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Abstract

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Keywords

Community Informatics, information, policy

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Communications Breakdown: Revisiting the Question of Information and its Significance in Developing Better Outcomes for Community Informatics Projects.

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Abstract. The gap between those who understand the complexities of community requirements and the information technologists who can build the technologies represents a central focus of concern with Community Informatics (CI) research. This paper explores how different assumptions about the utility of information leads to poor communication between researchers and practitioners. Braman's four-part hierarchy is a useful vehicle to investigate this as she seeks to include a range of actors such as policy makers, technologists and community members. A number of case study examples are explored to illustrate the value of Braman's work for CI.

Keywords: Community Informatics, information, systems planning

1 Introduction

Developing an effective relationship between technologists and those who have intimate knowledge of community requirements represents an important focus of research within the field of Community Informatics (CI). Dependent on this nexus is the planning and deployment of effective ICT based interventions to promote more equitable outcomes for individuals and communities that are marginalised by economic, cultural or other factors. The task of bringing together disparate groups in order to develop an effective response is fraught with many challenges that are in need of clarification.

This paper responds to this problem by engaging a research agenda that has been effective in the analysis of information systems and their use by individuals and groups [1]. By exploring assumptions that are entailed within different definitions of the term 'information' a number of areas leading to poor communication between planners and practitioners emerge. The paper develops this understanding by using Braman's [2] four-part '...definitional hierarchy...' of information to analysis a number of case studies within the Community Informatics domain. The motivation for developing this line of enquiry lies in recognition of the socioeconomic and

political factors that influence information creation, processing, flows and uses. From this analysis a number of implications are drawn for CI researchers and practitioners to consider.

The paper is organised in the following fashion. The paper begins by establishing a broader theoretical context to understand research and practice within the domain of Community Informatics. The analysis goes on to propose that one significant area of communication gap is factored on differing assumptions about the definition and utility of information. This contention is tested using Braman's four-part definition of information-as-resource; information-as-commodity; information-as-pattern; and information-as-constitutive force [2]. Case studies from Community Informatics are considered as each of Braman's definitions is explained. The paper finishes with a discussion about the significance of this analysis for Community Informatics research and practice.

2 Telecommunications Research and Community Informatics

The communications landscape has changed dramatically over the past two decades. Increasing penetration and connectivity of telecommunications on a world scale has opened up possibilities for economic and social development. The increasing miniaturisation and capabilities of electronic components together with the development of non-proprietary Internet protocols has brought with it a trend in which increasing network intelligence is being devolved to consumers [3] (pp. 25-27). The increasing participation of communities in standards settings [4] as well as growing popularity of online discussion forums on the topic of the digital divide reflects a greater degree of participation enabled by ICTs. While ICTs have always been considered a critical aspect to development a qualitative shift has occurred as Shearman describes people have become information '...makers...' rather than just mere '...chasers...' of information [5].

The [ITU \(International Telecommunications Union\)](#) hosted [World Summit of the Information Society \(WSIS\)](#) reflect a common agreement among nations that ICTs represent an important vehicle for the delivery of better development outcomes for groups that have been marginalised by economic or social factors. Retrospective analysis of the ITU's first concerted effort to link telecommunications with development called the Maitland Commission reveals a complex history of failure and some success. Milaward-Oliver's twenty year review of research since the Maitland Commission places central the thorny issue of bringing together the technological with the social [6]. Community Informatics, as a more recent arrival in this research space gives this linkage greater clarity with its emphasis on the end-user in its "effective-use" mandate [7]. The "effective use" of ICTs according to Gurstein aims to '...support local economic development, social justice and political empowerment; ensuring access to education and health services; enabling local control of information production and distribution; and ensuring the survival and continuing vitality of indigenous cultures...' [7].

One aspect that is given special emphasis is the link between technologists and those in community that will make use of ICTs. Gurstein suggests that a dialogue be

established between system planners and end-users. This two-way relationship recognises the fact that both planners and end-users are working within the limitations of their own knowledge. On the one hand, researchers do not fully comprehend the local circumstances in which end-users reside. On the other hand, end-users do not necessarily have the knowledge and experience to guide the deployment of ICTs. To this extent there needs to be a judicious mix of technology “push” and technology “pull” where the process is situated firmly within the cultural context in which the new ICTs will be deployed.

The terms “technology push” and “technology pull” are taken from innovation research where leading economists Schumpeter and Smookler are associated with each of the terms respectively (ref)¹. Innovation is essentially concerned with a process that effectively translates ideas into the disembodied objects of technology that can be deployed in a given location along with appropriate systems of organisation. The concepts of innovation represent a useful avenue for the analysis of Community Informatics projects.

Technology transfer is a related concept that is based on the idea that the costs of innovation to a country can be reduced if technologies are copied rather than developed independently. As pointed out by economic historian Rosenberg three decades ago, this idea is a simplistic one, as technology transfer is rendered less effective by the absence of complementary technologies as well as complementary sources of knowledge[8]. Such is the complexity of the process Hill states that technologies are culturally bound and dependent suggesting that questions of technology transfer are ultimately about cultural change[9].

In a Community Informatics setting it is not difficult to identify specific examples that support these observations of technology transfer. Absent complimentary technologies includes power and buildings while absent complimentary knowledge sources include IT specialists, multi-media experts and so on. The issue of the cultural divide between developers of technology and recipients represent a fundamental theme of the Community Informatics research agenda. Further investigation of innovation research reveals that there are those who look to the role of information as a useful perspective for better understanding the process of innovation.

In seeking to better understand the “mechanics” of innovation and better deal with questions of bounded rationality, culture and uncertainty, Macdonald argues that the innovation process can be distilled into a common substrate of information-related concepts[10]. Indeed, he details the ways in which the innovation process is constrained and facilitated by behaviour of people as they deal with information as both a tangible and intangible resource. Describing the innovation process he argues that the process of effectively responding to perceived needs, the development of plans, the putting together of artefacts and the coordination of each can be understood in terms of the unusual economic characteristics of information.²

¹ The “technology push” thesis holds that invention is the powerhouse of innovation while “technology pull” claims that the market leads innovation by its demand for certain products through investment.

² The fundamental economic characteristics of information are its high fixed cost (is expensive to produce) and its low marginal cost (is cheap to copy) (Shapiro and Varian, 1999). A

In contrast, information often appears as a relatively benign actor in the process of innovation especially if one considers the vast amounts of information that are available through the Internet and other sources. Machlup et al. warns that the apparent homonymy of the word information may in itself present a barrier to deeper understanding. He states:

‘...[i]nformation is not just one thing. It means different things to those who expound its characteristics, properties elements, techniques, functions, dimensions, and connections. Evidently there should be something that all things called information have in common, but it surely is not easy to find out whether it is much more than the name...’[11].

Machlup et al. go on to describe the rarity of individuals who are able to span just some of the boundaries that separate the ‘...30 or 40 cultures...’ that represent information-related disciplines.

So it is with this apparent contradiction between the simplicity of the term ‘information’ and its multi-disciplinary underpinnings that planners and practitioners in Community Informatics venture into partnerships to plan, deploy and analyse projects that have information as the fundamental resource being produced, stored, transferred and used. The potential for confusion appears obvious. The next section details one method by which the multifarious nature of information can be addressed.

3.0 A Definitional Hierarchy of Information with Case Study Analysis

Braman’s discussion on the use of definitions for information in a policy context establishes a hierarchy of descriptions that seeks to incorporate socioeconomic contexts [2]. Braman develops a four-part definition as follows: information as resource; information as commodity; information as pattern and information as constitutive force. As will be explained, each of these categories entails a host of assumptions that potentially can complicate the delivery of Community Informatics projects.

3.1 Information as Resource

The resource definition for information is one that Braman observes has widespread acceptance. As people are faced with the task of making decisions on a daily basis there is an intrinsic recognition that life can be improved by achieving greater access to information. Uncertainty is equated with the absence of information so the remedy to this is simplistically assumed to mean more information. Braman states that information in this context is judged to be akin to a physical economic resource. This leads to the adoption of economic measures that privilege the tangible over the

ground breaking paper that details the implications of these characteristics on innovation is provided by Arrow (1962)

intangible. An unfortunate side –effect is that information and communication technology (ICT) can then become a proxy for information leading to the view that the mere presence or absence of ICTs becomes the primary yard stick by which outcomes are measured. As a consequence it is difficult to respond effectively to questions of ongoing training and support because the project objectives are couched in excessively vague notions of what constitutes information access.

The visibility of infrastructure can mask deep-seated issues that relate to the absence of information that is most appropriate for the given circumstances. One example of this can be seen in the Australian experience with the establishment of government funded telecentres or Community Technology Centres (CTCs). This project was funded under a limited term funding arrangement that ended in July 2005 called “Networking the Nation”. An insufficient time frame in which to achieve financial sustainability has left many CTCs struggling to keep their doors open [12]. Inadequate attention appears to have been given to defining the specific information needs of the communities. As one consequence it has been assumed that a users-pays system is sufficient for the support of such activities. The question whether these information needs are worthy of public subsidy has never been actively addressed [12]. One significant ramification of reliance on this definition of information is that Gurstein’s prediction is likely to be realised where a second-class citizenry is institutionalised because the infrastructure effectively locks communities into linkages with ineffectual sources of information[7].

3.2 Information as Commodity

The second definition of information in a policy-setting context is the one of ‘commodity’. This definition of information recognises that information can be bought and sold. It also has the advantage of recognising information flows and the way these flows create economic value. It can be seen that the thesis supporting this concept is more refined than the previous definition in that it provides a rationale for system developers to follow. Internet commerce is dependant upon information-as-commodity and as a consequence this aspect of information use has been an important focus of activity in the e-commerce domain. The TEAR projects in the Solomon Island represent a successful e-commerce initiative to overcome the distance that island communities must deal with in this country. An innovative HF-based email systems enables villagers to place orders with distance suppliers, payment is arranged and goods are despatched by ferry to the consumer [ref].

This definition of information has its limitations because it excludes information that may not be amenable to commoditisation. As Arrow (or Lamberton – need to check) stated information is a commodity but only to a limited extent [ref]. If this fact is not understood the danger exists that Community Informatics projects may be understood as e-commerce ventures. One consequence, as Gurstein observes, is that the deployment of new ICTs in some cases is primarily designed to promote consumerism where the end-user is perceived merely as a passive receiver of information and goods [7]. In this context, the beneficiaries here are the manufacturers who are keen to sell their digital wares into new markets sometimes facilitated by subsidies from Government.

However, there are examples where information-as-commodity can be used to strategically support other equity goals. An example of this can be seen in the way a community newspaper have become an important source of revenue for one Community Technology Centre (CTC). The CTC, located in Sussex Inlet on the south coast of New South Wales, Australia, has used its community connections and its printing equipment to produce a newspaper that is supported by advertising. This revenue is used to subsidise other aspects of the CTC's operation. This indicates an arrangement that can flexibly deliver equity outcomes while drawing on the commodity aspect of information.

There are many similarities between this model of revenue generation used by this CTC and the tried and true methods of print and broadcasting media.³ Print and broadcasting have used information-as-commodity to develop revenue streams that in turn subsidise the provision of other public interest information such as news and current affairs. The challenge appears to lay in determining which information is amenable to commoditisation in a local context (or further a field) so that revenue streams can be generated to support other activities.

3.3 Information as Pattern

The third definition of Braman's, information-as-pattern, introduces researchers and practitioners to the close relationship that exists between useful information and communities. In short information-as-pattern seeks to recognise the importance of context when managing information. This definition recognises that complementarities must exist between new information and existing information in order for the former to become productive. Existing information can take the form of individuals with requisite capabilities, cultural traditions as well as ICTs giving access to relevant sources of information and tools to configure information.. All of these factors come to the fore when information is considered within context.

Recent UNESCO-funded work using ICTs to reduce poverty among minority groups in the Indian sub-continent provides an example where close consideration is given to existing culture mores, the uniqueness of local contexts and associated literacy skills. The use of video and audio production is found to be more effective with people' who's dominant mode of cultural reproduction is by oral accounts and visual art. Slater and Tacchi [13, p. 11] observe that radio and video production is more trusted and familiar while the Internet and computers are considered to be more remote and global. They claim that the most promising avenue for productively using computers and the Internet is incorporating these into multimedia mixes using radio and video.

In contrast the absence of consideration of information-as-pattern is central to the dilemma of why India's IT success is not having significant payback to middle and lower income Indians. One influential strand of theory in development economics called "trickle-down economics" claims that the benefits of India's \$xxx billion export industry should flow "down" to other members of society. Srinivasan (2006)

³ Interestingly, the manager of the Sussex Inlet CTC has a background in the print media and used this to begin the community newspaper venture.

observes that this has not occurred to date for the reason that the services supplied by Indian IT companies to their global markets experience little demand in a local Indian contexts (ref). The disappointment with the IT revolution in India has been the absence of 'entrepreneurs' who can value-add these new capabilities to develop services that are compatible with the needs of middle and lower income earning Indians. An information-as-pattern understanding allows one to see the highly contextualised nature of these information needs and the unique skills of individuals who can bridge India's existing IT capability with information-related needs of Indian communities.

Braman indicates that the disadvantage of the information-as-pattern approach is its relativistic nature. This makes it difficult to state unambiguously what specific information is required in a given situation. In response researchers have sought to establish the legitimacy of concepts such as "social capital" apparently to link the social good aspects of information provision with the economic concept of capital [ref]. Social capital seeks to establish the value of linkages and trust between people as an indication that worthwhile information is being generated and exchanged. In order to make this concept more concrete parallels are drawn with schools and libraries thereby establishing a rationale for Government support of Community Informatics projects [14].

Another consequence of the relativistic nature of defining valuable information in any given context is the proliferation of disciplines that make claim to expertise within the Community Informatics domain. Where before telecommunications research was dominated by engineers and economists, the study of Community Informatics incorporates a broad church of disciplines ranging in areas from education, telemedicine, media studies, social work, information systems and so on. The immediate effect on this discussion is the realisation that project sponsors and planners are likely to be constrained by communicating across disciplinary divides as well as with local individuals who are knowledgeable about community needs.

3.4 Information as Constitutive Force

The final category, information-as-constitutive force, represents the pre-eminent definition from Braman's perspective. This view not only recognises that information is context dependent but accords information with agency to bring about change in communities. This definition alludes to the productivity of information where the provision of the useful information leads to significant social benefit because information reproduction is very cheap. One example of this can be seen in the provision of health information that brings about beneficial changes in the behaviour of people. A more mundane example is the provision of a weather report that a farmers use to make decisions about whether or not to harvest a crop.

Decisions about information provision are in practice decisions about the way communities are to be shaped. One example of this can be seen in the deliberations over the naming of a web portal for the use of telecentres situated throughout the Pacific. The web portal was the focus of a successfully run UNESCO-sponsored workshop in February 2006 in Auckland, New Zealand in which participants populated a Drupal website hosted by IRDC telecentres.org. The naming of the

website represented an important project as it ideally should represent the essence of what Pacific Island culture represent. While Pacific Island cultures have much in common relating to smallness and isolation these have also developed in relative isolation over many centuries leading to each possessing a unique identity. The diverse range of cultures represented in the Oceania region as a consequence complicated the naming of the web portal.

The suggestion to name the website “Pactoc” was felt appropriate by some workshop participants because of its derivation from pidgin English, widely practised in Melanesian countries. Hence, within the name there was a melding of both European and some Pacific cultures. Pidgin English however is not spoken in Polynesian countries, which in turn generated an alternative suggestion of the word “talanoa” – “tala” being a common word for story in Polynesian countries. The significance of this apparent disagreement should not be overstated because amicable agreement over a number of initiatives was achieved. However, it can be safely stated that the term did not have the same currency among all participants.

This account provides a simple example that demonstrates the value of Braman’s definition of information-as-constitutive force and its close relationship to information-as-pattern. It is apparent that one’s background is likely to colour receptivity to information (namely the website name) and this in turn may influence the utility that will be attached not only to the name but possibly the website. It is clear that the task of establishing an optimum mix between stakeholder needs and wants can be difficult when diverse interests are present.

The notion of externalities becomes visible in this definition where the prospect of unintended consequences, positive or negative, extends beyond the immediate confines of a Community Informatics initiative. A historical example of this can be seen in public broadcasting in the Pacific region, which has largely been sponsored through foreign aid. As one of its ideals the promotion of free-speech is seen important for a host of reasons that relate to political and economic processes. However, broadcasting has not engendered an appreciation of the need for a free press within the political leadership of many Pacific Island countries even though considerable resources are devoted to funding these services [15]. This brings into stark focus the discord between project sponsors and recipients where an ideological clash has emerged because of different worldviews or ideologies. It is perhaps for this reason that observers suggest small-scale media technology centres are better areas for support where its less likely for politics to interfere [16].

Braman alerts readers to the issue of power as another factor shaping agreements about information and the nature of change that such information will engender. It is possible to understand the development of exploitative relationships in a situation of unequal financial resources. A similar circumstance may exist in relation to imbalances in knowledge. Perhaps the word ‘imbalance’ is ill advised in that the relative weighting accorded to individuals’ knowledge may be based on biased value judgements. For example, should knowledge about the function of a computer operating system be given more credence than the traditional knowledge of a community leader? Ideally the answer is ‘no’ but achieving the right environment in which an optimum mix of knowledge from stakeholders leads to ICT interventions that strengthen traditional knowledge structures and communities represents is no clearer as a consequence of this insight.

On the other hand, there are circumstances in which Community Informatics projects seek to disrupt established knowledge systems and by implication disrupt established power within a community. The UNESCO sponsored programme 'ICT Innovations for Poverty Reduction' has as one of its objectives '...ICT initiatives that change social norms that disadvantage marginalised people...' (2). There is ample evidence in this report to indicate the transformative effect that empowerment through ICTs brings as individuals are able to confidently claim new capabilities and knowledge. The report also acknowledges that such changes can have a down side in that '...power contests [can] threaten participants and initiatives...' (90). The potential for disagreement and conflict is real and methods to deal with such situations are not addressed in detail within this report.

Two factors stand out as important for those participating in similar projects. The first may be to heed Molnar's advice to broadcasters in scoping projects so that they are small scale[16]. This makes the task of management less complex and may not evoke the interest of those who may be threatened by CI initiatives. The second is for participants themselves, including project planners and sponsors, to ensure that they do not unwittingly reinforce inequities that come with knowledge and finances in the planning of such projects.

On the basis of this analysis of Braman's work it can be concluded that basic decisions about what information is considered appropriate is fundamental to establishing productive partnerships between technologists and those with knowledge of community requirements. As one moves to more socially integrated definitions of information decisions about ICT systems become increasingly tied to changes in established patterns of behaviour in order to create better socio-economic outcomes. The difficulty appears to lie in arriving at a common vision of "better". Increased revenue streams from commoditised information may be welcomed while the undermining of established patterns of authority may not be welcomed by all.

4 Discussion and Conclusion

From a perspective of equity and the ability of marginalised communities to fully profit from new ICTs, decisions about technology are perhaps less important than discussion about information and what works best in each local context. Braman's hierarchy of definitions has the potential to orientate the thinking of those planning Community Informatics projects in four ways.

Firstly, it is unhelpful to maintain vague notions of information as a resource because it tends to promote a dichotomy based on the presence or absence of ICTs. The provision of ICTs with insufficient understanding of local context tends to promote a second class of citizenry [7].

Secondly, the idea that information may be commoditised to create commercial opportunities is welcome but clearly must be understood within the broader information melee where the danger exists where information that has high social benefits but insufficient commercial potential is not communicated. The corollary to this situation is to take a cue from the established communication technologies of

broadcasting and print that have been using commoditised information to subsidise the provision of other information for many decades.

Thirdly, a complicated mix of contextual factors that include individual capabilities, social structure, cultural mores and understanding drives the productivity of information in any given environment.. As a consequence, there is a need to understand local epistemologies and ontologies and the gaps within as a means to developing effective ICT related responses. This has engendered innovative research agendas in a range of disciplines that look to the promise of multi-media technologies and the Internet for each of their area's challenges in overcoming marginalisation. High on the list of "essential attributes" for individuals is a multi-lingual capability that enables boundary spanning between disciplines as well as cultures. According to Matchlup such individuals are rare.

'...Translation of discourses by different speakers and writers is not easy and will succeed only if the translators have studied the other field to become sufficiently "multilingual" – even though all is being said is English. Few of those brought up in one of our thirty or forty "cultures" have become bilingual or trilingual in our sense, and only very few exceptional scholars have succeeded in understanding the communications emanating from all the disciplines involved ...'(4)

Fourthly, and building on the previous point is the potentially transformative effect ICTs may have in a given situation or conversely, the disruptive effect as local customs and patterns of communication are altered. As Slater and Tacchi advise, the highly uncertain nature of this activity suggests the need for iterative and evolutionary development and deployment of Community Informatics projects that are guided by contributions from a broad range of actors over a long period of time [13].

In summary, it appears that the task of system builders in the Community Informatics domain can be related in many ways to the vagaries of information – the manner in which it is defined and the factors that govern its flow and uses within communities. In describing the task of researchers in information Simon likens the project to one being an anthropologist.

'...We go into areas whose inhabitants speak foreign languages (with many words sounding like words in our language but have very different meanings); we try to find some guides to help us learn the meanings of strange sounds; and we try to make sense of what we see and hear, yet we probably misunderstand much and are bewildered by even much more...'
(5).

Such a description appears fitting also for those working at the coal-face in Community Informatics.

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