

TECHNOLOGY ALONE WILL NEVER WORK: Understanding How Organisational Issues Contribute To User Neglect And Information Systems Failure in Healthcare.

M. A. Jeffcott, University of Glasgow, Scotland

Abstract

Many European governments are endeavouring to use IT to improve the efficiency of their public sectors. Healthcare is at the forefront of this 'revolution', with increasing investment in large-scale information systems (IS) projects. However, the widespread implementation of IS in the UK National Health Service (NHS) has proved very unsuccessful. In order to improve this established history of IS failure, attempts have been made to increase the input of end users into the development process. But little progress has been made. This paper uses several case studies from both the NHS and British public sector to uncover the organisational issues that hinder effective user involvement and ultimately lead these government IS projects to fail. These organisational issues need to be addressed if participatory development techniques are ever to provide a solution to the problem of widespread IS failure in healthcare.

Keywords: End-User Involvement; Healthcare Information Systems; Organisational Issues; Public Sector Projects

1. Introduction

It was in response to a 1998 European Union report [1], that the UK introduced its first ever e-government strategy [2], published in March 1999. It proposed the creation of computer-based Information Systems (IS) throughout healthcare as a fundamental part of the new technology push. As a result, large amounts of public funds are being utilised to achieve this. In 1998-1999 the U.K. government spent £1bn out of a total of £7.1bn on health care IS, and this figure is set to rise considerably [3]. However, a subsidiary government report [4] stated that: "In the past, Government IT projects have too often missed delivery dates, run over budget or failed to fulfil requirements." Indeed, the recent history of the NHS reveals many IS failures and raises concerns for the ultimate success of the government's healthcare 'revolution.'

IS projects in the NHS are characterised by a number of high-profile and high cost failures, beginning in the 1980's and continuing to the present day. Most recent NHS failures include the Hospital Information Support Systems Initiative in 1997 and the Clinical Coding Information System in March 1998 [3]. 'Failure' is not a simple concept, ranging as it does from cancellation or termination, through late delivery and cost overruns, through to non-compliance with specifications and/or the demands and expectations of clients and users. Despite many years of work and investment, both of the above systems failed even before implementation, and so resulted in significant losses for an organisation already strapped for cash.

This is a typical experience, which has led to an increasing concern amongst organisations in the UK and elsewhere with the large amounts of money that appear to have been devoted to software projects with little apparent organisational benefit [5]. There is also an increasing realisation that risks in IS projects in the NHS continue to be underestimated and under-managed, despite the fact that the services long experience in the implementation of comprehensive IS has continually proven it to be a high risk and dangerous process [6, 7].

This paper argues that it is imperative that the government can identify the reasons for its current failures in healthcare and other public sector IS projects. The cost of scrapped or over-budget government IT projects has topped £1 billion since 1997 and the public are no longer willing to see their money thrown away, with no visible improvement in service provision and patient care [8]. This paper uses several case studies to reveal that many of these failures involve a neglect of organisational issues within the overarching NHS and government system, which result in the disregard of end user needs. While the emphasis is on the NHS as a case study this paper also provides a government example to help illustrate its argument. This is because the external organisational environment is the same and so lessons from this failure can be used to inform healthcare IS projects.

1.1 Structure of Paper

The paper begins by discussing some of the unique challenges present in healthcare and other public sector projects that make failure more prevalent in this sector than the private sector. It goes on to define and discuss the importance of 'organisational issues' in IS development and

implementation, and the tendency for projects to remain technology-led. Three case studies of IS failure, two from healthcare and one from the civil service, are used to illustrate that despite sound technology and attempts to involve users, social and political factors can lead to the demise of IS projects. Several common organisational themes are identified which are seen in the case studies to have had a detrimental effect on the way that users are incorporated throughout the IS development process.

2. Why Public Sector Information Systems (IS) Pose a Bigger Challenge

2.1 The Scale

IS failure is not isolated just to the NHS and public sector. Many researchers have recorded that IS have often been seen as expensive failures, alienating their intended users through irrelevance or insensitivity to their requirements, delivered late and over budget, and requiring increasing maintenance as they obsolesce [9-12]. However, it is considerably more difficult for public sector IS projects to succeed than those undertaken in the private sector. Research studies in the public sector have shown that over 20% of IS expenditure is wasted and between 40 and 50% of IS projects realise no net benefits, however measured [13]. While the private sector still has its share of problems, a recent review of 100 failed IT projects revealed that while 87% exceeded their budgets and 45% of the projects failed to produce the expected results, more than 65% were fully implemented [14].

This disparity has primarily been attributed to the difference in scale that distinguishes public sector IT from its private sector counterparts. It is believed that although government computer systems often appear superficially to be very similar to commercial developments, the truth is, that while they might use similar technology or even do similar things, government systems generally belong to "the information super league" [15]. The rates of failure in commercial systems are not as marked as those in the public sector, due to the fact that the information tasks faced by the government are infinitely more complicated. Research carried out in [15] has led to the identification of five major differences between government and commercial systems that may explain higher failure rate in the public sector. These are:

- 1 *Size* - Government IS serve national & regional populations, leading to huge volumes of data.
- 2 *Uniqueness* - Applications tend to be custom-made for particular government organisations so that systems must be created rather than bought-in.
- 3 *Complexity* - In addition to operational requirements the systems must strictly adhere to any core or local government legislation.
- 4 *Long timescale* – The development of IS is likely to be protracted due to scale of government operations, with many projects being carried out concurrently.
- 5 *Very high cost* – The combination of custom solutions, highly complex requirements and long development time all result in high cost.

It is important to recognise that these higher level factors, and others inherent in the political context of the NHS, make the challenge of developing and delivering successful government IS projects a greater one than many private sector projects. This paper acknowledges this distinction in order to highlight the increased difficulties that developers face when introducing IS into the NHS. These higher level considerations need to be remembered when healthcare IS are being designed as they provide fundamental constraints, which added to other social and political issues, can lead to the downfall of IS projects.

2.2 Throwing Good Money After Bad

The large scale of public sector IS projects is not the only thing that contributes to greater failures. Evidence suggests that common and undue delay in the termination of public sector projects is also to blame. The typical "big bang" approach of government IS, where a large project is rolled out all at once, results in a neglect of regular milestones to assess whether auditable business benefit is being achieved [3]. This has exacerbated failure.

In addition to the lack of prescribed project markers for performance, is the fact that ultimately, the question of whether an implementation has been successful or not, or whether it is necessary to terminate the system, is socially negotiated [16-18]. And centrally controlled government IS projects, are historically provided with continual investment and resources, despite serious and often long-standing contra-indications. This is due to elected management boards attempting to 'save face', rather than admit defeat [19].

A healthcare example of this is the Wessex Regional Health IS Plan. It was adopted in May, 1984 and despite auditor reports critical of the management of the project from as early as February 1987, it was not officially abandoned until April 1990. Even as late as January 1989 the emphasis on the Wessex Health Authority management executive had been to bring the project under control and to be clear about its delivery and costs, with a view to ensuring that it succeeded in its vision. At its eventual abandonment, at least £43 million had been spent and at least £20 million of this, by the management executive's own admission, was wasted due to their determination not to abort the project sooner [20]. This example highlights the importance of concentrating on the public sector, as a special case, as it appears that not even fatal flaws in IS projects will prevent a hopeless chase to after unachievable success. And given the scale of public resources invested, these NHS and government projects currently present a far greater priority than private sector failures.

3. Organisational Issues in Systems Development

3.1 The Importance of Organisational Issues

It has become evident that there are many more failure stories in healthcare IS than successes and that the public sector is a unique organisational environment, with a set of defined challenges. These challenges, along with other organisational issues, may limit the integration of users into IS projects, to the detriment of their development and implementation. Therefore, it is important to fully understand the context in which the user and the system are to operate in order to 'design around' possible organisational deficiencies. This idea stems from the 'work around' concept, where the use of a particular method to avoid specific problems accompanying a new way of working is adopted [21]. When building IS, designers start with what they take for granted about the users [22], and it is fair to assume therefore that they do the same about the context and organisational environment. Indeed, most of the well publicised failures of large computer systems have not been caused by simple breakdowns in their functioning, but by breakdowns in the larger web of computing in which the equipment resides [23]. This could be attributed to designer's neglect of a 'design around' approach to cater for the immutable challenges and organisational issues to be faced.

Before this 'design around' is possible the types of organisational issues prevalent in healthcare and government IS must be identified. Increasing research is focusing on this task, as there is a growing realisation that organisational issues play a substantial, if not primary role in systems failure [24-27]. Although there have been few attempts to explicitly define the term 'organisational issue', they have been defined by providing examples of 'non-technical' aspects of systems development, which might have an impact on the ultimate success or failure of a project [28, 29]. Recently, a study found that organisational factors, particularly the amount of senior management involvement and the degree of end user participation in the project development were the most widespread and dominant factors contributing to IS failure [30]. Also, a comprehensive survey of computer-related accidental death stated that: "To make computer systems safer, we need to address not merely their technical aspects, but also the cognitive and organisational aspects of their 'real-world' application" [31].

3.2 The Problem of the Technology-Led Tradition

Despite the recognised importance of organisational issues, research shows that systems development is still 'technology led', that organisational issues are not properly addressed during the systems process [32, 33], and that much of the responsibility for this rests with IT professionals. However, the systems analysts do not claim to have knowledge of organisational issues in IT systems, and there is no evidence that they are encouraged or rewarded for considering such issues [34].

This technical orientation of systems development methodologies has typically resulted in the approach of implementing a system, and then trying to cope with its organisational implications. This is mirrored in the trend of user involvement in government projects; a system is implemented and then users are involved in improving its usability [3]. A data centred rather than user centred approach is adopted, with detrimental effects to these IS projects.

This 'technology-led' attitude to government systems development contributed to the 1992 failure of the London Ambulance Computer Aided Despatch System (LASCAD). The London Ambulance Service (LAS) had scrapped a previous development at a cost of £7.5 million in October 1990. The reason for scrapping this earlier project revolved around a debate over faulty

software. The LAS sought damages from the developers for a faulty despatch module in October 1990, and sought to ensure that their next attempt, in 2 years time, would be technically sound. [35]. As a result, although the LAS were able to learn technical lessons, this experience did not shed any light on how to better manage organisational risks in IS projects. Many of the organisational issues that were not addressed in 1990, such as industrial relations and staff training, once again contributed to the failure of the 1992 system [5].

The government must learn to minimise the organisational risks in IS development, by examining past failures. A key lesson currently being introduced in public sector IS projects is the improvement of end user integration. Policy statements address the need to identify end users before the project commences so that their needs are taken into account fully during design and development [3, 4]. But little progress has been made towards this aim. This is because there is a critical need to address the organisational issues that lead to the detrimental neglect of end users. Government IS projects must move towards the satisfaction of the needs of the public and end users: "Delivering IT is only part of the implementation of new, more effective ways of working. The IT has to sit closely, for example, with the demands of the public and the new working practices needed to produce the desired changes. Achieving this requires a clear vision of the context in which IT is being implemented" [4]. The close analysis of the following case studies, from the British civil and health services, will reveal many examples of organisational and political factors presenting barriers to successful end user involvement.

4. Public Sector Case Studies

All three of the case studies were compared against the five criteria points in [15], and each was viewed as representative of the scale and complexity of typical government IS projects. The case studies come from the 1990's, but are typical of problems that occur in government IS projects today [3]. The advantage they have is that as a result of being highly publicised and costly failures they were comprehensively investigated, culminating in official government reports. This means that the London Ambulance, Wessex and Social Security IS projects are not only representative case studies but they provide us with thorough primary evidence. This is vital for a comprehensive analysis of the circumstances leading to failure and deems current failures

unsuitable, as due to their recency and comparative lack of press scrutiny, they have not had official investigations commissioned.

4.1 The Wessex Regional Health Authority Regional Information Systems Plan (RISP)

The Wessex Regional Health Authority Regional Information Systems Plan (RISP), envisaged the development of 5 core computer systems to achieve integration across the health region. RISP aimed: "to use modern technology in order to optimise the use of information in the continuous improvement of the effectiveness and efficiency of clinical and other health services" [20]. It began in the mid-1980's and was officially abandoned in April 1990 at a cost of £43 million.

The Wessex RISP development project strove to involve end users but although they were consulted, it was a hollow gesture as users felt that they were "consulted rather than listened to." And, despite the fact that "they were invited to 'participate' in the project...the door was closed against high level control" [19]. There was a lack of sufficient communication with end users: "The Management Executive told us that there had been flaws within the Wessex Regional Health Authority itself, particularly the way in which members of the Authority had not been given full information by their management" [20].

Although there was an initial aim to incorporate end users, the desire not to tell employees of the growing technical and financial concerns of the project meant that communication with end users was kept to a minimum. It was reported that "...the former Regional General Manager, Mr. Hoare, was in part responsible for this concealment although other employees of the Regional Health Authority had been involved as well." The result was that disillusioned end users would be a determining factor in the failure of the IS project. This is because after government reforms gave the health authorities the power to control their own budgets, end users became critical to the funding of the project. The report illustrates this budgetary control of end users: "Originally it was proposed that the RISP work would be funded by the Regional top slicing of the annual capital allocation. Then, as the cost estimates rose, a so called "nucleus" approach was adopted whereby each new system was to be limited to a nucleus which would be common to all users;

the stages beyond the nucleus, as systems were tailored to individual users needs, were to be financed by those users..." [20].

4.1.1 Summary

The primary deficiency in the way end users were dealt with here was that they were not given appropriate information throughout the development process. The original intention was to communicate openly with the users, but for much of the project "users were treated with condescension and important information about the system concealed" [19]. It is very important to inform the users throughout the development process so that they have the opportunity to explore their requirements and the consequences of design decisions. This is because systems designed by experts may be systems for experts [36]. This occurred in this case study, as the IS was not made suitably visible or accessible to its end users, because of their gradual exclusion from the development process due to financial problems.

Important organisational problems were behind the neglect of users. When RISP was conceived in 1982, there was no clear and agreed national framework for information management. The development of RISP was therefore left to a Wessex Health Regional Authority (WHRA), who had no previous experience of the technology procurement, project management and budgeting involved in an information systems project [20]. Major budgetary and time constraints resulted, which directly contributed to the detrimental oversight of the importance of consultation and learning about user needs and tasks throughout the IS development process. Commonly in public sector projects, it is time pressure from having to spend the money before the end of the financial year, that results in too little attention paid to project definition and control [15].

4.2 The Department of Social Security Analytical Services Statistical Information System (ASSIST)

Preparatory work on the Department of Social Security's Analytical Services Statistical Information System (ASSIST) began in 1992. It aimed to provide statistics to ministers and senior civil servants on how much money was being spent on what type of welfare benefit, and the social profiles and demography of those receiving particular benefits. The project was terminated in October 1994 at an estimated total cost of just over £3.5 million.

The three main stakeholders involved in the project were the contractors, the 'development' company, the IT Service Agency (the department's computer division) and the end users in the ASSIST team. The first phase of the project was due to be completed by 31 December 1993, but there had been a number of test incident reports produced and the problems these revealed had to be dealt with. A divergence of views amongst the three stakeholder groups, and the emergence of very different agendas exacerbated this situation.

Pragmatically, the first group, the hardware and software vendors, wanted the work on the systems to go ahead as soon as possible with the smallest number of changes. This was put diplomatically by a development executive who said that: "while all the efforts would be directed to providing a user friendly service and to implementing all of the user requirements, there would need to be a trade off between those that were essential and required immediately, and those that were simply desirable and could await later incorporation". The second group, directors of IT Services Agency, wanted the system in place as soon as possible. They felt that many of the issues were "almost certainly of a minor nature and could therefore be readily rectified" [37].

The third group, incorporating a diverse range of end users, were the least confident. They were the ones who would be left to use the system, and they had their beliefs as to what caused the problems. Firstly, they felt that "the suppliers spoke to them using unclear and indirect language" which resulted in user unfamiliarity with the system. The end users also thought that there was an inconsistent approach by different programmers making individual interpretations of what was required, which could have been alleviated with their consultation.

Ultimately, the system was imposed on end users, leading to resentment. Some users questioned whether the work should have been given to external suppliers rather than carried out internally. At the time the contract was let, the IT Services Agency employed more than 4,000 computer specialists of its own [15]. The agency's directors and the suppliers were talking in terms either of the timetable or of resolving minor problems. The end users were signalling a more fundamental unease. In fact the end user representative recorded in the minutes that although he had not yet identified any test incident reports of major significance, "many would need to be

addressed before he could feel confident that ASSIST could be released into the wider user organisation". Commencement of the pilot tests, he said, would "therefore depend upon the satisfactory clearance of these particular usability issues" [37].

These warnings from end users did not seem to be taken to seriously. One of the development executives said the "overall process was going rather well". An IT agency representative observed the problems that had been encountered were "not untypical" of those experienced by local welfare benefit staff during the roll-out of an earlier project, the Operational Strategy, a £2.6bn scheme to computerise welfare benefits. It was not stated in the minutes that the Operational Strategy had exceeded its budget by nearly 400%.

One member of the end user team warned against starting formal acceptance testing procedures until all the problems with the software had been corrected. Even so, the developers were anxious to start the formal acceptance period, partly because by now its regular monthly payments from the agency had ceased. Only when the system was shown to be satisfactory would payment be resumed. A development executive told the January meeting that "while a minimal delay to the commencement date was acceptable, he would not wish this delay to be viewed as a further formal breach of contract".

4.2.1 Summary

The main problem in the ASSIST case study was that end users did not feel that the system was being introduced for their advantage because it had been introduced largely 'over their heads'. The department of Social Security end users did not feel any sense of ownership of the ASSIST system development. End user commitment is a crucial requirement for a successful IS. This is because it is essential that end users commit to learning how to use a system and to apply its functionality to their working activities [38].

A subsidiary problem was that the end users were forced to request so many late design modifications because they had not been involved closely enough from the beginning of the IS project. If the developers had created a communication channel to enable free feedback from

end users early on in the project, these problems might have been reduced. It is important to note though that there are problems and considerations in integrating user feedback [22, 38-40]. If the users are encouraged to be actively involved in systems development, it is crucial that this involvement is controlled. End users contributions must be channelled positively so as not to dominate or indeed hinder the development process. This will usually involve waiting for the users to have gained the necessary experience with the system to make reasoned contributions [40].

This case study also highlights a very important organisational issue that directly affects end users - Stakeholder relations. It is apparent that the differing project agenda's and aims between the three main groups involved were problematic, with the unfortunate result of marginalising the end users views. Although it is never possible to foresee the reactions of many stakeholders to the behaviours of the technology in the development stage of IS projects [7], it is important to recognise the potential damage that a neglect of the issues surrounding different stakeholders can cause. This case study demonstrates this problem, where the atmosphere of resentment between government programmers and the external consultants led to a tension that was destructive to both the project development and the end users involvement in it.

4.3 London Ambulance Computer-Aided Despatch Project (LASCAD)

The main objective of the London Ambulance Computer Aided Despatch (LASCAD) project was to automate many of the human-intensive processes of manual despatch systems associated with ambulance services in the U.K. In June 1991, they signed a £1.1 million contract with Systems Options to provide a computer-aided despatch system. This attempt famously failed on 27th October 1992.

Similar to the Wessex RISP, user commitment to the LASCAD project was not addressed and input from users throughout the project not elicited. The official report stated: "There was 'incomplete ownership' of the system by the majority of the users. The many problems identified with several of the system components over the preceding months were not dealt with

adequately, and the staff had no forum to voice their concerns and opinions to London Ambulance Service management" [35].

This lack of consultation with users and acknowledgement of their feedback instilled an atmosphere of system detachment and distrust in which staff expected the system to fail rather than willing it to succeed. The situation was made worse by the unsatisfactory training of staff. The report recorded that: "Training provided to Central Ambulance Control staff and ambulance crews was incomplete and inconsistent" [35].

A problem was that there was considerable delay between the date most staff were trained and when the system was eventually implemented. This meant that there was a gap between staff being trained and actually using the system, with the result that the effectiveness of the training would have been reduced. A staff representative later commented: "At the end of January 1992 the first stages of the computer-aided despatch system became live without any meaningful consultation on training, staffing, health and safety, ergonomics, duties and responsibilities with representatives of the staff who have to operate it in the control room or respond to it on the road." In addition, "Control staff were given just two days' general training to familiarise themselves with this new system...Staff naturally concluded that their skills and experience were no longer valued. In the future the computer-aided despatch system was merely to require keyboarding skills, with all life and death decisions to be taken by computer" [41].

Also, an important issue regarding users was that the environment and the adaptation of work practices to the new computer-aided despatch system was disregarded by London Ambulance Service (LAS) management. This further exacerbated the users feeling of alienation from the system and added to their lack of acceptance of the computer-aided despatch system: "For satisfactory implementation of the system to occur changes to a number of work practices was necessary. Senior London Ambulance Service management believed that implementation of the introduction of the system would, in itself, bring about these changes. In fact many of the staff found it an operational 'strait jacket' within which they still tried to operate local flexibility. This caused further confusion within the system." [35].

4.3.1 Summary

The importance of user training has long been recognised as a facilitator to IS project success [42, 38]. It is unsurprising therefore, that the occurrence of little or no training of users in the London Ambulance Service (LAS) was a determining factor in the failure of the 1992 LASCAD project. The system was implemented without concern or understanding of how drastically the actual work task and control room environment was to change for users. The general lack of consultation with users led to a demoralising atmosphere [5]. Users felt that they were no longer useful as skilled and valuable controllers, resulting in their ultimate rejection of the computer-aided despatch system. An irony of automation took place as the LASCAD developers and management never attempted to reassure end users that the new computerised system would improve the efficiency of their jobs, rather than result in their de-skilling, as their level of competence reduced due to reliance on the system [43].

In terms of organisational issues, the general political environment at the LAS added to a dysfunctional culture between developers and end users. The industrial situation at the time was very unstable after a series of NHS management reforms between 1990-1992 that were intended to revitalise the service, had created a climate of mistrust and obstructiveness. The official report recorded that: "Hardware and software suppliers dealing with LAS spoke of disorganisation, low staff morale, friction between management and the workforce, and an atmosphere of hostility towards computing systems." [35].

The National Union Of Public Employees referred to a 'macho' style of management at LAS, which left users reluctant to give any feedback about the system or the problems with user training. It is important that management are responsive to users as the end users who know that their comments will be considered seriously appear to be much more willing to actually submit them [38, 40]. Some sort of acknowledgement of the importance of the user in the process by LAS management may have prevented user's resentment of the system and their inferior treatment. However, the problem between staff and management culminated in a public inquiry into the system being ordered in September 1992 [41].

But the public inquiry did little to help the situation as by this time the damage was already done in terms of the poor fit of the LASCAD to the organisational environment and users of the system. It was recommended that "there is a need to develop quickly an effective partnership between executive management and trade unions" [35]. As seen in the ASSIST case study, negative relationships between the different stakeholders involved within the IS development process is damaging to the treatment of crucial end user considerations.

5 User involvement in government IS projects

5.1 General Support for End User Involvement In System Development

The above case studies have clearly demonstrated the problems encountered by neglecting end users in government IS projects. It appears that the public sector needs to try harder if it is to make good its recent policy statements regarding the identification of end users prior to IS project commences so that their needs are taken into account fully during design and development [3, 4]. The case studies also give evidence to suggest the great need for this comprehensive integration of users into a large portion of the IS development process. This replicates the general view that user participation is critical to IS implementation and success [44, 45]. However, a review of past research in user participation led to the conclusion that: "The benefits of user involvement have not been strongly demonstrated" and to propose more attention should be paid to the antecedents of user participation. An important aspect of this is the attitude of the designer about user participation and their acceptance of crucial factors, such as previous experience of the user with IS and the degree of expected use of the system, when carrying out the design and development process [46].

The case studies also clearly demonstrate that organisational issues are strongly related to user participation. This suggests that more attention should be given to contextual and organisational aspects involving the end users of IS. There is a long list of important factors for consideration, including users IS knowledge and experience, the structure of applications and tasks to be supported, the change introduced by the system, management's support for user participation and project leader's commitment to and skill in it, user's possibility to affect outcomes, the acceptability of the time delays associated with user participation, and the user's willingness to

participate [10]. Our case study analysis provides examples of many of these issues, such as poor industrial relations at London Ambulance Service resulting in mistrust between users and developers and deficient project management by RISP developers leading to "concealment" of information to end users. Unfortunately though, despite an awareness of the importance of these organisational issues, a recent review of contingency research on user participation shows that the recommendations in [10] have had little influence on public IS development, thus far [47].

5.2 Organisational Issues That Affect End User Involvement

Throughout this paper the importance of organisational issues on IS development and implementation has been stressed. These issues have a direct effect on the way that users are incorporated throughout the development process. The case study analysis revealed several major organisational issues that were seen to prevent effective user involvement in government projects. These were:

- 1 Project failure due to *budgetary and time constraints* shifts end user involvement to a low priority.
- 2 A breakdown in the relationship between *internal groups and external suppliers* can lead to the marginalising of end users.
- 3 *Organisation and culture problems*, for example industrial relations, can reduce user participation.
- 4 *Political influence* can reduce enthusiasm for user participation if systems are seen to be imposed by outside bodies.

Effective user involvement is vital if IS are to achieve successful ownership by end users, increasing the likelihood of their acceptance and longevity. But this successful user involvement relies on an understanding of both the internal and external political and cultural context of the NHS organisation that the system is being introduced into. Without this, a lack of user participation in the key stages of development will continue, leading to further IS failures in UK healthcare.

6 Conclusion

This paper has analysed the failure of several large-scale public IS, with an emphasis on NHS projects. A common feature in all of these projects has been a lack of user participation during key stages of development. There is a general omission to begin the process of systems definition in an organisation-wide participative process of defining the needs, identifying the existing systems and their problems and preparing staff and management for change. These case studies have shown the importance of incorporating these factors into designer and developers initial IS plans.

More importantly though, the message of this paper is that the success of these types of initiatives that attempt to integrate end users, is entirely dependent on how effectively organisational deficiencies and risks in the context within which the IS is to be implemented are 'designed around.' Organisational issues are all too often left to create flaws in IS projects and barriers between both the crucial end user-developer relationship and between different stakeholder groups. Developers must remember that the public sector is a challenging environment in which to introduce comprehensive healthcare and other complex IS into.

The analysis has a number of important implications for practical IS development. In particular, participatory development techniques must be extended to address these organisational and political issues if previous failures are not to be repeated. Some researchers are already addressing these issues [39, 48]. However, much of this research focuses on commercial organisations rather than public bodies. This is a significant concern. As we have seen, public sector organisations, and particularly the NHS, provide extreme examples of the political and social barriers that complicate IS development in the 'real world'. Unless these issues are addressed then every one of us will continue to pay for the failure of government IS.

Acknowledgements

Thanks are due to the members of the Glasgow Interactive Systems group (GIST) and the members of the Glasgow Accident Analysis Group (GAAG). This work is supported by the UK Engineering and Physical Sciences Research council.

References

1. The European Union Commission
Public sector information: a key resource for Europe, EU Green Paper on public sector life in the information society. 1998; COM (98) 585 final.
2. The Cabinet Office.
Modernising Government White Paper. 1999.
3. House of Commons Report.
Improving the delivery of government IT projects. 24 Nov 1999.
4. Cabinet Office
Successful IT: Modernising Government in Action. 2000.
5. Beynon-Davis P.
Human error and information systems failure: the case of the London Ambulance service computer-aided despatch system project. *Interacting with Computers* 1999;11:699-720.
6. Willcocks L, Griffiths C.
Management and Risk in Major Information Technology Projects. In: Willcocks et al., eds. *Managing IT as a Strategic Resource*. London: McGraw-Hill, 1997:203-237.
7. Berg M.
Implementing Information Systems in Healthcare Organisations: Myths and Challenges. *International Journal of Medical Informatics* 2001. To be published.

8. Computing – The Newspaper for the Networked Economy.
State IT failures squander £1bn. VNU business publications, 5 July 2001: 1-6.
9. Lyytinen K, Hirscheim R.
Information systems failure: A survey and classification of the empirical literature.
Oxford Surveys in Information Technology 1987;4:257-309.
10. Anderson EE.
Managerial consideration in participative design of MIS/DSS. Information & Management 1985; 9:201-207.
11. Keen P.
Shaping the Future. Boston: Harvard Business Press, 1991.
12. Crowe M, Beeby R, Gammack, J.
Constructing Systems and Information: A Process View. McGraw-Hill, 1996.
13. Willcocks L.
Of Capital Importance: Evaluation and Management of Information Systems Investments. , London: Chapman and Hall, 1993.
14. KPMG International.
Project Risk Management: Information Risk Management Document. June 1999.
15. Flowers S.
Software failure: management failure (2nd ed). John Wiley & Sons, 1999.
16. Woolgar S.
Science: the very idea. Chichester: Ellis Horwood, 1988.
17. Bijker WE, Law J.

Shaping Technology – Building Society. Studies in Sociotechnical Change. Cambridge: MIT Press, 1992.

18. Kaplan B.

Evaluating informatics applications: social interactionism and call for methodological pluralism. International Journal of Medical Informatics 2001.

19. Collins T.

CRASH: ten easy ways to avoid a computer disaster. Simon & Schuster, 1997.

20. Committee of Public Accounts.

Sixty-third Report: Wessex Regional Health Authority Regional Information Systems Plan. House of Commons, London: HMSO, 1992-1993.

21. Button G, Harper H.

Taking the organisation into accounts. Technology in working order. Studies of work, interaction and technology. London: Routledge, 1993:98-107.

22. Van 't Riet A, Berg M, Hiddend F, Sol K.

Meeting Patient's Needs with Patient Benefits of Qualitative Research Methods. International Journal of Medical Informatics 2001. To be published.

23. Winograd T, Flores F.

Understanding Computers and Cognition. Ablex Publishing, 1987.

24. Long RJ.

New Office Information Technology: Human and Managerial Implications. Croom Helm, 1987.

25. Kearney AT.

Barriers to the Successful Application of Information Technology. London: Department of Trade and Industry, 1990.

26. Buchanan D.

Figure-ground reversal in systems development & implementation: From HCI to OSI. In: Nurminen M et al., eds. Human Jobs and Computer Interfaces. Amsterdam, 1991:213-226.

27. Doherty N, King M.

The consideration of organisational issues during the systems development process: an empirical analysis. Behaviour and Information Technology 1998;17(1):41-51.

28. Eason K.

Information Technology and Organisational Change. Taylor & Francis, 1988.

29. Clegg C, Warr P, Green T, et al.

People and Computers: How to Evaluate your Company's New Technology. Ellis Horwood, 1989.

30. Ewushi-Mensah K, Przasnyski, Z.

Factors contributing to the abandonment of information systems development projects. Journal of Information Technology 1994;9:185-201.

31. McKenzie D.

Computer-related accidental death: an empirical exploration. Science and Public Policy 1994; 21:233-248.

32. Clegg C, Waterson P, Clarey N.

Computer supported collaborative working: lessons for elsewhere. Journal of Information Technology 1994;9:85-98.

33. Clegg C, Axtell C, Damodaran L, et al.
Information technology: a study of performance and the role of human and organisational factors. *Ergonomics* 1997;40:851-871.
34. Hornby C, Clegg C, Robson J.
Human and organisational issues in information systems development. *Behaviour and Information Technology* 1992;11:160-174.
35. The Communications Directorate, South West Thames Regional Health Authority.
Thames Regional Health Authority: Report of the Inquiry into the London Ambulance Service. February 1993. ISBN No: 0 905133 706.
36. Hirscheim RA, Klein HK.
Four paradigms of information systems development. *Communications of the ACM* 1989;32: 1199-1216.
37. Collins T.
A Hollow Victory. *Computer Weekly*, 26 June 1997.
38. Jakobs K, Proctor R, Williams R.
Non-Technical Issues in the Implementation of Corporate Email: Lessons From Case Studies. In: Igbaria M, ed. *Proceedings of the ACM SIG CPR/MIS Conference*. Denver: ACM Press, April 1996:173-80.
39. O'Neill E.
User Developer Co-operation in Software Development: Building Common Ground and Usable Systems. PhD thesis. Queen Mary and Westfield College, University of London, UK, 1998.
40. Jakobs K, Proctor R, Williams R.

Users Participation in Standards Setting – The Panacea? ACM Standards Review (vol 2).
ACM Press, June 1998:85-89.

41. National Union of Public Employees

The London Misery Line. September 1992:38.

42. Nelson RR, Cheney PH.

Training end users: An exploratory study. MIS Quarterly 1987;11(4):547-559.

43. Bainbridge L.

Ironies of Automation. In Johannsen G, Rijnsdorp J, eds. Proceedings of the IFAC/IFIP/IFORS/IEA Conference on Analysis, Design & Evaluation of Man-Machine Systems. Baden Pergamon, 1993:151-8.

44. Hartwick J, Barti H.

Explaining the role of user participation in information systems use. Management Science 1994;40:440-465.

45. Kappelman L, McLean E.

The respective roles of user participation and user involvement in information systems implementation success. In: DeGross JI, et al., eds. Proceedings of the Twelfth International Conference on Information Systems, 1991:339-349.

46. Ives B, Olson MH.

User involvement and MIS success: a review of research. Management Science 1984; 30:586-603.

47. McKeen JD, Guimaraes T, Wetherbe JC.

The relationship between user participation and user satisfaction: an investigation of four contingency factors. MIS Quarterly 1994;18:427-451.

48. Bekker M, Long J.

User Involvement in the Design of Human-Computer Interactions: Some Similarities and Differences between Design Approaches. In: McDonald S, Waern Y, Cockton G, eds. People and Computers XIV - Usability or Else!: Proceedings of HCI 2000, 2000:135-147.

