Learning for professional competence in an IS context

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Abstract. This paper considers the nature of professionalism as an expression of more than technical competence. This is related to the incidence of failure in IS change projects. We discuss how professionalism may be displayed, relating this to learning processes. The essential qualities of desire, exercise of will and their role in professional judgment are considered in relation to transcendent values espoused by professionals. We note that organizational consumers of information are also professionals, and not simply passive 'users' of systems. We relate this to the environment of Information Systems research and practice, including recognition of the importance of contextual dependencies.

Keywords: professional competence; extra-role behaviour; organizational learning; Information Systems; IS failures.

1   Introduction.

The main concern of this paper is to highlight some key concerns that must be considered by IS professionals/analysts. In the IS community, we need to prioritize a perspective on human activity systems as integrated wholes, and the needs of unique individuals within them, rather than focusing blindly on 'model users' [12]. We reflect upon the high incidence of reported failures of Information Systems innovations in organizations over recent decades, relating this to the nature of professional competence in IS development practice and the learning which underpins it. The discussion draws upon secondary material reporting on failures, including one particular case that has received much public attention in the UK – attempts to introduce Computer Aided Despatch systems in the London Ambulance Service.

We begin by examining the nature of organizations as dynamic, open systems. This is relevant to the nature of professional IS practice and the requirements for professional competence, discussed in the next section. The paper goes on to examine instances of failure in IS innovation projects, before returning to consideration of appropriate learning to underpin improved professional competence and attempting to draw some conclusions.

1.1   Organization as a System

Figure 1 shows an organization as a system, with a hierarchical structure of functioning sub-systems, interrelated via channels for monitoring, feedback and communication. A boundary has been set, differentiating this system from its environment, i.e. those aspects of the world which influence system behaviour but cannot be controlled from within it. This is effectively a closed systems view, within certain parameters.

Let us imagine a systemic model of a health centre for example. Sub-systems include operational systems for patient consultations, therapy sessions, booking appointments, etc. A practice management-system resources the centre, provides for rule setting to regulate its use, and ensure effective staffing and materials/equipment.

A monitoring-system measures levels of supplies, wear-and-tear on equipment, waiting times, etc. and alerts the management-system to a need for further resources or actions to ensure continued effective functioning. The environment [forces affecting the system but not controlled by it] include local demographics, patient demands, policies of the Department of Health and Primary Care trusts, and current medical research.

We can recognise this generic picture of health centres. However, it does not enable us to distinguish characteristics of any particular centre. The qualities, experience, attitudes, beliefs, professional dedication and interests of particular medical staff and therapists employed in a particular centre [and, indeed, the individual characteristics of other stakeholders such as patients or health service administrators] create a unique organization that such a model fails to capture.
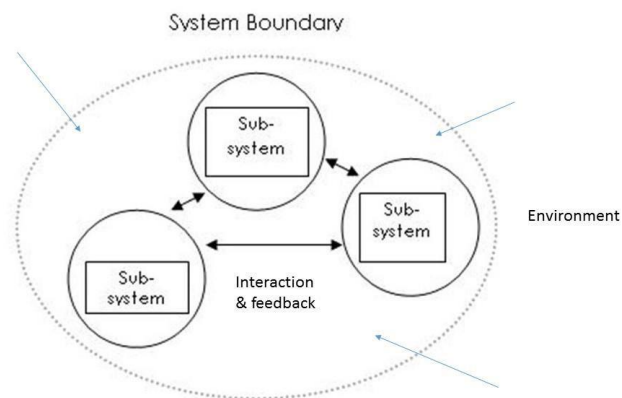

Figure 1: Model of an organization as a system

Checkland and Poulter [11, p.56] point out that, at any particular time, organizational behaviour subsists as an accommodation between differing perspectives of stakeholders. This suggests that the view shown in Figure 1 represents only a 'snapshot' of a phenomenon that is dynamic and constantly changing. As Mumford points out [e.g. 29], an open systems perspective on organizations is preferable. Any organization subsists from moment to moment as an emergent property of the interactions among the people who are its members. In the context of networked organizations, dynamic complexity is not merely expanded but radically altered. In a networked society, therefore, ICTs support transformations in organizational life as it is lived.

Bednar [6] describes an alternative view of organizational emergence, recognizing that any individual component of a purposeful-activity-system may possess emergent properties that are greater than the 'whole'. Individual components may be participating in several perceived 'Systems' at the same time (reflecting our multifaceted experience of 'real' life). Thus, a model of a system may be more akin to a set than a hierarchical model [see Figure 2]. The system under consideration and any of its component-systems are open and dynamic in a multidimensional way. Boundaries are not fixed but subject to continual re-drawing, depending on how the perspectives of interested observer(s) may shift to reflect fluctuating purpose(s) over time [24]. Organizational roles can also be seen to fluctuate - created and recreated as the perspectives/intentions of individual actors and their interactions shift. Furthermore, individual actors may occupy multiple roles, creating an effect of 'flipping' perspectives, shaped by contextual dependencies in a constant state of flux. Any particular actor's experience of working life will differ from day to day, and the actor is continually creating and recreating him/herself, through experiences in multiple roles within various systems in which s/he is a participant member. As pointed out by Ulrich [39; 40] in his discussion of boundary critique, perception of a system varies with the stance of the observer. This highlights the importance of effective participation in organizational decision-making
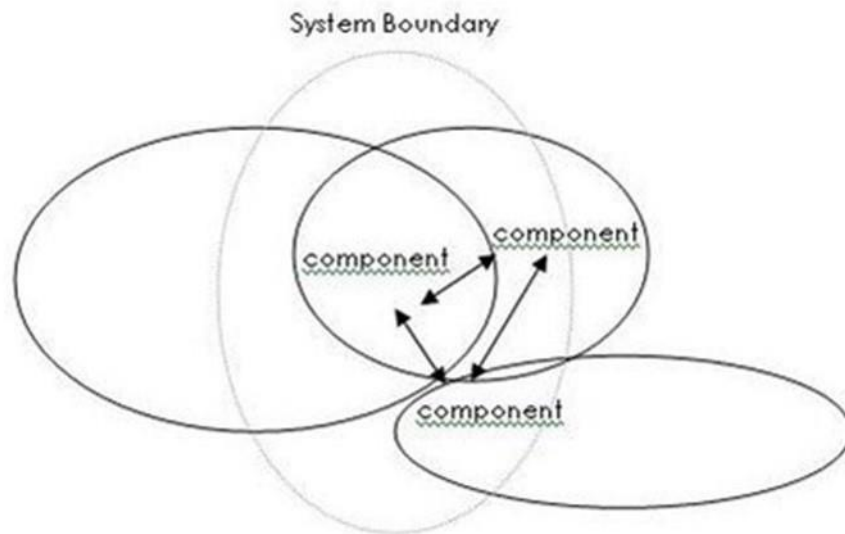
Figure 2: An organization as a dynamic, open system

Langefors [22, p.53] pointed out that organizations require direction from 'managers' in order to pursue their aims, and that managers require data about all activities and transactions conducted in order to provide appropriate direction. He concludes, therefore, that an Information System and the organization in which it is located must necessarily be seen as one and the same.

Recognizing this point, we now move on to consider the bases of professional competence, in relation to development of organizational information systems.

2 Professional Practice and Competence

Traditionally, management thinking favoured a view that decisions can be derived rationally from objective analysis of relevant data. This view has been reflected in many approaches to Information Systems development, where 'users' are asked to specify their requirements from proposed systems, which professional analysts then translate into terms realisable by computing specialists. This perspective is subject to criticism [25; 45]. It is a mistake to regard organizational actors as passive 'users' or consumers of technologies [33; 13]. Langefors, one of the founding fathers of IFIP-WG8, suggested long ago that:

> *Nowadays the insight is spreading that to determine IS user needs ... requires a search-learning process through which the users develop an understanding of what their real needs are and what new opportunities have become available to them. As a consequence, the users emerge as the key persons in the task of analysing user needs. Information analysts appear to have an important part in aiding the users in learning and analysing, in doing the documentation in a way understandable to the users, while efficient as a design input for the data system design stages to follow* [48, p.6].

This view of 'professional' practice makes it clear that the term that must be extended to all organizational actors who are stakeholders in a proposed system, not just to IT specialists. Alvesson [50] has questioned the usefulness of modern views of 'professionalism'. Some occupations traditionally described under different terms (craft? job?) have now been reinvented under the label of 'profession'. This has often been accompanied by adoption of grandiose titles, unreflective of the real significance of the work to be accomplished. While this has sometimes helped to advance the status of participants, it has also, at times, complicated and confused ideas about practice and underpinning education for practice. However, in the context of IS development, it is preferable to regard all stakeholders as professionals within their own zones of competence, rather than consigning them to generalized obscurity under the title 'user' [33].

In relation to those actors primarily concerned to promote systems development,

technical skills/knowledge relevant to the domain of competence are, of course, necessary; but these are insufficient in themselves without a *desire* to engage [4]. A professional is someone able to reflect upon practice of certain skills in context, and relate these reflections to a body of standards and values transcending his/her immediate job-role. Often, this involves membership of wider communities of practice – formal or informal [23], emphasising the duality of tacit and explicit 'knowing' inherent in exercise of any professional expertise [7; 8]. Bruner [9] points out that people do not just learn about the world, they also learn to be in their world.

More recently, Wenger-Trayner adopted the concept of 'knowledgeability', [49; 44] which involves modulation by individuals of their identification among multiple sources of accountability [44]. Knowledgeability is gained through participation in multiple communities, some enduring; others more ephemeral. Individuals develop competence by negotiating a path through complex systems of communities and boundaries, possibly over a protracted period. Wenger- Trayner uses the metaphor of a 'landscape-of-practice' to denote this system [44].

How would the individual improve his/her professional practice over time? What motives would govern whether s/he complies with any particular instruction to act in a certain way? Engagement with the context of application leading to reflection upon practice can promote a productive learning spiral [4; 45; 34], or what Gherardi [47] refers to as '*the creative entanglement of knowing and doing*'. It is through profound engagement with context and attachment to a transcendent system of values and standards that we recognise a professional at work, as opposed to, say, a capable amateur.

Within a formal organizational structure, a person may have a job description expressed in terms of appropriate skills, knowledge and roles. This is likely to bear only a loose resemblance to actual professional work carried out. Roles are created and re-created in conjunction with colleagues, taking into account professional standards. Desire to demonstrate skills in context according to particular standards and values is demonstrated in part through the informal organization [25; 18]. Exercise of judgment is an essential part of professional life. Sometimes, when faced with a dilemma, a person will justify an action by the words 'I had no choice!'. The suggestion that there is no choice here is a fallacy [4; 5; 20]. A person who habitually chooses a course of action that s/he knows will please 'the Boss' on these grounds is actually saying is that, weighing up the potential consequences of each available choice, s/he took the line of least resistance. Professionalism requires that we recognise the choices we make (including the choice to do nothing), their relationship to a wider value system, and their impact upon the contexts of professional life. It is important to remember that, in any context within which Information Systems development taking place, several/many different groups of professionals are at work, of which Systems Analysts are only one.

Drawing on work by Giddens [49] and Foucault [51], Walsham [52] reminds us that power relations pervade all organizational activity and discourse, and that continuous political processes impact upon any local change initiative. It is possible to perceive use of the term 'user' (denoting those professionals who are consumers of the proposed IS) as an effort to exercise power over them, both by initiating stakeholders - such as managers - and by IT specialists. However, those 'users' themselves exercise power of their own. It is important here to consider sense-making activities in relation to experience of work systems [42]. Vaast and Walsham [53] have considered how people make sense of their work practices through narratives that constitute shared social representations. Practices are reproduced where there is consonance between perceptions of action and these representations. Where gradual change in work context is experienced, adaptations in representations occur to maintain this consonance. Radical disruptions to context, such as IT innovation, may not be so readily assimilated. Devaujany [54] used a critical realist perspective to shed light on sociotechnical reflexivity, pointing out that internal conversations about technology and its use shape individual experiences on an on-going basis.

In understanding underpinnings of IS success or failure, it is important to consider agency of all groups of professionals upon project outcomes. The next section of the paper focuses specifically on the phenomenon of IS failure, using an illustrative case study.

3   Failure in IS innovation

In 2007, the IT Governance Institute commissioned research into the incidence of IT project failure [37], gathering evidence from IT projects in a variety of organizations of differing sizes and fields. Out of almost 1700 projects, only 53 (3%) were formally cancelled, but 31% either delivered or were expected to deliver negative value.

Thorp comments that persistence with projects already known to be failing could be attributed to a culture of blame within many organizations, such that cancellation of a project prior to completion was seen as a sign of weakness. Williams [46], commenting on this survey, highlights a discrepancy between organizational discourse emphasising rationality and decision-making grounded in the cognitive zone, when there is clear evidence that emotions, e.g. fear of blame and intransigence are impacting upon project status.

3.1   IT innovation at the London Ambulance Service

Failures of two projects to introduce Computer Aided Despatch (CAD) systems into the London Ambulance Service, in 1987 and 1993, have been well documented in the Press. An independent inquiry (the Page Inquiry) was conducted, whose terms of reference were to '*identify the lessons to be learned for the operation and management of the London Ambulance Service against the imperatives of delivering service at the required standard, demonstrating good working relationships and restoring public confidence*'. Overall the operational issues identified by Page can be summarised as: technical problems, including software bugs and incompatibilities/hand-shake failures between units; poor user involvement in initial specification and lack of ownership of the solution; poor staff relations and communication; inadequate training; big bang approach from manual to automated system with concurrent changes to working practices.

Subsequently, LAS successfully implemented a CAD system (CTAK) developed in-house. In 2009, an initiative was undertaken to replace CTAK with a complete package (CommandPoint), employing a leading global security company. The remit was to install the software with minimal changes to work practices. An internal report, presented to the LAS Trust Board in May of 2011 (the Armitage Report) was intended to be an assessment of the state of readiness for the Service to implement CommandPoint, with particular reference to lessons learned and recommendations set out by Page. The first part of the report dealt with technical recommendations, pointing out that extensive testing had been done, surfacing a number of problems that had been dealt with. Some outstanding problems were highlighted, including tensions between different staff groups; requirement for changes to communication styles and terminologies; untested interface with Police systems; and a need to deal with some remaining bugs and faults. It was stated that 'users' had been fully involved in the project, under the auspices of the Deputy Director of Operations, who provided '*consistent and effective user input at a senior level throughout the procurement and implementation phase*' - bringing in other users as and when their input was needed. The sense of staff ownership of CommandPoint was stated to be 'remarkable' and the feedback from training positive, as was feedback from 'staff-side representatives'.

Some modifications to working practices were deemed necessary, particularly to the layout of the Control Room. These changes were considered relatively minor, and based on 'sound reasons' of operational efficiency. Dry-run simulations had appeared satisfactory and a Readiness Checklist was provided and signed off by the Deputy Chief Executive prior to going live. It appeared that all was ready to go ahead with the project. Only in appendices to the report was a note of caution introduced. The section on Risks referred to the following: lack of user confidence in the solution; negative publicity for LS; and system performance not meeting user expectations.

In June 2011, the new system went live, and immediately collapsed. The Control Room operators were obliged to revert to pen-and-paper for a time. Delays in despatch during this failure contributed to the death of at least one patient and resulted in litigation by another. Many software 'bugs' emerged after going live. It emerged that, as the project progressed, it had slipped further and further behind schedule, creating budget pressures. In consequence, a freeze was placed on further changes or

requirements. This was not mentioned in the schedule of risks and is likely to have had a grave impact upon likelihood of success. An investigation into the collapse suggested the root causes to be: failure of CommandPoint to deliver the system, technical and operational functionality expected; critical configuration issues not identified during testing; lack of operational procedures in place in the event of a critical system failure; failure to integrate the project into business as usual.

3.2   Discussion

Looking at the ways in which failure was experienced in 2011, there is a remarkable similarity to the conclusions of the Page Report on the earlier project failures. Since a great deal of effort and expense was undertaken to pursue a project informed by these recommendations, one must ask whether there are not more fundamental lessons to be learned. It may be significant that no mention is made of the team responsible for creation and implementation of the earlier CTAK system. It seems likely that many lessons were learned in the course of implementing and running this system over a period of several years. Was this useful information made available to the CommandPoint project team?

The internal report placed great emphasis on rigour of development processes – testing; training; involvement of 'users'. Subsequent events, however, cast this into question. The Trust Board met in anticipation of greater demand for ambulances during the upcoming London Olympic Games. Minutes indicated that risks reported to the Board included lack of user confidence in the solution, due to system performance not meeting user expectation; staff unrest and consequent poor publicity were anticipated. Thus, previous confidence about the level of 'user' involvement and positive 'user' feedback during training seem to have evaporated. The Board was of a risk that 'lack of confidence in the reliability and functionality of the system and data by operational users will alienate staff, undermine confidence and/or create suspicion leading to confused expectations'.

CommandPoint had previously been used successfully in the United States by both law enforcement and city fire services. On this basis, it was assumed that it could be introduced into LAS with only a minimum of changes to work practices and customisation. Involvement of 'users' seems to have been limited to participation in training and consultation via the Director of Operations. This suggests that those professionals whose work was involved in dealing with public calls for ambulance services, triage of priorities and, significantly, those driving through London and providing interim medical aid to patients, were only minimally involved in any decision-making about the new system. Assumptions were made about the work practices of staff and the impact upon them of changes to Computer Aided Despatch. No opportunity was available for any of the staff to reflect upon the usefulness of the changes and take ownership of the new System – all decisions were made remotely at Trust Board Level. In other words, the actors engaged in the work of the Service were not treated as professionals in their own right, but as passive 'users'

It is important here to distinguish between 'usefulness' in context and other terms such as 'usability', which is concerned with ergonomic characteristics. This distinction is one that may be overlooked when staff are offered training in new systems. Only particular users, engaging with particular technologies in order to carry out work, can decide whether they perceive them to be useful [2]. McGrath [26] discusses emotion in the context of the earlier LAS projects, from the early 1990's. Here, it appeared that the prevailing culture of public service and empathic support for patients within LAS came into direct conflict with a rational planning ethic intended to increase 'efficiency'. McGrath reflects that: "*The case reveals that existing, even apparently latent, conflicts and emotions may surface or heighten when IS innovation is attempted. In the LASCAD case, these subjugated knowledges and emotions emerged during efforts to achieve cultural change of the LAS through the use of ICTs inscribed with government-driven efficiency logic*" [26, p.297]. It would seem that these lessons were not learned in the interim.

Friis [55] Points to a need for engaged professionals to take ownership over their own work systems, including change projects, in order to promote usefulness. A 'symbiosis of knowledge' is needed between technical experts and working professionals who have tacit understandings of contextual dependencies. This can be achieved through constructive and situated dialogue. She suggests an approach of user-controlled information systems development, achieved when the future 'users'

are regarded not only as problem owners, but also as problem solvers, taking responsibility for design and making binding decisions about the design project [55, p.225]. Such an approach, we suggest, requires professional engagement and commitment from both communities of practice.

In the sections that follow, we discuss professional commitment to action as involving more than rational, role-based activities but involving exercise of will to adhere to a value system. The impact of extra role behaviour [32, 35] in this context will be highlighted as a key factor in promoting creation of productive learning spirals [4].

4   Engagement and Competence

Rogers [36], in his discussion on diffusion of technology, distinguishes between different types of threshold, e.g. the difference between ignorance and knowledge of how a technology might be applied as a solution for a particular problem - a key aspect of professional competence; or the difference between thinking about engagement and engagement itself. This is similar to the distinction between theory espoused and theory in use [1]. Discourse about intention often fails to take into account the investment of personal resources needed to address the required 'unlearning' [33, 3, 5, 13] involved in innovative practice. There appears to be an unwitting belief in rational behaviour as if professional life could be conducted without any emotion. In the LAS case (above), it appears that this belief has persisted through a catalogue of successive failures, even though successive inquiries have reported that staff engagement, confidence and morale were crucial factors, and recommended greater staff involvement in future projects.

Possession of relevant skills/knowledge for a work role is insufficient without ability to exercise judgment in exercising those skills, related to a system of values that transcend the immediate context. This is the essence of professional engagement. In relation to Information System, as in art, desire can only be realised as we open up creative spaces for ourselves [30].

In a professional context, reflection is needed to negotiate such spaces [3, 34, 13]. These can become blocked through inappropriate management assumptions [19, 10, 28, 4], such as are evident in the LAS case regarding modification of work systems. As we have seen, an organization may be viewed as a system, made up of interacting elements. If any one element leaves the whole, or is changed, then it is no longer the same system and all other elements are necessarily affected [19; 22]. There is a need for design practice to address whole work systems and not just systems for use of particular artefacts. It is necessary for engaged actors to reflect upon their professional roles, engagement in those roles, and on engagement of the 'others', in order to avoid becoming entrapped in a double bind [4; 5; 7; 33; 38] in which they cannot create those choices that would empower escape. It is possible to observe 'disconnectedness', i.e. failure to reflect [54]. Entrapment can occur where a person feels that there are no choices open to him/her that will satisfy desire [14, 15, 4, 5, 5, 20]. This might be due to a lack of recognition of choices that are available, or inhibition of ability to create choices, as in the case described by Thorp, above [37]. Competence in judgment is required. However, this will not necessarily lead to appropriate action on its own, without desire for engagement.

The next section of the paper discusses such professional engagement, and its relationship to extra-role behaviour in organizations.

4.1   Extra-role Behaviour and Professional Development

Engagement, within a professional context, is related to the phenomenon of extra-role behaviour [41; 44]. We are faced with complexity of multiple, competing desires in many contexts [4, 5, 2, 6], partly due to the impact of opportunity cost – any choice to expend finite resources, including time, involves choosing between priorities. Boundary setting [4, 5, 22, 10, 39] is also involved, however. Channelled desire comes about through commitment to certain values and consequences. Efforts to recognise boundaries of competence involve extra-role behaviour or improvisation [43]. Ciborra comments on the MIR space station in relation to bricolage [16, p.2].

'*Up there, revolving in space, one could find, hand-in-hand, advanced, robust engineering solutions, rustic deign, and widespread virtuoso tinkering.*'

Such 'extra-role behaviour' becomes possible only through commitment to on-going reflection upon competence. There is also paradox in that a professional engaged must reflect upon 'the future' whilst still involved in creating it. This involves higher orders of learning [4, 13] in which an individual is reflecting not only upon experience, but upon the process of reflecting on exercising judgment - an exercise in practical philosophy as part of professional competence in action [13].

The engagement of particular individuals in professional work roles is accepted as a key attribute of organizational life from many points of view [17; 27; 28]. When interviewing a job applicant, employers often ask about the candidate's hobbies and interests. A person who cannot offer anything beyond the strict requirements of the job may not be considered suitable. However, there is a possibility that we concentrate too much upon role performance when modelling organizations as human activity systems, to the exclusion of proper recognition of extra-role behaviour. This can certainly be seen in the context of the LAS case, where the boundaries of the project were very narrowly drawn and attention to wider work systems, or desires of engaged professional staff, were specifically excluded, even where known risks were at stake. Work roles are shaped through interactions with others – co-workers, collaborators and also family, friends and acquaintances - in multiple contexts. These matters have long been recognised in the fields such as organizational behaviour and human resource management, through the concepts of formal and informal organizations [see, e.g. 21]. A professional's desire to demonstrate her skills in context according to particular standards and values is demonstrated in part through the informal organization, drawing upon wider communities of practice. Recognition has been given to this dimension within the field of Systems modelling too, e.g. in the Soft Systems Methodology [11] through focus on a cultural stream of inquiry.

It is also not uncommon for managers in organizations to suggest that they wish their staff to be creative or innovative - to go beyond their formal roles and skill profiles, to exercise all their personal resources in addressing messy and complex demands of organizational life [44]. Such personal resources will have been acquired and exercised through the individual's total life experience, not just those experiences that form part of their specific work roles. In this instance, the view of individual emergence adopted is that suggested in Figure 2. While work roles typically involve multiple contextual dependencies, life experiences of individual people nevertheless transcend them. It is possible to argue that organizational sustainability is critically dependent upon creativity and extra-role behaviour to generate innovation and drive the organization forward.

5   Conclusion

We have looked at the nature of professional commitment and how transcendent value systems and the exercise of judgment are important in creation of beneficial organizational developments. We argue a professional is therefore someone who is able to reflect upon practice of skills in context, and to relate these reflections to a body of standards and values transcending the his/her immediate job role. Often, this involves membership of a wider landscape of practice – formal or informal. It might be expected then that a professional would engage in extra-role behaviour, e.g. suggesting innovative methods, or making efforts to help others in their professional roles.

The potential to go beyond basic requirements of a role to create new boundaries involves a higher level of reflection. Thus, extra-role behaviour becomes possible only through commitment to on-going reflection upon competence. Such reflection involves higher orders of learning [4] in which the individual is reflecting not only upon experience, but upon the process of reflecting on exercising judgment. This development of a learning 'spiral' may be regarded as an exercise in practical philosophy. It follows that a rational planning model for considering organizational choices involves an inherent paradox for unwary actors. This is clearly demonstrated in the events unfolded in the LAS case. Since any observation must, by definition, be made by a particular observer, adoption of a 'neutral' stance cannot be achieved in practice. This means that those who espouse rational planning are unaware that any

data they gather about a dynamic and constantly-recreating problem space is inherently misleading, since they are failing to recognise their own, situated assumptions [5]. Ability to act as a professional is, we argue, crucially dependent upon ability to exercise extra-role behaviour.

Our conclusion is that it is of utmost importance that efforts made within IS communities must prioritize human activity systems, and engage contextual dependencies from a critical perspective, in order to promote systems that are experienced as contextually relevant (useful). What Meyers and Klein [31] describe as an explicit critique and improvement of social condition is necessary to develop richer meanings and understandings.

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