



## In-formation on the prairie: Signs, patterns, systems and prairie dogs

Paul Beynon-Davies\*

Cardiff University, Cardiff Business School, Aberconway Building, Colum Road, Cardiff, CF10 3EU, United Kingdom

### ARTICLE INFO

#### Article history:

Available online 30 December 2010

#### Keywords:

Information  
Significance  
Signs  
Patterns  
Systems

### ABSTRACT

The concept of information is clearly foundational to the 'information' disciplines but lacking in a clear conceptual foundation. In this paper we propose that the concept is clearly overloaded and suggest that a new vocabulary is needed to enhance our powers of understanding and explanation. We argue that information is better situated at the intersection of signs, patterns and systems, which involves the enactment of forma (the substance of a sign), informa (the content of a sign) and performa (the use of signs in coordinated action). Within this perspective 'information' is considered an accomplishment not only of humans but also of animals. This leads us to use a well-documented case from the animal kingdom, that of communication amongst Gunnison prairie dogs, to both ground and expand upon significant elements from our conceptual framework. This we believe helps shed new light on what the juxtaposition of information with behaviour actually means.

© 2010 Elsevier Ltd. All rights reserved.

'The world is full of signals of all different varieties and sorts spinning through the air, whisking through the water, brushing the skins and tickling the ears of a plethora of different beings. Communication happens at the cellular level through chemical and electrical impulses. It occurs on the genetic level with immense amounts of information packed on DNA, folded into chromosomes that forms life's blueprint, and also incorporated in RNA. It happens in mating rituals, in hunting forays, and even between entirely different species.' (Slobodchikoff, Perla, & Verdolin, 2009)

### 1. Introduction

Recently, Spinks (2010), based upon a detailed analysis of an inter-disciplinary literature, has argued for considering information behaviour as a universal, socio-cognitive behaviour that evolved amongst hominids. The natural consequence of this supposition is that information behaviour amongst modern humans is likely to have evolved from abilities found more widely in the animal kingdom. This paper continues our attempt to build a more encompassing theoretical foundation for studying the ubiquitous phenomena within which abilities such as information behaviour can be seen to take place. For lack of a better term we refer to this phenomena as the *enactment of significance* (Beynon-Davies, 2010a).

To summarise our perspective: we propose that the accomplishment or enactment of significance provides a common locus of interest amongst the 'information' disciplines of information man-

agement, information science, information systems and computer science. Within our perspective the enactment of significance is considered an accomplishment not only of humans but also of animals and, within the modern world, to a limited extent of machines. In other words, the key aim of our framework is to supply a means for understanding systems of representation, communication and performance amongst a range of different types of actors: humans, animals and machines. In this sense we are attempting to explore some of the deep structure underlying the conceptual collision between signs, patterns and systems.

The study of animal communication or zoosemiotics (Sebeok, 1972), which forms the background for the current paper, provides insight into the general nature of significance and the ways in which it is accomplished. We take the position that utilising material from the study of simpler forms of signification evident in the animal kingdom particularly allows us to make 'strange' a number of key taken-for-granted and sometimes much-abused concepts within the 'information' disciplines such as *information*, *data* and *communication*. The insight provided by zoosemiotics also allows us to identify the similarity between the ways in which humans and other animals accomplish significance and to suggest ways in which human semiosis may have evolved from such simpler forms of semiosis evident in the animal world.

In a previous paper (Beynon-Davies, 2010b) we considered the dances of European honeybees and what they tell us about the nature of semiosis. In the current paper we utilise another well-documented case from the animal kingdom, that of communication amongst Gunnison prairie dogs. We use this as a means of both grounding and expanding upon significant elements from the conceptual framework we have been developing.

The structure of the paper is as follows. First, we provide an overview of our framework followed by some background from

\* Corresponding author. Tel.: +44 029 2064 7028.

E-mail address: [beynon-davies@cardiff.ac.uk](mailto:beynon-davies@cardiff.ac.uk)

our chosen case. We then unpack the case using major elements from the conceptual framework. This leads us to conclude with a discussion of some of the value our perspective provides. It leads us particularly to reconsider the nature of the concept of 'information' and to suggest that a new vocabulary is needed to avoid the terminological confusion evident within the 'information' disciplines such as information science. In this sense we hope to shed new light on what the juxtaposition of information with behaviour actually means.

## 2. Significance

Fig. 1 illustrates the three main facets of a 'prism' we use to illuminate the phenomenon of significance. Fundamentally, this framework attempts a unification of semiotics on the one hand with systemics on the other, through the lens of patterns. This unity evident amongst signs, patterns and systems we refer to as the *enactment of significance* (Beynon-Davies, 2010a). We provide a brief overview of the fundamental elements from this framework in this section and then seek to elaborate upon the nature of key elements in further sections below.

Signs are units of significance. Semiotics, the study of signs, can be seen to have four branches which offer four perspectives on the sign and act as a 'ladder' from the physical world through the psychological world and into the social world (Morris, 1946; Stamper, 1973). *Pragmatics* considers the relations between signs and actors and is concerned with the purpose or intentionality of a sign. *Semantics* considers the relations between signs and objects and is concerned with the meaning or intensionality of a sign. *Syntactics* considers the relations between signs and other signs and is concerned with the structure of some sign-system. Finally, *empirics* considers the relations between signs and matter or energy and is concerned with the physical form or representation of a sign.

Signs take their shape within systems of various forms and thus act as conceptual 'glue' which inter-connect various levels of organised phenomena. Systems constitute the continuing patterning of order or organisation in the world. Hence, we use the term system to refer not only to the patterning of signs. It is also used to denote the patterning of activity, communication and representation.

Therefore, signs interrelate between and within three different patterns of order, which following Dietz (2006), we choose to denote as forma, informa and performa. Forma constitutes the substance or representation of signs, informa the content or communication of signs and performa the use of signs in coordinated action. The patterning of order characteristic of organisation amongst actors is enacted through three inter-related forms of patterned action. Formative acts amount to the enactment of forma: acts of data representation and processing. Informative acts constitute the enactment of informa: acts of communication involving message-making and interpretation. Performative acts constitute the enactment of performa: the performance of coordinated, instrumental action amongst groups of actors.

These patterns of order and action allow us to more clearly define three levels of system of interest to organisation: activity systems, information systems and data systems. Activity systems consist of the patterning of performa: of regular and repeating patterns of performative acts. Information systems consist of the patterning of informa: of regular and repeating patterns of informative or communicative acts. Finally, data systems consist of the patterning of forma: of regular and repeating patterns of formative acts.

## 3. The prairie dog

Prairie dogs are formally classified as rodents within the squirrel family, Sciuridae. There are five species of prairie dog: black-tailed, Gunnison, white-tailed, Utah and Mexican. Gunnison prairie dogs

live in the 'four corners' area of the South Western United States – a boundary area between the states of Arizona, Colorado, New Mexico and Utah (Hoogland, 1996). All prairie dogs are herbivores that eat plant material such as leaves, stems, roots, grasses and seeds. Prairie dogs are highly social creatures that live in flexible social structures varying from monogamy to polygyny (multi-male/multi-female assemblages).

Prairie dog colonies are made up of a number of distinct groups that defend territories. These groups, sometimes referred to as clans or coterries, occupy an area consisting of one or more burrow openings, an underground burrow system and the food resources growing within the territory. Territorial boundaries are defended by all members of the territorial group, which can vary in size from one individual to several males and females.

Prairie dogs have good sight and hearing. They have dichromatic colour vision, meaning that they see well in the blue and yellow parts of the visual spectrum, but not well in the red range. They can also hear sounds in much the same auditory range as humans.

Prairie dogs use a number of different sensory modalities to communicate. They communicate through sounds such as alarm calls, through visual signals such as wagging of their tails and standing upright in an alert posture; they also seem to communicate through the use of olfactory and odour cues given off by glands situated both in their anus and in their faces.

Alarm calls are by far the most well studied forms of prairie dog communication, particularly amongst Gunnison prairie dogs (Slobodchikoff et al., 2009). The alarm calls comprise loud and often repetitive vocalisations that sound similar to certain forms of bird call. Such calls are given by one or more prairie dogs within a colony when a predator is detected. A particular type of call produces a distinct escape response on the part of other prairie dogs on hearing the call. All five species of prairie dog produce such calls but the acoustic structure of these calls varies between species.

## 4. Forma

Forma falls primarily within the empirics level on the semiotics ladder and is concerned with the physical characteristics of signs. It is concerned with how signs are represented using various different media as well as the traditional concern with how signs are coded as signals which travel along various communication or sensory channels (Shannon, 1949). Theoretically, any form of matter, whether it be solid, gas or liquid, can be used as forma. Likewise any form of chemical or physical energy can be used to provide a signal for communication (Sebeok, 1972).

A signal therefore consists of the patterned modulation of energy or matter along some communication channel. For instance, human speech travels as a signal consisting of a pattern of sound waves (acoustic energy through air), while human facial expressions rely upon the reflectance and transmission of light (optical, reflected energy). In contrast, honeybees can communicate through the transmission of particular odours (gases diffusing through air) and through vibrating honeycomb within the hive (manipulation of a solid).

To transmit a signal along a communication channel the signal must be subject to some modulation. Modulation is the process by which variety (Ashby, 1956) is introduced into a signal. If an actor is unable to modulate the pattern of a signal then no information can be communicated between transmitter (sender) and receiver along a communication channel. Once an actor can vary the signal then it becomes possible to code certain messages using variations or differences (Bateson, 1972) in the signal.

For our purposes it is important to distinguish between three distinct types of forma in terms of the source of signalling: natural, embodied and disembodied or persistent forma. Note, in our

Download English Version:

<https://daneshyari.com/en/article/1025966>

Download Persian Version:

<https://daneshyari.com/article/1025966>

[Daneshyari.com](https://daneshyari.com)