Development through communicative action and information system design: a case study from South Africa

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Many authors have recognised the importance of structure in shaping information system (IS) design and use. Structuration theory has been used in IS research and design to assist with the identification and understanding of the structures in which the IS is situated. From a critical theoretical perspective, focusing on the Habermas' theory of communicative action, a community based child health information system was designed and implemented in a municipality in rural South Africa. The structures which shaped and influenced the design of this IS (the restructured health services and social tradition) are explored and discussed. From this case study the implications of using IS design as a developmental tool are raised: namely the development of a shared understanding, the participation of key players and the agreement on joint action.

Categories and Subject Descriptors: H.4.0 [**Information Systems Application**]: General; H.1.1 [**Information Systems Applications**]: Systems and Information Theory—*Information theory*

General Terms: Design, Theory

Additional Key Words and Phrases: information system design, community information systems, structuration theory, critical social theory

1. INTRODUCTION

Many authors [Walsham and Sahay 1996; Walsham and Han 1991; Jones 1997; Rose 1999; Orlikowski 1992; Orlikowski and Baroudi 1991; Orlikowski and Robey 1991] have recognised the importance of structure in shaping information system (IS) design and use. Structuration theory has been used in IS research and design to assist with the identification of the structures in which they are situated. Using this meta-analysis tool, information systems have been used to redefine and/or reinforce some of these structures. The IS design process is particularly important, not just in shaping the structures, but also in terms of understanding what structures exist and how they were formed.

Critical approaches to IS examine those structures with the perspective of questioning and changing some of them. Critical social researchers seek to emancipate people by finding alternatives to existing social conditions as well as challenging taken-for-granted conditions. In particular, Habermas [1987] examines communication and how through striving for an ideal speech situation these structures can be challenged. In the process of IS design communication is especially important, as is who participates, and how.

In this paper the author explores the existing structures which have contributed to the accessibility, or as the case may be inaccessibility, of the health services in the Okhahlamba municipality, KwaZulu-Natal, South Africa. Through the design of the community-based child health information system these structures were explored and addressed throughout the design process. Communication and participation were integral to the process, as well as the recognition of the importance of the context in which the system is designed.

The rest of this paper is structured in the following manner. The following section looks at what is meant by structure, the process of structuration and its application to IS design. The third section looks at critical social theory in IS design, in particular Habermas' notion of communicative action. The fourth section outlines the existing structures in a community in KwaZulu-Natal that were important in shaping the IS design process. The fifth section explores how the process of IS design acknowledged and challenged these structures and the last section discusses the implications for IS design as a developmental tool.

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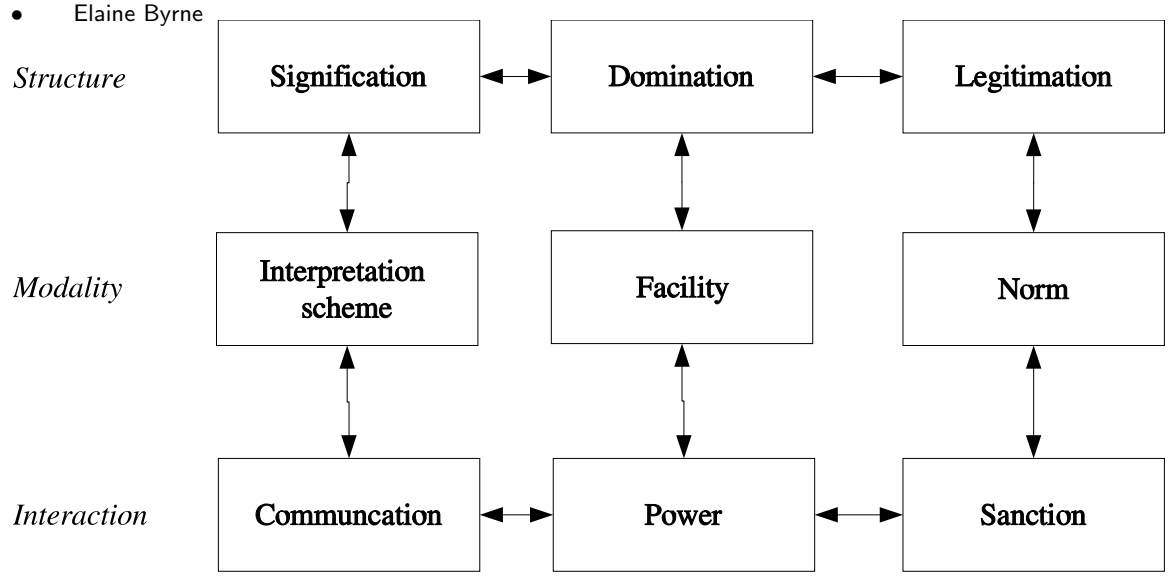

Figure 1. Dimensions of duality of structure.

2. IS DESIGN AND STRUCTURATION

In this paper structure is regarded as 'Rules and resources, recursively implicated in the reproduction of social systems. Structure exists only as memory traces, the organic basis of human knowledgeability, and as instantiated in action' [Giddens 1993] p377. That is, through action, based on rules and resources in peoples' minds, structures in society are produced and reproduced. The rules and resources drawn upon in the production and reproduction of action are simultaneously the means of system reproduction (this is what Giddens refers to as the 'duality of structure'). The rules can be viewed as generalised procedures of action and human agents are aware and knowledgeable of these rules, but may not know what the outcome of that action will be because action can have both intended and unintended consequences. The resources are both authoritative (coordination of the activity of human agents) and allocative (control of material aspects of the natural world), so both human and material resources are included.

The process of structuration involves knowledgeable actions of human agents discursively and recursively forming the sets of rules, practices and routines which, over time and space constitute structure. Thus agents and structures are not seen as independent, but as a duality whereby structure is relied upon in human actions, and in so doing structures are produced or reproduced. Over time these social practices becomes reasonably stable and routines develop. Giddens [1993] p29 breaks down social structure and human interaction into three dimensions which are interlinked by three modalities as illustrated in Figure 1.

When human actors communicate, they draw on interpretative schemes to help make sense of interactions. At the same time those interactions reproduce and modify those interpretative schemes which are embedded in social structure as meaning or signification. Similarly the human actors allocate resources through use of power, and produce and reproduce social structures of domination. Moral codes or norms help determine what human agents can sanction and thus produce and reproduce social structures of legitimation. It is useful to separate structure and interaction into these three dimensions for analysis of structure, but the dimensions are interlinked. [Rose 1999]

The design and use of information systems are shaped by the very structures within which they are situated, but IS can also be used to help define and redefine these structures. By exploring each of the above dimensions in the process of IS design, IS design can be used as a tool for development by refining the structures to include the views and values of those currently disadvantaged by the existing structures. Through a participative and reflective process in IS design, cultural and traditional norms which influences human action can be explained, understood and addressed. The design process, and the IS itself, can improve communication and encourage reflection and change interpretative schemes. Through the process of IS design and reflecting on the situation the excluded can be empowered, which redefines the power and resource structures. In summary IS design can define and refine structures by understanding and incorporating all the dimensions of the duality of structure in the design process.

Structuration theory has been used quite widely in IS. Rose [1998] conceptualises the use of the theory in IS for three different purposes: analyse; theorise and operationalise. Walsham and Han [1991] analyse literature under topics of operational studies, meta-theory and specific concepts used, as well as outlining structuration

theory. Jones [1997] analyses the use of structuration theory in an attempt to reconstruct theory to accommodate technology. He further explores the application of the theory as an analytical tool, the use of theory as a meta-theory, and use of concepts from the theory.

In an attempt to theorise aspects of the IS field using structuration theory Orlikowski and Robey [1991], apply the fundamentals of structuration theory to help understand the relationship between information technology and organisations. In a later article Orlikowski [1992] developed her structurational model of technology to understand the relationship between information technology and institutions. She recognises that technology cannot determine social practices, but can condition them and that technology in conditioning social practices is both facilitating and constraining.

In terms of empirical studies Walsham [1993] provides a number of case study analysis which cover issues of IS strategy, development, implementation and evaluation in three different organisations. Walsham and Sahay [1996] use structuration theory, with actor-network theory, to investigate problems in developing Geographical Information Systems in an Indian government department. In a similar manner this paper, from a critical social perspective, uses structuration theory to highlight two key aspects of existing structure which were addressed in and affected the process of designing the IS. The meaning of a critical social perspective is provided in the next section before section 4 decribes the key structural aspects of the case study.

3. CRITICAL SOCIAL THEORY AND IS DESIGN

Critical social researchers by their very presence influence and are influenced by the social and technological systems they are studying. 'For critical social theorists, the responsibility of a researcher in a social situation does not end with the development of sound explanations and understandings of it, but must extend to a critique of unjust and inequitable conditions of the situation from which people require emancipation'[Ngwenyama and Lee 1997]p151. Critical social theorists seek to emancipate people; they are concerned with finding alternatives to existing social conditions as well as challenging taken-for-granted conditions. Critical social theorists view people, not as passive receptacles of whatever data or information that is transported to them, but as intelligent actors who assess the truthfulness, completeness, sincerity, and contextuality of the messages they receive.

Adopting a critical social theoretical perspective to IS design is not new. In relation to IS research Ngwenyama [1991] gives an in-depth treatment of critical social theory. Ngwenyama and Lee [1997] approach research on communication richness in computer mediated communication from a critical social theoretical perspective. Hirschheim and Klein [1994] deal with a critical approach to qualitative research.

Habermas [1987] suggests that critical social theorists should initiate a process of self-reflection among human actors, but it is only participants in the community that can select the appropriate political action. His theory of communicative action notes that all social action assumes a basic set of norms. These norms allow all actors to express themselves fully and openly. They also imply that all actors accept the outcome of open rational argument. According to the theory of communicative action, breakdowns in communication occurs when actors fail to adhere to these norms. There have been numerous studies which refer in particular to the theory of Habermas. Lyytinen [1992] has explored the theory of Habermas to analyse systems development. Hirschheim et al. [1996]using Habermas' theory of communicative action propose a framework for the intellectual trends in IS development research.

In this study Habermas' theory of communicative action and the notion of 'the ideal speech situation' is used to explore how effective striving for its attainment is as a transformation strategy. My study uses aspects of critical social theory to examine how community action can be strengthened or changed by exploring the structures which enable or constrain that action. Communication, power and norms are key in trying to grasp an understanding of that action. Fundamental to this exploration is the belief that as intelligent and knowledgeable agents, human actors can, within limits, choose to act in accordance with or against societal norms.

4. SITUATION IN OKHAHLAMBA MUNICIPALITY, UTHUKELA DISTRICT, KWAZULU-NATAL, SOUTH AFRICA

The existing district health information system in South Africa excludes children and adults that cannot, and/or do not, access the services at the health facilities (clinics, community centres, mobiles and hospitals). Those who are most vulnerable and socially excluded, and need the health support systems the greatest, are the very ones not accessing the health services. Policies are formed and resources allocated to the community based on the information they recieve. Since the vulnerable are excluded from the formal IS they are further and systematically excluded from these policy and resource decisions.

With the impact of HIV/AIDS children have increasingly become an excluded and more vulnerable group. This exclusion and vulnerability of children can be tackled on two interconnected levels. The first is through the creation of awareness of the situation of children and the second through the commitment and action of government and society to address this situation. The first can be supported by designing an information system

for action - an information system that can be used for advocating and influencing decisions and policies for the rights of these children. So IS design can be used as a developmental tool.

Since protecting and improving the health of the children of the entire district is the aim of the district health system, research was conducted on how to develop a community-based health information system that could support a comprehensive district health information system. The research was conducted in Okhahlamba as a component of the child health programme of the uThukela district child survival project and the department of health. Okhahlamba is a municipality of the uThukela district lying in KwaZulu Natal on the eastern coast of South Africa. The primary objective of developing a community-based information system is to assist community members in their decision-making regarding the health of their children. On a secondary level it aims to establish interfaces with the formal health facility information system to enable district managers to use information from the whole district to make informed decisions and policy changes.

After a review of the district's health information system and a community meeting on monitoring and evaluation community members, as well as district government staff, recognised their need for a community-based child health information system. To understand what the information needs were, who should be involved in the information system and the format the information should be communicated in a total of 10 interviews, 16 focus group discussions and 1 meeting took place between July and September 2002. From the field work there was a greater understanding around the meaning of 'well-being' and 'at-risk' for a child, what factors/practices contribute to these situations, how the situations can be measured and, based on what action can be taken, who the information should go to. Consequently a community-based child health information system has been integrated into the district health information system.

In this section two key aspects of structures which address, or have contributed to, the exclusion of children are outlined, namely restructuring of health services and status of child health, and social traditions. The first aspect provided an opportunity for change and reflection on the current role and function of the IS whilst also providing an understanding of the exclusion of segments of the population. The second aspect again provides an understanding of the position of women and children in society which impacts on IS design as well as presents some challenges in the design process. [For more details of the child health programme and the research see [uThukela District Child Survival Project 2002; 2000a; 2000b; 1999a]]

4.1 Restructuring of health services and status of child health

After 1994 the national Health Plan for South Africa and the Reconstruction and Development Programme outlined that a Primary Health Care (PHC) approach is the underlying philosophy for the restructuring of the health system. Crucial to this is the role of the community in the development of a district health system emphasising the movement from a traditionally vertical curative based health system to a newer client centred and preventive based health system. In addition, more recently, there has been the move towards the decentralisation of health service delivery (along with other basic social services) to local authorities from the department of health. The newly established structures, such as the community health committees and community health forums, have meant a renegotiation of roles and responsibilities at the district level. This requires active communication between the parties involved to ensure consent on the new roles and responsibilities of all local government staff [uThukela District Child Survival Project 2000b; 2000a].

Since 1994 children have benefited from the move to PHC. However the free health care policy is not without its fair share of problems. Due to the emphasis on PHC, there has been a 30% increase in clinic attendance and a 2% increase in hospital attendance in the province of KwaZulu-Natal. The additional drugs and personnel needed for the increased attendance at the clinics was not budgeted correctly. As a result the quality of services in terms of shortages of personnel and drugs has been compromised as well as putting severe strain on the budget. Clinics in particular have struggled to accommodate the increased number of clients. Clients also complain that hospital-based health workers are often unsympathetic to their needs. [uThukela District Child Survival Project 1999b]

Poorer children living in rural areas have poorer access to PHC facilities than children living in the wealthier more urbanised areas. They have greater distances to walk and fewer health personnel to cater for them. KwaZulu-Natal is one of two provinces with especially poor client-to-clinic ratios (23,000 clients per clinic) and in 1995 only 54.3% of households in KwaZulu-Natal were within 5 kms of medical care, the second lowest in the country.[Crisp and Ntuli 1999]

Child health indicators point to the lingering effects of apartheid's racial, geographic and socio-economic policies. Just over half of all children aged 12-23 months in KwaZulu-Natal are not immunised, though 62.2% have their road to health cards. This indicates at least one contact with the health services, but this contact was not sustained as the immunisation schedule has not been completed. The infant mortality rate for KwaZulu-Natal has been estimated at 52.1/1000 and the under-five mortality rate at 74.5/1000.[Crisp and Ntuli 1999]

This situation is exacerbated by disparities in access to basic infrastructure. Access to potable (drinkable) water and sanitation are often critical to improving child health outcomes. The government has however committed itself to increasing access to water and sanitation. In spite of two major dams and several springs in the area, a serious shortage of water for agriculture and clean drinking water has impacted nearly every household, and influenced the health status of the area. The cholera epidemic in 2001 is evident of this poor access. A situational analysis for the Okhahlamba municipality completed in July 1998 estimates that only 25% of the population live within 15 minutes walking distance of safe water, and only 25% have adequate sanitary facilities. Transport remains poor, particularly during rains when rivers become impassable. [uThukela District Child Survival Project 1999b]

4.2 Social traditions

Strong Zulu cultural and traditional values exist in the Okhahlamba municipality. Traditional leaders are highly respected, though there is some controversy over the roles and powers being eroded with the formation of the new local government structures. Grandmothers and traditional healers are often the first persons to be consulted in times of illness and many locally available remedies and treatments are used and practiced.

Grandmothers can have quite a powerful decision-making influence at household level. However, women in general tend to be dependent on males for income and have very little access to independent means of livelihood. Household responsibilities also make women subject to 'time poverty' that is, it is not uncommon for most women in this rural area to work ten hours a day, making it a hardship to travel to seek health care for themselves or their children. Much of each day involves several hours of strenuous manual labour, hauling water and firewood, and performing agricultural work. Women, including mothers, grandmothers and older 'girl children', are predominantly responsible for childcare [uThukela District Child Survival Project 1999b]. However if the health-seeking or care decision involves any financial decisions the head of the household, which is usually a man, will need to be consulted in order to make the final decision. This process often causes a delay in a child attending a clinic as money for transport and alternative child care for the siblings would need to be sourced.

Through the existing patriarchal social system women are particularly at risk from HIV/AIDS. These factors include: sexual subservience to men, higher risk of transmission with the migrant labour of partners to cities; differential access to information and resources for prevention, and; women often remain with spouses who are HIV positive rather than vice-versa. Women in their twenties have the highest rate of HIV infection nationally, but between 1997 and 1998 the HIV prevalence among teens attending antenatal clinics jumped over 65%, from 12.7% to 21%. With high teenage fertility rates this picture is unlikely to change in the near future. In 1998, the provincial fertility rate was 3.3%, and the provincial teenage pregnancy rate was 13.8%. In Okhahlamba/ Mtshezi municipalities the average teenage pregnancy rate for young women delivering in facilities in 1999 was 22.9%, significantly higher than the provincial rate [uThukela District Child Survival Project 1999b]. Children are particularly susceptible to the ravages of the HIV/AIDS epidemic through high rates of mother to child transmission and an increasing number of AIDS orphans and consequent child headed households.

5. ASPECTS OF THE PROCESS OF DESIGNING A COMMUNITY-BASED INFORMATION SYSTEM IN OKHAHLAMBA, KWAZULU-NATAL, SOUTH AFRICA

5.1 Visioning and primary health care

One of the fundamental steps that needed to be addressed before addressing the situation of children, and how this was reflected in information systems, was a paradigm shift. It required a shift from the older focus on curative centre based service delivery to the newer health services approach which focuses on prevention, clients and quality. To support this paradigm shift the project adapted a new approach of transformational thinking, or future focussed approach, developed in the business sector, but which is also being integrated in health systems. The approach focuses on working towards holistic well-being for all, rather than just solving health associated problems. Through community meetings and discussions the community determined a vision for their children: 'To achieve optimal health, growth, development and well-being of children within the family and community in the uThukela Health district'.

The implications of the paradigm shift for IS was that though it was important to measure children's physical condition, it was also important to measure how far towards our vision we are. So instead of saying 80% of our children are immunised, we would say that we still need to immunise 20% of our children. This approach reflects what we still need to do to attain our vision and thus, hopefully, stimulate action. Adopting a forward looking perspective also stresses the importance of the context we are presently in and the importance of measuring changes in that context. Monitoring the context and acting based on that information, should lead to a situation where most children in the future would find themselves in a state of 'well-being'.

5.2 Sharing of information with key actors

If people are to act or reflect on information received that information needs to be relevant and communicated in a culturally sensitive and appropriate manner. In terms of a community-based information system for children an important step in the process of the IS design was who should participate in the process. The main role players and duty bearers [1] need to be included as it is them who are in the best position to change or influence the context in which the child is placed. In the case study these key people were: the community health workers, parents, family members, early childhood and creche teachers, home based carers, caretakers, social workers, health facility staff, clinic health committees, councillors, government officials and staff from external organisations. This indicates that a multi-leveled and multi-sectoral group affects the situation of children at community level.

What was also important was a common understanding by all parties on what was meant by 'well-being' and 'at-risk' as the monitoring of these situations and conditions would be important if we were to measure whether we were on the right track to attaining our vision. Meanings of 'well-being' and 'at-risk' were gathered through focus-group discussions, interviews and meetings with all the role players and duty bearers. This common understanding was translated into common data definitions in the community-based, as well as in the health facility, information system.

A review of the existing data sources and flows was conducted based on the assumption that information flows are a key element of dialogue between providers and consumers of health services. One important conclusion from this review was that some of the data collected through the current district health information system is valid and useful, but is not getting to the people who can act upon or use it. As one project leader mentioned we need to look at how data is flowing and the possibility of establishing 'feedback pathways' for this data. There are many of these pathways at different levels, but the one between community based workers and community forums is core for a community-based health information system. This level of feedback was entirely absent from the district health information system in Okhahlamba.

It is also interesting to note what was absent from existing data sets, yet what key role players and duty bearers felt were important in monitoring the situation of their children. Data items relating to the context in which a child is being reared are mostly excluded. Many of the current indicators focus on the condition the child is currently in, such as having immunisation or not, and not the context that caused the child to be in that situation, such as no caregiver to take the child to the clinic. But exclusion is a process and to prevent the child becoming excluded requires analysing the situation of the child throughout that process. Measures for context, such as happiness, playfulness and communication are more intangible and therefore difficult to develop as data items. However through the new observation tools developed by and for the community health worker these measures are now included. So data items on the presence of a caregiver, drug and alcohol abuse, cleanliness of the household for example, are now included as indicators of 'at-risk'. This observation tool is used as part of the dialogue between the health worker, who is a trusted and respected family advisor, and the household. The results from the aggregated monthly data is shared through role play, song, dance, drawings and histograms in the community quarterly meetings. The act of sharing information establishes networks of people at community level who are responsible for the care of the children. These networks form the basis for communication.

5.3 The communication loop

In terms of capacity to act, or to make decisions, most respondents, in the research undertaken, felt that they could act if given appropriate information and if key role players were included in the communication loop with one another. The visioning exercise started a communication process, but this needed to be developed into more formal communication structures. Communication was needed with other levels of government. Building on the recent development of clinic health committees and the governments' appointment of the community health workers in the KwaZulu-Natal province, communication loops were developed. These loops are described below at three levels: household, community, and district.

—Household level: Following on from a discussion on how to measure the more intangible measures a standardised observation checklist was developed. The checklist is used as a communication tool with household members. Based on the community health worker's assessment a number of choices or options to solve any of the problems identified is given to the household. The community health worker could facilitate the choices, such as contact with certain services, if requested to do so, but the final decision lies with the household. The assessment is used as an empowering tool, rather than as a means of inspection. These visits assist the child caregivers in

[1] Role players have a role to play in children's lifes, but duty bearers are those people who are responsible and obligated to fulfill childrens' rights

terms of their knowledge of child care and health seeking behaviour within their household. The visits also provide the mother or caregiver with a mediator between them and health facilities as well as a mediator between them and their family. Therefore issues of access to basic social services could be addressed.

—Community level: The community health workers, with the assistance of their supervisors (community health facilitators), conduct village health days for discussion of broader issues affecting the community served by the clinic. Bar graphs, role-plays, song, poetry and dance are used as these methods seem to work very well. These meetings form the quarterly community health meetings, that were suggested in the course of the field work. Members of the community and the clinic health committee, health facility staff, community health worker, school children and other key people attend the meetings. More people have now access to the information they requested and in a format that is easy to understand. The village health days also provide a forum for reflection and discussion.

—District level: Communication and information flows between community and district involves combining data from various sources to provide a comprehensive database for the district. Important for the collation of this data is the use of the same data definitions in the different data sources. This collation is done through the district information officer as her office already receives this data from the different sectors. A summary of the district data is distributed every quarter. The content of the summary sheet is regularly determined in consultation with the clinic health committees and through feedback on the village health days. Existing local government structures, community and clinic committees, have already established clear communication channels with higher levels of local government. The feedback from these meetings would be sent through these structures when needed. Thus a comprehensive picture of child health in the district is achieved.

In summary, with the restructuring of the health services there was the need for a paradigm shift, before addressing the review and design of a community-based child health information system. This shift was from the older more curative health service approach to the newer client and service focused approach of primary health care. With the newly established local clinic and community health committees this offered an opportunity of new people coming into the health services with a new vision and who were also willing to be involved in the IS design process. Furthermore the newly formed local government structures have established clear communication channels with higher levels of local government. The feedback from quarterly community health meetings could be sent through these channels and forms part of the health information flow and communication loop.

Challenges around the position of women in society impacted on decisions regarding participation. However as women are the main carers of children they were involved in the process without any question. Furthermore as some of the key positions in the community are occupied by men it was also felt that they needed to participate in the design process as their positions were influential in terms of the situation of children in the community. The dialogue initiated in the design process continues through the community health quarterly meetings which provide an opportunity for dialogue to take place at community level. At the household level the community health workers role is to empower the household in its health seeking and caring practices. This is done through household visits and providing the appropriate education at the appropriate time, for example if a child has diarrhoea the conversation would be around what to do for the child with diarhoea. The community health worker also plays the role of mediator - mediator between households and the community forum and also between the caregiver and the rest of the family. Through the supportive role of the community health worker the position of women and children will not change in society, but their views on health and the care of children will be supported and heard.

The process of IS design in the case study supported and questioned two key aspects of structure, namely the restructuring of health services and the status of child health and social traditions and their implications on the process of the design. The next section explores what implications the use of such an approach has for IS design.

6. DISCUSSION: IMPLICATIONS FOR IS DESIGN

The implications for IS design have been categorised into three main areas: the need for a shared understanding, the need for participation of key people and the need for agreement on joint action.

6.1 Shared understanding

If health IS design is to be used in a developmental context their needs to be agreement reached between health care deliverers and those who receive the services on the design and the purpose of the health service. From our case study the importance of having a common vision for the health services was seen as an important first step in this direction, especially given the restructuring of the health services and the adoption of a PHC approach. Creation of this vision and shared understanding necessitates communication between the designers of the system, the users of the IS as well as the users of the health system. The process of IS design is important for

establishing the relationship between the users and providers of health care, as reaching agreement on subsequent action that needs to take place involves both parties working together.

The objective of communicative action is to achieve mutual understanding. In this case study mutual understanding on a vision for the children, how to measure our progress to this vision and who needs to be involved in that process was made. IS design should be ' . . . concerned with achieving and maintaining mutual understanding . . . among all those who are involved in a coordinated organizational situation . . . Organizational actors involved in communicative action depend on a common language and a shared understanding of the organizational context in order to enact meaning from each other's communicative actions.' [Ngwenyama and Lee 1997]p158/9

IS use in developmental contexts can go beyond communicative action and be an enabler of discursive action. Discursive action is intended to achieve or restore agreement for collective action. It is ' oriented toward achieving or restoring agreement and redeeming validity claims. Discursive action is initiated when organizational actors need to achieve agreement for joint action. In such a situation, the individuals would generally engage each other in a debate of the issues until they agree on a course of action' [Ngwenyama and Lee 1997]p155. However there needs to be a common medium of communication, agreement on roles and responsibilities and terms and conditions set for means of discourse. A common understanding was needed in this case on what was meant by 'at-risk' and 'well-being' children and how to measure the situation of the child.

The process of IS design can create an environment where people can express themselves, where understanding on various roles can be agreed to, where responsibility can be taken and where action using available information occurs. However unless we explore and change the structures in which a person operates, e.g. the position of children and women in society it is difficult for an actor to be able to engage either in reflection or in discursive action.

6.2 Participation of key players

Reaching a common understanding between the users and providers of the health services is impossible without their joint participation. Participation of the excluded increases transparency and opens officials and other responsible parties to dialogue and wider scrutiny by the citizens they serve. Underlying power differences between different actors influences the interaction and negotiation between them (both within the community and between the community and outside groups) and this can influence whose 'interests' are explored and served in information systems. The social dynamics and power relationships that underlie and constitute the actual practice of the information system needs to be explicit.

In this research the unequal nature of social relationships and positions between different actors and also institutions was recognised from the outset. Forums were established that suited the needs of the various groups. Discussions were also facilitated from people who were familiar with the area and who also had an understanding of the norms and values of that society. In the initial stages because of these differentials in status and roles within the community, groups comprising, for example, mothers, councillors, facility staff, met separately to discuss what they wanted for their children. These meetings were held in the local language and near the homes of the individuals. The community health worker formed the essential mediation role between the service providers and the clients. At a later stage representatives from the various groups met jointly to share the findings from the research and to discuss the way forward.

Even with community participation communication does not always work smoothly, or in favour of children. Communication provides the means for exploring, affirming or denying norms, debating policies and practices, and discussing old experiences and new ideas. The situation of children will change only when action to improve that situation is taken. So the next step was to explore what will happen once the information has been shared.

6.3 Agreement on joint action:a multi-leveled and multi-sectoral approach

Once the vision is formulated then the necessary action to attain that vision needs to be agreed to. Often this involves a multi-leveled and multi-sectoral approach. It also needs all key role players to be in communication with one another. It is not easy to challenge or change the institutions and systems established that support the status quo.

In Okhahlamba the key role players that could act to change the situation of children were all identified. The most difficult task was achieving agreement by these role players on their action. Most of the confusion was over formal roles and responsibilities which had changed with the recent moves to decentralization of basic social services to local authorities, rather than an unwillingness to support one another. With this move the community health workers had also recently moved from a local non-governmental organization to the Department of Health and were confused over their reporting structures. The district department of health needs to hand over delivery of health services to local authorities, but the local authority does not have the human nor financial capacity to carry out this function. The volunteer clinic health committees are enthusiastic to support initiatives that

will improve the situation of their children, but have only been formed recently. It was only after groups met one another and agreement was reached on their roles and responsibilities that agreement on the action, and who was responsible for that action, took place. The recent changes have provided an opportunity for inclusion of children on the agenda as many of the structures and systems are not, or have only recently, been formed. What was encouraging from the field work was that most people felt that they had the capability to act if they received the information.

7. CONCLUSION

It is increasingly recognised that globalisation also produces marginalisation. Castells [2000b; 2000a] argues that processes of globalisation are extremely selective, and various parts of the globe in both the developing and developed world run the potential of being excluded from this process. He uses the term 'fourth world' to describe this segment of society. Conditions of history and geography shape the access that groups and societies have to new information and communication technologies. Lack of such access can be exclusionary. Castells describes these processes to be systematic and can lead to further marginalisation and exclusion of societies.

In information systems, and not just health information systems, the voices of communities - in particular women, children and youth - are not often heard, both within communities, between communities and between the other levels of society. When, where and how do they get the opportunity to express their needs and aspirations? How do they have the chance to identify and develop the skills and resources they need to address their problems? Where do they get the opportunity to express themselves or to exchange ideas and experience? In a sub-district in KwaZulu-Natal these questions have been addressed through a holistic approach to health information systems development.

Some of the challenges for IS design is the need to focus both on the output, as well as the process. Attaining a common vision is fundamental if the system is to be used, but this involves the participation of different sectors and different levels of actors from the outset. It also offers some opportunities. Clarification over roles and responsibilities allows recognition and acceptance by duty bearers of the tasks they need to perform. This is a first step towards action. There was great enthusiasm by these key role players in the design process and a desire to work together. The community monitoring system in Okhahlamba was based on an understanding that people are intelligent and know what affects their children's and their own development. There is the need to co-design systems, processes and tools in IS design and obtain clarity on what we need to measure. IS design should be about facilitating a journey of development, rather than measuring the destination.

Communication and participation, as well as the capacity to do so, are needed to strive towards Habermas' ideal speech situation. This is no easy task, as exclusion is built upon a system of norms, interpretative schema and facilities that systematically excludes segments of the population and country from the network society. Communication will not simply be improved by introducing a new or improved health information system. Even so, a process from visioning, developing skills and capacity and constructing a conducive environment can mean that IS design can be viewed as a development tool, as striving towards this 'ideal speech situation', even if this situation is not attained.

ACKNOWLEDGMENTS

I wish to thank all the people from uThukela district who assisted with the research. In particular thanks must go to the staff from the uThukela District Child Survival Project and the Department of Health, who assisted with the carrying out of the field research, the data analysis and the implementation of the information system. For support on the formatting and editing of this paper I am grateful for the assistance of Bob Jolliffe. I have also benefitted from the insightful comments from Sundeep Sahay on the various drafts of this paper. Financial support for the research was provided by a World Vision/USAID grant to uThukela District Child Survival Project.

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