Information behaviour in pre-literate societies.

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Introduction

Ong (1988:10) refers to "*the relentless dominance of textuality in the scholarly mind*". As studies of Everyday Life Information Seeking (ELIS) show (eg, Carey *et al*, 2001, McKenzie, 2002), human information behaviour includes far more than just the use of text. Humans seeking information will generally seek it from other people before looking to a written source (eg. Ellis *et al*, 1993, Shenton, 2003). However, information behaviours associated with text are probably the easiest to examine and so have been the most studied. This chapter provides a new direction in human information behaviour research by considering information behaviour in societies where the seeker of information has no opportunity to resort to text.

For almost all of the thousand or so centuries that humans have been around, we have sought and exchanged information without using writing. This chapter looks at one society where, until recently, there was no awareness of writing. It discusses that society's relationships with information and uses examples from archaeology and biology to put those relationships into a broader context.

The aims of the following chapter are:

- to explore some of the ways in which the demands of a pre-literate society determined the information needs of its members and shaped information roles within that society;
- to show how the information roles identified relate to life in a modern, literate society;
- to discuss how and why text-based information sources have dominated the development of Information Science;
- to explore some of the consequences of that dominance.

Background

Information Science is a pragmatic discipline. It grew from the need to organise documents in ways that facilitated retrieval; but the studies associated with this task have raised questions that impinged on several other disciplines, including computer science, business and management studies, education, and psychology. The themes explored in this chapter are something of a departure from existing Information Science literature. The first and third author of this chapter have, respectively, experience in biological and archaeological sciences. Of most interest however, is the background of the second author.

Joe Palimi is a member of the Kope Tribe (pronounced ‘Koppi’) from the Western Highlands Province in the Central Highlands of Papua New Guinea. He studied for several years in Papua New Guinea, Australia and the UK, but this chapter draws on his experiences as a member of a technologically unsophisticated society; and puts those experiences into the context of

human and cultural evolution in general. As such, it accords with the views of Spink and Cole (2005), that Information Science, in addition to drawing on the disciplines listed above, can benefit from an anthropological perspective. In compiling this chapter, we are working with a definition of information suggested by Madden (2004): i.e., that information is a stimulus that expands or amends the World View of whoever (or whatever) is being informed.

The Kope tribe of Papua New Guinea

Anthropologists describe the most primitive unit of society as a *band*. Bands comprise around 25 to 100 members: they are usually hunter-gatherers and tend to be extended families. Bands are nomadic, without hierarchy, and none of their members has a specialized role.

In regions where there is a rich supply of food, or where agriculture has begun to develop, bands may merge to form tribes (such as the Kope). These are substantially larger bodies of people, sharing the same language and usually with fixed villages. There is little more specialisation than with bands, but there is a rudimentary hierarchy (Service, 1971).

The Kope is a tribe of around five thousand Melpa-speaking Melanesians based in the Western Highlands Province in the Central Highlands of Papua New Guinea. Traditionally, they were hunter-gatherers and subsistence farmers, with a technology based on tools made from materials derived from plants, animals and stones.

The Kope tribe is divided into clans which comprise a number of settlements based on extended families. Polygamy was traditionally a common practice, so extended families can be very large. Family settlements may be several hundred metres apart, but there is always a central meeting house called the *manga rapa* or round house. This is usually the residence of the clan leader.

The manga rapa is the focal point of the community; and men of the clan would meet there frequently for business and social purposes. Most important decisions took place in the manga rapa. If any decisions required expenses however, they had to be cleared with the women of the tribe, who were custodians of the men's wealth (which usually took the form of pigs).

The manga rapa was built at the end of a rectangular field (moka pena) the size of a football pitch. This was used for open air meetings, dances, trading etc.

The Kope's first contact with Western culture was in 1930 when some Australian prospectors wandered into their territory (Connolly & Anderson, 1987). The prospectors, the Leahy (pronounced *lay*) brothers, were the first white people the Kope had seen. Initially the pale visitors were thought to be ghosts; but after the Kope had observed long enough to conclude that the men were human, they made themselves known.

Several members of the tribe who were children at the time of this meeting are still alive, including Joe's father. Given the inaccessibility of the Western

Highlands Province, contact with Western society remained intermittent until after World War Two, when missionaries began to arrive. As a result, the tribe's culture remained largely unaffected until the late 1940s.

Information uses in the Kope tribe

In text-based societies, we read in order to be informed, inspired, educated or entertained. In pre-literate societies, such divisions are alien. Tribal myths, histories and technologies are remembered as stories, songs and dances. Tellers of religious tales recount the origins of the tribe and its land; and in so doing may impart lessons on how to hunt, what to eat, and how to manage the environment. Tribal dances may be ritualised interpretations of technology, with the movements providing lessons in how to build a house or fashion a weapon (Guss, 1989). Alternatively, they may be used for organising. In the Kope for example, most dances are standard and unvarying. The exception is the war dance, which is used to help plan battle tactics.

From the perspective of a literate information scientist however, tribal information can be regarded as performing three main functions for the Kope:

1. Defining tribal identity through history and mythology

Like all other communities, the Kope are interested in news and gossip; and story-telling plays a significant part in their culture. However, traditionally, one of the more serious purposes of story telling is the preservation of the tribe's history, which was remembered and passed on from generation to generation.

2. Preserving social networks

Kinship hierarchies in a polygamous society are both complex and important. The clan provides a system of mutual support, but with it come reciprocal obligations. To avoid or resolve conflicts, it is necessary to be able to recall accurately the links and associations between relatives. Marriages between clans are forbidden, but not marriages between tribes: even warring tribes.

3. Promulgation of practical skills, including hunting, house-building, agronomy.

Before their contact with Western culture, the Kope were, of necessity, generalists. The clan groups were too small to support specialists, so all the skills required for survival had to be acquired by all members of the tribe. Since plant and animal materials were commonly used, not only for food, but for building and tool-making, the Kope have a very detailed knowledge of the local flora and fauna and their uses. Such an in-depth applied knowledge of botany and zoology amongst all members of a pre-literate society seems widespread. Lévi-Strauss (1966: ch1) cites numerous incidences of Western biologists being astounded by the ability of native peoples to classify and identify large numbers of indigenous organisms.

Tribal politics

Leadership amongst the Kope has never been hereditary: leaders were chosen on merit. The tight network of family connections helped to make the

biases and motivations of aspiring leaders common knowledge, and their skills would have been on display to all.

The main role of the tribal leader was to represent his tribe in inter-tribal negotiations. In consequence, the most important skill for a chief was oratory. He would need to be well versed in local history and politics, but not only was his knowledge important, so too was the skill with which he presented it.

Strathern (1984) contrasts this with the practice in the Eastern Highlands of Papua New Guinea, where leadership was tied up with prowess in warfare, rather than leadership through trading and exchange. As a result, where the hierarchies in the Eastern Highlands were destroyed by contact with Europeans, those in the Western Highlands were

> *"…in a sense, enhanced… The oral history of politics was preserved, developed, and constantly brought into play."* p23

It could be argued that a key difference between the cultures of the Eastern and Western Highlands was that, while the Eastern tribes prized military prowess, their Western counterparts recognized the value of knowledge and information.

Presentation of information

Because the tribe's history and politics were widely known, a leader (or 'Big Man') was judged, not by the information he gave, but by the way in which it was presented. Like all politicians, Kope orators make considerable use of wit,

metaphor and simile, allowing them to present information in a way that suits their case, while being entertaining.

Such use of imagery in presenting information helps to place it in a context selected by the presenter. Use of inappropriate imagery however, makes the message uninformative. As an example of this, the first missionaries to visit the Kope had considerable difficulty in explaining their beliefs to a people who had never had sheep. The idea of 'The Lamb of God' proved to be more confusing than enlightening. Given that the Kope's usual sacrificial animal was a small pig (Strathern, 1984:47), a more appropriate description of Jesus would have been the 'Piglet of God'.

Initiation and religion

Although the Kope no longer practice initiation ceremonies, many neighbouring tribes still do. Such ceremonies usually involve teaching the initiates necessary survival skills and testing their knowledge of the tribe's traditions and beliefs.

Under pressure from missionaries, many indigenous religions in the Highlands of Papua New Guinea were discouraged (Strathern, 1984). Prior to the arrival of the missionaries however, the Kope did have a well-established religion based on ancestor worship (Ross, 1936). As with other aspects of Kope culture however, religious roles were not hereditary.

Because there was no partitioning of knowledge into history, arts, technology and religion; activities and rites that, to the literate observer, might seem religious, could combine spiritual and mnemonic functions. All however, were important in allowing all participants to feel integrated into the tribe.

Repositories of knowledge

As has traditionally been the case in most societies, the elderly are repositories of tribal knowledge. Even today, with many Kope living and working around the world, tribal links are strong. From a Kope perspective, if someone is not part of a tribe, then he or she is nobody. The people who hold the memory of the tribe's culture, to a large extent shape the identity of all members of the tribe. In a sense, this role contributed to the tribe's religion. Like many societies, the Kope were ancestor worshippers. Knowledgeable, wise and skilful members of the tribe could therefore be consulted, even after death.

Information roles in the Kope tribe

The various information sources and flows discussed above can be summarized by arguing that there are a number of information roles within the Kope community that determine how information is used, and what it is used for.

- Induction – The passing on of the knowledge and skills needed to make a person a fully contributing member of the tribe. To be inducted into tribal society, children need to have an understanding of the tribe's culture, and sufficient knowledge of the local environment to provide for themselves

and any families they may have. In the Kope, a boy, once inducted, was permitted to enter the manga rapa and join in the discussions relating to clan business.

- Dissemination – The spreading of news and stories. This may be local gossip, concerning the activities of tribal members; it may be news brought back from traders about the goings on in neighbouring tribes; or it may be reports from hunters and gatherers about the movements of prey or the location of useful plants.
- Presentation – The ability to select and express information in a way that best suits the interests of a representative and those of his family, or of the clan that he represents.
- Organisation – The sharing of information to co-ordinate group activities, such as hunting, warfare and trade.
- Interpretation – The ability to derive information. Most obviously, this is done by trackers who 'read' the landscape in order to determine the movements of prey; but it is also valuable in social interactions for interpreting motives and anticipating actions.
- Preservation – The retention of tribal history, culture and expertise by the elderly.

The Kope is only one tribe, and caution should be exercised if generalising from a single instance; but the roles described above have obvious parallels in most societies. Some of these are discussed below.

Derived information

Of the six information roles listed above, five are related to the exchange of information. Interpretation is the exception and relates to innate abilities. Indeed, from the perspective of the information scientist, an appropriate definition of intelligence would be 'the ability to derive useful information from the environment', whether the environment be physical, social, economic or cultural. This ability, coupled with an intimate understanding of the environment and the nuances of change, facilitates serendipitous acquisition of information (eg, Foster & Ford, 2003), and is especially important in a society that depends on hunting and gathering, where survival can depend on derived information.

Spink and Cole (*2005*), in summarising theories of sense-making (e.g., Dervin:1992, 1999) suggest that such theorising about the world may be hard-wired. This view accords with that of Gibson (1986: ch8), who argues that humans perceive their environment and the objects it contains, not in terms of measurable qualities, such as height, weight, colour, etc, but in terms of what useful service they may perform. So, a barren hillock is not seen as being 100m high, it is "high enough to help me see above the trees"; a stone is not thought of as1kg in weight, it is "heavy enough for me to crack nuts with"; and a dark red soil is not considered to be reflecting light of approximately 750 nanometres, but "will be good for marking my face and body with". In other words, people view their surroundings in terms of what actions they afford. Gibson refers to the properties that allow these actions, as affordances. Such behaviour is an example of hard-wired theorizing:

"There is much evidence to show that the infant does not begin by first discriminating the qualities of objects and then learning the combinations of qualities that specify them. Phenomenal objects are not built up of qualities; it is the other way around. The affordance of an object is what the infant begins by noticing. The meaning is observed before the substance and surface, the color and form, are seen as such."

From the perspective of a Kope hunter, changes in the environment afford information concerning an animal's whereabouts. So, a Kope hunter may look at a fallen fruit beneath a tree. He is not interested in the type of fruit, but in what might have been eating it. If there are bite marks, he will learn what creature is in the tree above him. Or the hunter, on finding the puppies of a wild dog, may feel the lair to see how warm it is. He is not interested in the temperature as an absolute property of the lair, but because it will help him to learn about the movements of the mother. If the lair is warm, the hunter will infer that the mother has only just left to find food and will not be back for a while. If it is cold, she may return soon, so he leaves - quickly.

Carruthers (2000) argues that scientific reasoning has its roots in the art of tracking. Both the scientist and the tracker infer from the observed to the unobserved; and thus derive information about the world.

Intra- and inter- generational communication

Of the five information roles associated with the exchange of information amongst the Kope, three deal with the sharing of information amongst

contemporaries (dissemination, presentation and organisation), while the remaining two relate to the transmission of information to future generations.

One of the key differences between tribal society and industrial/post-industrial societies is the level of specialisation. The Kope were, of necessity, generalists. Age and sex played a part in the roles a Kope may be able to fulfil; but all members of the tribe had an understanding and appreciation of every task, making them well able to judge whether or not they were being adequately performed. This included the information roles listed above. A Kope's assessment of information would, to a large degree, be based on his or her evaluation of the person providing it.

In the modern world by contrast, people specialise in one or more of the roles. Huge industries have arisen around the dissemination of news and stories. Advertisers, legal representatives and politicians go to considerable efforts to present information in ways that best suit the interests of themselves or their clients. Managers, consultants and systems analysts are paid great sums of money to ensure that organisational information reaches the right people at the right time. Teachers and lecturers are paid rather less money to ensure that students are inculcated with the knowledge and values needed to function appropriately and effectively in society.

This latter information role, induction, has arguably grown in scope with increasing levels of specialisation. For the Kope, induction into the community usually meant the initiation of children into adulthood; hence the

description above, of induction being an instance of inter-generational information exchange. In our society however, with growing numbers of communities of interest, induction can be intra-generational.

The nature of a community will determine the nature of any form of induction. Professional communities for example, will normally require prospective members to have appropriate qualifications. These will be determined by the community's representative body, and administered by those responsible for induction. The jargon and other arcane language of many expert communities has led to their being perceived as

> *"Priestly groups* [which] *effect and maintain power by possessing significant cultural secrets. Training in the codes and rituals of these secrets is characteristically arduous, often lengthy, and reserved to elites."* (Marvin, 1988:39)*.*

Preservation is the information role most commonly associated with Information Science. It involves librarians, archivists and museum curators, and will be discussed more fully later in this chapter.

Macro and micro information studies

Although specialists now perform each of the six information roles discussed above, people in everyday life information seeking, within their own "small world" (Spink & Cole, 2005), will still perform all of these roles to some degree. It may be useful therefore, for the information scientist to borrow from the economist and refer to macro and micro information situations. In macro

situations for example, specialist information roles are developed and refined, and processes are introduced to ensure that information can be retrieved that is appropriate and of adequate quality. Micro information situations would depend on people's ability to assess the communities and environments in which they live and work

Repositories of knowledge and cultural transmission

Culture, to an anthropologist, is *"Information affecting their phenotype acquired by individuals by imitation or teaching*" (Boyd & Richerson,1985). Culture therefore refers not only to the artistic expression of a civilization, but to all the practices that define it, from its belief systems to the way it prepares its vegetables. The success with which aspects of a culture are transmitted from one generation to the next helps to determine the stability and durability of a civilization. As will be discussed later, there are many instances of technology playing a role in cultural transmission; but the most readily available means of passing on culture in a pre-literate society is to rely on the memory of older generations.

Care of the elderly has a long history within human and pre-human society. Archaeologists in France for example, have found a hominid jawbone 150-200 thousand years old (from the Middle Pleistocene period) which provides evidence of an individual being kept alive for some time after most of his or her teeth had been lost (Lebel *et al*, 2001). Behaviour of this sort is mirrored today in tribal societies such as Papua New Guinea, where old, virtually

toothless Papua New Guineans eat food that is chewed by their children and spat into a bowl (Diamond, 2001).

That such behaviour should have remained a feature of human society for so long, suggests that it has evolutionary significance; an idea recently given support by studies of historic data from Canada and Finland. Lahdenperä *et al* (2004) found that, if a woman survives beyond menopause, her offspring are likely to have more children of their own, and those children are more likely to survive beyond childhood. Consequently, genes that increase the chance of surviving beyond reproductive age in women are being selected. Since many of these genes will be the same for both men and women, longevity is likely to increase throughout the population.

Although Lahdenperä *et al* do not suggest reasons why the presence of a post-reproductive mother increases the likelihood of children surviving to adulthood, one probable reason is the accumulated knowledge of the grandmother. Evidence from Kenya suggests that this is the case with elephants. McComb, *et al*, (2001) have found that family units of elephants display greater social confidence if they have older matriarchs. This appears to be linked to the fact that older females are able to remember the calls of a greater number of elephants. If elephants hear a call they don't recognize, they display defensive behaviour. The frequency of such behaviour was lowest amongst groups led by older matriarchs, who, the authors infer, are acting as repositories of social knowledge.

Joe Palimi notes the exceptional clarity of recall of the older, illiterate, members of his tribe. Even in literate societies however, where memory loss is regarded as a common feature of old age, it tends to be short term memory that is impaired. Nelson (2003), in discussing the role of autobiographical memory, stresses the role of communal narratives in defining and sustaining cultures. Throughout most of human history, culture changed very slowly; so what was learned in childhood would serve throughout the whole of life, without there being a need to keep learning new skills and stories. Arguably therefore, there is more selection pressure for people to remember for a long time, than for them to carry on learning into old age.

The role of the elderly as repositories of public knowledge not only plays a part in preserving tribal identity, it is of considerable practical importance. At times, tribal survival can depend on the knowledge of the elderly. Diamond (2001) recalls a visit, in 1976, to one of the Solomon Islands, where he learned that tree species were categorised according to whether they were inedible, fully edible, or only to be eaten in famine times. None of his middle-aged informants could tell him which trees fell into the latter category, so they introduced him to a woman who had been a child in 1910, when a particularly destructive cyclone struck the island. Many of the trees bearing 'fully edible' fruit had been destroyed, so the islanders had resorted to eating foods that, though nutritious, were presumably less palatable. The old woman was the only person in the community who had lived through the disaster, and was the only person who could recall what foodstuffs they had resorted to. Had there

been a similar disaster therefore, the old woman's memory may have saved the tribe from starvation.

Cultural transmission through signs

It is widely acknowledged that, in pre-literate cultures, hearing was the sense most commonly associated with exchange of information (eg., McLuhan, 1967; Ong, 1988; Shanks & Tilley, 1987). According to McLuhan:

> *"The dominant organ of sensory and social orientation in the pre-alphabet societies was the ear—"hearing was believing." The phonetic alphabet forced the magic world of the ear to yield to the neutral world of the eye. Man was given an eye for an ear. "* (p44).

Certainly, most of the information roles identified above would have involved auditory rather then visual transmission of information; and preservation of information would have depended on frequent and formulaic repetition. Memory, to a pre-literate

> *"…is not so much a thing as an act, a gestalt uniting bard and audience in a shared consciousness. This phenomenon has little in common with that desiccated thing we literates call "memory." In the world before writing, memory is the social act of remembering. It is commemoration"* (Hobart and Schiffman, 1998:15).

Nevertheless, McLuhan's emphasis perhaps understates the role of the visual. Colour and imagery commonly play a part in pre-literate cultures, not

only in ritual, but also in the exchange of information. During a tribal war for example, a member of the enemy tribe with relatives among the Kope may stick his tongue out at them. This would inform them that they are moving towards an ambush and so should approach with caution. Alternatively, the relative may hand over a knotted leaf. The Kope recipient would then know that he was a target for assassination.

Other means of transmitting information visually amongst the Kope include the use of body paint, eg, black for war, red for funerals, or blue for a widow in mourning. People also wear ornaments. A Big Man may advertise his wealth by wearing a necklace of small bamboo tubes, with each tube representing a quantity of wealth (usually measured in pigs or shell money).

Another example of the use of signs is the placing of markers to delineate the boundaries of regions. If a wanderer steps beyond the marker, he or she may be in trouble, perhaps because a crop has just been planted and the farmer does not wish it to be trampled, or perhaps because they are walking on taboo ground and will offend the spirits. If a Kope sees a certain type of leaf tied to a stake or a tree beside a path, he or she will know that entry to that path is restricted. Such manipulation of the landscape as a means of marking routes is by no means a solely human practice. Wood mice for example, have been found to distribute markers (twigs, leaves, etc) when exploring. If they are startled, the mice will dash for cover. The markers help them to return quickly to the site of their earlier exploration (Stopka and Macdonald, 2003). Humans, like wood mice, use such devices as an *aide memoir*; but

humans also use them to convey information to others from their culture. Those capable of interpreting the devices therefore, can benefit from the experience of the explorer without needing to do the exploring themselves.

Unreliability of cultural transmission

When a society becomes sufficiently stable, it begins to manipulate the landscape by producing permanent structures. Many of these, such as residences and storehouses, have an obvious function. Other structures, often the largest and most ornate ones, are less easy to understand, except for people from the society that created them. As a means of transmitting information from generation to generation, they were only effective when reinforced by the rituals, or "*social act of remembering*" that imbued them with meaning.

It has been common throughout human history and pre-history for some societies to dominate and ultimately assimilate other societies. One means of doing so is the prohibition of the rituals that gave identity to the dominated society. An oral culture, and the identities of those belonging to that culture, resides

> *"in the living memories of successive living people who are young and then old and then die…* [and is preserved by] *the rhythmic word organized cunningly in verbal and metrical patterns which were unique enough to retain their shape."* (Havelock, 1963:42,43).

If such mnemonic rituals and rhymes are suppressed or prevented therefore, after a few generations the communal memory will be lost, and with it, the meaning assigned to the material representations of that culture.

An archaeologist, given the relics of that culture *in situ* may, by applying various techniques and by analogy with apparently similar cultures, attempt to discern some of the meanings that were attached to those relics. In the absence of written records however, any picture that emerges will be sketchy and possibly misleading. Imagine, for example, an archaeologist, ignorant of Christianity, coming across the ruins of ancient churches in Western Europe. One obvious feature common to all the ruins would be their east to west orientation. It would not be unreasonable to assume that this related in some way to the passage of the sun throughout the day.

Such fundamentally attractive, but demonstratively inaccurate attributions of meaning are not unknown in archaeology, and remain current in popular consciousness long after they have been abandoned by archaeologists. One of the most famous examples is that of Stonehenge, the well-known megalithic monument in the South West of England. This example of ritualised landscape from a pre-literate society was constructed over many generations during the early Bronze Age (ca. 3000-1500 BC), with each generation introducing additional features and with them, more associated meaning to the landscape. In the 1960s, it was noted that several astronomical alignments coincided with certain key features of Stonehenge. This led to the theory that Stonehenge must have acted as a form of

observatory. However, subsequent research revealed that these alignments are fortuitous (English Heritage, 1995:20); so

> *"…despite strong popular belief… Stonehenge did not incorporate precise astronomical alignments and did not function as an ancient 'observatory'"* (Ruggles, 1996:15).

Although archaeologists cannot say what Stonehenge meant to its builders, they have good reason to suppose that it meant a great deal. Four to five hundred years after the first Stonehenge was built, huge stones from Wales were added to it (English Heritage, p10). How Bronze Age technology could have quarried stones weighing up to four tonnes, then moved them hundreds of kilometres, is the subject of much speculation. What is not in dispute is the fact that it would have required a great deal of effort; so it is not unreasonable to suppose that Stonehenge was considered important by those who built or commissioned it. Knowledge of why it was important however, like most of the monuments of prehistory, died many centuries ago.

Writing and cultural transmission

Writing, by contrast, provided a memory that did not fade. Even today, over five thousand years after their creation, records of transactions can be read (Schmandt-Besserat, 1997). Without those records, the different interests of the transacting parties would have been represented by their own memories and the memories of witnesses, all of which would have been subject to change, to bias and, of course, to death.

Writing did not only offer a way of preserving transactions and accounts however. By 2900 BC (around 300 years before the builders of Stonehenge moved stones from Wales), it had developed to a level where it could also provide a means of preserving and disseminating histories and legends (Schmandt-Besserat, 1997:98). Once preserved in this way, they became canon. They became the standard against which all other versions of histories and legends could be compared. Documents could be copied and distributed around a realm and would provide fixed reference points. A central administration would know that its instructions were being relayed precisely, to all parts of the realm, without undergoing change through inaccurate recall (either accidental or deliberate).

Groups of people, making

> *"parallel use of texts, both to structure the internal behaviour of the groups' members and to provide solidarity against the outside world"*

are described by Stock (1983:90), as 'textual communities'. Most obviously today, they include adherents to the world's major religions; but legal codes, written constitutions, bodies of rules, and the standard texts of many academic disciplines, produce other examples of textual communities.

Reactions to writing amongst pre-literates

When and how writing began is the subject of much discussion amongst archaeologists. Of necessity, its origins were in pre-literate society and are therefore the subject of myth rather than history. What myths there are however, are instructive.

Our writing system has its roots around four thousand years ago in Mesopotamia. According to a Sumerian myth, writing was the invention of Enmerkar, the lord of Kulaba. He sent an emissary to another lord to ask for materials to help rebuild the residence of the goddess Inanna. The emissary travelled back and forth between the two lords, passing on their messages verbatim; until one day Enmerkar's instructions proved too difficult to memorise. The lord of Kulaba then promptly invented writing and the messages were committed to clay tablets rather than to the memory of the emissary (Schmandt-Besserat, 1996:2). As Schmandt-Besserat notes however, Enmerkar lived around 2700BC, when writing had been common practice for 500 years.

Perhaps the best known myth surrounding the origin of writing is that recounted to Phaedrus by Socrates (Plato, 2002:68). According to Socrates, the Egyptian god Theuth invented writing, and demonstrated it to the god Thamous (or Amon). Writing, Theuth explained, would

> *"increase the intelligence of the people of Egypt and improve their memories".*

Both accounts stress the role of writing as a support for memory. In Plato's story, Socrates famously goes on to express reservations about the value of writing; but modern accounts of pre-literate people encountering writing for the first time show a rapid appreciation of its value. Joe Palimi recalls an encounter that took place while he was a student. While on vacation from

university in the 1980s, he sat beneath a tree, reading a novel. An old man, after watching him for over an hour, came and asked what he was doing. The man may have been aware of the existence of reading, but had never seen it being done. Joe explained that the book contained representations of words and that he was listening to those words. Over the next few days, Joe recounted the story in the novel to the old man, who was both amazed and angry. Why, he wondered, hadn't the white man come sooner so that he too could have learned this secret?

Lévi-Strauss (1973:ch28) tells of his experiences with the Nambikwara tribe of Brazil in the 1930s, and recalls their response on seeing him write. Most members of the tribe were content merely to draw wavy horizontal lines in imitation of his writing,

> *"..but the chief had further ambitions. No doubt he was the only one who had grasped the purpose of writing… if I asked for information on a given point, he did not supply it verbally but drew wavy lines on his paper and presented them to me … As soon as he had got the company together, he took from a basket a piece of paper covered with wavy lines and made a show of reading it…. Was he perhaps hoping to delude himself? More probably he wanted to… convince [his companions] that he was… in alliance with the white man and shared his secrets.*

If these accounts are put into the context of the six information roles identified earlier, it is interesting to note that two of them (the myth of Enmerkar and the account of the Nambikwara chief) recognise the value of writing as a means

of accurately transmitting organisational information. As stated in the previous section, it was only after many years that writing was used to preserve histories and legends.

Pre-literate and post-literate consciousness

The myth of Theuth and Thamous is an invention of Plato's (2002:xxxviii), but it was written in a society where, although writing was a widely used tool, the culture was primarily oral. Speech was an extension of the speaker, and the idea of externalising it remained alien to such an extent that, even as late as the end of the fourth century AD, St Jerome (the patron saint of libraries and librarians) was considered remarkable because he read without speaking the words out loud (Manguel, 1994: Ch3).

However,

> *"At some time towards the end of the fifth century before Christ, it became possible for a few Greeks to talk about their 'souls' as though they had selves or personalities which were autonomous and not fragments of the atmosphere nor of a cosmic life force, but what we might call entities or real substances"* Havelock (1963:197).

Havelock attributes this change to the switch from an orally memorised tradition to one in which memory is supplemented by text. Around a hundred years later, Plato, through the persona of Socrates, criticised writing because it would make people

> *"remember things by relying on marks made by others, from outside themselves, not on their own inner resources"* (Plato 2002:69).

As we saw earlier, the use of route markers amongst pre-literates already made this possible to some extent, by allowing people to benefit from the explorations of others. Writing expanded this facility to levels that even Lévi-Strauss's canny Nambikwara chief would have found difficult to grasp. Havelock implies that there was a change in the nature of consciousness arising from textuality, but Dennett (1993:220) states it. A post-literate consciousness, he argues

> *"… can exist only in an environment that has not just language and social interaction, but writing and diagramming as well, simply because the demands on memory and pattern recognition for its implementation require the brain to "off-load" some of its memories into buffers in the environment."*

Before the development of text, knowledge was inseparable from the knower. As societies became literate however, it became possible to stand aside from what was known, and to review it. Carruthers (2002), in considering the roots of scientific reasoning, argues that there is no difference between the cognitive abilities of the hunter tracking prey, and the scientist drawing inferences from data. What is different however, is the extent to which scientific activity can draw on external resources; in particular, the prop of the written word. A pre-literate hunter-gatherer, for example, cannot learn from the writings of a zoologist. He can draw only on his experience and the experience of those in his tribe that taught him. But his teachers in turn, are drawing on the collected memories of a limited community. Zoologists, by

contrast, have learned a great deal from the recorded observations of pre-literate trackers from many hunter-gatherer communities.

Respect for writing

To a society in transition from orality to literacy, writing could be seen to give life to memories that otherwise may have died out in a few generations; it provided an impartial witness to business transactions; and statements of law and belief became an immortal presence that outlived the law givers and priests.

Those few who could read and write therefore, were in a powerful position. Their mouths gave voice to the words of gods and rulers. Given the close association in oral societies between the knower and the knowledge, and between the speaker and the words, some of the respect due to gods and kings would have been accorded to those who spoke their words. The same awe was accorded to the writings themselves. Joe Palimi describes an incident in the 1950s when one of his clansmen burned a piece of paper. The tribal elders promptly cursed the man.

The paper had details of the contributions expected from each clan towards the cost of a new van, and the man who burnt the paper considered them unfair. But most dealings with the outside world came through missionaries, who had introduced the Kope to the written word in the form of the Bible. Since none of the elders could read, they had no way of knowing whether the piece of paper bore something sacred or something trivial.

Those Kope clansmen in the 1950s were in the same position as most people who have lived in a society undergoing the change from orality to literacy. Literacy, throughout most of history, has been rare. Those initiated into the knowledge stored in written documents guarded that knowledge. In temple libraries in ancient Mesopotamia for example, inscriptions at the end of religious and scientific texts often carried the restriction:

> *"One who is competent (or knowledgeable) should show this only to one who is also competent, but may not show it to the uninitiated"* (Black, 2004).

For the illiterate majority, documents bearing text became a symbol of knowledge, power and sacredness. In a purely oral culture, the symbols of knowledge, power and sacredness had, associated with them, rituals and communal acts of remembering that involved the whole community; but now, the full power of the symbol could only be accessed through a literate intermediary.

The painstaking reproduction of texts meant that, for centuries, only the most significant of documents were copied and preserved. A single copy of the Bible might take up to three years to produce (Gutenberg digital, 2004). Then, between 1452 and 1455, one man in Mainz, Germany, produced around two hundred Bibles (Presser, 1974:4,18).

The invention by Johannes Gutenberg of the printing press with moveable type turned the production of textual documents into a large scale commercial

enterprise. Within fifty years, books were being printed in almost every European country. By 1500, more than 10 million copies of 40,000 different books had been printed (p22). The introduction of the steam press in the early nineteenth century, followed by the invention of Linotype in 1884 (p30) made printed texts widely available and affordable. In the industrialised world, reading and writing were no longer associated with an influential few, but were being taught at all levels of society. Literate intermediaries became commonplace.

Although the advent of printing provided increased opportunities for reading, the barriers to publication remained formidable. People being published were often exceptionally talented, and were certainly educated far beyond the norm. (Being wealthy, well-connected and male also significantly contributed to the chance of publication of course).

Furthermore, a published work generally represented the efforts of a community, usually comprising not only the author, but also editors and financiers. Consequently, it was in the interests of several people to ensure that the work could be defended. Published documents therefore, were usually considered reliable at the time of going to press. Where they expressed opinions, they were the opinions of influential people.

Published documents became artefacts that represent knowledge. A person making a contested statement can often satisfy the demand that they "*prove it!*" by pointing to an appropriate text. The association between knowledge

and publication is such that the deliberate destruction of texts is considered shocking. The burning of books, such as that carried out in Nazi Germany in May 1933 has become a modern symbol of barbarism; but people are upset by rather less extreme incidences of the destruction of texts. In 1992 for example, while Andrew Madden was working as a biologist at the Natural Resources Institute in Kent, UK, a new librarian was appointed. Within weeks of his appointment, skips were hired and were soon filled with books and papers. Tim Cullen, the librarian in question, still recalls with frustration, the outcry that ensued. Those documents, some of his critics argued, went back decades and were part of the Institute's long tradition. Tim Cullen's response was to point out that the documents hadn't been looked at for decades, no one had wanted them when he had offered them around, and he needed to make space for texts that would be looked at. To those who protested however, published texts, regardless of their content, remained a symbol of knowledge.

Online Publishing

A year earlier, in 1991, the World Wide Web was released (Berners-Lee, 1999), making it possible to disseminate documents among a potential readership that rapidly grew into hundreds of millions. Where previously, the opportunities for reaching a worldwide readership were limited to very few people, now the barriers to publication became trivial.

McLuhan (1964:33-35) discusses the tendency of people to accommodate to new technologies by relating them to existing, familiar ones, and the Internet

is clearly no exception. The perception of the Internet as a bookstore or library is widespread, even amongst expert users (Ratzan, 2000). In an unpublished survey in March 2003, Madden asked 176 students at a Sheffield school to indicate on a five point Likert scale, the extent to which they agreed or disagreed with a series of statements about the Internet. Eighty six percent of the students (aged 11-16) agreed that "The Internet is like a library". When the same questionnaire was circulated amongst delegates of the 'Internet Librarian' International 2003 Conference, only ten of the 29 respondents disagreed with the statement (though nine neither agreed nor disagreed).

Clearly therefore, even some experienced users of the Internet are inclined to regard it as some kind of electronic book collection. With that perception comes the risk that people transfer to the Internet the respect that they accord to books.

Information roles and the Internet

Text, as has been stated, developed from providing a useful means of exchanging organisational information to become, in time, a reliable way of preserving information. It was this latter role that led to text-based information sources being held in such high regard.

With real (as opposed to virtual) text, there are certain, widely recognised indicators of quality associated with the presentation of information. As has been said, the fact that something has been published is an indication that several people have assigned value to the text. Aspects of presentation

however, are also considered when judging the information transmitted by a text. So, for example, if, next to the paperback edition of a text, there is a leather-bound version with expensive paper, it suggests that the text is particularly valued. While the quality of a book's binding does not guarantee the quality of its contents, it seems reasonable to suppose that there is a correlation. There are probably more leather-bound editions of Plato sold than of pulp Westerns.

With the Internet however, there are no such conventions. A sophisticated, well laid out Web site may be the product of a professional publisher, or it may have been produced by a technically competent fifteen year old with pirate software, who copied the design from another Web site. Even the worst of books by contrast, has been subject to some quality control (unless published through a vanity press). Experienced users of the Internet will be aware of this: inexperienced users, believing the Internet to be some sort of electronic library, may not.

Such an unquestioning acceptance of professional-looking documents on the Web helps to account for the numerous cases of naïve Web users who, following the directions in a hoax email, go to a Web site that resembles their bank's, and enter all their bank details. Admittedly, such people are at the more credulous end of the spectrum of inexperienced Web users. A more common response is one of disappointment and frustration at the number of unhelpful, misleading, and plainly inaccurate sites.

The Web though, is not primarily used as a means of preserving information but a means of exchanging it. It is used for the presentation and dissemination of information; and uses the information exchanged for the purposes of induction and organisation. Rather than comparing the Web to a library, it would be more meaningful to regard it as a collection of monologues. Madden (2003) for example, has suggested that a more appropriate analogy than a library would be a bar-room, because most of its users are men, and most of the talk is of sex and sport. However, "*among the bar-room bores are many people who come to do business, and many others who can talk knowledgeably and enthusiastically about their interests.*"

Although documents on the Web are preserved; for many (perhaps most) the preservation is incidental. Whereas the authors of traditionally published texts need to convince a real audience of the text's merits before it will be printed, many (perhaps most) authors of documents on the Web are speaking to a wholly imagined audience. What the author says is of interest to him or her; which is reason enough to say it. At one time, it was sufficient for people in information professions to concentrate on the organisation and retrieval of documents. Now it is increasingly important that they consider means of evaluating them.

Writing and Information Science

The influence of written information sources on society is hard to overstate. Indeed, Diamond (1997) argues convincingly that writing, by providing an

effective means of transferring knowledge from generation to generation, has been a major factor in explaining the dominance of Western culture on the world.

As a result of the influence of text, it is not uncommon to equate text with information, hence the frequent claim that the Internet has contributed to 'information overload'. This equation is even common amongst Information Scientists (particularly those in the Information Retrieval community) many of whom ignore the suggestion by Meadow and Yuan (1997), that textual documents be regarded as 'potential information'.

The close association of text with information was reinforced when Shannon (1949), in modelling the transmission of signals, referred to the content of signals as 'information'. Text is, after all, a signal; and the application of Shannon's mathematics facilitated the transmission and receipt of text. However, when information is understood in this way, there is no requirement for it to be meaningful to the recipient.

Such a view of information is in marked contrast to the definition used in this chapter. With derived information for example, nothing is communicated: any meaning is assigned by the person who receives the information. The assumption that there is a connection between information and communication however, is widespread in the Information Sciences; but as Madden (2004) implied, the two, although associated, are not inseparably so.

Information foraging

Sandstrom (1994) and Pirolli and Card (1999) drew analogies between information seeking behaviour and the behaviour of animals foraging for food. To survive, an animal in search of food must successfully offset any gains made from finding food, against any effort involved in seeking it. Pirolli and Card built on this analogy to develop a sophisticated and much publicised mathematical model.

To find food, an animal must derive information (from scent, sound, tracks etc) from the environment. Superficially therefore, the idea of information foraging may be thought relevant to this chapter; but one consequence of working with the broad concept of information used here is that it is not readily amenable to mathematical modelling.

Pirolli and Card take mathematical models developed in studies of animal foraging behaviour (known as optimal foraging models) and adapt them to help describe information seeking behaviour. In their model, rather than balancing the reward of food against the effort of finding it, they looked at the benefit (in terms of valuable information) against the cost (in terms of time).

For a mathematical model to be tested however, it has to rely on measurable units. Optimal foraging models assess the costs and benefits of seeking food in terms of energy losses and energy gains. To test the models, these energy flows must be calculated. This is not an easy task, but there is a range of established techniques available that produce objective measures.

Pirolli and Card assess the cost of information foraging in terms of time taken to find “valuable information”, and they describe the benefit as “the total net amount of valuable information gained”. They do not explicitly provide a means of measuring the forager’s gain in valuable information, but their later experiments imply that they consider “valuable information” to equate to documents deemed relevant by the searchers. In short therefore, they have developed a system to study document foraging, but it ignores many interesting aspects of information seeking.

Summary

Information Science, though a new discipline, deals with old practices. Human information behaviour predates writing by a hundred thousand years or so. Writing and associated activities however, have been hugely influential information technologies that have literally defined cultures.

Six information roles were identified amongst the Kope: induction, dissemination, presentation, organisation, and preservation. It was argued that these roles have parallels in literate societies; but that some of these roles are more effectively performed when text is available. The adoption of text by a society gave that society a valuable tool for organising, disseminating and preserving information; making the cultures of literate societies more robust and durable than the wholly oral cultures of pre-literate societies, which relied on rituals and memory.

The power of text to preserve culturally defining information led textual records to be accorded respect, especially in societies where literacy was uncommon. The development of printing and the consequent increase in availability of written documents helped to increase literacy; but the cost of publication meant that most authors had to convince a critical audience of the value of their work before they could be provided with the resources needed to publish.

In ELIS situations, most people continue to exchange information within their communities, performing all the information roles carried out by the Kope and using knowledge of their informants and their environments to evaluate the information. Where information is derived from published sources however, it is often evaluated by proxy. Editors, publishers, etc., consider the texts to be worthwhile, so the information-seeker credits the text with some value as a result.

The Internet creates problems for information-seekers wishing to evaluate its contents because there is no personal link with the informing author, and there is often no evaluation by proxy prior to publication. Such problems are compounded by the widely held view that documents are information, which leads many information seekers to give more consideration to a statement that is written down than they would to a similar spoken comment.

Conclusion

Most of the story of humanity, though unwritten, has involved flows of information within and between communities. Although there are good reasons for the dominance of text in Information Science, its use represents only a small part of human information behaviour.

As was discussed earlier, not all information is associated with communication: much of it is derived. Where it is communicated, text has value in releasing "*unheard-of potentials of the word*" (Ong, 1988:74). In considering exchanges of information between humans however, it is important to remember that the main tool of communication is the word, not the letter.

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