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**THE 'SELF-SERVICE' STUDENT:  
BUILDING ENTERPRISE-WIDE SYSTEMS INTO UNIVERSITIES<sup>1</sup>**

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## **THE 'SELF-SERVICE' STUDENT: BUILDING ENTERPRISE-WIDE SYSTEMS INTO UNIVERSITIES**

*ABSTRACT This article investigates the take-up by universities of enterprise-wide computer systems and the development of a new module for the management and administration of students. Having its origins in Electronic Commerce, the system assumes the existence of a certain kind of user, one with particular roles and responsibilities – a self-service user. The notion of 'self-service' is deployed as an integral part of the system rollout where students are to view, input and modify administrative and financial information on themselves and their courses. Drawing from the sociology of science and technology, and material from a three-year ethnographic study, we describe the system's implementation in a British university. While accepting of the need for an ERP system the campus community reject self-service. However, as we will show, because Campus Management is a 'global product' unwanted functionality can be difficult to resist outright and this can have important implications for the autonomy of the university and the reshaping of fundamental principles and relationships.*

Keywords: Self-service technologies, universities, student identity, enterprise-wide computer systems.

## INTRODUCTION

If we say that we want students to [self-administer], and because they do these things for us, we have to treat them in a different way. It is similar to the example of 'Smile' Internet banking and the way they are blurring the boundary between 'customer' and 'cashier'<sup>2</sup>.

Universities are unlike many other organisations in that they are said to be governed by a number of shared principles, some of the most important of which are their right to self-determination in deciding how they operate and function, their autonomy in setting their aims, and their responsibility and duty of care to their students<sup>3</sup>. Presumably, to the extent these principles still hold, universities must work to maintain them whilst at the same time taking account of new and sometimes conflicting pressures. Some of these pressures, as described in Ronald Barnett's important book Realizing the University in an Age of Supercomplexity<sup>4</sup>, include the need to find new sources of income, to engage with new constituencies, audiences & knowledge, for the university to function efficiently and flexibly, and to become a much more modern form of organisation<sup>5</sup>. This latter goal is particularly interesting as it appears at odds with the historical status of universities which until relatively recently were, as Barnett describes, 'devoid of large-scale organisational characteristics'<sup>6</sup>. This poses intriguing question for academics and managers alike: how does an institution (seemingly without much in the way of one) create for itself a greater level of organisation, what will this organisation look like, and what are the implications for foundational principles, relationships and responsibilities?

For some institutional managers a part solution to what is becoming known as a 'crisis'<sup>7</sup> is to be found in new forms of administrative and organisational computer systems, especially those used by large commercial firms. We focus on what are known as Enterprise Resource Planning (ERP) systems and the various organisational philosophies that accompany them. This software promises the kinds of flexibility, efficiency and organisational 'templates' that are increasingly desired by universities<sup>8</sup>. Yet if seen as part of the solution to the 'organisational issue' they are also part of the problem. In order to bring about the kind of changes required they demand a large scale re-engineering of institutional practices. They

also assume the existence of certain kinds of users with specific roles and responsibilities towards the support of the newly reconfigured institution. We consider how a British University – whom we are calling ‘Red Brick’ - is attempting to adopt such a system. The aim of the project is to shift the university from a professionally supported administrative culture to one which is increasingly computer supported and self-managed. The eventual plan being that all staff and students will become ‘active’ users of the new system with responsibilities for the upkeep of their own administrative records, which they will access and manage on a ‘self-service’ basis.

Self-service philosophies, the principle focus of this article, while seemingly appropriate for the challenges facing a modern organisation do not as yet exist within this institution. Bringing the self-service user ‘into being’ will therefore require changes in organisation and thinking. In the first part of the article, we describe arguments deployed by system advocates as well as some of the resistances to these proposals. In the second part, we focus on the development of ‘Campus Management’, a new module being built by the ERP Supplier specifically for the management and administration of students. This module is being developed around the needs of Red Brick and a number of other ‘pilot sites’, with the Supplier’s eventual aim to launch it as a ‘global product’. We show how the adoption of the new module has implications for the reshaping of organisational practices and relationships.

The study can be located within two, as yet, unrelated literatures, one that considers the future of universities, and a second concerned with the design, development and implementation of information & communication technologies (ICTs), the sociology of science and technology. While the former is concerned with the application of new technologies, much of this writing fails to provide a sense of where these technologies come from and how they are adopted (or contested, resisted and deflected) by their intended audience. Also, it tends to portray technologies in a simplistic way, as instruments that simply add or detract from universities. Through discussing insights from the latter literature we hope to show the variety of outcomes possible through the deployment of ERP systems. We analyse the notion of self-service and locate it within recent developments within electronic-commerce. The subsequent section describes some of the reasons why self-service has become popular among universities. The institution where our case study

was carried out is then described, including a brief review of its strategies for the procurement of administrative computer systems. The discussion then focuses on Campus Management and the reactions of senior managers and academics to proposed changes to student administration. Finally, we discuss how other universities involved in the Campus Management project are able to shape the system and ultimately Red Brick's own organisation.

## **UNDERSTANDING TECHNOLOGICAL CHANGE IN UNIVERSITIES**

Before we discuss the introduction of new ICTs into universities we should say a little about what we understand the university as an organisation to be. The traditional university is conventionally, if mythically, thought of as a band of scholars coming together in pursuit and dissemination of knowledge, governed by a more or less collegiate model of organisation, based around a complex structure of committees and with a high degree of individual and departmental autonomy. In this sense, the university as an organisation tends to lack a clear identity, primarily existing in the heads of people who constitute it and a myriad of locally negotiated practices and interactions. In organisational terms, it has thus been described as an exemplar of a 'loosely coupled system'<sup>9</sup> characterised by a lack of clearly articulated policy and weak control over the implementation of policy<sup>10</sup>. The traditional university, then, and this is what Barnett is referring to, often appears to be only virtually present<sup>11</sup>. It is important to also note that the university is best described as 'ambivalent' about change. By this we mean that institutions have proven to be highly flexible and responsive (in particular to financial incentives from government) and, at the same time, highly rigid and resistant to organisational innovation (particularly where founding principles are threatened). How has this odd, sometimes contrasting position been reflected in the literature on ICTs?

In truth, it has not in any serious way. Much of the writing on universities tends to be future orientated, structured around questions about what the implications of the technology will be rather than on empirical studies<sup>12</sup>. Much of this work overlaps with the more general debate on the 'future of the university', both of which generally give a large degree of influence to the capacities of the new technologies<sup>13</sup>. As a result, one seldom gets a sense of

where these artefacts come from, how they are shaped, the processes by which they are built into institutions, or the variety of outcomes that might arise as they are deployed within the (ambivalent) institution of the university. In many accounts, ICTs are seen to simply preserve and reproduce the existing organisation, what Feenberg has described as the ‘principle of the conservation of the hierarchy’, or they undermine or bypass existing institutional forms, what he has called the ‘principle of subversive rationalisation’<sup>14</sup>. Only occasionally, are they described as doing both. Barnet, to give one example of this latter type, argues that the Internet and email are a significant element in accentuating, if not actually causing the attenuation of universities and of destroying their ‘defining centre’<sup>15</sup>. ICTs in this sense are presented as unified and monolithic<sup>16</sup>.

Our concern is to investigate how an institution constructs a new identity and responsibilities for students, the response to proposed change, and the implications that follow from such projects. To help us, we draw on the sociology of science and technology, particularly a body of work that has considered the ‘co-production’ of technologies and society. According to this view, engineers, innovators, technical specialists and the like are not simply concerned with making artefacts but will also construct a theory of society or social relations which their objects can be inserted into. Such theory can be (and often is) radical, ranging from the depiction of large-scale social change, such as shifts in consumption patterns, through to the characteristics of the users of the future technologies<sup>17</sup>. This process is clearly described in an article by Madeleine Akrich on the production of electricity generators for use by villagers in French Polynesia<sup>18</sup>. Her argument is that the design of a technology simultaneously requires the ‘design of the user’ and his or her environment. That is, a user’s skill, their abilities and what the technology should do in relation to the user are ‘scripted’ into an artefact and this influences the generators final shape. This is not to say that it is a matter of simply outlining a better description of users. Rather, according to Akrich, the ‘user’ does not pre-exist the technology but is actively constructed alongside the object. In other words, the introduction of the technology may well be intended to contribute to the construction of a new kind of user, one with different characteristics, roles, and responsibilities than before. Yet, it is not simply that an artefact simply specifies the shape of the user and his or her environment. These scripts often fail, to a greater or lesser extent, to be translated into practice. Rather

they are contested, resisted, deflected or complemented by other scripts developed by their intended audience and others. In other words, technologies can often have a variety of outcomes, some of which are often not known or expected.

## **METHODOLOGY**

This article is developed from a three-year ethnographic study of the application of enterprise-wide systems in universities. In terms of ‘what’ and ‘who’ we looked at during our study we drew again on lessons from the sociology of science and technology. Bruno Latour has famously advocated that technologies should be studied not as finished artefacts but ‘in the making’, arguing that, by studying them in this way, the ‘messiness’ is still there for all to see<sup>19</sup>. By messiness, he means not only those issues identified by the researcher but those that arise during the building and implementation of such projects. We studied Campus Management as it was actually being built, tested and implemented. For this, we made use of direct and participant observation where we attended project meetings, away-days, committee meetings, user-feedback and brain-storming sessions, technical briefings, presentations and, travelled overseas to observe interaction between the software supplier and the universities acting as pilot sites for the technology under development. Moreover, Latour suggests ‘following the actors’, meaning those central to rolling out these technologies. These are not people identified by the researchers but are those deemed relevant by those actually building the technologies. Here we spoke to senior university managers, external consultants, project managers, practitioners, academics, administrators and support staff. During this research, some interviews were taped but extensive hand-written notes were taken at most sessions.

## **SELF-SERVICE: WHERE DID THE CONCEPT COME FROM?**

The genesis of the notion of self-service is interesting and worth exploring. Though it is a relatively new concept in the world of computing it first became popular some time ago with the work of the economist Jonathan Gershuny. In his book, After Industrial Society? The Emerging Self-Service Economy, Gershuny contradicted the firmly held belief at the time that industrialised countries were becoming ‘service economies’<sup>20</sup>. His counter-argument was that people were not in fact purchasing more services, but rather consumers

were investing in durable goods (such as washing machines, cars, etc.) that would allow them to produce and consume services for themselves. Self-service principles, as he saw it, were set to spread elsewhere leading to the growth of a ‘post service’ economy. One only has to look to the world of banking and the widespread adoption of Automatic Telling Machines (ATMs) to see examples of this phenomenon<sup>21</sup>. More recently self-service has become an important, albeit implicit, part of many of the ‘dis-intermediation’ arguments surrounding the growth of the Internet<sup>22</sup>. Most strikingly it has become part and parcel of much of the marketing rhetoric that software suppliers deploy when selling and implementing their systems. As developed by them it has become a dominant mode of use, one might even say ‘organisational philosophy’. We say organisational philosophy because, for suppliers, it is not simply that self-service is seen to have economic benefits through easing basic administration processes but it is also described as having an ‘emancipatory’ aspect. According to some, having direct access to personal data is seen to ‘empower’ employees and give them greater ‘control’ over their careers:

The Employee Self Service solution consists of a set of easy-to-use applications that empower employees to view, create, and maintain confidential personal data over an intranet or the Internet (my emphasis)<sup>23</sup>.

It is no secret that most companies introduce self-service technology for one primary reason: it can save huge sums of money by eliminating unwieldy processes that devour time and resources. Of course, other benefits can result from employees taking control of their own transactions, including helping them take greater responsibility and ownership of their careers (my emphasis)<sup>24</sup>.

Of course, while one should be wary of accepting the above claims at face value (see below), it is interesting to note that such a discourse is beginning to also become popular within higher education. Below, we analyse some of the reasons for this.

## **SELF-SERVICE DISCOURSE AND UNIVERSITY EXPANSION**

The self-service philosophy, along with the cost saving and emancipatory rhetoric, has recently influenced organisational change strategies and computer systems implementations

within universities. Universities, perhaps more than other large public institutions, are seen to benefit from self-service technologies - along with Campus Management we know of many other similar projects underway<sup>25</sup>. What is driving the rapid diffusion of this vision? Firstly, and most significantly, there has been a shift from elite to mass higher education taking the form of increasingly large proportions of 18-20 years olds going on from secondary education to higher education. This phenomenon, observed around the globe, has not been accompanied by a proportional increase in the funding of higher education<sup>26</sup>. This has led to a declining resource per student and a concomitant search by institutions for efficiency gains<sup>27</sup>. In other words, there has been little choice but to rethink traditional methods of enrolling, registering and administering students. Secondly, and related to this, there is an increasing tension between the demands of teaching and research on the staff of the university. In this respect, the application of self-service and ERP technologies is widely seen as offering the possibility new divisions of labour between different categories of individuals within the university. Work can be shifted from staff to students – i.e., students can take on responsibility for checking and maintaining some parts of their student records, relieving administrative and academic staff of this task<sup>28</sup>.

Thirdly, there are not only economic motives driving this philosophy, students are increasingly seen as discerning clients with an increasingly wide experience of ICT from the world of private services and from the spread of these technologies in the home and workplace. The incorporation of ICT spend per head figures into many of the influential university rankings, for example, is seen shaping the choices of potential students. Here too the provision of online services is widely seen as ‘helpful’ to the image and recruitment appeal of the institution. For example, students can complete registration details or pay bills online before coming onto campus and thus avoid lengthy queues<sup>29</sup>. Fourthly, students are increasingly seen not just as clients of the university but also as a resource to be used by the institution. The clearest sign of this is in terms of regional engagement (e.g., student community action), and as alumni who may be persuaded to help to fund the institution and who can provide valuable contacts for research and recruitment, as well as openings for new graduates<sup>30</sup>. Institutions are therefore adopting a more institutional approach to their students and self-service is seen as an important tool in maximising this resource – i.e., students should be taking more responsibility for their own administration<sup>31</sup>.

As well the examples listed above, we attended a number of conferences where people involved in these kinds of projects outlined some of their thinking and strategies for self-service<sup>32</sup>. One Project Manager, for instance, described how the impetus for their system stemmed directly from his Vice Chancellor who saw self-service not simply in cost saving terms but as ‘empowering the students to manage their own learning more actively’, and how the system was ‘for students’ and ‘not about students’<sup>33</sup>. Another Project Manager, in contrast, described how he did not see self-service as part of a student centred educational philosophy but more as a reflection of a wider societal, business and technological shifts to self-service formats (i.e., ATM, Internet shopping). In his view the Internet and computer systems like ERP offer universities a new way of ‘doing business’, where there are a ‘defined set of rules’ that have the potential to radically reshape university structures and to make them ‘more like other organisations’.

Before turning to the empirical material, we note two further points. The turn to ERP is a notable departure and above we have presented what might be described as ‘external influences’ for this. Below we describe the move in terms of conventional computing procurement and organisational change strategies. ERP systems promise large rewards, though like most ICTs they often fail to deliver the kind of services expected by users. We also discuss the difficulties of implementing such technologies<sup>34</sup>.

## **IMPLEMENTING ERP: PROMISES AND DIFFICULTIES**

While universities relied on ‘in house’ systems for basic management and administration functions this has changed in recent years as a result of complaints about the ‘fragmented’ and ‘amateurish’ nature of such systems. Here, some commentators too have pointed to the ambivalent attitude of universities to change. Universities, argue Bull et al, have been a central factor in the development and proliferation of modern computing but their attitude to administration systems has been ‘highly conservative’: “...[m]any institutions might lag behind the state-of-the-art of computing systems for more than one generation; others might not have computer support at all in one or other administrative domain”<sup>35</sup>. There have been various initiatives to counter this situation. For instance, there was the large and expensive University Funding Council sponsored ‘Management & Administrative Computing

(MAC)' project which began in the UK in 1988. This involved institutions forming into 'families' to collaborate with software suppliers<sup>36</sup>. In the eyes of many the MAC system was regarded as 'a failure': having been designed only months before important external changes in higher education it was seen as incapable of dealing with the 'organisational problem' that universities were increasingly seen to have<sup>37</sup>.

Red Brick, who had been at the forefront of the MAC initiative, were amongst the first to seek an alternative solution. They engaged the services of a well-known group of management consultants to carry out a review of their systems and they, in turn, recommended the procurement of a 'tried and tested' commercial system'. A further benefit of a commercial system over a bespoke option was that it was seemingly 'future proof' in that suppliers were constantly updating their products (with new upgrades and modules) to account for the changing demands and needs of enterprises. Shortly afterwards a tender process was conducted with a large European supplier being selected ahead of a number of other strong competitors. Interestingly, the successful bidder had no previous experience working with British universities (and only a small amount of experience with higher education in general) whereas other suppliers had significantly more experience (several having been involved in the MAC project, for instance). The rationale for this choice given by senior managers was that this was the only supplier that had suggested that the exercise should be treated not in a narrow, technical way but as an opportunity to restructure the University's entire business processes. This met with approval as the managers were in the early stages of putting together such a plan to restructure and devolve much of the management and administration issues to departments and the system appeared to offer a useful template in structuring such changes.

While the procurement of such generic solutions is an increasing trend among organisations<sup>38</sup>, it was not a popular decision throughout Red Brick. There were those within the Central Administration who thought ERP systems were not appropriate to the workings of a university and foresaw problems particularly around the amount of upheaval required. There was a feeling that many of the basic assumptions, categories and models embedded in the system would not necessarily translate well across the boundary from large corporation to a higher education institution<sup>39</sup>. System advocates assured colleagues,

however, that though the Supplier was committed to re-developing its software and this would include tailoring existing modules, and where needs could not be met within the current offering, the development of new software, which would include Campus Management. These tensions, however, were not resolved and remained throughout the life span of the project (see below).

### **Campus Management**

The actual selection of the student management system was conducted under the auspices of the wider ERP project. As we have said, the Supplier was offering to develop the Campus Management module and to allow Red Brick access to this process as one of a number of 'pilot sites'. From Red Brick's point of view, they were being presented with a unique opportunity to shape what would become a global software package. Moreover, in return for their co-operation it was agreed that the Supplier would meet all the software and some implementation costs. There appeared to be little point in looking at other products. Although some evaluation of alternative student systems was carried out, this was by no means extensive. On the project website it was described as a 'pioneering' development between a well-respected software supplier and several prestigious universities from around the world. Moreover, it described how its plan was to merge Campus Management with the other ERP modules already installed, meaning that not only would Red Brick be among the first to rollout the Campus Management module but also it would be the first to have a fully integrated 'University ERP solution'.

### **BUILDING STUDENTS INTO THE SYSTEM**

Computer systems are well known to disrupt established divisions of labour<sup>40</sup>. What was notable about previous systems (like MAC) was they were kept within the domain of the centralised administration and had little influence on the primary functions of universities and their workforce. Most academic staff rarely came into direct contact and students were barely (if at all) aware of their existence, their relationship to administrative systems having until now being mediated by academic and support staff. Under Campus Management, however, students are to move from being 'passive' objects of administration to one of the main groups of 'active' users. In doing so they will be expected to do many different things

for themselves: they will self-register for certain aspects of their degree course; they will validate the accuracy of other information (e.g., academic results, financial status and so on); eventually students will be able to pay bills on-line; book accommodation; and schedule meeting with their tutors and so on. It will be possible to do all these things without physically coming onto the campus. Moreover, it is not only that students will be taking on new data inputting tasks, a job currently done by university staff, but they will also be responsible for the timeliness and accuracy of the data contained in their student record.

The work required to bring about these new divisions of labour is considerable, requiring effort at the level of both software and institution. Technically speaking the project appeared to pose few problems for the Supplier. Having promised to build a university specific system they were in fact proposing to use a reworked version of two existing ERP modules, the Training and Events Management Module, a system used to run internal training programmes within firms, and the Real Estate module. These modules, however, are structured around commercial categories (like supplier, employee, and customer) and there is no notion of 'the student' within the system. And, therefore, this new category has to be created. There is not the space here to describe the fascinating process where the Supplier attempts to works out the nature of 'students' and some of their differences from existing categories<sup>41</sup>.

Just as the notion of the student has to be built into the software, it had also to be created within the institution. Here again the process is not straightforward, as the relationship of the university to the student is a complex one. Over time, the relationship has been characterised as something akin to the one an 'apprentice' might have with his or her 'master'. In the same vein, a student has been seen as a 'ward' of the university placed there by parents or society. More recently, students have been seen as members (albeit junior ones) of the institution with rights to serve on committees and in some cases help shape university decision making. Today they are commonly viewed as an institution's 'customers' or as the 'consumers' of higher education<sup>42</sup>. Despite the prominence of this latter view, no one relationship fully dominates and the legacy of all previous relationships are still found (however small). This begs the question as to how self-service might fit

within this rather complicated relationship. Below we describe two facets of this attempt to reconfigure the student-university relation (the creation of new expectations concerning registration processes and building of responsibilities towards information). Finally we note some of the tensions that arise as the various legacies butt up against each other.

### **Queuing and Confusion**

Internally, there was a widespread recognition that many of the processes relating to student management and administration were in need of updating. This is in keeping with considerations generally that yearly enrolment or registration processes where students queue for hours in large halls to complete paperwork that could be completed elsewhere (i.e., over the Internet prior to travelling to university) are no longer acceptable. While for some the 'queuing and confusion' that one meets when arriving at university for the first time is an important facet of 'becoming a student'<sup>43</sup>, for others there is an increasing awareness that such frustrations should be minimised given the changing demands of students as 'critical consumers'. An internal document outlines this reorientation and move to a 'service culture':

Student tuition charges, possible top-up fees and vouchers are fuelling increased student expectations and prompting the move to a service culture. Students are no longer willing to stand in long queues to register or order transcripts nor are they happy to travel between different offices across the campus to deal with programme registration, housing applications or payment of fees. Universities that can offer these functions (and others) on-line via self-service to an integrated information system will gain a competitive advantage (Red Brick Internal Report).

Of course, what is being articulated here are concerns for consumerism that have been typical of American higher education from the 1970s and that have been increasingly appearing on UK campuses since the late 1990s. There is no need to rehearse this debate, as the implications of this are well understood. It is sufficient to say that one aspect relevant to our discussion is that students as customers are now commonly seen to have new rights. According to Silver and Silver, these can be described as 'the delivery of services promised', 'appropriate forms of services' and a 'greater access to information'<sup>44</sup>.

Important to note here is that self-service access appears to correspond with the need to fulfil these rights, and at Red Brick there was an emphasis on achieving this through encouraging access to and ownership of information.

### **Ownership of Information**

A common complaint throughout Red Brick was that as no single person or department had ‘ownership’ of information and, therefore, those inputting data were not concerned with its accuracy. Accuracy was increasingly important given the new demands placed upon the university to report and manage its activities as well as provide efficient services for its students<sup>45</sup>. The resolution of this problem appeared to reside with self-service technologies and shifting responsibility for the ownership of data to those who could ensure its accuracy – namely students. This view is by no means restricted to Red Brick and can be found in good practice guides to institutional management in higher education:

The best systems ensure that those who need to rely on the data are also those responsible for ensuring the accuracy of the data: it is of little use if, for example, entry of student fee information is a low priority for that part of the institution which enters it, or if, on the other hand, tutors who need accurate course and module lists feel that it is not their responsibility to take registers of attendance. This ‘ownership’ of the data is crucial<sup>46</sup>.

The author of the good practice guide argues that in terms of student information the best ‘owners’ are seen to be students themselves as: ‘...they have most to lose if their records are wrong, and ought to be placed in a position not only to change any inaccurate data easily but also to be required to ensure that they are changed...’<sup>47</sup>. The suggestion is that students should become ‘responsible’ for the accuracy of all information the university might hold about them. Similar sets of aims were driving Campus Management. The University’s ‘Communication and Information Strategy’, for instance, includes the following objective:

To provide staff and students with access to information appropriate to their needs by a wide variety of information sources...All information should have owners who are responsible for up-to-date accuracy of that information...

In a further discussion document concerning Campus Management it is described how students' could and should have direct, read access to their '...own personal and academic data.' On top of this, it is suggested that students should also be able to input and modify data and that they, therefore, be given: 'write access to all self-service functions, including applications for admission, changes of address, module registration, leave of absence.' Interestingly, the tentative and preliminary natures of allowing students write access is highlighted by a question mark, which follows the suggestion. Such tentativeness is also present later in the document where it outlines some possible future scenarios for student registration:

For Sept 2001, it is proposed that personal and module registration takes place in Departments via personal tutors. New students will attend first, check their personal details with their tutors and select module options where appropriate. Exactly how this is done depends upon the level of access to the system in Departments (and on the preference of the Dept):

Option 1) If all tutors had access e.g. via MySAP.Com and a web browser, it would be possible to call up the student details on screen, check/amend master data and select modules without the need to print, distribute and complete registration forms and module selection forms (and then re-input the data into the student system).

Option 2) SAP provides student self-service via a web browser to carry out personal and module registration. New students could follow Option 1 with returning students carrying out their own registration after first meeting with their tutor. This could be carried out via selected clusters [of university PCs] or Departmental PCs. Students could be made entirely responsible for ensuring that they register correctly and that their data are accurate or students could enter data under the supervision of central or local administrative or academic staff. With students entering data, staff time could be used more productively in providing services for the students

Providing students with direct access to the system is an issue that has raised some discussion and below we consider the debate that ensued among those groups responsible for Campus Management's implementation.

### **COUNTERACTING THE SPONSORS GROUP**

The day-to-day management of the project was controlled by a small project team (the 'Sponsors Group'), which reported to a larger steering committee (the 'Strategy Group'). Whereas the Sponsors Group was staffed by those actively involved in implementing Campus Management, the Strategy Group was made up of senior academic and non-academics who held full-time positions elsewhere and would come together only once a month. The role of the Strategy Group, which was chaired, attended and administered by members of the Sponsors Group, was to ultimately review progress, oversee potential problems, help co-ordinate the system rollout across the institution, and have the final say over the various technical and organisational issues that arose. In practice, however, the Strategy Group often acted at times as something of an 'orthogonal group'<sup>48</sup>. That is, they openly attempted to counteract the dynamics and power structures of the group they were charged with supervising. While the Sponsors Group was a narrowly focused body with strong investments in the Campus Management technology, the Steering Group alternatively had a much wider membership from across the campus, some of who were critical of the project and its far-reaching objectives.

Objections ranged from those questioning the implications of self-service for foundational relationships and responsibilities, to the more practical issues of managing self-service access. One member, for instance, thought that self-service went far beyond the question of administrative procedures, to the nature of the University's relationship to its students, and this raised an issue about the way in which the system might undermine longstanding pastoral responsibilities. For instance, if a web browser or portal were to replace conventional mechanisms for the payment of accommodation bills etc., this would then increase or, worse still, force credit card use among students, thereby encouraging them to enter further networks of debt. Should the University be seen to be encouraging such practices? Allied to this there was a general opinion that while self-service was not

necessarily a bad thing there was the possibility when replacing the administrative apparatus of destroying or submerging those interactions that are tacit, informal, flexible - the very processes that might, for instance, offer important forms of support to students. For instance, just how might a student ask for an extension on the payment of a late rent bill? Was this simply a matter of 'functionality' just waiting to be built into the system? Might cases that do not quite fit be supported by the increasingly ubiquitous 'help desk'? Alternatively, will 'non-standard' requests simply fall between the inevitable cracks in the system?

Concerns were also expressed as to whether students actually wanted or, more importantly, could be 'trusted' with such access. This issue of trusting students is recognised as a more general problem. To return to the good practice guide mentioned earlier, Gledhill tackles a similar issue, suggesting that for academic matters and for many administrative matters students should not be given direct, write access to a system, as there is the potential for fraudulent use. This was an important issue at Red Brick and discussions exposed many potential problems. For instance, if a student was to have control over their home address say, what was to stop them inputting an incorrect address, thereby allowing the student to claim that he or she had not been notified of a demand for payment of fees or a letter detailing a problem (such as the failing of an exam)<sup>49</sup>? There were worries not only about fraudulent use but also whether students could actually be persuaded to update their own records. One department head, for instance, described how they currently had a problem with postgraduates failing to register changes in modules and:

If, as is suggested with the self-service option, the departmental student office no longer has responsibility for this data it is unclear what will persuade students to update their files electronically (internal memo).

What really troubled members of the Strategy Group, more than these conceptual questions, was 'data access'; i.e., how to organise and manage the level of access users had to the system, their ability to view, input and update personal and course information. From the outset, it was clear deciding access rights held important implications and it was thus decided to form a smaller 'Data Access' committee<sup>50</sup>. The task was potentially enormous.

The difficult issue was the heterogeneity of the student body. Could all students have access to the system regardless of the type of course they were following. The full time and part-time MBA students for example often had large amounts of experience in working with IT systems in firms. They thus expected similar kinds of access and service at the University. In contrast, the more traditional student who had joined the University from school was often less familiar and comfortable using these systems. Would they have the skills and wherewithal to self-register? Also, should distance-learning student have the same (or more) access that those studying on campus? Theoretically, this issue could be resolved by allocating each users with an appropriate 'authorisation profiles'. This was a template that would help manage the kinds of access particular groups of students had. However developing and maintaining different authorisation profiles for several thousand students and staff was seen to be 'prohibitive'. Originally designed around the needs of firms, the profiles were limited and could not capture the diversity of the user base. Implementing them would require the time of several full-time members of staff. In order to keep development and maintenance costs down, therefore, the suggestion from the Data Access committee was to limit access and, where access is granted, to keep this to as basic a level as possible.

More generally, then, it appeared that concerns were growing among the Strategy Group. There were many 'unknowns' (whether they could fit the student body into a number of profiles, whether students would respond favourably to, or could be trusted with access etc.). The final deciding factor was that the Supplier was late in delivering the latest version of the software, which meant there would be little time for testing the self-service concept before the go live date. Therefore, the Strategy Group stalled and decided not to decide but postpone the decision until some time in the future when there might be more 'certainty' surrounding the system<sup>51</sup>.

In the mean time, if the Campus Management implementation were to proceed, then it must do so in a much less adventurous manner, without self-service functionality. This meant that the system, rather than radically change the University, would instead mirror many of the current processes. This was a disappointment for the Sponsors Group who had invested much time and effort in developing the self-service concept across the university. At an

away day meeting, the Pro-Vice Chancellor in charge of the project describes this postponement in terms of the Strategy Group's aversion to 'risk':

The Strategy Group didn't want students doing self-registration or registration via the Web...[Therefore] the message given to SAP is that we want to minimise risk and minimise change. The screens will be different but overall business process will be the same. The Strategy Group consensus was 'risk averse'.

## **BUILDING A GLOBAL PRODUCT**

As we have already mentioned, it was not simply the needs of Red Brick contributing to the building of the system, it was also to include the requirements of a number of 'pilot sites' from around the world. Despite the fact that the software was being designed to accommodate the structures and processes of many universities, Red Brick was confident this would not impinge upon the shaping of their institution:

The University will need to explore all parts of the system and decide which parts of the functionality it wishes to use. The approach taken by the Strategy Group is that the system functionality will not drive our academic aims and processes.

Functionality will only be exploited if it supports the University's aims for the management of its students or if it is required in response to external drivers (internal document describing the project).

Indeed, it was widely acknowledged that Red Brick had been successful in ensuring that its needs were well represented. This was both because it was the only British institution involved in the project, and thus acted to represent this large market, and because it was among those planning to attempt an early implementation. One other pilot – a North American University we are calling 'Large Campus' – was also planning to go live with the system at the same time. Unlike their British partner, however, this institution appeared to be enthusiastically embracing the technology. Indeed, not only were they open to the possibilities that self-service might afford but they were also attempting to persuade the Supplier to incorporate further advanced functionality, such as credit card payment facilities and Customer Relationship Management (CRM) software. According to Large a

Campus report, these technologies suited their more 'competitive' and 'market oriented' admission processes as well as the mode of interaction they were attempting to establish with their students:

With each passing year, [Large Campus] students are becoming more and more proficient in their use of the Internet. Evidence of this is the increasing number of accesses to online services for students...from the campus website. Students can register through the web, check grades and even find out about holds and accounts information<sup>52</sup>.

The worry at Red Brick now that they had 'temporarily' rejected self-service, was that they would lose influence over the design of Campus Management. According to the Pro-Vice Chancellor in charge of the project, this is what was happening with the American University's requests for new CRM software. As he saw it, the other pilots were now making requests for functionality that would not fit Red Brick's existing processes:

...[Large Campus] also plonked on the table more requests for CRM and that has blown the whole thing apart. If SAP meets this request, then that is less for us. SAP has finite support and [Large Campus's] need is more complicated than ours is. If they are going to go live with a CRM approach and we're going for a 'handicraft' approach based on our more 'handicraft' and 'paper-based' approach then this has an implication for our business processes (notes made at away day).

In other words, as Red Brick had decided that such technologies were incompatible with their needs, the Supplier had to prioritise one set of requirements over another, choosing as some internal critics have described to build the system according to the needs of the larger US market. This left Red Brick concerned that a system heavily favouring the US model of student administration would have implications for its own methods for managing students. Indeed, in various aspects of the system the University was finding that it had to accommodate software designed for the other pilots. One example, and there were many other of this kind, was the part of the system used to record applications by prospective students. This was built according to procedures common within American universities, and as applicants there are required to submit 'application fees', the system automatically

generates an 'accounting record' for each new prospective student so that the appropriate information can be logged. There is no similar fee requirement in Britain therefore leaving Red Brick with the problem of deciding what to do with all the unwanted accounting records, some 30,000 being generated each academic year.

To what extent this means that Red Brick will eventually be forced to adopt self-service functionality or that its processes will come to resemble further those of other institutions is unclear – Red Brick is yet to decide on whether to go ahead with self-service. However, the fact these types of technologies are an integral part of Campus Management suggests that it will be a factor shaping discussions and decisions concerning future student management. For example, the issue of the accounting records was ultimately resolved by storing the records on the system (seriously hampering the efficiency of the system!) which did cause some irritation and enjoyment among the Strategy Group. On hearing of the problem, one member suggested 'well, why don't we also charge a fee for every application we receive?' It was some moments before the others seated around the table realised that he was in fact joking and they accordingly burst out laughing. For a split second, then, it was an item on the table worthy of serious consideration!

## **CONCLUSION**

Universities, we are increasingly being told, have an 'organisational problem'. Many as a result of mounting pressures (both external and internal) have turned to new forms of computer systems (Enterprise Resource Planning) and their associated organisational philosophies (self-service) in an effort to build for themselves a different and new type of organisation. We have described the case of a British institution and its attempts to move away from a professionally supported administrative culture to one that is increasingly distributed and self managed. From the outset, the assumption was that self-service - just as it has found to be popular among proponents and users of Electronic Commerce systems - would work equally well within the university. Indeed, the notion that people will increasingly do things for themselves appears to be entirely in keeping within the spirit of an organisation that lacks 'an organisation' (i.e. the collegiate model with its high degree of individual and departmental autonomy). Whether this autonomy extended to students

(given the legacy of old and established relationships) was a bone of contention. Installing self-service at Red Brick, therefore, involved both the implementing of the ERP system and establishing a new role and identity for students. Initially, there was much enthusiasm for the introduction of the new system, particularly in those more paper-based and time-consuming functions for administering students. There was a wide-spread recognition that processes for registering students were badly in need of updating; forcing students to queue for hours to complete paperwork that might be completed online was seen to be unacceptable, especially given the changing demands of students who were now increasingly 'critical as consumers'. Much work was also conducted enrolling others into the idea that they should take responsibility for information concerning themselves and aspects of their courses. The aspect being particularly important if the institution was to ensure the accuracy of data in its systems – an essential feature of a modern, flexible organisation.

As we have said, the university is ambivalent about change. On one hand, this article lends further evidence to the debate on the conservatism of large institutions; that the unique structures and sets of complex relationships (such as the committee structures) mean that technologies which propose radical change across an organisation are difficult to implement. Despite pressure, many staff remained committed to established structures, identities and relationships. Scepticism arose because it was recognised that the system went beyond mundane administrative procedures to the nature of the University's relationship to its students and this raised concerns about the way in which self-service might undermine longstanding pastoral responsibilities. These technologies, in other words, by shifting the burden of administration to students appeared to jeopardise the University's unique relationship with its students. On the other, as this article demonstrates, the adoption of ERP presents universities with particular sets of issues regarding the control and shaping of their systems and ultimately their institutional and organisational practices. This is a new problem as until recently universities have developed their own organisational computer systems. Campus Management as part of an ERP system is a 'global product' and this means it can be difficult to reject unwanted functionality. Rejecting self-service would require a large software effort, therefore taking their version of the system further from the global product. If this was to happen, there was the risk that they would be unable to make

use of later upgrades and new functionality released to the world-wide ERP and Campus Management user community – one of the reasons why the system was procured in the first place (i.e., future proofing). While it was important that the system was modified to ease concerns of prospective users, there were also compelling reasons, then, why the University should simply accept and accommodate inappropriate aspects. It appears, then, that this attempt to foster increase self-sufficiency among staff and students has led to the University suffering a potential loss in its own autonomy

In summary, the institution at this point in time appears to be stalled at a crossroads facing two (seemingly) opposing directions of technical and organisational development. They can either decide to revert to developing software in keeping with unique characteristics or they can continue along this new path and accept the problems and limitations of enterprise-wide systems and self-service. In practice, however, as we indicated at the outset, this is not an either/or situation and universities are, of course, doing both. Moreover, to talk of the loss of unique characteristics or, as Barnett has described, the loss of a ‘defining centre’ is to suggest the university is able to return to a time when there was greater coherence and more certainty around just what its principles were. Such a notion is romantic and we are frankly sceptical that such a period ever existed. We cannot understand the reshaping of the university by reference to ‘pretechnological conditions’ or to ‘some prior unity irrelevant to the contemporary world’<sup>53</sup>. This does not mean, however, that we should jump the other way to embrace wholeheartedly the vision of the self-administering student. Rather, we are certain that while self-service will become a central feature of student and university administration more generally, this is likely to be in a largely reconfigured form.

Understanding the kind of self-service which will emerge within universities (as well as the issues and tensions that arise from it), then, is crucial for academics and institutional managers alike.

#### Bibliographic Note:

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## Notes and references:

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<sup>2</sup> Comment made by a speaker at a recent conference on self-service technologies. The conference was the 'Process Improvement Programme in Higher Education' workshop at Staffordshire University, UK September 2000. See <http://www.staffs.ac.uk/services/pip/welcome.htm>.

<sup>3</sup> H. Silver, and P. Silver, Students: Changing Roles, Changing Lives, Buckingham: Open University Press, 1997.

<sup>4</sup> R. Barnett, Realizing the University in an Age of Supercomplexity, Milton Keynes: Open University Press.

<sup>5</sup> G. Lockwood, 'Universities as Organizations', in G. Lockwood, and J. Davies (eds), Universities: The Management Challenge. Windsor: NFER-Nelson Publishing, 1985; F. Balderston, Managing Today's University: Strategies for Viability, Change and Excellence. San Francisco: Jossey-Bass Publishers, 1995.

<sup>6</sup> Barnett, op cit. note 4, p129. Karl Weick makes a similar argument, see 'Educational Organizations as Loosely-Coupled Systems', Administrative Science Quarterly. 1976, pp1-19, 1976.

<sup>7</sup> For a description of the 'crisis' see T. Schuller (ed.), The Changing University? Buckingham: Open University Press/SRHE, 1995; see also P. Scott. The Meanings of Mass Higher Education. Buckingham: SRHE and Open University Press, 1995.

<sup>8</sup> T. Davenport, 'Putting the Enterprise into the Enterprise System'. Harvard Business Review. 76(4), 1998: 121-132; T. Davenport, Mission Critical: Realising the Promise of Enterprise Systems. Boston: Harvard Business School Press, 2000; G. Walsham, Making a World of Difference: IT in a Global Context. Chichester: Wiley, 2001.

<sup>9</sup> Weick, op cit. note 6.

<sup>10</sup> I. McNay 'From the collegial academy to corporate enterprise: the changing cultures of universities', pp. 105-115 in T. Schuller (Ed.), The Changing University? Buckingham: Open University Press/SRHE, 1995.

<sup>11</sup> This argument is most forcefully made in James Cornford's article 'The Virtual University is the University Made Concrete'. Information, Communication and Society. 3(4): 508-525, 2000;

<sup>12</sup> See for example, T. Abeles, 'The academy in a wired world', Futures, 30(7), 603-13, 1998; and T. Abeles, T. 'The inevitability of a business model for higher education', Foresight: The Journal of futures studies, strategic thinking and policy, 1(1): 10-16, 1999.

<sup>13</sup> Abeles. op. cit. note 12. See also several of the papers in P. Scott (ed). The Globalisation of Higher Education. Buckingham: Open University Press.

<sup>14</sup> A. Feenberg, Critical Theory of Technology. Oxford: Oxford University Press, 1991.

<sup>15</sup> Barnett. op cit. note 4.

<sup>16</sup> There are, of course, a few exceptions and certain authors do attempt to provide a more sophisticated understanding of technology. See for example W. H. Dutton & B. D. Loader (eds.) Digital Academe: The New Media and Institutions of Higher Education and Learning, London: Routledge, 2002.

<sup>17</sup> In Michel Callon's description of the design and building of an 'electric car' by French engineers during the 1970s, for instance, he argues that this work was premised on the belief that society was on the brink of shifting its preference for combustion engines to other more environmentally friendly battery powered alternatives. While on this occasion the engineers were proved 'wrong', their theorising was still a central factor in the shaping and eventual outcome of this project. M. Callon. 'The Sociology of an Actor-Network: The Case of the Electric Vehicle', in M. Callon, J. Law and A. Rip. (eds) Mapping the Dynamics of Science and Technology. London: Macmillan Press, 1986.

<sup>18</sup> M. Akrich, 'The De-Description of Technical Objects', in Bijker, W. and Law, J. (eds) Shaping Technology\Building Society. Cambridge, Massachusetts: MIT Press, 1992.

<sup>19</sup> B. Latour, B. Science in Action: How to Follow Scientists and Engineers Through Society. Harvard, MA: Harvard University Press. 1987.

<sup>20</sup> J. Gershuny, After Industrial Society? The Emerging Self-Service Economy, 1978.

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<sup>21</sup> Y. Moon, and F. Frei, 'Exploding the Self-Service Myth', Harvard Business Review, 78(3), 26-30, 2000; P. A. Gilster, 'Making Online Self-Service Work', Workforce, 80, (1), 54-62, 2001.

<sup>22</sup> Dis-intermediation, to paraphrase Phil Agre, might be understood as the increasing obsolescence of many of the institutional and organisational processes that play a mediating role between buyer and seller, borrower and lender, students and knowledge, and so on, such that it is said that anyone can connect to anyone else with minimal effort. P. Agre, 'Designing the New Information Services', Educom Review, 34, (5), 12-14, 42-43, 1999.

<sup>23</sup> SAP Brochure, available at <http://www.sap.com>.

<sup>24</sup> S. Greengard. Building a Self-Service Culture That Works, Workforce, 77, (7): 60-69, 1998.

<sup>25</sup> Though there is no research as yet available on the diffusion of self-service, it appears that most (if not all) universities in the UK are engaging in some kind of self-administration based project. Two early projects of particular note were conducted at Liverpool and Bath. Liverpool John Moores University (JMU), for instance, as part of a nationally funded research project, recently added a 'self-service front end' to an existing student record system (see <http://www.s3.livjm.ac.uk>). For further description of this project see R. J. McClelland. Web-based Administrative Supports for University Students. The International Journal of Educational Management. 15, 2001: 292-302, 2002. Bath University have also invested heavily in a new 'of the shelf' system that allows students to register online (see <http://www.bath.ac.uk/samis/history.htm>).

<sup>26</sup> Schuller, op. cit. note 10.

<sup>27</sup> H. Newby, 'Higher Education in the 21<sup>st</sup> Century: Some Possible Futures', Discussion Paper, CVCP: London, 1999.

<sup>28</sup> N. Pollock and J. Cornford, 'The Theory & Practice of the Virtual University: Working Through the Work of Making Work Mobile', Minerva: A Review of Science, Learning & Policy, in press.

<sup>29</sup> C. Crook, 'Learning as Cultural Practice' in M. R. Lea and K. Nicoll (eds), Distributed Learning: Social and Cultural Approaches to Practice. London, Routledge Falmer, 2002.

<sup>30</sup> J. B. Goddard, D. Charles, A. Pike, G. Potts, and D. Bradley, Universities and Communities. London, CVCP, 1994.

<sup>31</sup> H. R. Hansen, 'A Case Study of Mass Information Systems', Information and Management, 28, 1995: 215-225.

<sup>32</sup> The conference attended was the 'Process Improvement Programme in Higher Education' workshop at Staffordshire University, UK September 2000. See <http://www.staffs.ac.uk/services/pip/welcome.htm>.

<sup>33</sup> This view can also be found in documents describing the rationale of the project; see 'University Portal Gives Students Direct Access', <http://s3.livjm.ac.uk/document/jtapol.htm>, downloaded 15th December 2000.

<sup>34</sup> See Cornford & Pollock for a review of some of the claims made concerning the application of new ICTs to universities. J. Cornford & N. Pollock, Putting the University Online: Information, Technology & Organisational Change, Milton Keynes: Open University Press, 2003. See Sauer for a more general description of the difficulties encountered when attempting to implement information systems. C. Sauer, Why Information Systems Fail: A Case Study Approach. Alfred Waller Limited, Henley-on-Thames, 1993. See also Ciborra et al for a detailed account of the problems of integrating enterprise wide system in large organisation. C. Ciborra and Associates, From Control to Drift: The Dynamics of Corporate Information Infrastructures. Oxford University Press, 2000.

<sup>35</sup> G. Bull, C. Dallinga-Hunter, Y. Epelboin, E. Frackman, & D. Jennings. Information Technology: Issues for Higher Education Management. London: Jessica Kingsley Publishers, 1994, p30.

<sup>36</sup> The idea behind this initiative was to attempt to 'standardise' the way in which universities collected and reported information upwards to bodies like the Higher Education Statistics Agency and to Government sponsors; see A. Goddard and P. Gayward 'MAC and the Oracle Family: Achievements and Lessons Learnt', Axix, 1, (1): 45-50, 1994.

<sup>37</sup> See N. Pollock, The Virtual University as 'Timely and Accurate Information', Information, Communication & Society, 4, 3, 2000: pp349-365; see also J. McLaughlin, P. Rosen, D. Skinner, A. Webster, A. (1999) Valuing Technology: Organisations, Culture and Change. London: Routledge, 2000.

<sup>38</sup> T. Brady, M. Tierney & R. Williams. 'The Commodification of Industry Applications Software', Industrial and Corporate Change, 1(3): 489- 514, 1992.

<sup>39</sup> ERP systems have a complex history which has seen their initial development in one context with one set of users in mind (manufacturing) and constant re-development in light of the experiences of later adopting organisations (financial, chemical, local government and so on). See Davenport op. cit. Note 8.

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<sup>40</sup> For a discussion of this in relation to universities, see S. Kiesler & L. Sproull. Computing and Change on Campus. Cambridge: Cambridge University Press, 1987

<sup>41</sup> See Cornford & Pollock for more detail, op. cit. note 34.

<sup>42</sup> Silver & Silver, op. cit. note 1.

<sup>43</sup> J. M. Gledhill, Managing Students. Buckingham: Open University Press, 1999.

<sup>44</sup> Silver & Silver, op. cit. note 1.

<sup>45</sup> N. Pollock, op. cit. note 37.

<sup>46</sup> Gledhill, op. cit. note 42, p88.

<sup>47</sup> Ibid, p88.

<sup>48</sup> K. Knorr-Cetina, Epistemic Cultures: How the Sciences Make Knowledge, Cambridge, MA: Harvard University Press, 1999.

<sup>49</sup> The application of technologies to universities is raising numerous issues to do with fraud, both in the potential of new systems to be misused by students (or staff!) and, just as important, highlighting loopholes in conventional practices. For example, one issue taxing academic managers is how to confirm the identity of a student who is following an online, distance course. How can they control for 'real-time plagiarism' in which a student copies from model answers posted on the web? Advocates of these courses, in response, have argued that in the campus situation, there is relatively little direct checking of the student's identity in the examination hall, indeed, the staff undertaking the exam invigilation may not even be from the same faculty as the student. There is, in practice, little to stop a student paying someone to sit their exam for them. For further discussion of this see J. Cornford & N. Pollock. 'The University Campus as a 'Resource Constraint': Process and Practice in the Construction of the Virtual University'. in M. R. Lea & K. Nicoll. Distributed Learning: Social & Cultural Approaches to Practice. London: Routledge Falmer, 2002.

<sup>50</sup> Another task of this committee was to discuss 'privacy', though they tended to focus on this in a rather narrow way, and in terms of ensuring how academic staff would have access to only those students they had teaching or tutoring responsibilities towards. There was no consideration given to the level of information (or secondary information) the institution was able to collect on the student and the uses to which this might be put. For a consideration of some of the issues related to this, see the chapter 'Databases as Discourse' in Mark Poster's The Mode of Information. Cambridge: Polity Press, 1995.

<sup>51</sup> Such temporal strategies are relatively common in universities, see G. Lockwood & J. Davies. Universities: The Management Challenge. Windsor: NFER-Nelson Publishing, 1985.

<sup>52</sup> There is no research available to suggest how widely self-service technologies are used in American universities. More anecdotal evidence gathered during the attendance of Campus Management development sessions and workshops suggests that US institutions have been thinking about these kinds of systems for one or two years before their European or British partners.

<sup>53</sup> This is drawn from Andrew Feenberg's description of environmentalist constructions of nature, op. cit. note 14, p197.