decisions.

Much of the communication in rural areas is restricted to physically close locations, the nearby towns and villages. For this intra and inter village communication, word of mouth information exchange is most widely used. People gather at public places like local market, bus stop etc. and discuss various issues concerning them. This is also the place where social consensus is made and decisions taken. However inaccuracy is a major problem with this communication system. Most of the written communication done by the illiterate population like filling up government forms, Insurance formalities, and even writing letters is through agents/middlemen. This can be attributed to low literacy levels, unfamiliarity with the "official" language used and lack of information resources.

In practice it is much more difficult as finding useful information implies that the actual end-users understand what the problem is and ask the 'right questions' which get the 'right answers' so that the resulting information is pertinent and applicable. Expressing oneself with the 'right questions', understanding the 'questions right', and giving the 'right answers' are all learnt skills which, because of their socio-economic situation, people in rural communities may not have had the opportunity to develop [21].

As discussed in [23], author said that the first obstacle to overcome would be the general level of computer literacy of the people in the area. Merely providing the technology will not lead to a large number of people using it, similarly training would be sufficient. Studies in rural areas in Asia showed that in the battle against poverty, micro-finance has emerged as one of the most potent weapons.

Problem Analysis:

By reviewing literature, we observe that technology adoption is a barrier between rural and remote communities of India specifically women. It is difficult to understand the perception of messages of illiterate women. Women living in rural areas are more subject to these aspects because of more challenges like literacy, socio-economics, religion and technology. Rural woman hardly have any interaction with technology.

METHODOLOGY

Rural community based on their local knowledge instead of global knowledge. Rural area needs bridge between local knowledge and global knowledge. This bridge can be built by providing information according to their preferred mode [24-25]. The method to conduct our research will be survey based and evaluation of system for rural communities. This survey and participatory audience research will be conducted from some selected rural areas of Maharastra. The expecting finding in the study will have a guideline to design an interface to meet the need of rural community. Results will be drawn after data analysis of gathered data. A framework will be proposed for designing interface for rural women of India.

CONCLUSION AND FUTURE WORK

The Requirement gathering to match the capabilities of the rural women will enhance the usability of software and enable users to develop confidence in it. Future work we expect academia and practitioners will implement and evaluate our design.

REFERENCES

[1] Sheikh, J. A; Fields, Bob; Duncker, Elke (2011a). Cultural representation by Card Sorting. Ergonomics for All: Celebrating PPCOE's 20 years of Excellence. Selected Papers of the Pan-Pacific Conference on Ergonomics, 7-10 November 2010, Kaohsiung, Taiwan CRC Press, 215 -220

[2] Sheikh, J. A; Fields, Bob; Duncker, Elke (2010b). Multi-Culture Interaction Design. Advances in Cross-Cultural Decision Making. CRC Press, 406 -415

[3] Sheikh, J. A; Fields, B. and Duncker, Elke (2010a). Cultural based e-Health

Information system, Presentation at the Health Libraries Group Conference 2010: 19-20 July. CILIP, Salford Quays, UK.

[4] Roling, Neils (1988), Extension Science, Information System in Agricultural Development. Cambridge: Cambridge University Press.

[5] Nonaka, Ikujiro; Takeuchi, Hirotaka (1995): The Knowledge-Creating Company. Oxford University Press, New York

[6] Davenport, Thomas H., Prusak, Laurence (1998): Wenn Ihr Unternehmen wüsste, was esalles weiß. Das Praxishandbuch zum Wissensmanagement. Landsberg/Lech

[7] Hess, C. G (2006): Knowledge Management and Knowledge Systems for Rural Development. In: READER: GTZ Knowledge Management. GTZ Sector Project Knowledge Systems in Rural Development, www.gtz.de/agriservice

[8] Tousif ur Rehman, Muhammad Naeem Ahmed Khan Naveed Riaz, "Analysis of requirement Engneeing Processes, Tools/Techniques and Methodologies" I.J. Information Technology and Computer Science, 2013

[9] Nikita Nahar G, Pujita K wora, Sakthi Kumaresh, "Managing Requirement Elicitation Issues Using Step-Wise Refinement Model", IJASCSE, Volume 2 Issue 5, 2013

[10] Aditya, Chand, (2002) "Designing for the Indian rural population: interaction design Challenegs", Development by Design, Bangalore.

[11] Nilofer M., Sheetal G., "Comparison of Various Elicitation Techniques and Requirement Prioritization Techniques", International Journal of Engineering Research & Technology, May 2012

[12] Zheying, Zhang (2005), "Effective Requirements Development – A comparison of Requirements Elicitation Techniques", Department of Computer Science,

[13] Didar, Zowghi and Chad, Coulin 2005. Requirements Elicitation: A Survey of Techniques, Approaches and Tools. Engineering and Managing Software Requirements. Pp.19-46.

[14] Ahmed I S., Zaber M., and Guha S. 2013. Usage of the Memory of Mobile Phones by Illiterate People. Proceedings of the third ACM Symposium on Computing for Development. New York, USA

[15] Lehrer Rachel and West Harry 2014. Literacy a Hidden Hurdle to Financial Inclusion. http://www.cgap.org/blog/literacy-hidden-hurdle-financial-inclusion, retrieved on Feburary 21 2014.

[16] Medhi I., Gautama N. S. N., and Toyama K. 2009. A Comparison of Mobile Money-Transfer UIs for Non-Literate and Semi-Literate Users. CHI 2009, April 4–9, 2009, page 1741-1750, Boston, Massachusetts, USA.

[17] Medhi, I., Sagar A., and Toyama K. 2006. Text-Free User Interfaces for Illiterate and Semi-Literate Users. International Conference on Information and Communication Technologies and Development, page 37-50

[18] Ruth Branvall 2013. Designing products and services for the illiterates. Inclusive business insights: http://community.business   fightspoverty.org/profiles/blogs/ruth-branvall-designing-products- and-services-fory-illiterate retrieved on 23 January 2014

[19] Parikh, T., Ghosh K.., and Chavan A. 2003. Design Studies for a Financial Management System for Micro-credit Groups in Rural India. ACM Conference on Universal Usability, pp 15-22, Vancouver, Canada.

[20] Sheikh, J. A; Fields, B. and Duncker, Elke (2009c). Cultural Representation for Interactive Information system. In: Proceedings of the 2009 International Conference on the Current Trends in Information Technology, Dubai.

[21] Sheikh, J. A; Fields, B. and Duncker, Elke (2009b) Cultural Representation for Multi-culture Interaction Design. HCI (13), volume 5623 of Lecture Notes in Computer Science, page 99-107. Springer.

[22] Kristina, Pitula; Radhakrishnan, T (2008) "A multimedia tool to elicit information needs in rural communities", CHI'08, Florence Italy, ACM 1-58113-000-0/00/0004, April 5-6.

[23] Delene heukelman, "Can a centered approach to designing a user interface for rural communities be successful?", Durban Institute of technology, 2005

[24] Duncker, Elke; Sheikh, J. A and Fields, B. and (2013): From Global Terminology to Local Terminology: A Review on Cross-Cultural Interface Design Solutions. HCI (15), volume 8023 of Lecture Notes in Computer Science, page 197-207. Springer

[25] Sheikh, J. A; Fields, B. and Duncker, Elke (2011): The Cultural Integration of Knowledge Management into Interactive Design. HCI (14), volume 6771 of Lecture Notes in Computer Science, page 48-57. Springer