Community Exchange: Designing to Support Empathy and Interaction of Hope

Romiza Md Nor* and Ralf Muhlberger**

Information and communication technologies (ICT) can accelerate development in rural areas. It is important to explore how information can be disseminated in rural communities so that members will get the most benefit from the interaction. People in rural areas depend on farming to generate their income, and information plays an important role in these activities. Communities in rural areas are independent and it can be difficult for them to seek help. One of the ways to improve this is to find a remotely accessible solution. This research suggests that when collaborating virtually, the farming community can receive effective advice from experts to facilitate their decision making and at the same time to support their psychosocial health. Locales Framework is used as a model to analyse the existing systems in a cooperative work situation. In examining the possibilities of computer supported cooperative work (CSCW) systems, the study will look closely at the technology already in use and will apply the Locales Framework to explore how locales can be enhanced to better support the various activities and to tackle the unmet needs existing in the process. We posit that it is important that empathy and hope are included in interaction between participants, especially when ICT is used to deal with complex conversations (e.g. climate change, agricultural information).

Field of Research: Psychology, ICT for development, Empathy

1. Introduction

ICT for development (ICT4D) has a large role in supporting the future of rural development with the integration of available technologies and the existing knowledge landscape (Unwin 2009). It is identified that there are barriers to improving the dissemination of information among rural communities. There have been increasing changes in rural development but still agriculture remains the direct and indirect base for the livelihood of the majority of the world's population (Chapman & Slaymaker 2002). The importance of ICT infrastructure development and strategic ICT intervention lies in promoting social development goals that have the potential to contribute to economic growth.

_____

* Romiza Md. Nor, School of Information Technology and Electrical Engineering, University of Queensland, Brisbane, Australia
Email: romiza@itee.uq.edu.au

 **Dr. Ralf Muhlberger, School of Information Technology and Electrical Engineering, University of Queensland, Brisbane, Australia
Email: ralf@itee.uq.edu.au

To achieve those goals, it is important to understand the complexity of the rural development contexts and how ICTs can accommodate the demand in rural development.

Today, there are massive developments in ICT with advanced technology innovation affecting the way people lead their lives. At the same time, the quality of life in most rural areas will not improve without significant development of agriculture. Information plays an important role in agricultural activities and farmers have always made key decisions about what and when to plant, how and when to harvest or how and where to sell based on the information that is exchanged and transmitted using any means of technology that is available to them and their communities.

The design of virtual collaborative systems is a useful paradigm so that higher levels of collaboration may be achieved among geographically dispersed community. The social process is critical to understanding how ICTs may be used effectively to support geographically dispersed collaboration of farming communities and agricultural experts in rural areas. This research suggests that when collaborating virtually, the farming community members can receive effective advice from experts to increase their knowledge and at the same time to support their psychosocial health. This research is inspired by studies into exploring and understanding computer supported cooperative work (CSCW) systems that can support and allow people to communicate with each other when they are in different physical locations and thus not able to communicate in the usual face-to-face manner (Kabanda 2008).

1.1 Problem Statement

Inspired by the research into exploring and understanding of Information Communications Technology (ICT) for development and particularly Computer Supported Cooperative Work (CSCW) systems that can support and allow people to communicate with each other in a different physical location and thus not be able to communicate in the usual face to face manner. This is an important matter as people in rural areas need to seek advice and support remotely. The main issue here is how to design a platform that can allow farmers and agricultural experts to interact as if they were in the same place although they are geographically separated. Another challenge in this study is to design a collaborative technology to assist them in interact and work together more effectively, especially when creating and sharing content to support decision making.

2. Literature Review

The fast growth of information and communication technology, mobile communication and the Internet has played an important role in people's social lives. Relationships, social interactions and information sharing among people in a community can be strengthened with the increasing accessibility and speed of

communications platforms. Communities can incorporate this emerging technology into their social interactions without losing social touch and engagement (Preece 2000).

Community is defined as a group with the same interest, shared goals, activities and individuals who cooperate to share resources and satisfy each other's needs (Jewkes & Murcott 1996). In this research, the community refers to the rural community. As rural communities are remote, they rely on farming to obtain food and at the same time generate their income and contribute to the economy. Farming is a stressful occupation which is impacted by the environmental context, such as decreased yield, as well as the prices of goods from competitors, cost of fuel, and globalization. It has one of the highest rates of suicide and farmers are at high risk of developing mental health problems. In Australia, for instance, approximately one male farmer dies from suicide every four days (Judd et al. 2006). As people in rural areas live in isolation, they are necessarily independent and it is difficult for them to seek help. As people in rural areas live in isolation, they are necessarily independent and it is difficult for them to seek help. People in situations of isolation also lack the contact that is important for their psychosocial wellbeing. One of the ways to improve this is to find a solution remotely.

Globally, ICTs have emerged as strategically important tools for social and economic change. Many issues faced in rural areas have been highlighted in previous studies where technology has been designed and developed to facilitate communication between stakeholders (Unwin 2009). There is great potential for improvement in the design of technology interventions in ICT for development in rural areas. ICT4D plays a large role in supporting the future of rural development with the integration of available technologies and the existing knowledge landscape.

Today, there is a massive development of ICT with advanced technology innovation affecting the way people lead their lives. The quality of life in most rural areas will not improve without significant development of agriculture. There are many issues in rural areas that have been highlighted in previous studies identifying technology that has been designed to facilitate communities in rural areas. The present study aims to look into the issues involved in the technology interventions in various areas by examining articles that concentrate on technology in rural areas and ICT for development in rural areas.

There are many benefits in the adoption of ICT by farming businesses and a great prospect for overcoming the digital divide in the agricultural sector through the ubiquitous internet and associated services such as email, bulletin board and the World Wide Web (Warren 2002). With the technology, information of knowledge on scientific farm practices and risk management can be disseminated, improved the input from the farmer themselves (Anupindi & Sivakumar 2005). The existence of technology in the rural areas also brings opportunity for development to better understand people and practices in the

agricultural sector before technology interventions are designed and put into place. They found out that there is a need to study into equipment capabilities, environmental conditions and user needs informs new capabilities for sensing and gathering data about the environment and new ways to manage data digitally (Burrell, Brook & Beckwith 2004). In addition, there is also study being done in the architecture of sensor-based agricultural information systems for effective planning of farm activities (Chaudary, Sorathia & Laliwala 2004) .

Decision making is one of the most common applications of technologies in farm management. Advances in ICT allow farmers to obtain amounts of specific data for their fields but they may lack sufficient time to analyse the data and interpret the information which can reduce vagueness in decision making. Farmers need to know about their information needs, the costs of information, alternative sources, the value of the information and they need to identify what is the necessary information to collect before making decisions. Decision analysis factors were identified to characterise a farm manager's decision making process (Fountas et al. 2006). A study also has been done that personalized agricultural advisory system called eSagu that delivers the expert advice at regular intervals to each farm by getting the crop status in the form of digital photographs and other information which assisted the farmer to save in capital investment and improved the crop yield (Reddy, Ramaraju & Reddy 2007).

Today's technology needs to incorporate knowledge and also experience from farmers or local expertise to solve problems and to design the technology based on the user needs. It is necessary to incorporate locally available resources, farmers' preference criteria and indigenous knowledge to offer wider opportunities for the development and acceptability of a technology by farmers (Mekoya, et al. 2008). As rural areas are isolated, there is a need to improve the delivery of information to farmers and other rural dwellers for agricultural development purposes (Meera, Jhamtani & Rao 2004) and they also need tools that can deal with decision making problems via the technology (Wen 2007).

3. Methodology and Research Design

The spread of information and ICT is equally important to urban or rural areas. The only difference is that rural communities have limited access to the tools and infrastructure (Hargreaves & McCown 2008). This paper will describe the development of technology intervention and telecommunication infrastructure available in rural areas where analysis of existing ICT4D projects has been done. Of these analyses, 184 papers have been reviewed and only 40 papers fall within the agricultural field. The search strategy took in papers from the years 2004-2008 from various resources, namely, the Association Computing Machinery (ACM) portal, low cost computing devices and initiatives for the developing world website, reports from the World Bank website, first monthly magazine on ICT4D portal, ICT for Development and Rural Industries Research and Development Corporation websites. The phenomenon of rural community conversation is complex as it involves many stakeholders that can be classified into three

groups: governments; interested industries or businesses; and NGOs or charitable organizations. The technology that has been designed is also a complex combination of hardware, software, content, information accessibility and the social infrastructure that benefits from it.

The Locales Framework provides an overview of the approaches to understanding and designing in the CSCW community to improve how people work together through computer-based support. The Locales Framework is a comprehensive theoretical CSCW and interaction design framework in the field of information and computer science (Fitzpatrick 2003). This research framework is an approach that allows the creation of shared abstractions among stakeholders (e.g. experts, participants, government, individuals) and also the narrowing of the gap between social and computing concerns (Fitzpatrick 1998). According to the Locales Framework, there are two factors that are important in designing an application: firstly, understanding the social world; and secondly, designing a suitable application according to the social setting.

In relation to understanding, the Locales Framework can function as the foundation for understanding the characteristics in a collaborative work environment. The framework will assist in developing questions and observations that can be used as a basis for structuring the data. In relation to design, designers can use the Locales Framework aspects to identify other features that can be added to enhance the existing technology or to consider whether new technology can be developed to combine with an existing group of people or communities. The strength of the Locales Framework for CSCW design is that decisions about computer-based support are motivated by the context of how interaction happens, rather than by the representation of the interface.

The aim of the Locales Framework is to help build a system requirement with the concern of CSCW design principles where the problem of technology support provides an environment that can apply, evaluate and evolve this approach to understanding and supporting group work. The second purpose is to discuss the problem of remote conversation between participants in a community. The Locales Framework is composed of five inter-dependent aspects, namely: locales foundation; civic structure; interaction trajectory; individual view; and mutuality. Each aspect characterizes the nature of work from a different perspective and considers how the locale does, or could be evolved to support the life of this social world. We describe these in the lead into an analysis of each Locales Framework aspect in the next section.

4. Discussion of Findings

Locales Foundation
A locale provides the site and means through which members of social worlds interact. The locale foundation allows us to consider the information in which the stakeholders are and the shared context of interaction. The primary social world of common interest in this study will be the community of villagers or farmers who

will go to an information kiosk or to the infrastructure or facilities that are available to interact with different social worlds to get information or advice.

The locale that needs to be supported will be the computer network in the site where the experts or government officers can communicate and share information relevant to farmers' interests. This includes the facilities for accessing and sharing information about agricultural products, farming, medical issues or education needs regardless of the location of the participants.

The key members of this locale are the experts who provide the advice and initiate the agriculture consultation. The coordinators are also involved as the mediators who send the digital information to the experts on behalf of the farmers, the majority of whom are illiterate. When the farmers need to send a query or respond to an email that they have received, operators of the kiosk or telecentre will perform the data entry.

One limit to effective communication in this locale is the digital information that is burnt on compact discs and sent by post. The experts rely on written communication that has been mediated by the coordinators and, thus, have to construct their own representation of the farmers' situation without direct access to the farmers' testimony. The locale has to wait a number of days to receive the experts' feedback and does not have any awareness of activity or shared information that is occurring between farmers and experts.

Civic Structure

Civic structure allows us to consider the locale in a broader landscape where all considerations have an impact on the locale and the activities that take place. The locale is established by the farmers who are looking for advice and information. Previous ICT4D projects locate their facility such as a telecentre, kiosk or booth, at a physical location that can be accessed easily by the rural community and where the infrastructure is available.

Interaction Trajectory

Interaction trajectory allows us to consider the temporal aspects as interactions happen over time. The social world has a past, present and one or more futures. There are several different aspects of the trajectory to consider: trajectory of the management of the kiosk/booth; trajectories of the objects (complaint records, equipment, agricultural information, etc.); and trajectories of the individuals involved (farmers, villagers, experts, government officer, etc.). The connection of the different trajectories is an interesting aspect of studying the rural community. The kiosk/booth is used as an information gathering and information tool. The time taken for the information to be received at the kiosk is one day to one week depending on the complexity of the query or advice. Online services are available for the farmers to chat with the experts. The numbers of kiosks can be increased due to the demand from the farmers who depend on it to find new information and assist them in making decisions.

Most of the farmers have the same objective in going to the kiosk: to obtain agricultural, educational and medical information or advice from the experts. They interact through email, chat or through the coordinators/mediators as most are not literate. More applications will be developed in the future due to requests from the users collected during their visits.

Individual View

The individual view lets us consider the different perspectives of the same locale adopted by its members depending on the degree of interest and focus.

The individuals who come to the kiosk are those needing advice about improving the productivity of crops, making complaints, or submitting online registration. Experts need to receive and analyse the digital information that has been created by the coordinator before advice is given based on the crop and problem that has occurred. In addition, several days are needed for the information to be received from the rural areas because, if information in a digital form cannot be provided, it needs to be printed out and sent to an appropriate authority.

Mutuality

Mutuality means considering in more detail how locales, people, objects and trajectories can be presented or represented in a locale and how others can be aware of that presence.

There is very limited presence and awareness in the current ICT4D projects. Most of the time, information or queries are sent to the experts in the form of text, image and video and this information will be burnt onto compact disc and sent through the post. The meeting is conducted physically between the farmers and coordinators and conducted virtually between experts and coordinators or farmers. Experts also can visit the farm virtually by interactive mode at the main system. Some farmers send their complaints or queries through the website or email.

4.1 Locales Work Coverage

In the analysis, the content is compared with the content of other ICT4D projects to identify those with similar content where the contribution made by each aspect of the framework. As shown in the following results, mutuality is the least mentioned: locale foundation, 75%; civic structure, 42.5%; interaction trajectory, 25%; individual view, 20%; and mutuality, 5%. (*Note that research can cover more than one aspect of the Locales Framework, so the percentages do not necessarily add to 100%*).

Most ICT4D projects in rural areas are web-based systems. Farmers in rural areas can only interact by email or by entering the specific website to ask questions or look for suggestions. There is no synchronous interaction between farmers and experts on a real time basis. The above analysis also shows that participation of farmers should be included and rapid rural appraisals should be made to find out what type of information the farmers need. In view of the fact

that farmers are computer illiterate, training is needed on how to get the best possible use out of the services provided. There is a great potential benefit for the farmers if the current system enables them to collect, share and disseminate information in an effective way. Such interaction may, for example, improve their crop productivity. Furthermore, stakeholders will be able to utilize the analysis from this study to become more familiar with how the project functions and how they can participate to make it a success.

4.2 Motivating System Design

From the analysis, it has been identified that there are gaps in the mutuality context. This research reviews studies on mutuality to discover any opportunity for incorporating it in the future design of the technology intervention. Systems in remote rural/regional primary industries work to improve the efficiency of information flow and allow for faster responsiveness and reduced costs, but also have a contact reducing impact. Remote regional workers who use technology to automatically measure and report data and to ask for advice in decision making rather than through regular direct contact with work offices also find themselves with reduced social contact. An argument can be made that meeting social contact needs through professional interactions is not the best solution, and thus that the reduction of that contact simply returns responsibility for social interaction rightfully to the affected party. However, as new technologies that transmit information are introduced into an environment, we see an opportunity for design enhancement that increases benefit to the affected user's psychosocial wellbeing (Baharin, Nor & Muhlberger 2008).

ICT design should not only consider how people communicate but also what they communicate (Zhang 2007). It is necessary to incorporate human to human interaction mechanisms in the design of new technology as this can provide the sense of relatedness socially and psychologically when communicating (Baumeister & Leary 1995). Much of the research in CSCW and computer-mediated communication focuses on performance in formal tasks, where empathy is usually not obvious. The increasing number of studies in empathic communication provides researchers with opportunities to take a new perspective on the role of empathy in informal communication. Computer-mediated emotional support allows support seekers who have limited mobility to participate in or attend the support offered in face-to-face formats. One important factor in empathic communication is hope. This concept supports the farmers' needs in dealing with negative emotions by giving them hope and appropriate advice if there are any problems. Hope has been identified as an important therapeutic factor in effective coping, decision making, psychosocial adjustment, quality of life and has been used in the process of recovery in mental health.

Thus, interaction of hope is introduced. Groopman defined hope as "the elevating feeling we experience when we see in the mind's eye a path to a better future". Future is based on the reality that there would be obstacles existing along the path (Groopman 2004). In the present study, this distinction is important because

the expert must know how to express hope as well as the risk that it may be proven wrong. When farmers interact with the expert, they anticipate that there is some hope when they have to deal with bad news regarding their crops. According to the studies done, hope is a path to a better future and the interaction of hope can improve the communication between farmers and experts. This can be expected to result in self care and higher level of psychosocial adjustments. In contrast, when farmers have the feeling of hopelessness, it can lead to depression, suicidal ideation and decreased physical health (Curtis et al. 2008).

To create successful interactive systems, a definition of a design pattern is a proven solution to a recurring design problem. It gives special attention to the positive and negative consequences of the application and also the usability (Borchers 2001). It appears that the interaction pattern in presence technologies still requires attention in order to design technologies that are effective in creating the sense of presence in the interaction between farmers and experts. Thus, designing to support empathy and interaction of hope design pattern needs to be introduced (Nor & Muhlberger 2010) to support the interaction between communities and experts especially when ICT is used to deal with complex conversations (e.g. climate change or agricultural information).

The result form this research is expected to provide more significant that can contribute to the rural community. The technology must be designed in a proper way so that the rural community will utilize it to improve their farm productivity. By analysing the current technology which emphasize on ICT for development and CSCW context using Locales Framework, this study will be expecting to come out with the best practice model that can be applied in the development process of the new technology. The result of the investigation will assist the future designer in the quality improvement of the overall production. By focusing on the core elements of CSCW and interaction design, the outcomes can reduce the gap between the technology intention to give advice to the farmers and the reality of famers that lost the quality of interaction when seek for advice via technology. Nevertheless, this study will provide concrete evidence and significant by offering alternative method and process of designing the new technology especially in a highly context sensitive environment, the rural areas.

5. Conclusion

The aim of this study is to design a technology intervention that can support emotional communication as well as factual information in the system during the community conversation. In examining the possibilities of CSCW systems, the study will look closely at the technology already in use and will apply the Locales Framework to explore how locales can be enhanced to better support the various activities and tackle the unmet needs existing in the process. It is hoped that applying the Locales Framework will give a broader range of theoretical frameworks that can map the complex problems of designing a system for regular discussion among the communities in the group that can be done without

the need to meet face to face. We posit that the usage of ICT in farming creates an open channel, which can be tapped to enhance the psychosocial wellbeing of farmers in times of crisis by delivering empathy and hope. The sense of mutuality in the design will be incorporated so that users are aware of the presence of others. The design developed in this research will be based on the user experience of interaction among participants in a community in. A collaboration technology which can be more supportive and facilitate empathic communication techniques in the rural farming community is the focus of our future work.

References

The ACM digital library, viewed 2008, <http://portal.acm.org/dl.cfm>.

The first monthly magazine on ICT4D, viewed 2008, <http://i4donline.net/archive/index.asp>.

Information and Communication Technologies for Development, viewed 2008, <http://www.ict4d.org.uk>.

Quick guide: Lowcost computing devices and initiatives for the developing world, viewed 2008, <http://www.infodev.org/en/Publication.107.html>.

Rural Industries Research and Development Corporation, viewed 26 May 2010, <http://www.rirdc.gov.au>.

The World Bank, viewed 2008, <http://www.worldbank.org>.

Anupindi, R & Sivakumar, S 2005. 'ITC's e-Choupal: A Platform Strategy for Rural Transformation', *BSAP Conference*.

Baharin, H, Nor, RM & Muhlberger, R 2008, 'It's the Thought that Counts: Content vs. Contact', OZCHI 2008, Cairns, QLD, Australia.

Baumeister, RF & Leary MR 1995, 'The need to belong: Desire for interpersonal attachments as a fundamental human motivation', *Psychological bulletin*, vol. 117, pp. 497-497.

Borchers, JO 2001, 'A pattern approach to interaction design', *AI & Society*, vol. 15, no. 4, pp. 359-376.

Burrell, J, Brooke, T, Beckwith, R 2004, 'Vineyard Computing: Sensor Networks in Agricultural Production', *IEEE Pervasive Computing,* vol. 3, no. 1, pp. 38-45.

Chapman, R & Slaymaker, T 2002. *ICTs and Rural Development: Review of the Literature*, Current Interventions and Opportunities for Action London, UK, Overseas Development Institute.

Chaudary, S, Sorathia, V & Lailiwala, Z 2004. 'Architecture of Sensor based Agricultural information System for Effective Planning of Farm Activities. International Conference on Services Computing', *IEEE International Conference on Services Computing.*

Curtis, JR, Engelberg, R, Young, JP, Vig, LK, Reinke LF, Wenrich, MD, McGrath, B, McCown, E & Back, AL 2008, 'An approach to understanding the interaction of hope and desire for explicit prognostic information among individuals with severe chronic obstructive pulmonary disease or advanced cancer', *Journal of Palliative Medicine*, vol. 11, no. 4, pp. 610-620.

Fitzpatrick, G 2003, *The Locales Framework: Understanding and Designing for Wicked Problems*, Kluwer.

Fitzpatrick, GA 1998, 'The Locales Framework: Understanding and Designing for Cooperative Work', Department of Computer Science and Elecrical Engineering. Brisbane, University of Queensland. Doctor of Philosophy.

Fountas, S, Wulfsohn, D, Blackmore, BS, Jacobsen, HL, Pedersen, SM 2006, 'A model of decision making and information flows for information-intensive agriculture', *Agricultural Systems*, vol. 87, no. 2, pp.192-210.

Groopman, J 2004, *The Anatomy of Hope: How People Prevail in the Face of Illness*, New York: Random House.

Hargreaves, DMG & McCown, BRL 2008, 'Low cost, low bandwidth online meetings between farmers and scientists', OZCHI 2008, Cairns, QLD, Australia.

Jewkes, R & Murcott, A 1996. 'Meanings of community', *Social science & medicine,* vol. 43, no. 4, pp.555-563.

Judd, F, Jackson, H, Fraser, C, Murray, G, Robins, G & Komiti, A 2006, 'Understanding suicide in Australian farmers', *Social Psychiatry and Psychiatric Epidemiology*, vol. 41, no.1, pp. 1-10.

Kabanda, G 2008. 'Collaborative Opportunities for ICTs Development in a Challenged African Environment', *Journal of technology management & innovation 3*, pp. 91-99.

Meera, SN, Jhamtani, A & Rao DUM 2004, *Information and Communication Technology in Agricultural Development: A Comparative Analysis of Three Projects from India*, Network Paper No.135, Agricultural Research & Extension Network.

Mekoya, A, Oosting SJ, Fernandez-Rivera, S, & Van der Zijpp, AJ 2008, 'Multipurpose foodder trees in the Ethiopian highlands: Farmer's preference and relationship of indigenous knowledge of feed value with laboratory indicators', *Agricultural Systems*, pp.184-194.

Nor, RM & Muhlberger, R 2010, 'Community Conversation: Designing to Support Empathy', IADIS International Conference on ICT, Society and Human Beings, Freiburg, Germany.

Preece, J 2000, *Online Communities: Designing Usability and Supporting Sociability*, John Wiley & Sons, Inc. New York, NY, USA.

Reddy, PK, Ramaraju, GV & Reddy GS 2007, 'eSagu: A Data Warehouse Enabled Personalized Agricultural Advisory system', SIGMOD '07, Beijing, China.

Warren, MF 2002. 'Adoption of ICT in agricultural management in the United Kingdom: the intra-rural digital divide', *Agricultural Economics,* pp.1-8.

Wen, W 2007, 'A knowledge-based intelligent electronic commerce system for selling agricultural products', *Computers and Electronics in Agriculture, pp.* 33-46.

Unwin, T 2009, *ICT4D: Information and Communication Technology for Development*, Cambridge Univ Pr.

Zhang, P 2007, 'Designing motivating ICT', *Proceedings of CSWIM*, Shanghai.