

Through the kaleidoscope: Perspectives on cultural change within an integrated information systems environment

Teresa Waring*, Dimitra Skoumpopoulou

Newcastle Business School, Northumbria University, Newcastle upon Tyne NE1 8ST, United Kingdom

ARTICLE INFO

Article history:

Available online 19 May 2012

Keywords:

Integrated information systems
Cultural change
Higher education

ABSTRACT

The study of information systems and their influence on organisational culture is a complex and highly contested area of research which has been the subject of much theorising. This paper intends to add to the debate through a longitudinal case study of an integrated information system implementation undertaken within a large UK university. The system known as SITS (Strategic Information Technology Services) was introduced into the university in 2006 and the focus of the research has been on culture change within the SITS environment. Document analysis, interviews and participant observation were used to collect the data for this study. What has emerged from this study is that current approaches are unable to account for the complexity of cultural studies within an integrated information systems environment and therefore we have developed the concept of the 'cultural kaleidoscope' as a heuristic to better understand the nature of cultural change within these circumstances.

© 2012 Elsevier Ltd. All rights reserved.

1. Introduction

One of the challenges that information systems (IS) academics have been addressing is to develop better theoretical understanding of organisational issues within the context of IS implementations. Much of the work that has been done in this area has been through multi-variate statistical hypothesis testing research which reflects a cross-sectional approach and a snapshot of data at one point in time (Lee, 2010:341). Although not decrying this approach Lee goes on to argue that the IS discipline cannot continue to rely on this approach alone and must adopt other relevant research methods along with appropriate theory development to reflect the subjective, dynamic nature of organisations.

The study of culture and its relationship to IS and Information Technology (IT) is an area of organisational research that has recently been the subject of much theorising (Gallivan & Srite, 2005; Kappos & Rivard, 2008; Leidner & Kayworth, 2006). The authors' work based on extensive literature reviews has produced mixed results and little agreement. This should not be surprising as the study of culture within the anthropology and organisational behaviour literature is highly contested, complex and with a number of epistemological perspectives (Hatch, 1997; Schein, 2010). Systematic literature reviews are a vital component of all research strategies but should not be the only approach.

We argue that although many authors have 'studied' culture within the context of IS/IT there are few examples of academic research which have developed approaches that reflect the dynamic and complex nature of organisations undertaking integrated systems implementations. Those that have (Doherty & Doig, 2003; Doherty & Perry, 2001) have tended to focus on corporate culture and have paid little attention to the micro-cultures or the apparent lack of culture within the organisation. Studies which take a more inclusive approach require longitudinal studies of an ethnographic nature as well as an understanding that cultural change is an emergent process that cannot be undertaken as a snapshot in time (Gallivan & Srite, 2005). The aim of this paper is to illustrate how this has been done using a 3 year study of an integrated information systems implementation, the Strategic Information Technology Services (SITS) which was introduced into a university, NewU, in 2006 to support the administration of student data. It develops the concept of the 'cultural kaleidoscope' to provide insight into the changing nature of culture within organisations and the multiple perspectives of those stakeholders affected by the implementation. The next section explores some of the theoretical concepts used within IS and pertinent to this study before reviewing the contributing literature to the IS culture debate.

2. Integrated information systems and SITS

Lee (2010) has pointed to the problematic nature of IS research when terminology is taken for granted. He argues that even the definition of a generic information system (IS) is contested and

* Corresponding author.

E-mail address: teresa.waring@northumbria.ac.uk (T. Waring).

offers an interpretation which identifies three dynamic, interacting aspects of an IS – ‘the technology system’, ‘the data system’ and ‘the organisation system’ which emerge over time. Further complexity arises when considering integrated IS. This has been interpreted by a variety of academics from different perspectives and once again there is no one accepted definition of integration. These interpretations have been comprehensively discussed by Wainwright and Waring (2004) and have been classified into four domains of integration. The technical domain is very dominant in the fields of computer science and IS and integration is seen as a goal to make complex software and hardware artefacts communicate using appropriate protocols, conventions and technologies. The systems domain encompasses approaches to integration that provide a greater holistic perspective or which have a philosophy underpinned by general systems theory. Below (1987:17) differentiates integration from interfacing:

“integrated systems cannot be taken apart without destroying them. . . whereas an interfaced system consists of parts which are replaceable and which are clearly individual. . .”

A number of authors have argued that integration is also a strategic issue and any definition should have a strategic component (Platts, 1995; Voss, 1989). Hence a strategic domain can be identified and is typified by the drive to develop and implement large scale Enterprise Resource Planning (ERP) systems and e-business (Porter, 2001). The focus of the strategic domain has been on integrating business strategy with IT/IS strategy and this has resulted in a plethora of planning methods, tools and techniques (Robson, 1997; Ward & Peppard, 2002). The organisational domain is acknowledged to be extremely important for integration of information systems. However, this domain is very difficult to define as each implementation is unique to its context. It involves the integration of people, their ideas, their methods of working, interpersonal relationships and decision making processes all of which may be highly subjective. It can involve tangible issues such as structure (Orlikowski & Robey, 1991; Walsham, 1993) but equally it encompasses the social and historical situation, organisational power and politics (Markus, 1983) as well as culture (Dubé & Robey, 1999; Pliskin, Romm, Lee, & Weber, 1993; Wagner & Newell, 2004; Waring & Wainwright, 2002).

Over the last 20 years many off the shelf technically integrated IS have emerged – Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), supply chain systems, computer integrated manufacturing to name but a few. Even within the Higher Education (HE) environment systems technical integration has been on the agenda. An example of an HE integrated information system is SITS (Strategic Information Technology Services) and is used by over 60% of the UK HE market and 25% of the Scottish Further Education (FE). It has become the de facto standard within the UK HE sector and is gaining ground in European Market (Experian Qas, 2012). Like many other integrated information systems of its genre it has been built around an ‘ideal’ model of university administration and consists of modules to support admission of students to university, programmes to manage the curriculum, a student module to manage enrolment, fees, progression throughout the degree and tools to ‘enable’ users to analyse, process and extract data to suit their purposes. The issue for SITS adopters is to understand how such a demanding and tightly coupled ‘technology system’ and ‘data system’ will interact with the ‘organisation system’. The organisation has specific, non-generic requirements and these are not just around data and technology. Utilising technology which is all encompassing and infiltrates every aspect of University business may have a substantial affect on its culture and its ability to be innovative and flexible going forward (Ogbanna & Wilkinson, 2003).

3. Culture and integrated information systems

The study of culture has its roots in anthropology, has been based on groups or tribes and has been a growing subject of study in sociology, business and management as well as IS. Yet what is meant by ‘the study of culture’? There is no consensus as to the approach taken within the extensive body of literature and this is reflected in the numerous definitions of culture (e.g. Geertz, 1973:5; Kotter & Heskett, 1992:141; Reeves & Baden, 2000:4; Smircich, 1983:344; Sathe, 1985:255). This is further complicated when extended to ‘organisational culture’ as new definitions emerge (e.g. Kilman 1982:11; Lawrence & Lorsch, 1986:84; Martin, 1992:3; Schwartz & Davis, 1981:33; Schein, 1984:3). Summarising much of this work Harman (1993:34) suggests that “culture is typically applied to organisations to mean the shared beliefs, myths, ideologies and other forms of expressive symbolism which serves as a normative guide for members’ behaviour. . .”. Much of the early research into organisational culture conceptualised culture as a variable that can be controlled or manipulated and has led to prescriptive approaches to culture research (Deal & Kennedy, 1982; Huczynski & Buchanan, 2001; Knights & Willmott, 2007; Ouchi, 1981; Peters & Waterman, 1982).

An alternative, interpretive perspective has been adopted by other researchers such as Smircich (1983) and Meek (1988) which suggests that rather than culture being something an organisation ‘has’ it is something an organisation ‘is’ and moves the focus from cultures as ‘social facts’ to cultures as on-going social constructions. Thus culture is seen as being more complex, a product of many factors including history, the environment as well individuals’ backgrounds and their view is that researchers do not seek to discover culture but to interpret it. Martin (1992:3) suggests:

“. . . individuals come into contact with organisations, they come into contact with dress norms, stories people tell about what goes on, the organisation’s formal rules and procedures, its informal codes of behaviour, rituals, tasks, pay systems, jargon and jokes only understood by insiders, and so on. These elements are some of the manifestations of organisational culture. When cultural members interpret the meanings of these manifestations, their perceptions, memories, beliefs, experiences, values will vary, so interpretations will differ – even of the same phenomenon. The patterns or configurations of their interpretations and they ways they are enacted constitute culture.”

As the popularity of organisational culture grew so did academic interest in the role of culture in organisations (e.g. Agee & Holisky, 2003; Cramer & Pfeiffer, 2002; Hofstede, Neuijen, Ohayv, & Sanders, 1990; Lawrence & Lorsch, 1986; Meyerson & Martin, 1987; Morgan, 1986; Pettigrew, 1979; Schein, 1984). This has been mirrored in the IS field (e.g. Avison & Myers, 1995; Boersma & Kingma, 2005; Dubé & Robey, 1999; Fowler & Gilfillan, 2003; Gallivan & Srite, 2005; Kappos & Rivard, 2008; Leidner & Kayworth, 2006; Pliskin et al., 1993; Robey & Azevedo, 1994; Straub, 1994; Wagner & Newell, 2004).

It is clear when one considers the extensive literature reviews conducted by Gallivan and Srite (2005), Leidner and Kayworth (2006) and Kappos and Rivard (2008) that IS research faces many of the dilemmas that have arisen in studies of culture within the Organisational Behaviour field. Is culture and its relationship to IS defined and studied from a positivist, interpretivist, critical or post-modern perspective and which framework or analysis tools should then be used? Should researchers look for regular or symbolic ‘laws’ and not for the ‘intricacies of meaning’ as Robey and Azevedo (1994) suggest or should they see culture as being understood differently by different users depending on their specific beliefs, assumptions

Table 1
Artefacts of organisational culture.

Category	Example
Manifestations/artefacts of organisational culture	
Formal and informal practices	Formal practices – written policies, formal structures, technology use, rules, controls Informal practices – custom, alternative procedures not written down
Physical manifestations	Art/design/logo Building decor Dress/appearance Material objects Physical layout
Behavioural manifestations	Ceremonies/rituals
Verbal manifestations	Communication pattern Traditions/customs Rewards/punishments Anecdotes/jokes Jargon/names Explanations Stories/myths/history Heroes/villains Metaphors

Adapted from Hatch (1997:216).

and values – they ‘socially construct’ the technology and hence ‘their patterns of behaviour in idiosyncratic ways may change over time’ (Gallivan & Srite, 2005:324)?

Essentially determining ones epistemological understanding of culture will determine how it should be studied and analysed. Much of the early cultural analysis research was from a positivist perspective and is typified by Hofstede's (1980) work on national culture and Schein's (1984, 1991) studies of organisational culture. These two streams are reflected in the IS literature and commented upon by Gallivan and Srite (2005) who argue that they should be merged to provide a more holistic theory of IT and culture. From a post-modern interpretivist perspective researchers (Brown, 1998; Hatch, 1997; Martin, 1992) have argued that frameworks are unhelpful and cultural manifestations within the organisation may provide better insight into the nature of culture and change. These are shown in Table 1.

Nevertheless a further complication can be seen when considering the concept of ‘organisation’ and the level of analysis. Should researchers only explore the culture and IS at the holistic, corporate level or should they consider the sub-groups and individuals who constitute the organisation? Meyerson and Martin (1987) recognised this dilemma very early in their research and proposed a three perspectives view of organisational cultural studies. These are summarised in Table 2.

Within the IS field most culture research has been conducted from an integration perspective (Kappos & Rivard, 2008) and has focussed on corporate culture. However, some authors (Dubé & Robey, 1999; Jackson, 2011; Wagner & Newell, 2004) have strived to better understand the three perspectives approach and have applied it within an information systems environment once again with interesting but mixed results. Nevertheless we believe that their approach has merit and should be pursued further as we demonstrate later in the paper.

Thus summarising, researchers who study IT and its relationship to culture must explicitly consider a number of issues:

1. The epistemological stance of the study.
2. The levels of analysis.
3. The role of the information system – artefact or cultural proxy?

Table 2
The three perspectives of cultural analysis.

Perspective	Understanding
Integration	Culture according to this perspective is an integrating mechanism, it is the shared values, etc. of a given group or organisation. The term ‘shared’ helps identify relevant manifestations of a culture – a common language, shared values or an agreed set of appropriate behaviours. 3 characteristics are central to all of these studies of culture.
Differentiation	Instead of a focus on homogeneity this perspective on culture is characterised by differentiation and diversity. Researchers within this perspective pay attention to inconsistencies, lack of consensus and non-leader centric sources of cultural content. This approach emphasises the importance of sub-cultures including groups and individuals who may represent constituencies based within and outside the organisation. It is an open system influenced by aspects from outside and inside the organisation. It tends to emphasise disagreement rather than consensus and acknowledges that complex organisations reflect broader societal cultures and contain elements of occupational, hierarchical, class, racial, ethnic and gender-based identifications – subcultures.
Ambiguity (fragmentation)	Rather than denying ambiguity (integration) or channelling it (differentiation) this 3rd perspective accepts it. Complexity and lack of clarity could be accepted and made the focus of attention. From a fragmentation perspective irreconcilable interpretations are simultaneously entertained; paradoxes embraced. A fragmentation perspective would have no shared, integrated set of values – except an awareness of ambiguity itself. Ambiguity is thought of as the way things are, as the ‘truth’ not as a temporary state awaiting the discovery of ‘truth’ – integration is viewed as over-simplification. Consistency and consensus are considered abstract illusions created by management for the purposes of control. A fragmentation portrayal of culture cannot be characterised as generally harmonious or full of conflict. Instead individuals share some viewpoints, disagree about some and are ignorant of or indifferent to others. Consensus, dissensus and confusion co-exist, making it difficult to draw cultural and sub-cultural boundaries.

Adapted from Meyerson and Martin (1987:623–647).

The first two issues have been discussed but point three requires further consideration. Many researchers would consider an information system part of the formal procedures and structure of the organisation. It would not be seen as a variable even in the most positivist of studies (Lee, 2010). However, it is our contention that integrated information systems as typified by SITS have a ‘culture by proxy’ that has been embedded into its formal structure and operating procedures by those that designed it around the ‘model of best practice’. Thus it comes with its own jargon, coding system, rules, data and technical requirements that need to be addressed by the adopting organisation. It is also endowed with the values and beliefs of those developers of the system and added to by co-operating stakeholders such as ‘beta testers’. These values and beliefs may have been developed in another country such as the USA by individuals who have little experience of the adopting environment. This provides cultural tensions at the interface of the technology and the organisation and within the organisation itself which are difficult to understand, anticipate or conceptualise using current theories. They also change over time and are dynamic as organisational actors leave, develop new roles, become accustomed to the system, develop new systems, etc.

Thus having developed an understanding of the complex nature of integrated information systems and culture research the paper

considers the approach taken to the longitudinal ethnographic study in a UK university which undertook an implementation of SITS and how it has led us to conceptualise culture change within the integrated IS environment through the metaphor of the kaleidoscope.

4. The research strategy

According to Remenyi, Williams, Money, and Swartz (1998) one of the most frequently used strategies to examine research questions in business, management and IS research is the case study approach. Case study research is a broad concept and evidence is collected in a variety of ways, ranging from structured interviews to active participation with the subjects being studied (Remenyi et al., 1998). The greatest advantage of using case study is the opportunity to provide a comprehensive understanding of the issues under investigation. Case studies can be used in different types of research such as when using a 'positivist stance' (Benbasat, Goldstein, & Mead, 1987; Yin, 2003) or 'interpretivist stance' (Walsham, 1993). It can be used in many types of research for instance exploration, theory building or testing, and theory extension or refinement (Voss, Tsikriktsis, & Frohlich, 2002). Marshall and Rossman (2006) argue that studies focusing on society and culture in a group, programme or an organisation typically espouse some form of case study as a strategy. As Bryman and Bell (2007) observe, case study research is concerned with the complexity and particular nature of the case in question. Furthermore, Klein and Myers (1999) state that case study research is accepted as a valid research strategy within the IS research community. The organisation used in this study is NewU, a large post 1992 institution located in the United Kingdom. The research described here is part of a longitudinal, interpretivist case study which started in 2006 (Bryman, 2004; Walsham, 2006) and takes the perspective that culture is something an organisation 'is' not something it 'has' (Parker, 2000).

Data collection involved a number of different methods including document analysis, participant observation, story-telling and interviews. Within this case study the researchers were fortunate to have access to documentation dating back to 2005 when the concept of integration was first developed. This documentation included minutes and papers from senior management meetings, project boards, SITS user group meetings, user documentation as well as vendor and coding documentation. The data used in this paper was mainly collected during 2007/8 but does refer to earlier documented data as well as recent data collected during an academic quality audit organisation. The research team developed a series of semi-structured questions that were used during the early interviewing process and these were revised and refined in an iterative manner as further interviews were conducted. A total of 22 long serving organisational participants were interviewed.

Table 3
Emergent themes from the interviews.

Work arounds	New power/politics	Loss of trust
Difficulty working together	Uncertainty	Technological discourse
Changing identities	Structure/restructure	

We interviewed senior academics, academics who were involved in managing degree programmes, senior administrators such as registrars as well as junior administrators who worked on a daily basis with SITS. We interviewed the SITS project manager as well as some of the technical staff involved in the implementation. The interviewees were chosen based on the post they held and the department they came from as it was important to ensure there was a balanced representation from across the whole University. After the interviews had been transcribed the researchers used Template Analysis to make sense of the data (King, 2004; Waring & Wainwright, 2008). The analysis of the data focuses on the emergent cultural themes and manifestations as seen within NewU. Themes which emerged are shown in Table 3.

These themes will be discussed in relation to the theoretical framework utilised in the next section.

5. The case study

The discussion of the case study begins with a brief overview of the history of NewU and focuses on the key issues that led to the need for a SITS (Strategic Information Technology Services) system. The findings are then explored using the Meyerson and Martin's (1987) three perspectives framework – integration, differentiation and ambiguity (Table 2) incorporating the conceptual interactions of the SITS system itself. The SITS adoption affected most academic and administrative staff across the university but to appreciate how it has influenced culture it is important to reflect a little on the key events which led up to the need to purchase it. Fig. 1 summarises this history of NewU.

5.1. Brief history

NewU has a long and varied history starting life as a vocational college, then a polytechnic and in 1992 it became a university. The university structure is based on a faculty system and at the time of this research there were nine faculties in total. The 1990s heralded a period of growth in the UK university sector which has continued to date. Academic staff knew one another and knew their students by name; they socialised together and this was a recurring theme during the interviews with long serving staff both from the academic and administrative groups. The organisation was seen as friendly, supportive where staff worked as teams. Nevertheless in response to the demands of UK government the higher education sector was

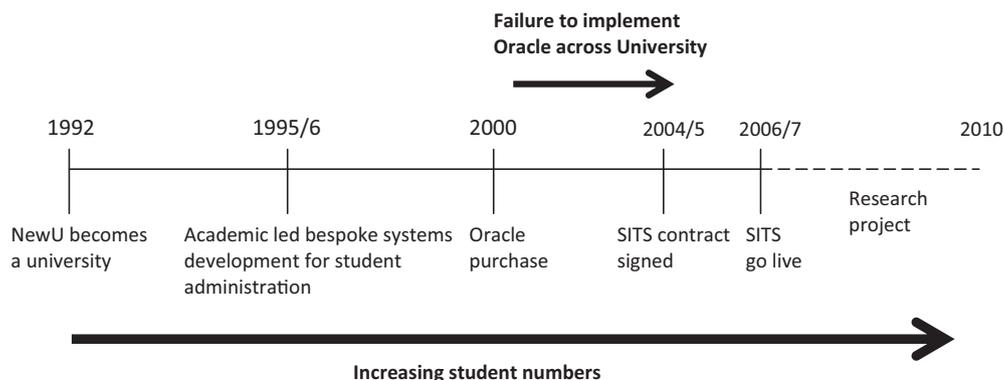


Fig. 1. Timeline of the study.

expanded and degree courses with small cohorts of students were replaced with much larger ones and this proved challenging for many staff. Thus by 2010 it was reported that NewU had approximately twenty thousand students from which fifteen thousand were full time students and the remainder part time. The complexity of the education envelope was also increased by overseas business as well as an increase in overseas students on campus.

In terms of IT NewU has been at the forefront of student administration. Once PCs became available to support student business it was individual academics who took the lead in developing small systems to administer degree programmes:

“When I first started here I was deputy course leader for degree X. I had to develop a spreadsheet for the exam board that held all of the students’ marks. The administrator for the course didn’t have a clue. I put in all of the formula and was responsible for the results at the end of the board. Marks were frequently changed after discussions.” (Academic1, Business)

However, towards the end of the 1990s with the growth in student numbers larger systems developed by skilled academics began to emerge. There was one system for capturing student information, known as the Student Administration System (SAS), a separate system for programmes and their module descriptors, the Academic Programme Database (APD) and a third system for capturing student marks, the Marks Recording System (MRS). The data requirements were defined by academic staff and the processes around these systems reflected how the individual faculties operated. However, none of those systems were integrated and with increasing student numbers and demands by central government for more detailed standardised student information it was clear that these standalone systems would need to be replaced.

The first attempt at systems integration occurred when NewU purchased an Oracle system. Academics, as perceived major stakeholders, were involved in the consultation process. However, Oracle was abandoned after a period of time due to its complexity and lack of acceptance in the organisation. This appeared to be a critical incident for the organisation and its approach to IT as from this point on it is clear that attitudes and relationships change.

5.2. Integration – towards centralised control through SITS

To overcome the student data challenges facing the university and the threat of ‘claw back’ of funding by central government if that data was poor, a decision was taken to adopt a more consistent system. Thus in 2004/5 a group led by the Director of Finance purchased SITS. A small team of central administrative staff and managers were assembled and discussions were held with the vendors. From this emerged the SITS strategy:

“Representative key stakeholders must be involved in the consultation process. . . Faculty Registrars and key users will act as product champions, and the Registrars Senior Managers Group will be advised by key specialists and practitioner and focus groups and will in turn advise the Project Director” (The Student Systems Replacement Strategy, 2005)

The key users and stakeholders were taken from the administrative function within each department. The numerous documents produced at the time detail the plans going forward, how the change-over to the new SITS system would occur, the training that would be required for staff and how communication of the project would take place. Control of the project up to ‘going live’ was to be tight and kept within a discrete body of management staff. The discourse here emphasised the need for management control because of the technical nature of the system and was aimed at getting the chosen administrative staff aligned to the organisational goals

(Wagner, Newell, & Piccoli, 2010). Academics on the whole were oblivious to what was going on:

“I was not involved during the implementation. I sit on the University Teaching and Learning committee and was only told about how it (SITS) was progressing. The downside from my point of view is that I can’t believe that there were no academics involved in those discussions. The issue for me is that academics are the end users of SITS. It must be there to support an academic purpose primarily to do with examination boards.” (Associate Dean, Learning and Teaching)

By excluding academics and centralising early control of the SITS project has its consequences as suggested by Bloomfield and Coombs (1992, p. 474):

“the effects of the new information systems on management practices of particular groups are under-determined by the intentions of the powerful groups shaping the systems at the centre of the organization”.

5.3. Differentiation – the emergence of new powerful groups

In order for SITS to be introduced into New University a number of new **powerful groups** or teams were established. The two groups that played a major role in the project were the SITS implementation team (technical staff employed from internal university resource and external agencies) and the SITS liaison group (senior administrative staff seconded from each of the departments) both of which were intended to be temporary structures to be dismantled after the system was up and running. The SITS implementation team were seen as the technical experts, housed in their own suite of offices, trained by the SITS vendors, who would ensure that the system went live without too much trouble. The SITS liaison group would support departments in getting the data into the system and extracting the requisite information. Examination of minutes of their meetings suggest the focus prior to going live was on technical issues with little evidence of concern about the academic business processes, academic data requirements or the effect SITS would have on academic life. This neutral representation of systems and technology is not unusual within these types of Information Technology projects as the initial focus is to ensure that the physical resources are in place and being accessed by the appropriate staff (Coombs, Knights, & Willmott, 1992; Parker, 2000). Nevertheless the decision on who would have access to SITS is a political decision (Doolin, 1998).

One area that was of concern for the new SITS groups was student data migration from all of the department systems to the new SITS system. SITS has a very rigid set of data structures which cannot be altered. It was the responsibility of the SITS implementation team to transfer the current university student data into the structures available in SITS. This was not easy as has already been stated each department kept their student records according to their needs. They were also faced with determining how the standardised approach to student data collection would be managed going forward. Pollock and Cornford (2004) suggest that enterprise systems such as SITS overwhelm organisations so that they have little option but to implement ‘default’ settings which tend to emphasise similarities between organisations and not their differences. Thus individual departmental needs are disregarded in the quest to be ‘up and running’. The SITS liaison group was asked to assist and advise on new degree programme codes which they did without reference to the academic colleagues who actually managed the students. This assumption of ‘knowing what is best for the rest’ can be a feature of enterprise systems implementations as a dominant group, in order to make sense of their identity, imposes a view

of practice intended to enhance their credibility and competence (Nicolini, 2007).

In the run up to 'going live' training of sufficient staff to be able to use the system in time for 'going live' in August 2006 was an issue. Vendor training was prohibitively expensive so the SITS project manager decided that the SITS implementation team would provide training for all. With time pressures training was done in large groups and was inadequate. Added to the quality of training issue the SITS implementation team would not allow cascade training 'in case the wrong message was given' so tensions were high as August 2006 approached. The power to determine the nature of the training is indicative of the growing internal credibility of the SITS implementation team not just with the senior management of the university but also the departmental staff taking part in the training who may never have encountered them prior to training and this acts to transform and re-enforce their identity and position in the organisation (Coombs et al., 1992).

Academic staff knew little about SITS until they returned from annual leave in September 2006. Student enrolment had taken place without their input and when term began there was chaos: staff were in the wrong rooms, students were on the wrong degree programmes, class lists were inaccurate. This was a result of a previous decision taken by the SITS implementation team and the SITS liaison team when developing degree programme codes for the system.

Tension between academics and administrative staff were high during 2006/7 and this was also the case within the administrative teams who were dealing with SITS on a day to day basis. Managers within the faculties believed they had to 'sort things out' and what emerged over a number of months were new processes and control mechanisms to ensure that SITS delivered the student information. These processes and mechanisms were intended to safeguard the quality of the data and provide a better service for the students. Administrative staff were **re-structured** across the university to reflect SITS best practice. Nevertheless there was some dissent:

"The system is so complicated, using codes, jargon and real problems with screens that it takes five times longer than the previous one... It is time consuming and complicated... we have a full time team working on it... SITS is their job now... and we have **good housekeepers** who know the system very well. We didn't have them with the Marks Recording System as we knew the system inside out." (Administrator, 6)

A new group of SITS administrators emerged in the departments during this period, the Good Housekeepers. These individuals were SITS experts in data entry and information retrieval and because of the complexity of the system became very powerful. As in the United States university studied by Kuo (2009) the Good Housekeepers have continued to develop as a distinct group in NewU and have made themselves indispensable to their individual departments. They along with the SITS team have their own jargon and **technical discourse** which allows them to reinforce their position as experts within the organisation.

5.4. Ambiguity – the cultural reality at NewU?

Although SITS has imposed a centralised approach to student data management it has not necessarily led to a culture which reflects shared values across the university. In fact there are **difficulties working together** on student business. Prior to SITS administrators worked alongside academics and supported their roles. However, now many of the administrative jobs focus on SITS data entry and negotiating the complexity of the system with no access for academics.

The processes and control introduced in 2006/7 have impacted heavily upon academic staff. For example academics no longer have access to the 'system' recording of marks for examination boards and have found themselves much more regulated by the departmental SITS administrative requirements:

"I put my marks into an EXCEL spreadsheet that does not talk to SITS. I put the marks into the Blackboard gradebook that does not talk to SITS. So not only have I recorded my marks three times – on the examination paper, EXCEL and Blackboard which increases the possibility of mistakes BUT I then have to put them onto a piece of paper that I hand to an administrator who then inputs them into SITS. This is nuts! I have asked if my spreadsheet can be uploaded into SITS or the gradebook – but the system says NO! I get into trouble for asking the questions.(Academic 6 who is also a Course Leader)

Examination boards are also conducted in a different manner. SITS uses algorithms to calculate marks for modules and then the overall year average:

"...discretion has now almost disappeared at the examination board. Degrees are now awarded mathematically. So if you get 59% and more than half of your modules are over 60% then you get a 2.1. If you get 59% and half of your modules scored less than 60% you get a 2.2." (Associate Dean).

Academics find it difficult to challenge the logic of the system and SITS and often find there are penalties for not abiding by the SITS rules. Administrators report academics to their managers when they fail to meet SITS deadlines and it can be seen that academics are increasingly becoming subjugated to a system that challenges their sense of meaning, identity and reality through their participation in an increasing range of disciplinary practices (Coombs et al., 1992).

Nevertheless some academics and administrators do recognise that SITS will never be able to support all of the diverse student business on-going in the university. This **working around the system** which was one of the most pertinent findings of Fowler and Gilfillan (2003) was also apparent in NewU is that an informal network often evolves to 'get things done' outside of the formal role and responsibility structure in institutions where an ERP system was implemented. For example faculties have unofficial databases to deal with placements, block teaching, postgraduate research students, etc. Additionally, there is the development of an external system which operates outside SITS and was designed because some academics are not satisfied with the current situation of not having adequate and accurate student data. This system is managed by an academic member of staff and already has over sixty colleagues enrolled on it. This is still in operation to date.

Throughout the data collection and discussion regarding the period before and after SITS it was evident that the research participants suffered a great deal of **uncertainty** that still persists today. The lack of academic consultation around the purchase of SITS caused much consternation after the system went live. A number of individuals who had developed the departmental systems or had used them for student administration were left without an understanding as to why SITS was necessary. Even during the implementation period some staff were trained on SITS and others were excluded. When the system went live many staff were put under a great deal of stress because they were unsure as to how the system would operate. Even today academic staff are suspicious of the algorithms behind SITS which determine grades especially when they are required to present data in a format that suits the system and not the academic.

Trust in the system, the business processes around SITS, the data quality and the people who operate it is extremely important

and where lost can impact upon other activities in the organisation (Waring & Skoumpopoulou, 2012). By excluding academic staff from many of the implementation activities, not giving them direct access to SITS and putting the management of SITS into the hands of administrators has impacted upon working relationships. Some administrators interviewed also do not trust academic staff around data quality:

“A couple of departments have trialled letting academics put in their own marks. It is not something I would encourage in this department. We have enough problems getting information from academics to get them to meet their own deadlines and that’s with administrators helping quite a lot”. (Senior administrator)

Instead academics have to submit marks on paper which are then entered into SITS by the administrators who then print them out to be signed off by the academics. Academics see this as a lack of trust and administrators view it as guarding against ‘irresponsible academics’ (villains).

The **identity** of many staff across the university has been challenged by the SITS adoption within NewU. More specifically, SITS has enabled the reconstitution of formal management structures and processes within the university and has led to some groups of staff being winners and others possibly losers. For example staff in the central finance department who previously struggled with providing student information to central government now have it provided by SITS. This has created space for them to undertake higher level tasks related to university strategy. Also the university Registry department have now centralised the control of academic programme modules, timetables, student data and academic quality control within one growing department. They have been able to expand their portfolio of services and staff and increasingly dictate quality standards and performance targets to the university departments.

On the other hand life is not so good for other stakeholders such as academics and some administrators who have been deskilled, becoming data entry clerks. Yet the administrators who have developed advanced SITS skills and have become ‘good housekeepers’ (heroes to some) hold more control and power than before. This means that many administrators have moved from having a supporting role to a leading role. However, academics have little input into the new SITS working processes and decision making activities within student enrolment, degree progression and awards boards.

Finally the ambiguous nature of NewU is also manifest in the difficulties experienced around **structural** organisation for SITS. At the beginning of the project no restructuring took place in anticipation of SITS business processes being incongruent with those formal student administrative processes present in NewU. Yet over a 4 year period departmental and faculty structures have changed a number of times. These re-organisations have impacted on staff and their allegiance to their teams as they have been moved around offices. One academic suggested that they had to restructure because the new system showed all the gaps in their way of operating and therefore a restructuring was inevitable.

6. Discussion

In summary the emergent cultural change is complex and must be considered in a number of different ways. If the integration perspective is considered (Meyerson & Martin, 1987; Table 4) then SITS has brought about a unified approach to data collection and information management across the university. It has homogenised the student and staff data experience and has eliminated a great deal of innovation around course development as course structures must fit around the SITS data structures. Thus if this is happening in NewU

then similar situations must be being experienced across the UK Higher Education sector.

From a differentiation perspective SITS is being experienced and interpreted differently by various groups. New cultural groups are emerging – Good Housekeepers and the SITS user groups who have power and recognition within NewU and have even got their own discourse.

Looking at the emergent changes within this case study it is possible to detect cultural ambiguity growing in certain areas. Informal systems are being developed both in the academic arena and administrative area to address the inadequacies of SITS. These systems are not officially acknowledged and hence there are tensions within groups and across groups. There are real difficulties developing between academics and administrators to the point where there is little trust and a great deal of suspicion. Even individual identities are being challenged as SITS takes on a much greater role than ever before. Academics are being distanced from the real business of academic governance as administrative staff take on a much greater role in the management of students. Local politics and power struggles are evident in all aspects of SITS usage.

Making sense of the findings is challenging and we have utilised the Meyerson and Martin (1987) perspectives approach to provide further insight as shown in Table 4.

Even taking each lens and focusing on one at a time only provides insight into certain levels of the organisation when in reality they are all interacting and may have particular relevance at different times. Using the three perspectives approach advocated by Meyerson and Martin (1987) and Martin (1992) is insightful but does not capture the interaction of SITS and its influence on the culture of the organisation within which it is implemented. It is very important to better understand the new system and its ‘cultural manifestations’ including formal processes, rules, jargon, staffing requirements, licence needs, etc.

It is our proposal that the study of culture within an integrated information systems environment is complex and dynamic and may be conceptualised through the metaphor of the kaleidoscope. Kaleidoscopes consist of many coloured fragments which when turned change pattern and configuration and are unstable. Fig. 2 contextualises this for SITS.

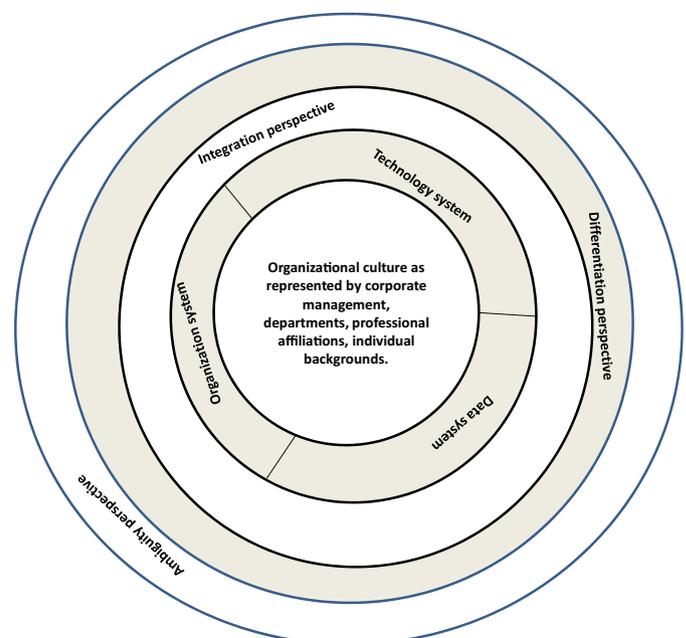


Fig. 2. The SITS kaleidoscope.

Table 4
An analysis of the emergent cultural manifestations using a three perspective lens.

Culture manifestations	Integration	Differentiation	Ambiguity
Certainty/uncertainty	Prior to SITS certainty about data collection and use was at departmental level. SITS implementation brought data collection centrally and imposed strict rules. SITS forces all schools to conform to a standardised data collection and storage. Only the SITS team can develop reports.	Departments, academics not informed why SITS was needed. Selective training of administrative staff-why? Academics excluded from SITS access. Why? Complicated system.	Uncertainty has led to poorer working relationships between the centre, schools and administrators and between administrators and academics.
Loss of trust	Prior to SITS team working staff getting on together around academic work.	SITS data inaccurate initially. Led to academics losing trust in new system as well as administrative staff.	Academics challenging SITS 'rules' and questioning new processes.
Work around the system	Prior to SITS central teams needed to manipulate data coming from departments and work around their systems. SITS gives the central university management data in the format they need.	Departments finding they need parallel systems to do their 'business', e.g. placements, non-standard degrees, etc.	Individual academic staff setting up their own systems. Some accessing SITS data through informal channels.
Difficulties working together	Not greatly evident before SITS. Team work evident within departments.	SITS implementation caused many problems as people learnt new jobs and tasks, thus tension grew. Tensions now exist between administrative staff and academics.	Academics becoming disengaged from the university as their pastoral roles are trivialised.
New power/politics	Prior to SITS departments led the university on academic student matters now central control of systems.	Emergence of a new power bases within the administrative function around SITS, e.g. SITS team, good housekeepers.	Loss of individual academic power over student affairs. Isolation for many.
Identity change	Administrative staff prior to SITS supported academics. SITS has provided them with new identities as 'SITS' people. New central SITS culture emerging.	Academics identity changing in relation to SITS and student support. SITS team essential to functioning of university.	Individuals impacted by SITS. Some staff gaining new status, others leaving the university.
Technological discourse	SITS has introduced a new set of jargon and discourse shared only by SITS staff – centrally and in departments.	Academics do not share the SITS discourse but are impacted by it.	Even within administrative staff the SITS discourse is not shared and can discriminate.
Structure/re-structure	The only structure enforced on the departments is that of conforming to SITS requirements.	Many attempts to develop internal management structures to ease the SITS implementation.	Many staff believe that they have been in perpetual flux since SITS was introduced.

The study explored culture at various levels – corporate, departmental, professional (Academics, administrators) and individual and considered how each interacted with the SITS system – data, technology and organisation. We then incorporated the three perspectives of integration, differentiation and fragmentation to add a further level of understanding. Reporting the finding is problematic as culture is not static and as the SITS kaleidoscope turns so do the cultural patterns over time. Thus specific incidents which occur during an implementation period may only be transient and researchers should focus on cultural trends which become increasingly more apparent.

7. Conclusion

The work presented in this paper builds upon cultural studies within the IS/IT area. It recognises that there is little agreement on how these studies should be conducted or which theoretical perspective is most appropriate. The concept of the 'kaleidoscope' is not unique and has been used in other contexts including cross cultural global collaborations (Gibbs, 2009). However, its use within integrated systems implementation to explore cultural change may be of interest to IS academics looking for alternative theoretical approaches. The work presented here relates to a specific context and may benefit from insights provided by other longitudinal studies of culture and integrated IS. Recently the researchers have embarked upon a 2 year study of a manufacturing company which

is implementing an ERP system. An insider/researcher is embedded in the organisation and data is being collected. This will be reported upon at a later date.

As far as NewU is concerned our research has identified some unintended cultural consequences of SITS that appear to be stabilising over time. Values are changing – administrative staff are increasingly being appointed for their IT skills rather than their interpersonal, student friendly skills. Academics are becoming disengaged from their academic citizenship roles that were prized only a few years ago. New power bases are being established which are determining how the academic business of the university is run and these exclude academics. In 2010/11 a new system, Aggresso, was introduced into NewU to manage research projects and in 2012 another system was rolled out to manage academic research plans. Both systems were introduced without academic consultation.

Data requirements and formal procedures around SITS are beginning to impact upon creativity and innovation in curricula design. In isolation these may seem trivial and unimportant but when considered against the recent UK comprehensive spending review and the reduction in university funding for students could cause difficulties for NewU going forward. In the new demanding world of the student/customer relationship management may become vital and SITS may have little relevance to an organisation that is getting little funding from central government.

References

- Agee, A. S., & Holisky, D. A. (2003). Crossing the great divide: Implementing change by creating collaborative relationships. In C. E. Regenstein, & B. I. Dewey (Eds.), *Leadership, higher education and the information age: A new era for information technology and libraries* (pp. 61–80). NY: Neal Schuman.
- Avison, D. E., & Myers, M. D. (1995). Information systems and anthropology: An anthropological perspective on IT and organizational culture. *Information Technology & People*, 8(3), 43–56.
- Below, L. J. (1987). The meaning of integration. In B. B. Hundg (Ed.), *Proceedings automated manufacturing – Proceedings of the fourth European conference 12–14th May 1987*, Birmingham, UK, (pp. 345–351). Bedford: IFS Publications.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 11(3), 369–386.
- Bloomfield, B., & Coombs, R. (1992). Information technology, control and power: The centralization and decentralization debate revisited. *Journal of Management Studies*, 29(4), 459–484.
- Boersma, K., & Kingma, S. (2005). Developing a cultural perspective on ERP. *Business Process Management Journal*, 11(2), 123–136.
- Brown, A. (1998). *Organisational culture* (2nd edition). Financial Times.
- Bryman, A. (2004). Member validation. In M. S. Lewis-Beck, A. Bryman, & T. F. Liao (Eds.), *The Sage encyclopaedia of social science research methods*. Thousand Oaks, CA: Sage.
- Bryman, A., & Bell, E. (2007). *Business research methods*. Oxford: Oxford University Press.
- Coombs, R., Knights, D., & Willmott, H. C. (1992). Culture control and competition: Towards a conceptual framework for the study of information technology in organizations. *Organization Studies*, 13(1), 51–72.
- Cramer, S. F., & Pfeiffer, M. J. (2002). *Co-existing or collaborating? A preliminary methodological approach to develop a paradigm to examine working relationships*. Kerhonksen, NY: NERA.
- Deal, T., & Kennedy, A. (1982). *Corporate culture: The rites and rituals of corporate life*. London: Addison Wesley.
- Doherty, N. F., & Doig, G. (2003). An analysis of the anticipated cultural impacts of the implementation of data warehouses. *IEEE Transactions on Engineering Management*, 50(1), 78–88.
- Doherty, N. F., & Perry, I. (2001). The cultural impact of workflow management systems in the financial services sector. *The Service Industries Journal*, 21(4), 147–166.
- Doolin, B. (1998). Information technology as disciplinary technology: Being critical in interpretative research on information systems. *Journal of Information Technology*, 13, 301–311.
- Dubé, L., & Robey, D. (1999). Software stories: Three cultural perspectives on the organizational practices of software development. *Accounting Management & Information Technology*, 9, 223–259.
- Experian Qas. (2012). *Tribal*. <http://www.qas.co.uk/partners/tribal-8.htm>. Accessed 5th March 2012.
- Fowler, A., & Gilfillan, M. (2003). A framework for stakeholder integration in Higher Education information systems projects. *Technology Analysis and Strategic Management*, 15(4), 467–489.
- Gallivan, M., & Srite, M. (2005). Information technology and culture: Identifying fragmentary and holistic perspectives of culture. *Information and Organisation*, 15, 295–338.
- Geertz, C. (1973). *The interpretation of cultures*. New York, NY: Basic Books.
- Gibbs, J. L. (2009). *Culture as kaleidoscope: Navigating cultural tensions in global collaboration*. IWIC'09 February 20–21, 2009, Paulo Alto, CA, USA, (pp. 89–98).
- Harman, K. M. (1993). Culture and conflict in academic organisation: Symbolic aspects of University Worlds. *Journal of Educational Administration*, 27(3), 30–54.
- Hatch, M. (1997). *Organization theory: Modern, symbolic, and postmodern perspectives*. Oxford University Press.
- Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage.
- Hofstede, G., Neuijen, B., Ohayv, D. D., & Sanders, G. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, 35(2), 286–316.
- Huczynski, A., & Buchanan, D. (2001). *Organizational behaviour: An introductory text* (4th edition). Harlow: Financial Times Prentice Hall.
- Jackson, S. (2011). Organizational culture and information systems adoption: A three perspectives approach. *Information and Organization*, 21, 57–83.
- Kappos, A., & Rivard, S. (2008). A three-perspective model of culture, information systems and their development and use. *MIS Quarterly*, 32(3), 601–634.
- Kilmann, R. H. (1982). *Getting control of the corporate culture*. Managing, University of Pittsburgh Graduate School of Business.
- King, N. (2004). Using interviews in qualitative research. In C. Cassell, & G. Symon (Eds.), *Essential guide to qualitative methods in organisational research*. Sage Publications.
- Klein, K., & Myers, M. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67–94.
- Knights, D., & Willmott, H. (2007). *Introduction to organizational behaviour and management*. Thompson Press.
- Kotter, J. P., & Heskett, J. L. (1992). *Corporate culture and performance*. New York: The Free Press.
- Kuo, H. M. (2009). Understanding relationships between academic staff and administrators: An organisational culture perspective. *Journal of Higher Education Policy and Management*, 31(1), 43–54.
- Lawrence, P. R., & Lorsch, J. W. (1986). *Organization and environment: Managing differentiation and integration*. Boston, MA: Harvard Business School Press.
- Lee, A. S. (2010). Retrospect and prospect: Information systems research in the last and next 25 years. *Journal of Information Technology*, 25, 336–348.
- Leidner, D. E., & Kayworth, T. (2006). Review: A review of culture in information systems research: Toward a theory of information technology culture conflict. *MIS Quarterly*, 30(2), 357–399.
- Markus, M. L. (1983). Power, politics, and MIS implementation. *Communications of the ACM*, 26, 430–444.
- Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research* (4th edition). Thousand Oaks: Sage Publication.
- Martin, J. (1992). *Cultures in organisations: Three perspectives*. Oxford University Press.
- Meek, L. V. (1988). Organisational culture: Origins and weaknesses. *Organisational Studies*, 9(4), 453–473.
- Meyerson, D., & Martin, J. (1987). Cultural change: An integration of three different views. *Journal of Management Studies*, 24, 623–647.
- Morgan, G. (1986). *Images of organization*. Beverly Hills, CA: Sage.
- Nicolini, D. (2007). Stretching out and expanding medical practices: The case of telemedicine. *Human Relations*, 60(6), 889–920.
- Ogbanna, E., & Wilkinson, B. (2003). The false promise of organizational culture change: A case study of middle managers in grocery retailing. *Journal of Management Studies*, 40, 5.
- Orlikowski, W. J., & Robey, D. (1991). Information technology and the structuring of organisations. *Information Systems Research*, 2(2), 143–169.
- Ouchi, W. (1981). *Theory Z: How American business can meet the Japanese challenge*. Reading, MA: Addison Wesley.
- Parker, M. (2000). *Organizational culture and identity*. London: Sage.
- Peters, T., & Waterman, R. (1982). *Search of excellence: Lessons from America's best run companies*. New York: Harper and Row.
- Pettigrew, A. M. (1979). On studying organizational cultures. *Administration Science Quarterly*, 24, 570–581.
- Platts, K. W. (1995). Integrated manufacturing: A strategic approach. *Integrated Manufacturing Systems*, 6(3), 18–23.
- Pliskin, N., Romm, T., Lee, A. S., & Weber, Y. (1993). Presumed versus actual organizational culture: Managerial implications for implementation of information systems. *The Computer Journal*, 36(2), 1–10.
- Pollock, N., & Cornford, J. (2004). ERP systems and the university as a “unique” organisation. *Information Technology and People*, 17(1), 31–52.
- Porter, M. E. (2001, March). Strategy and the internet. *Harvard Business Review*, 62–78.
- Reeves, H., & Baden, S. (2000). *Gender and development: Concepts and definitions*. Brighton, UK: Institute of Development Studies, University of Sussex. (Report No. 5)
- Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management: An introduction to process and method*. London: Sage Publications.
- Robey, D., & Azevedo, A. (1994). Cultural analysis of the organisational consequences of information technology. *Accounting Management for Information Technology*, 4(1), 23–37.
- Robson, W. (1997). *Strategic management and information systems* (2nd edition). London: Pitman Publishing.
- Sathe, V. (1985). *Culture and related corporate realities*. Homewood, IL: Richmond and Irwin. (pp. 951–969).
- Schein, E. H. (1984). Coming to a new awareness of organizational culture. *Sloan Management Review*, 25(2), 3–16.
- Schein, E. (1991). What is culture? In P. Frost, L. Moore, M. Louis, C. Lundberg, & J. Martin (Eds.), *Reframing organisational culture* (pp. 243–253). Newbury Park, CA: Sage.
- Schein, E. H. (2010). *Organizational culture and leadership* (4th edition). Wiley: Jossey-Bass.
- Schwartz, H., & Davis, S. (1981). Matching corporate culture and business strategy. *Organizational Dynamics*, 30–48.
- Smircich, L. (1983). Concepts of culture and organizational analysis. *Administrative Science Quarterly*, 28, 339–358.
- Straub, D. W. (1994). The effect of culture on IT diffusion: E-mail and fax in Japan and the US. *Information Systems Research*, 5(1), 23–47.
- Voss, C. A. (1989). The managerial challenges of integrated manufacturing. *International Journal of Operations and Production Management*, 9(5), 33–38.
- Voss, C., Tsiriktsis, N., & Frohlich, M. (2002). Case research: Case research in operations management. *International Journal of Operations and Production Management*, 22(2), 195–215.
- Wagner, E. L., & Newell, S. (2004). Best for whom? The tension between ‘best practice’ ERP packages and the diverse epistemic cultures in a university context. *Journal of Strategic Information Systems*, 13(4), 305–328.
- Wagner, E. L., Newell, S., & Piccoli, G. (2010). Understanding project survival in an ESS environment: A sociomaterial practice perspective. *Journal of the Association for Information Systems*, 11(5), 276–297.
- Wainwright, D., & Waring, T. (2004). Three domains for implementing integrated information systems: Redressing the balance between technology, strategic and organizational analysis. *International Journal of Information Management*, 24, 329–346.
- Walsham, G. (1993). *Interpreting information systems in organisations*. Chichester, UK: Wiley.

- Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, 15, 320–330.
- Ward, J., & Peppard, J. (2002). *Strategic planning for information systems* (3rd edition). New York: Wiley.
- Waring, T., & Skoumpopoulou, D. (2012). Emergent cultural change: Unintended consequences of a strategic information technology services implementation in a United Kingdom University. *Studies in Higher Education*, 19, 1–17.
- Waring, T., & Wainwright, D. (2002). Communicating the complexity of computer-integrated operations: An innovative use of process modelling in a North East Hospital Trust. *International Journal of Operations and Production Management*, 22(4), 394–411.
- Waring, T., & Wainwright, D. (2008). Innovative developments in the use of template analysis: Two comparative case studies from the field. In *ECRM Conference* Regents College, London, UK, 19–20 June.
- Yin, K. R. (2003). *Case study research: Design and methods* (3rd edition). Sage Publications.
- Teresa Waring** is Professor of Business Systems and Information Management at Newcastle Business School. Her main research interests include critical approaches to implementation of information systems and systems integration.
- Dimitra Skoumpopoulou** is a lecturer at Newcastle Business School and her research interests include the role of culture within systems implementation.