

Association for Information Systems AIS Electronic Library (AISeL)

ECIS 2011 Proceedings

European Conference on Information Systems
(ECIS)

Summer 10-6-2011

THE ENACTMENT OF PERSONAL IDENTITY

Paul Beynon-Davies

Follow this and additional works at: <http://aisel.aisnet.org/ecis2011>

Recommended Citation

Beynon-Davies, Paul, "THE ENACTMENT OF PERSONAL IDENTITY" (2011). *ECIS 2011 Proceedings*. 62.
<http://aisel.aisnet.org/ecis2011/62>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ECIS 2011 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

THE ENACTMENT OF PERSONAL IDENTITY

Beynon-Davies, Paul, Cardiff Business School, Cardiff University, Aberconway Building,
Colum Road, Cardiff, UK, beynon-daviesp@cardiff.ac.uk

Abstract

The issue of personal identity and its management is a major problematic area for action, communication and representation within the information society. Surprisingly, whereas theorisation of personal identity as an individual and social construct is well-established, theorisation of identity as a technological construct is less well-formulated. This means that whereas technological developments in the area of so-called personal identity management move forward at pace, much of this research and development lacks firm theoretical underpinnings. This paper builds upon previous work and attempts a tentative theorisation of the issue of personal identity in terms of a framework we refer to as the enactment of significance. We argue that this conception better enables us to understand more clearly the way in which personal identity is enacted through the complex entanglement of action, communication and representation and the bearing such entanglement has on contemporary considerations of information, systems and technology.

Keywords: personal identity, sign-systems, sociotechnical, sociomaterial.

1. Introduction

The issue of personal identity has been considered in a number of different ways in a variety of distinct literatures. At a high level we can argue that three inter-dependent strands are evident within this literature: personal identity as an individual construct; personal identity as a social construct and personal identity as a technological construct. Perhaps the oldest conception of personal identity is that associated with individual consciousness and the self, as in the work of Locke (Locke, 1975) and Mead (Mead, 1934). With the rise of the social sciences interest shifted to personal identity as a social construct. In this sense, identity is conflated with concepts such as stereotype, social category, status and role (Goffman, 1969). More recently, interest has grown in the concept of personal identity as a technological construct, sometimes referred to as digital identity (Lyon, 2009). There is increasing recognition that significant aspects of what we mean by personal identity in the modern world is bound up with or represented in electronic personal records. As Poster describes digital identity it comprises '*a complex of media content contained in information machines that combine to define an individual*' (Poster, 2006).

Despite its recent coverage, whereas theorisation of personal identity as an individual and social construct is well-established, theorisation of identity as a technological construct is less well-formulated. This means that while work in so-called digital or personal identity management moves forward at a pace (Neubauer and Heurix, 2010), much of this research and development lacks firm theoretical underpinnings. Our aim in this paper is to move forward this debate by demonstrating that a theoretical unity between conceptions of identity as an individual and social construct with its instantiation in the modern world as a technological construct is possible. To help achieve this we interpret the issue of personal identity, which we have considered in previous work (Beynon-Davies, 2006; Beynon-Davies, 2007), in terms of a conceptual framework that we have recently used in consideration of the interaction of technology, communication and action within a number of other domains (Beynon-Davies, 2010).

This framework helps conceptualise the sociotechnical (Bostrom and Heinen, 1977) and sociomaterial (Orlikowski, 2007) nature of human organisation in terms of the enactment of signs within three types of patterned action across three levels of system. To summarise our perspective: we maintain that any consideration of human organisation should use a theoretical lens located at the intersection of signs, patterns and systems – what we refer to as the enactment of significance. This means that sense-making within forms of human organisation (Weick, 1995) is fundamentally concerned with the enactment of signs through *forma* (the substance of a sign), *informa* (the content of a sign) and *performa* (the use of signs in coordinated action). This conception of the accomplishment of significance allows us further to define more clearly and to relate three classes of entangled system important to human organising: activity systems, information systems and data systems.

Our key argument is that personal identity, particularly within modern settings, is a critical accomplishment signified through *forma*, *informa* and *performa* within a multitude of data, information and activity systems. At the level of *forma*, a person's identity is authenticated through various forms of persistent and non-persistent identifier. At the level of *informa*, such symbols are critical to identification and necessary to ensuring the effective operation of communicative acts. At the level of *performa*, the possession of appropriate identity is critical to enrolment in various systems of human activity and the coordination of mutual performance amongst a multitude of actors.

This conceptualisation of personal identity can be situated as an extension of the pragmatic approach of Agerfalk (Agerfalk, 2010) and Eriksson (Eriksson and Agerfalk, 2010). It also provides greater conceptual granularity than that proposed in the work of authors such as Lyon (Lyon, 2009) and Poster (Poster, 2006). Finally, it assimilates the important work of Clarke on identity (Clarke, 1987; Clarke, 1988; Clarke, 1994), which appears largely forgotten by the IS community, but which has much to offer any understanding of personal identity and its management.

2 Identity within signs, systems and patterns

We wish to make the overarching claim that the issue of personal identity is best viewed as a phenomenon which is enacted at the intersection between signs, patterns and systems. Indeed, we will argue that personal identity itself can be usefully viewed as a sign-system. In such terms, personal identity is conceived of as a continual, enacted accomplishment. We continually signal our personal identity by how we behave, what we communicate and the data stored about us. We draw upon performative, communicative and formative patterns to help form our identity; but in the process of enactment such patterns are likely to change.

We equally assert that, particularly in the contemporary world, the issue of personal identity is constitutively entangled within the sociomaterial nature of systems (Orlikowski, 2005). In systems terms, the issue of personal identity appears to have a clear synergy with the concept of viability (Beer, 1972). a viable system being one that has an independent existence in space and is coherent through time. A person's identity, we shall argue, must display viability across activity, information and data systems within which a person continually enacts significance.

Consideration of personal identity as a sign-system is important because it demonstrates the increasing importance of 'technology' to the enactment of significance. Personal identity is a critical aspect of contemporary activity systems, information systems and data systems. Communication of identity is critical for coordination of performance; issues of personal identity are inherently given persistence in personal records.

Consider gender as a key aspect of personal identity. I communicate my gender in a number of ways. Clothing masks many aspects of my anatomy so my gender may not be immediately obvious to a distant observer. Hence, how I choose to behave or 'perform' will be a significant way in which my gender is communicated. For instance, dress code is frequently used to signify gender. Within face-to-face communication such visual cues may be sufficient to signify this aspect of my identity. If such performance proves insufficient, a communicative act such as the statement - 'I am a man' - can be used to signify my gender. However, such signification breaks down when communication is remote in time and space. For such remote communication my gender is likely to be recorded in persistent forms of signification as records such as birth certificates, passports and identity cards. A 'reading' of such records within remote communication is necessary to signify appropriate gender.

Following Morris (Morris, 1946), it is possible to understand the issue of personal identity as involving the use of three types of signs: identifiers, designators and prescriptors. Identifiers are signs used to reference an object in time and space. Personal identifiers are stimuli used to signal an individual actor. Designators are stimuli used to signal properties of some object. Identity is frequently signalled through an aggregation of designators about the individual actor. Prescriptors are stimuli used to signal appropriate responses. Identity is typically used as a means of determining appropriate behaviour associated with some assigned role within some activity system.

If personal identity is communicated through a composite of signs to oneself, to others and to 'machines', then the issue of identity can be unpacked in terms of layers from the semiotics ladder (Stamper, 2001). This offers a convenient way of understanding the role of signs within identity and the way identity crosses the physical (technological), psychological and social worlds. Empirics considers the relations between signs and matter or energy and is concerned with the physical form or representation of a sign. As far as the empirics of personal identity is concerned, we are interested in the variety and physical composition of identifiers. Syntactics considers the relations between signs and other signs and is concerned with the structure of some sign-system; in essence we are interested in the structural relationship between identifiers and other signs. Within the modern world much signification is given persistence – aspects of our identities are represented in records. Such records are read, used in communication and support performance. In terms of semantics we are interested in the relationship between identifiers and their referents. We are interested in the use of identity as designators of the person and the relationship with attributes represented about an individual and

transactions undertaken by the individual. In terms of pragmatics we are interested in the use of identity within human activity. Identity signifies within activity appropriate responses by actors. This constitutes the use of identity as prescriptive signs: prescribing appropriate behaviour by particular actors in a particular context.

Signs then are important because they act as conceptual 'glue' which inter-connect various levels of system. Systems constitute the continuing patterning of order or organisation in the world. 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. Signs can also be seen to interrelate between and within three different patterns of order which, following Dietz (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 action amongst a group of actors.

These patterns of order and action allow us to more clearly define three levels of system of interest to human 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. Using this conceptual architecture we unpack the issue of personal identity in the sections which follow.

3 The performa of personal identity

The performa of identity is concerned with the key question as to why personal identity is important within human action. We propose that the signification of identity is important to joint action because of the way it conflates three critical processes of signification: authentication, identification and enrolment (Beynon-Davies, 2007). These processes communicate three different things about the identity of the individual. In other words, personal identity is normally accomplished within three inter-dependent signification processes. We argue that the idea of credentials and the associated process of credentialisation, much discussed within the area of information security, can be unpacked in terms of this framework (Whitman, 2008). Credentialisation is a term which typically encapsulates all three issues of authentication, identification and to a certain extent enrolment (figure 1).

Authentication involves answering the question - *Am I who I claim to be?* Authentication is signalled by identifiers: symbols which signify locations in space and time and direct behaviour to a certain region of the environment (Morris, 1946). Within face-to-face inter-action standard or 'natural' identifiers are used for the communication of identity. The contemporary problematic of remote communication in support of remote inter-action demands the use of surrogate identifiers (Clarke, 1994) (see below).

Identification in the large involves answering the question - *Who am I?* and is typically signalled by designators. As we have seen, a designator is a sign that signifies characteristics or stimulus-properties of stimulus-objects (Morris, 1946). In terms of personal identity designators signal attributes of the individual including a history of events within which the individual has participated.

Enrolment is a term we adapt from actor-network theory (Latour, 2005). Enrolment in the large involves answering the question *how am I expected to perform and how will others perform towards me?* Enrolment is largely signalled by prescriptors: signs that signify the requiredness of certain response-sequences on the part of the actor.

Identity is critical to enrolment in the human activity systems of contemporary societies. The possession of appropriate identity privileges individuals with rights, responsibilities and activities in a particular activity system. For instance, a validated identity such as that of a taxpayer will enrol the individual in a whole range of rights, responsibilities and expected actions in the activity systems associated with fiscal matters. It will also entitle the individual to access services provided by the tax authorities of a particular nation-state.

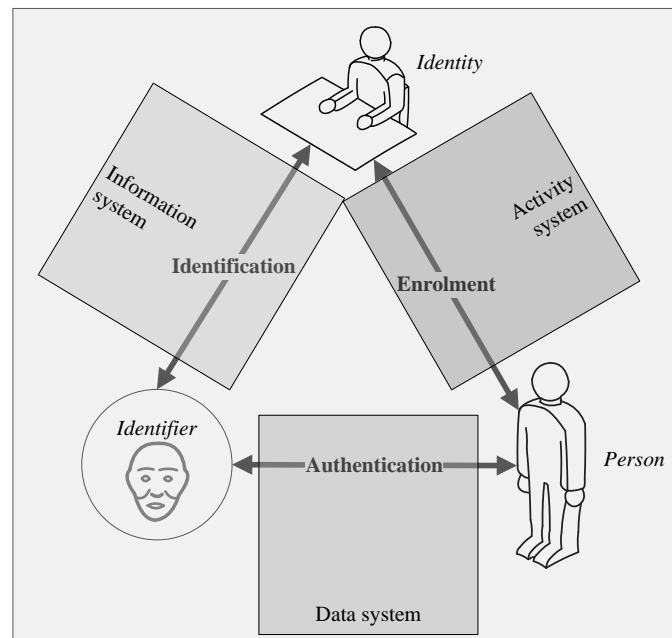


Figure 1. Enactment of personal identity

4 The informa of identity

The informa of identity relates to the way in which identity is crucial to and relates with communicative acts. Within speech act theory a communicative act is some aspect of human performance designed by one actor, A, to influence the performance of some other actor, B. Searle argues that a given communicative act consists of two main elements: a propositional attitude or illocutionary force and a propositional content (Searle, 1975). Illocutionary force is used to represent the kind of attitude a speaker has when he says something and the direction of fit between the world and the propositional content of the communicative act (the word). Searle (Searle, 1975) identifies five key types of illocutionary act in these terms: assertives, directives, commissives, expressives and declaratives.

Any communicative act relies on the unambiguous signification of the identity of the actors in some communication. The theory of speech or communicative acts tends to be based on examples of face-to-face communication and hence presupposes the use of what we shall refer to as natural identifiers (see below). Therefore, the identity of actors is a critical part of the context of any illocutionary act. In particular, conditions of satisfaction (Searle, 2010) associated with a particular communicative act normally rely on the assignment of appropriate identity to participating actors.

Assertives are communicative acts that explain how things are in the world, such as reports and assertions. The trustworthiness of an assertion made by a particular actor will normally be assessed by other actors in terms of the assigned identity of the individual. Hence, if actor A asserts that actor B has cancer, B is likely to accept the truthfulness of the assertion if A has the validated identity of an oncology consultant.

Directives are communicative acts that represent the senders' attempt to get a receiver to perform an action, such as requests, questions, commands and advice. The success of a particular directive will typically be determined by the judged identity of the actor issuing the directive, particularly attributes of status and authority associated with this identity. Hence, if actor A issues a command to actor B then B is likely to perform the directed response if B is a private soldier and A is a sergeant.

Commissives are communicative acts that commit a speaker to some future course of action such as promises, oaths and threats. When someone makes a commitment to some other person to perform a future action, the identities of the person making the commitment and the identity of the person to which the commitment is made must be clear. The veracity of a commitment normally relies on effective authentication of the actors involved in an act of commitment. Hence, if actor A is selling some object to actor B at a defined price it helps actor B if A can be authenticated as a valid salesperson for the purchased object. Commitments clearly underlie the performance of all forms of economic exchange. The authentication of individuals within such communicative acts is important for ensuring so-called *non-repudiability* in remote communication

Expressives are communicative acts that represent the speakers' psychological state, feelings or emotions such as apologies, criticisms and congratulations. Normally, actor B will only expect an apology from another actor that is identified as in some way doing wrong. In an expressive act where one of the actors yells, the assignment of identity to this actor as a grieving mother provides a significant amount of the context necessary to interpreting or in-forming a meaning associated with this communicative act.

Declaratives are communicative acts that aim to change the world through the communication itself, such as baptism, pronouncing someone husband and wife and sentencing a prisoner. Expectations as to who may validly declare such changes to the world depend upon assigned identity. Hence, within modern societies, an actor must be an identified judge to sentence an accused and a person must be an authenticated priest to declare a baptism.

The relationship between identity and communicative acts described above makes clear that identity is a form of in-formation and therefore a critical part of many information systems within society. Within communicative acts identity is signified by identifiers. Identifiers serve to signify a particular person; they also relate the person to a set of designators making up the identity of the individual. In turn, a personal identity is likely to signify a set of prescriptors determining constraints on the behaviour of some person.

In a semiotic sense, personal identifiers can hence be seen as symbols relating to the referents of the multiple identities that individuals may experience in the Information Society. Hence, the issue of personal identification is distinct from and reliant upon the precursor process of authentication as described above. In turn, identification is a necessary pre-condition for enrolment in many activities in contemporary life.

Identifiers are ubiquitous in the Information Society. The identifier is a symbol or set of symbols that can be used to authenticate an object such as a product, a place or in our case a person. Authentication in terms of personal identity involves validating the association between the identifier and the person. For example, possession of a valid passport is taken as an authentication token in travel situations between countries. However, it is also used as a form of strong authentication in many other personal transactions in modern life.

In the context of information systems, identification is the process of using an identifier to connect to a stream of data (designators) constituting a person's identity. Personal identifiers are hence used to assign identities to individuals – for example, legitimating somebody as a legal resident, credit-worthy customer or taxpayer.

The key problematic in modern society is the complexity of the 'syntax' of identity. The syntax of identity is concerned with the complex web of possible identifiers; but also with the complex relations between identifiers and designators (attributes and transactions). Individuals in Information Societies

utilise a complex web of identity for existence and action. Hence, a given individual is likely to be identified in a host of different ways by a wide variety of identifiers: credit card numbers, debit card numbers, driving licence numbers, passport numbers, library card numbers, national identity card numbers, and so on. We must also distinguish between an identifier and its representation as a physical token. Hence, for instance, it is important to distinguish between a driving licence number and the physical token of a driving licence or a passport number and the physical token of a passport.

Each identifier can be used to determine an aggregation of other signs associated with a person and stored in given information systems as two types of data items: attributes and transactions. Attributes designate relatively persistent properties assigned to the individual. For instance, knowing a person through some identifier may allow one to determine the person's age, gender, home address, home telephone number, and so on. The process of identification hence involves associating an identifier with an aggregation of data attributes held about the individual in organisational data systems (see below). Such data systems may store not only personal attributes (age, gender, ethnicity), but possessions (phone, home) and behaviour (language, sexuality). Data systems are also likely to record events in which the individual has participated (eg., purchases, enquiries, registrations, payments). Such events are enacted as transactions (patterns of formative acts) within organisational data systems. This is really a reflection of the increasing complexity of activity experienced during industrialisation and subsequently into the modern world, which has led to a control crisis in the management of identity (see conclusion).

5 The forma of identity

The forma of identity concerns the empirics of identity. Personal identity is critical to the notion of data systems in contemporary society, because of the way in which identity increasingly becomes reified in personal records.

As indicated in the previous section, personal identity is signalled through various symbols. A number of forms of identifier are available for authenticating a person and associating data with such a person. These forms include appearance, social behaviour, names, codes, knowledge, tokens, bio-dynamics and natural physiography (Clarke, 1987).

Within face-to-face communication facets within the sensory modalities of sight and hearing are normally used to code identifiers as symbols. Hence, appearance, names, social behaviour and aspects of knowledge are typically regarded as 'natural' identifiers. Appearance concerns how a person looks including features such as gender, skin colour, hair colour, colour of eyes, facial hair or distinguishable markings such as a birth-mark. Names concern what the person is called by other people including forename(s), surname, maiden names, nicknames and also-known-as names. Social behaviour concerns how the person interacts with others, including style of speech and accent. What a person knows in relation to some activity system might also be used as an identifier.

Generally speaking, such natural identifiers are deficient in producing the characteristic of uniqueness demanded by organisations and their data systems. For this reason, surrogate identifiers tend to be used in mechanisms of remote identity management. Surrogate identifiers constitute additional features such as codes and tokens as well as technologies that 'measure' and record aspects of the individual such as bio-dynamics and aspects of physiography used to uniquely identify individuals. Codes are what the person is referred to within a particular activity system such as a series of numbers or letters which can be human-readable, machine-readable or both. Tokens constitute what the person has in his or her possession, such as a birth or marriage certificate, passport, drivers licence and credit card. Bio-dynamics are what the person does, such as the way in which someone's signature is written, statistically analysed voice characteristics, keystroke dynamics in relation to login-id and password. Natural Physiography amounts to what the person is in terms of features such as skull measurements, teeth and skeletal injuries, thumbprint, fingerprint sets and handprints, retinal scans, earlobe capillary

patterns, hand geometry and DNA patterns. If such characteristics are readable by machine then they are referred to as biometric identifiers.

There are a number of characteristics of good surrogate identifiers used by a data system in support of a given human activity system. First, every relevant person for the activity system in question should have an identifier (*universality of coverage*). Second, each relevant person should have only one identifier and no two people should have the same identifier (*uniqueness*). Third, the identifier should not change, nor be changeable without authority (*permanence*). This implies that the identifier should be *non-mnemonic* since if any meaningful association is built into an identifier such an association may change over time. Fourth, the identifier should be available for use at all times within the activity system (*indispensability*). Fifth, no other form of identification should be necessary or used for the activity system in question (*exclusivity*).

Biometric identifiers have become important because of the way in which they satisfy many of these properties. A biometric is typically defined as a measurable physiological and/or behavioural trait that can be captured and subsequently compared with another instance at the time of verification. Therefore, this definition conflates the issues of natural physiography with that of bio-dynamics. Biometrics includes fingerprints, iris scans, retina scans, hand geometry, face recognition, voice recognition, signature recognition and keystroke patterns. Biometric identifiers are therefore somewhat ambivalent in terms of the distinction between natural and surrogate identifiers. On the one hand they can be seen as natural identifiers in the sense that they are based upon the physical characteristics of the person. On the other hand they can be seen as surrogate identifiers in the sense that they rely on the creation of electronic profiles captured and processed by technologies.

6 Enactment of personal identity

In this section we propose that contemporary notions of personal identity are a reflection of the sociotechnical or sociomaterial nature of contemporary organisation.

Orlikowski (Orlikowski, 2007) and others have tried to resurrect and re-position the nature of information technology within studies of organisation. For this purpose she argues for the sociomaterial nature of organisational practice. She argues that ‘...materiality is integral to organising...the social and the material are constitutively entangled in everyday life. A position of constitutive entanglement does not privilege either humans or technology (in one-way interactions), nor does it link them through a form of mutual reciprocation (in two-way interactions). Instead, the social and material are considered to be inextricably linked – there is no social that is not also material, and no material that is not also social.’

Our key argument is that the enactment of significance is central to understanding the nature of the sociomaterial and consists of the entanglement of performative, informative and formative action. Weick (1998) uses the term enactment to refer to the process by which individuals bring structures and events into existence and set them in action within an enacted environment. Enactment therefore involves both a process and a product: an enacted environment. The enacted environment is described as ‘... the residuum of changes produced by enactment’. It is also described as a ‘material and symbolic record of action’. This suggests that Weick is struggling to encapsulate both technology and action within his conception of an enacted environment.

In terms of our conception we see the enacted environment as composed of the patterning of performance, communication and representation. Such patterns form resources for performative, informative and formative action. People, on the basis of established understandings of the significance of things, will perform in some situation. Patterns of communication will be important to the coordination of such performance. Groups may choose to make records of certain aspects of both communication and performance. One particular advantage of the use of records within communication is that the presence of such persistent artefacts facilitates one-to-many and many-to-many communication within a group of actors over a period of time. It turns individual memory into

social memory. Such social memory serves to encapsulate objects and events of significance to some group of actors. Such records as social memory, combined with individual memory, will form the enacted environment for further cycles of the enactment of significance.

It is possible to consider personal identity as an enacted environment in modern society (figure 2). In other words, it is a critical and continuing accomplishment by people in their interaction with information, systems and technology. People perform with others on the basis of established understandings of the significance of identity to particular situations. Identity will be signalled as a critical element of much communication. Certain aspects of identity may be recorded within records. Such records may become a critical resource for sense-making within further acts of communication and performance.

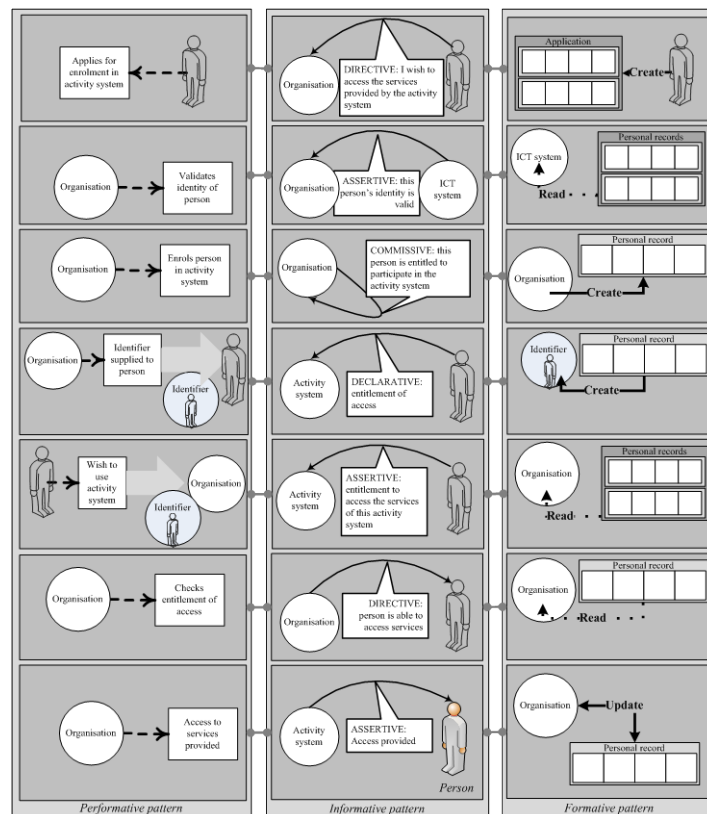


Figure 2. The modern enactment of personal identity

To perform their roles in numerous situations, people have to enrol within numerous activity systems. To do this, they normally have to apply to become a validated identity to such activity systems. This typically involves creating some element of forma such as an application ‘form’. In doing so the actor engages in a communicative act which expresses a wish to engage in the behaviours of the activity system, such as accessing services. Organisations will typically validate details recorded about the individual by reading personal records held on other data systems. Such data sources will assert or not the validity of a person’s identity. Decisions will be made on the basis of the validity of a person’s identity as to whether or not to enrol the person into a particular activity system. Assuming so, a personal record and associated personal identifier may be created to represent such enrolment in the activity system. This commits the organisation to providing participation and declares such entitlement to the individual.

The identifier supplied to the person will then normally be required in all future interactions between the person and the activity system. The person will need to provide the identifier in any interaction as an assertion of her rights to entry, which will be read by systems of the organisation. This will serve not only to authenticate the individual to the system but also to pull down other designative attributes of the individual held in her personal record. Once identification is achieved, the person is able to utilise the services provided by the activity system. Accessing such services may cause changes to be made to records held about the individual.

6.1 A case of the enactment of identity

The storage of data pertaining to identity is important to supporting human activity in numerous domains. Such data is typically held in registers of various forms - basic data systems storing necessary identity data. In Finland for instance (Rekisteripooli, 2003), four base identity registers are specified by central government: a personal identity register, an enterprise identity register, a building identity register and a land identity register. In this light, Eriksson and Agerfalk (Eriksson and Agerfalk, 2010) describe the case of the Swedish personal identity number or PID number, which is used within various identity registers used to enrol Swedish citizens and residents. For instance, it is used amongst all universities within the country as a student identifier. They highlight a number of problems in action, communication and representation caused by use of this identifier. This PID number (eg., 571129-8337) consists of a sequence of ten digits in the format specified in BNF as: <PID No>::=<Date Of Birth>-<Sequence No><Check Number>; <Date Of Birth>::=<Year><Month><Day>; <Sequence No>::=<Digit><Digit><Digit>; <Check Number>::=<Odd number> | <Even number>

As forma this surrogate identifier is clearly critical to the storage and retrieval of records held about students within Sweden. The presence of such a record with such an identifier serves to assert that a particular individual is a valid student (informa) and serves to enrol the student in a number of critical activity systems associated with higher education (performa).

The PID is clearly mnemonic in that it embeds an attribute of the individual – his/her date of birth – within the identifier. The check number also acts in a similar capacity – an odd number signifying a male student and an even number a woman student. However, this forma has led to a number of breakdowns in the informa and performa within this enacted environment. In turn, a number of situated workarounds at the level of forma have been developed to accommodate changing informa and performa.

For instance, the physical structure of this designator of identity sets a limit of 499 females and 500 males for any particular birth-date. An increasing number of foreign students also need to be accommodated using this forma to signal identity. Foreign students are typically given a ‘temporary’ PID number signalled by placing a T as the first character of the sequence number. This limits the number of foreign students to 49 females and 50 males for any particular birth-date. Such students can also acquire multiple PIDs invalidating the uniqueness characteristic of this identifier.

7 Conclusion

Our primary aim has been to suggest a more satisfactory theorisation of personal identity that helps unify ideas of individual, social and technological (digital) identity. We conclude with a summary of the value which our framework supplies to unpacking the issue of personal identity management.

First, it provides greater precision to understanding personal identity in relation to data, information and action. People, in contemporary interactions between individuals and between individuals and organisations, signal personal identity through types of signs we have referred to as identifiers. Traditionally the forma of personal identity has been built around the use of ‘natural’ symbols such as aspects of personal appearance. This is sufficient to authenticate identity within situations of face-to-

face communication, normally through what we have referred to as natural identifiers. However, when individuals are remote in time and space some form of persistent signification is required in the form of personal records. Within records, identifiers are data which enable processes of association with other represented properties of the individual and events in which she has participated. This is a more precise definition of digital identity (Poster, 2006) and helps explain the central importance of such identifiers to contemporary communication and performance, as in the case of the Swedish PID number (Eriksson and Agerfalk, 2010).

Second, the framework supplies a more situated conception of the technology of identity management. Basing the essence of such technology in the concept of a data system allows us to see the evolution of contemporary biometric systems from personal identity registers. One might argue that the representation of identity within personal records is at least as old as the idea of state administration. Over the last couple of hundreds of years personal records have become associated first with the records-based data model and more recently with databases utilising data models such as the relational data model (Codd, 1970). As the case of the Swedish PID number demonstrates, the successful design of systems for handling personal data must incorporate an understanding of the entangled nature of formative, informative and performative action in processes of authentication, identification and enrolment.

Third, the framework provides a clearer conception of what information systems for personal identity management constitute, and how such systems, as specialised forms of communication system, serve to address crises in the control of activity (Beniger, 1986). The increasing concern with personal identity management in contemporary global society could be seen as a response to such a crisis in control. Personal identity is critical to inter-personal communication, particularly economic exchange. But much such exchange relies on increased remoteness of interaction; the interaction being mediated by 'machines'. Hence, there is an increasing reliance upon records of personal data in the management of personal identity. This places greater demands on issues of 'design' in relation to data systems.

Fourth, and as a consequence of the above, the framework provides a new rendering of personal identity as a socio-technical and sociomaterial phenomenon (Bostrom and Heinen, 1977). A coherent account of personal identity in the modern world cannot be provided without considering the information technology used, the communication this enables, and the activities supported. Personal identity is important to the coordination of joint activity. The communication of identity supports performance. The increasing complexity of such performance means that records are increasingly used as an aid to interpreting and accomplishing identity.

Fifth, portraying the contemporary enactment of identity in this manner allows us to correctly situate a number of unintended or emergent effects: in particular, some of the inherent dangers in the use of personal records as a form of social memory. Eco maintains that signs constitute anything that can be used to lie (Eco, 1977). Identity theft and fraud are clearly a direct consequence of the enactment of identity – particularly the complexity of the contemporary enacted environment in this area. The enactment of identity is not only a resource within communication; it becomes a resource for deception by individuals. The rise in so-called identity theft and fraud can really be seen as a side-effect of an increased reliance on surrogate identifiers within enrolment processes. Lyon's idea of 'social sorting' can also be seen as constituting informative acts undertaken by organisations which rely upon a 'reading' of personal records (Lyon, 1994). In turn, this communicative activity determines a range of performative acts taken toward the individual. In other words, contemporary institutions make an increasing range of life-critical decisions about the performance to be taken towards individuals on the basis of data profiles created on the individual.

Sixth, the entanglement of forma, informa and performa described by our framework helps direct focus on the personal identifier as a critical aspect of modern information systems design. Any design of identifiers must address the purpose served by the identifier within communication and how such communication supports coordinated performance. Hence, effective design of personal data systems cannot and should not be decoupled from design of associated information and activity systems.

References

- Agerfalk, P. J. (2010). Getting Pragmatic. *European Journal of Information Systems* 19(1): 251-256.
- Beer, S. (1972). *Brain of the Firm: the managerial cybernetics of organisation*. Allen Lane, London.
- Beniger, J. R. (1986). *The Control Revolution: technological and economic origins of the information society*. Harvard University Press, Cambridge, Massachusetts.
- Beynon-Davies, P. (2006). Personal Identity Management in the Information Polity: the case of the UK National Identity Card. *Information Polity* 11(1): 3-20.
- Beynon-Davies, P. (2007). Personal Identity Management and Electronic Government: the Case of the National Identity Card in the UK. *Journal of Enterprise Information Management* 20(3): 244-270.
- Beynon-Davies, P. (2010). *Significance: exploring the nature of information, systems and technology*. Palgrave, Houndmills, Basingstoke.
- Bostrom, R. P. and J. S. Heinen (1977). MIS Problems and Failures: a socio-technical perspective. *MIS Quarterly* 1(3): 17-32.
- Clarke, R. (1987). Just another piece of plastic in your wallet: The 'Australian Card' scheme. *Computers and Society* 18(1): 7-21.
- Clarke, R. (1988). Information Technology and Dataveillance. *Communications of ACM* 31(5): 498-512.
- Clarke, R. (1994). Human Identification in Information Systems: management challenges and public policy issues. *Information Technology and People* 7(4): 6-37.
- Codd, E. F. (1970). A Relational Model for Large Shared Data Banks. *Comm. of ACM* 13(1): 377-387.
- Dietz, J. L. G. (2006). *Enterprise ontology: theory and methodology*. Springer-Verlag, Berlin.
- Eco, U. (1977). *A Theory of Semiotics*. Macmillan, London.
- Eriksson, O. and P. J. Agerfalk (2010). Rethinking the meaning of identifiers in information infrastructures. *Journal of the Association for Information Systems* 11(8): 433-454.
- Goffman, E. (1969). *The Presentation of Self in Everyday Life*. Penguin, Harmondsworth, Middx.
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press, Oxford.
- Locke, J. (1975). *An essay concernng human understanding*. Clarendon Press, Oxford.
- Lyon, D. (1994). *The electronic eye : the rise of surveillance society*. Polity Press, Cambridge.
- Lyon, D. (2009). *Identifying citizens: ID cards as surveillance*. Polity Press, Cambridge.
- Mead, G. H. (1934). *Mind, Self, and Society*. University of Chicago Press, Chicago.
- Morris, C. W. (1946). *Signs, Language and Behavior*. Prentice-Hall, New York.
- Neubauer, T. and J. Heurix (2010). A Roadmap for Personal Identity Management. *Fifth International Conference on Systems (ICONS)*: 134 - 139.
- Orlikowski, W. J. (2005). Material Works: exploring the situated entanglement of technological performativity and human agency. *Scandinavian Journal of Information Systems* 17(1): 183-186.
- Orlikowski, W. J. (2007). Sociomaterial Practices:exploring technology at work. *Organization Science* 28(9): 1435-1448.
- Poster, M. (2006). *Information Please: culture and politics in the age of digital machines*. Duke University Press, New York.
- Rekisteripooli (2003). *Base registers in Finland*. Helsinki.
- Searle, J. R. (1975). *A Taxonomy of Illocutionary Acts*. Language, Mind and Knowledge. K. Gunderson. Minneapolis. Volume 7.
- Searle, J. R. (2010). *Making the social world: the structure of human civilization*. Oxford University Press, Oxford.
- Stamper, R. K. (2001). *Organisational Semiotics: Informatics without the computer? Information, Organisation and Technology: studies in organisational semiotics*. L. Kecheng, R. J. Clarke, P. Bogh Anderson and R. K. Stamper. Dordrecht, Netherlands, Kluwer.
- Weick, K. E. (1995). *Sensemaking in Organizations*. Sage Publications, Oxford.
- Whitman, M. (2008). *Principles of information security*. Delmar, New York.