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A STRUCTURATIONAL CONCEPTUALIZATION OF INFORMATION LITERACY: REFLECTIONS ON RESEARCH IN RURAL SOUTH AFRICA

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Abstract

This paper draws upon Giddens's Structuration Theory to provide a conceptualization of information literacy, which conventionally has been limited to librarian and educational studies, and usually perceived at the level of individual skills. The structuration conceptualization expands it to be more integrated with social, cultural, and institutional dimensions. An empirical study in two remote rural hospitals in South Africa is then presented and analyzed under this conceptual framework. The research is completed with an attempt to answer the "so-what" question. Further discussion on the cultivation of information literacy is based on insights of "agency" from the structuration theory. The paper makes a contribution to the research of information literacy and enhances its relevance to current social studies of information systems.

Key words: information literacy, health information systems, structuration theory.

1. INTRODUCTION

One major critique on the discourses of information and communication technology (ICT) and development is that some of the literature is overly techno-centric. While ICT provides a lot of opportunities for social economic development, the core capability lies with information rather than technology (Heeks 2002). Therefore, while e-literacy is needed to address social exclusion in the network society (Cushman & Klecun 2006), information literacy constitutes a central link of the major challenge, that is, to enable individuals and communities to connect, interact and utilize the world of information (Todd 1999).

Compared to ICT literacy, information literacy implies a much wider range of capabilities which form the basis of lifelong learning, with or without technology. The concept has its roots from library information studies. For example, the American Library Association defines an information literate person as someone able “to recognize when information is needed and have the ability to locate, evaluate, and effectively use the needed information (ALA 1989)”. However, in the information age, information literacy is no longer just about formal education. Rather, it has become a matter of effectively functioning in today’s much more informationalized world, in addition to being considerably more technologized. For example, Bruce (1997b) identifies seven ways in which individuals experience information literacy, among which information technology is but one. The other six include information sources, information process, information control, knowledge construction, knowledge extension, and even wisdom. Aiyepetu et al (2002) argue that, for the African context, there should be an eighth face - “information for coping/survival”. They comment that strategies for information literacy will not be relevant to rural Africa unless they also address the population who are constantly struggling with natural and human-made disasters. This highlights the needs to further expand our conception of information literacy, which should move beyond the scope of individual skills to a structural level social phenomenon which entails the diversity of human conditions and social contexts.

This paper is an attempt to provide a conceptualization of information literacy sensitized to the complexity of social, cultural, and institutional factors by drawing upon Giddens’s structuration theory. Based on this conceptual framework, the paper then presents a case study of information practices in two rural South African hospitals, where data collection was considered a bureaucratic imposition and information management was almost non-existent, yet where there is an acute need for effective information utilization. Implications from the empirical material are drawn to explore how information literacy may be cultivated.

The remainder of the paper is organized as follows. Section 2 presents the structural conceptualization of information literacy. Section 3 provides the research background and methodology. Section 4 then describes the field data from the perspective of the three modalities of information literacy. Section 5 takes one step further to discuss the theoretical and empirical implications of the cultivation of information literacy, anchored upon the notion of “agency” in structuration theory. Section 6 concludes by reflecting on the rigour and relevance of the paper.

2. CONCEPTUALIZING INFORMATION LITERACY

Virkus (2000) points out that although the word “information literacy” has caught the attention of some important forums, the majority of those concerned are still librarians and information professionals. As reviewed by Bruce (2000), information literacy research is in its infancy. A number of the studies have employed a well-articulated theoretical framework to explore ways of investigating important aspects of information literacy, such as phenomenography, cognitive analysis, action research, relational approach, and so on (Bruce 1997b; 1997a). Educational research has been the dominant theme in the information literacy research area, and there have been a strengthening

influences from the information science and communication fields (Bruce 2000), particularly through the application of sense-making methods (McMahon & Bruce 2002). Most research perceives information literacy as a set of individual skills and retains a librarian and educational focus. There is therefore space for the expansion of the concept to be more contextualized and embedded in different aspects and levels of social life.

This paper draws upon Giddens’s structuration theory to construct the concept of information literacy. Structuration theory (e.g. Ranson et al. 1981; Whittington 1992; Willmott 1987) has been applied in various areas for diverse purposes, and in occasion with varying interpretations, including accounting, organization studies, and information systems (see Jones 1999 for a review). The concept of structure, defined by Giddens, refers to “structuring properties”, which “can be understood as rules and resources, recursively implicated in the reproduction of social systems” (Giddens 1979). A central core of structuration theory is the *duality* of structure, which refers to the “essential recursiveness of social life, as constituted in social practices: structure is both medium and outcome of the reproduction of practices” (Jones 1999). Hence the stress on structuration as an ongoing process, as opposed to structure as a static property of social systems. In other words, structuration theory claims to resolve the dualism of action and structure and that between individual and society (Giddens 1976).

Information literacy can be conceptualised with the duality of structure in the following ways. First of all, the concept “structure” serves to encapsulate the notion of information literacy as “structuring properties” of a social group, which enable and constrain the access, evaluation, and use of information. Therefore, information literacy “exists out of time and space”, and produced and reproduced by social practices (Giddens 1976). This notion breaks away the restricted perception of information literacy as a set of individual skills. Rather, it can be perceived also at a higher level as a social construct which actors draw upon in their day-to-day practices, and in turn transform. Therefore, information literacy is not a static entity, something which can be directly “acquired”. It evolves as social practices are shaped by social actors, creating consequences for both individuals and the social context they are embedded in.

Secondly, structuration theory describes structure in the three dimensions of *signification, domination* and *legitimation*, interacting with human action of *communication, power* and *sanctions* through the three modalities of, respectively, *interpretive schemes, facility*, and *norms* (Giddens 1984, p.29). The three modalities provide a suitable framework to explore various dimensions of information literacy. It should be noted that the three dimensions are three interrelated and interactive aspects of an integrated whole, and each contains structural properties that are engaged in a structuration process as well. Figure 1 portrays information literacy in the three modalities of structuration. Information literacy as implicated in the modality of *interpretive scheme* is perhaps closest to its most prevalent connotation: the collection, interpretation and communication of information. In the *facility* regime, we look at

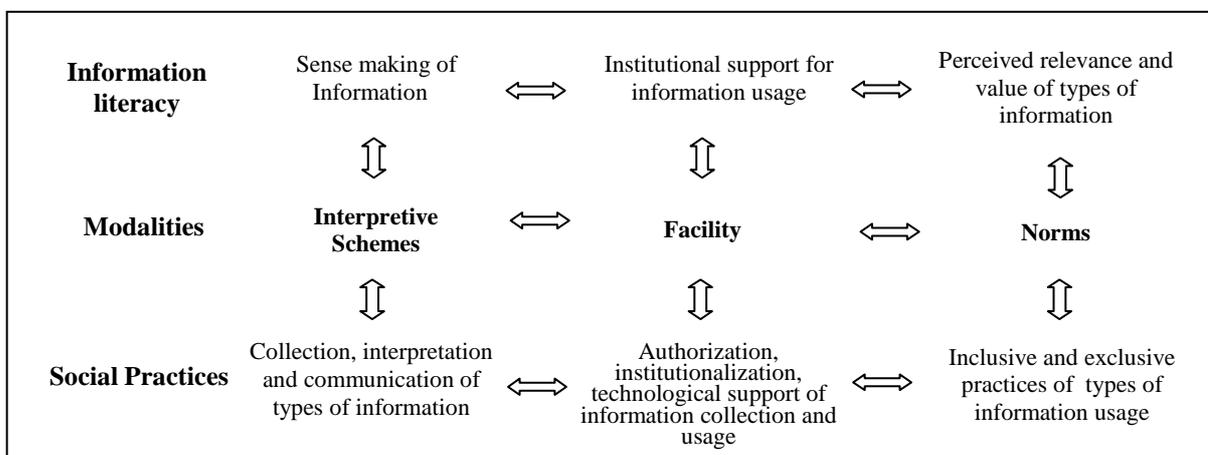


Figure 1: A Structural Framework of Information Literacy

information literacy in terms of institutional rules applied to the allocation, evaluation, and usage of information. The *norms* dimension of information literacy is implicated in inclusion and exclusion of different types of information use and dissemination as mediated by their perceived relevance and value. For example, some communities demand highly accurate and comprehensive encoded information as the basis of any decision making, while some rely on tacit or oral knowledge to go about their daily lives.

Thirdly, structuration theory is above all a theory about change, which is rooted in Giddens's concept of "agency". This allows us to go one step further to explore how to cultivate information literacy. Social changes are mediated through the social practices of knowledgeable and reflexive agents. Individuals, as agents, are the "perpetrator" of social events, in the sense that they could have acted differently at any given time and place if they choose to. Nevertheless, agency "refers not to the intentions people have in doing things but to their capability of doing those things in the first place (ibid. p.9)", because human actions often have unintended consequences, and intentions do not necessarily produce intended results. In other words, Giddens readily acknowledges the boundedness of human knowledgeability: "the flow of action continually produces consequences which are unintended by actors, and these unintended consequences also may form unacknowledged conditions of action in a feedback fashion (ibid. p.27)." Agency is both situated and enabling in structuration process, which leads us to consider what are the constraints of agency, and what are the possibilities of change agency enables; in other words, to address both conditions of social environment and individual aspirations.

Finally, there are two levels at which social systems can be reconstituted; one is "social integration", which refers to "reciprocity between actors in contexts of co-presence (ibid. p. 28)." This is the level at which social systems are continuously being produced and reproduced in the *routinisation* of social practices of day-to-day life, i.e. situated actions. The other level is "system integration": "reciprocity between actors or collectivities across extended time-space (ibid. p.28)". This is the level where strategically-placed agencies seek to reflexively regulate the overall conditions of system production. Giddens gives the example that the ideas produced by social theorists tend to be fed back to social life itself, which gives rise to the attempt to monitor and even control the "highly generalized conditions of system reproduction." Actions of system integration include, for instance, political decisions, public policies, and institutional arrangements. The two levels of system reproduction indicates the need for an integrated approach of situated action and structural changes in our discussion of cultivating information literacy.

3. RESEARCH BACKGROUND AND METHODOLOGY

Having conceptualized information literacy, the following two sections present research findings in two rural hospitals in South Africa, starting with an introduction to the research background and methodology in section 3 and the description of case material in section 4.

There are 11 official languages in South Africa, which represent 11 major ethnic groups with unevenly distributed population across the country. Most people can speak several languages but may not be proficient in written languages. Despite its successful transformation from apartheid to democracy in 1994, South Africa still suffers from the legacy of severe inequality between the white and black population in terms of income, education, quality of living, and access to resources, etc. The research material presented in this paper was collected in one of the former Transkei areas in the Eastern Cape Province, home of the Xhosa people. The area was one of the homelands segregated from the former South Africa. The legacy of apartheid has left this region in a disadvantaged position in terms of resources, infrastructure, and education.

According to a white paper on information literacy (Underwood 2002), illiteracy rate in South Africa varies from 27% in urban areas to 50% in rural areas. During the apartheid period, library and information services were seriously underdeveloped due to the lack of state initiative and coordination.

The 1990s saw the restructuring and transformation of library and information services as a result of progressive protests and lobbying by information workers. The South African government sees the need for a restructured education system for the information society, yet provision of information literacy education and programs had been “patchy” (ibid.).

The Xhosa culture, in which this study took place, is a prominent example of African oral cultures (Alagoa 1990; Miller 1980; Kaschula 2001). The oral traditions among black African ethnic groups have been extensively researched (e.g. Goody 1997; Ong 1982). As opposed to written literature, people in primary oral cultures communicate through oral literature, or oral art forms, which may take different forms such as folk tales, myths, epics, praise poems and historical accounts on rituals. Primarily oral based communication and thoughts could be characterised with “homeostatic and situational” rather than “abstract”, “empathetic and participatory” rather than “objectively distanced”, and close to “human lifeworld” (Ong 1982). Understanding the characteristics of oral cultures helps one to construe the patterns of information usage in these cultures. Gough and Bock (2001), for instance, show that the writings of Xhosa-speaking students manifest strong influences from their oral primary discourse, and relative underdevelopment of secondary discourse of both Xhosa and English. Moreover, the authors note that other research has suggested “epistemological oppositions” from some students to the ways of thinking about knowledge and interpretation in their university, and conflicts between dominant and marginalised literacies, i.e., between Western academic literacy and local oral literacy genre. They point out that this was in part the result of educational practices that emphasise memorisation and rote learning, which are currently prevalent in South Africa’s education system.

The research described here formed part of a collaborative action research project between the University of Oslo (Informatics Department) and the Health Information Systems Programme (HISP) of the School of Public Health at the University of the Western Cape (Braa and Hedburg 2002). HISP was initiated in 1995 as a collaborative project between four Universities (Western Cape, Cape Town, Oslo, and Eduardo Mondlane in Mozambique), health departments and non-government organisations. The vision of HISP is to “support the development of an excellent and sustainable health information system that enables all health care workers to use their own information to improve the coverage and quality of health care” (Mahlalela 2001). The author conducted two cycles of ethnographic studies for a total of two and a half months during visits to two rural hospitals: Alpha and Beta (pseudonyms). The research methodology was mainly participative observation, combined with interviews and a focus group, with a specific focus on information practices. A total of eight interviews were conducted, including government officials at the provincial level, information officers at the district level, head of hospital and hospital staff. A focus group meeting was organised in one of the hospitals involving about 15 hospital staff. The emphasis of research lay with observing and communicating with people about their work and lives. Particular attention was also paid to the research contexts: extensive notes were taken regarding environmental factors - geographic locations, living conditions, physical layouts of buildings, posters on the walls and so on; social factors - ethnic groups, local cultures, historical background, organizational structure, etc; and personal factors – gender, education level, etc. These research notes were important to provide a rich understanding of the social, cultural, and institutional contexts where information practices were embedded, in order to avoid as far as possible a narrow perception on the subject of research.

4. INFORMATION LITERACY IN TWO RURAL HOSPITALS

The HISP project implemented a District Health Information Systems (DHIS) software, complimented by a paper-based District Hospital Essential Data Set (DHospEDS) registers in the hospitals of Eastern Cape province, which achieved considerable overall success in collecting data from the grassroots health facilities. However, some hospitals seemed to have had difficulties with these tools. Investigation was therefore conducted to explore possible reasons. Beyond the most visible technical difficulties, such as not knowing how to call Microsoft customer support to activate Windows XP on the donated computer, or how to save files onto a floppy disk, the investigation revealed fundamental

issues with information literacy. Findings are presented in the rest of this subsection, based on the three dimensions of the structuration framework of information literacy, as shown in Figure 1, and simplified as: the use of information (interpretive scheme), institutional support (facility) and information norms (norms).

4.1. The Use of Information

Hospital Alpha

There is a notebook with each day's patient records, which, as a rule, is carried by a sister-in-charge on duty each shift who would walk into the matron's office to read out the reports the hospital manager. In other words, in what sounds like a ritual of reporting, the matron listened to the numbers to get an idea of what was going on in the hospital, but did not keep any paper record in her office, as the record book normally lay on the desk in the sisters' duty room in the wards. Since all records were mixed, there was no clear information about total numbers of admissions, discharges, and deaths, etc., at the end of the month.

The community service doctors, the only three white people in the hospital, found it difficult to help improve the situation despite their enthusiasm. Educated in Western Cape, an economically developed area dominated by a white population and a Western culture, the young doctors came as volunteers to work in hospital Alpha for a year. They found it easier to cope with the underdeveloped living environment than to interact with the local hospital staff to get things to work to their standards of healthcare. As one of the doctors commented, "Each sister has her territory and they don't want others to interfere with their work. They think it's their job so they will just do it themselves." They tried, for example, to organise the pharmacy by using the computer in it to organise data in databases, which was working reasonably well for a while. But one day the sister working in the pharmacy presented them with a formal letter extracted from some policy document, stating that nobody but the pharmacist should enter the pharmacy, which should be locked outside work hours; and that it was the responsibility of the pharmacist to check the stock and order drugs. The white doctors had to stop using the computer, which remained idle ever since.

The sister in the pharmacy was not a qualified pharmacist, but appeared to be quite skillful and efficient at issuing drugs, while having conversations with the patients. However, no record was taken of the types and amount of the drugs being issued. The only records in the pharmacy were the orders that they have placed for the in-patient wards and the operating theater. When asked how she usually determined the quantity of drugs to supply the wards, and what to order for stock each month, she replied, "I work here and I know".

Despite the occasionally frustrating elements of the situation, the hospital kept on running in some way. Dr. A commented that, "Somehow things sort of work. I am surprised actually at how well things function, given the lack of training of the nurses and the situation. Things just appear when you think they are out of stock." Dr. B added, "In other words, although the gloves are not the right size, but they are gloves; and although the needles are not the right type, but they are needles..." Nevertheless, the doctors commented that patients often had to be referred to bigger hospitals in the nearest town, hours away by transport, due to the shortage of utensils or drugs which prevented the doctors from carrying out certain procedures.

Hospital Beta

Most wards had adopted the registers of the DHospEDS. The problem lay mostly with the incorrespondent records from the admission registers, midnight censuses, and monthly reports. Apart from possible missing records, another factor was numeracy. For instance, the midnight census might be done correctly but the sum was wrong at the end of the month, giving an incorrect inpatient-day number. The fact that nobody had found out about these errors implied that the numbers were rarely used.

While there were colorful graphs of some basic indicators posted on the walls of each ward, there was little evidence of interpretation or use of the graphs. When asked what purpose the graphs were supposed to serve, one nurse replied that they were for visitors to see. Inspecting closer, one could often find errors in the graphs. If the indicators involved some simple calculations, most nurses could not figure out how the results came about. The graphs on the maternity ward showed that in August 2003 their admission number on the graph was about 100 more than the number in the monthly report. When asked where the number on the wall came from, the sister-in-charge said: "I don't use the books at all. I just take all the patient cards, categorize them, and count them. That's how I came up with these numbers. It may take more time, but I know I am doing it the right way, so the numbers are more reliable."

4.2. Institutional Support to Information Practices

The lack of motivation from the health workers is rooted in the shortage of institutional support. While occasionally we observed enthusiasm and perseverance of some individuals to improve information and computer skills, some of the frustration and difficulties could clearly be reduced if institutionalised support was available from a variety of sources. A matron in Beta who was very keen for us to support them with the DHIS commented: "We want to learn how to interpret data. Otherwise people don't get any feedback and they are not motivated to collect data." According to the HISP facilitators, historically, these remote hospitals had been neglected and isolated. They were seldom visited by their superiors in the district or province. Statistics requests from above were therefore felt to be imposed, to be submitted unquestioningly, yet irrelevant to their own work. Even when collecting data for the DHIS, insufficient support was provided to making those data useful for the people who collect them. For example, a district information officer made the following comments to the hospital managers when visiting hospital Alpha, "...with the data missing, the province cannot do the budget for the hospital, therefore it is important that data collection is supported by the management The province does not care about inpatient days of the wards. They only need the total numbers of the hospital."

Herein lay the contradiction between the stated intention of the DHIS to promote information use at hospital and ward level, and the perception of data collection driven by the needs of the province or district. The perceived irrelevance of data to the health workers was also evident during the researchers' attempts to build up a formalised data collection process at Beta. In a meeting where almost all the key managerial and medical personnel were introduced to and given an explanation to the quick guidelines of the DHospEDS and a simple data collection process, the audience remained silent until one of them spoke up on behalf of the rest: "Why do we have to do this? Why do we have to be busy with all these stuff when we already have many patients?"

In Alpha, the so-called information officer, a reception clerk, was the only person with some knowledge of the DHospEDS and the DHIS, whereas the hospital managers paid little attention to them, nor did they have other established data collection tools or procedure. Without any medical background, the information officer found himself isolated and helpless with a far too advanced technology, a PC with Windows XP. In Beta, it was obvious that the adoption of the data collection process was full of tension and resistance. In the first cycle of the research, we achieved a consensus with the superintendent and a number of people at key hospital managerial posts that they could set up an information systems team and review the data collection process regularly. We also provided detailed documents and explanations of the data collection process, and went through training sessions with most of the managerial staff, matrons, and sisters-in-charge. Such practices did not sustain after we left, as no effort was made from the part of hospital management to continue the involvement of hospital staff in achieving a shared understanding and sustainable practices of data collection and information use.

4.3. Information Norms

Local culture is another important factor affecting information practices (McMahon & Bruce 2002). As one can observe in African communities, singing and dancing are very important elements of their expressions and communications. For example, at 7 am every morning, the nurses walk into the wards and start singing morning prayers, and all the patients, young or old, join the singing in their beds. The morning singing was what sounded to me a rather complex chorus, while it was sung by the Xhosa nurses spontaneously without any conducting. At the latter part of the prayer, the nurses and those patients not confined to their beds would walk into the corridors and start swinging their bodies, or dancing, to the songs.

The ability of the Xhosa nurses to communicate through oral interactions, or other means of expression such as singing and dancing, seems to be in contrast with their ability to use written information in any systematic way. The high rate of errors and mismatching records indicate at least a degree of insensitivity to numbers. However, it does not necessarily imply a lack of knowledge about patients on the part of the health workers. On the contrary, the Xhosa nurses are reasonably competent at work. When we pointed out missing data about a certain patient in one of the registers, the nurse could usually recall who that patient was and what happened to that person so that missing data could be filled in. It seems that for the nurses, patient information was more embedded in their daily practices in the healthcare environment. For example, they would remember that the pregnant woman accepted last Wednesday stayed on the bed next to the door and delivered a baby boy of 3 kg last Saturday. Whether this information was recorded on the register in a timely and accurate manner was irrelevant. As mentioned earlier in the paper, the patterns of thought in the primary oral cultures such as that of the Xhosa may tend to be intuitive and situational rather than abstract and logical. In other words, the black South African health workers may more readily engage with “embodied” or “encultured” knowledge than “encoded” knowledge (Blackler 1995).

Such information norms may have an exclusive effect when confronted with different demands of information practice. The information officer in Beta found herself isolated and disrespected. She wanted to quit this job: “...I don’t like to go [to the wards], because I feel that they (the sisters) undermined me. And this has been a long time... They look at me as if I don’t do any work. When I go to ask them for reports, they wouldn’t pay attention to me. They will only do it if the matron asks them. And I don’t have the background of this... I didn’t know it would be so difficult. Nobody cooperates with me...” One reason behind these struggles could be the relatively clear hierarchies, and hence boundaries, among the health workers. With epaulets on the uniform indicating the various types and levels of trainings, professional hierarchy was explicitly visible, and constantly reminded and respected. Since encoded information was not valued in their work, requests for data collection were easily dismissed, unless coming from a senior health manager.

5. CULTIVATION OF INFORMATION LITERACY

To recap, a structural conceptualization of information literacy has been presented and used as a framework on the empirical study in two rural South African hospitals. Although more information may not always necessary lead to better results; information shortage certainly constitutes a problem for development initiatives especially in disadvantaged communities such as those studied in the paper. It is shown that focusing on the capabilities to use technologies is seriously inadequate. Information literacy not only entails individual ability to interpret and use information, it is also indicated in the perception of the value of information. Such perceptions are generally shared within a certain information culture, and are very difficult to change by educating a few individuals. As has been shown in most ICT projects, the lack of institutional support for data collection and information use would render a lot of initiatives futile, with or without technology.

The more difficult question is probably what can be done to make a difference. While provision of resources and direct training are the most straightforward and practical measures to facilitate the improvement of local conditions, in the long term, it is vital to cultivate the information literacy on the grounds of local conditions. The word *cultivation*, normally referring to improvement and development by education and training (Oxford English Dictionary 2006), is used here also to emphasize that information literacy is rooted in the ground of local conditions. Thus rather than created or implanted, information literacy has to be developed with attention and care to deep-seated cultural and social issues. This is meaningful not only in isolated communities such as those in rural Africa, but also in highly technologized communities in perhaps more developed countries, as technological diffusion does not automatically imply a sophisticated level of information literacy (Cushman & Klecun 2006).

This section draws upon Giddens's insights on agency, as presented earlier in section 2, to explore implications of the empirical material on the cultivation of information literacy. This will be organized around three aspects of agency. Firstly, agency is the root of changes; individuals are knowledgeable and they are able to act differently; secondly, agency is also situated, constrained and enabled by their environment; thirdly, agents can produce changes on both daily social practices and higher level "structure".

5.1. The Potential for Change

Being both the medium and outcome of information practices, information literacy embodies both constraints and facilities of action. Low information literacy can be constricting on individual's actions concerning information; meanwhile, it may enable actors to reflexively adopt, sustain, or modify social practices as related to information.

While the above presentations of the field studies focused on problematizing information literacy, it has to be noted that there are also evidences of the potential for change. The existing structure of information practices in the rural clinics and hospitals is drawn upon by health workers and managers in their everyday work. These practices offer little assistance to the improvement of health conditions in the poverty-stricken areas, and in fact appeared to counteract the developmental efforts invested by local governments and international aid agencies. Nevertheless, some health workers showed interests in acquiring new knowledge and skills. By introducing and promoting the concepts of information use through the implementation of health information systems, the health workers in rural SA hospitals were exposed to the need of information use, and encouraged to exploit whatever resources available to do so. Therefore, the collision with and accommodation of the local information culture on the one hand, and coordinated endeavours to promote data collection and usage on the other, constitute a reflective space. The reflective space allows the reproduction of information culture to trigger changes to the *routinisation* and feed back to the *structure*. This structuration process can be observed from the increasing awareness of information use. A government official working for the DHIS in the Eastern Cape province gave an example of a district health manager learning to use indicators. When visiting the provincial stock of drugs, she discerned a certain type of drug ordered in an extraordinarily large quantity for her district. For the first time, she resorted to the data she collected from the hospitals to investigate the reasons behind such an abnormal ordering of drugs. "This shows that our managers have started to understand the meaning of data and learned to use it in their work," said the health official.

5.2. Addressing Both Individual Aspirations and Conditions of Social Environment

As agency is situated, the cultivation of information literacy must be based on the consideration of both individual aspirations and conditions of the social environment. From the case material, one can sometimes observe almost a contradiction between individual agency and the overall goals of development. While tremendous efforts had been made to diffuse information technology and to

provide training for its use, it is not often recognised that the resistance comes from the very people whom it is claimed will be empowered - the health workers. Even though alliances had been formed with higher-level local institutions to mobilise resources, health workers and managers at the grassroots tended to view data collection procedures as nothing more than an irrelevant or imposed administrative task.

This arguably is due to their cultural background, social norms, and local circumstances. Some African ethnic groups are characterised with a dominant oral culture in which rationalistic thinking and encoded knowledge generation are not the norms. This is not to say that the Western style of systematic thinking should replace their traditional cultures and conventional social practices. Nevertheless, there is a need for the recognition of the exclusive effect of the unresolved tensions between these local cultures and an increasingly globalized information culture. Furthermore, the “resistance” may be alleviated if individuals were involved and supported in developing a shared understanding as to how information use could serve their specific needs. As commented by the assistant of the district information officer overlooking ISA hospital, “Attitude brings the problem of numeracy.” Acknowledging these contradictions allow possibilities for new elements to be brought in by mobilising the agency of local people, namely, their self-determination, self-motivation, and creative transformation to enable and facilitate the improvement of local conditions. Such efforts should go much further beyond the installation of ICT.

5.3. An Integration of Situated Action with Structural Changes

As information literacy is subject to changes engendered by agency, such transformation may occur at the level of individual social practices, as well as at the generalised level of information literacy. Therefore, cultivation of information literacy involves not only gradual daily changes of the pattern of people’s behaviour and norms, but also reconstitution to its structural conditions. This indicates the need to consider the integration of bottom-up and top-down approaches. The former is grounded in mostly homeostatic social interactions, while the latter requires institutional actions and political processes. On the one hand, it is necessary to address the attitude and skill problems in the day-to-day practices of local health workers, so that information can be converted to social value. Unfortunately such interventions are extremely resource- and time-consuming. At a societal level, more can certainly be done at the level of policy making. Resources can be allocated to effectively raise the rate of basic literacy, and to promote a higher awareness of information literacy, with more sensitivity to various ethnic cultures, in vocational educations and management training. Having information literate managers is crucial, as they are at the key positions of organisations to make effective changes to the existing practices of data collection and information use. This is particularly important at the facility level, where data is collected and transferred to other levels of the health system.

6. CONCLUSION

This paper makes a contribution to the research on information literacy by providing a conceptualisation framework which brings in elements of social, cultural, and institutional dynamics, expanding on the conventional perception of information literacy merely as individual skills. In fact, such a conceptualization is applicable to any type of literacy. The empirical study in the context of health information systems adoption in rural South Africa indicates that information literacy should no longer be regarded only as a topic of librarian or educational studies; it is an important subject in today’s world, especially in communities left out of the “network society” (Castell 1996). Table 1 outlines how information literacy is conceptualized in the paper.

In this concluding section, the author would like to step out the arguments and reflect upon the research itself. More specifically, in light of the theme of this conference, to what extent has the paper demonstrated relevance and rigour? The former very often depends on which audience we are addressing. Nevertheless, the research is done as part of an international health information systems

Structuration Theory	Applied on Information Literacy
Duality of Structure	Information literacy exists at both social and individual level, the former being the medium and outcome of the latter.
Structuration	Information literacy evolves as social practices are shaped by actors.
Three modalities: interpretive scheme, facility, norm	Information literacy embodies the understanding and usage of information, institutional support for information, and information norms.
Agency <ul style="list-style-type: none"> ▪ Knowledgeable individuals are capable of acting differently; ▪ Agency is situated; ▪ Social and system integration 	Cultivation of information literacy <ul style="list-style-type: none"> ▪ Information literacy can be improved by motivating individual interest and determination; ▪ Need to address both individual aspirations and social environment ▪ Need to integrate situated action with structural changes.

Table 1. Conceptualization of Information Literacy

initiative which has produced significant impact in various developing countries. The empirical research was conducted at the grassroots level, the frontline of ICT development endeavours. The issues identified in this study can certainly be found in other similar communities or in different societal contexts. At a conceptual level, implications from the theorization of information literacy transcend specificity of the field study and have general relevance to other social settings. In terms of rigour, the paper has made considerable effort in theorization. Structuration theory is used to construct a conceptual framework of information literacy, which is then applied in the interpretive study of information practices in two rural South African hospitals. The research is then completed with theoretical and practical reflections on actions and changes, again drawing upon Giddens's concept of agency, to discuss the cultivation of information literacy. Methodologically, the researcher recognizes the study as her own interpretation of the field and presents it from an analytical perspective of information literacy, while endeavouring to avoid a narrow and simplistic reading of the practices and contexts by employing methods of triangulation, participant observation and iterative reflection. Nevertheless, the field study falls short in terms of length of time, and there is always space for a better and more in-depth understanding of the complexity of other cultural settings. In terms of future research, it would be valuable to follow up the research in these two remote hospitals to obtain a more historical perspective, in terms of HIS adoption and in terms of the evolution of information literacy, and the interaction of the two.

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