Campus as a Framework for a Networked University

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INTRODUCTION

Electronics-based information networks have brought widespread transformations in the way information flows in university campuses, to such a degree that the expression "campus information system" is usually equivalent to "campus electronic networked information system." Universities are highly decentralised organizations, so managing corporate electronic information resources poses challenges such as finding an optimal degree of standardisation or the global orientation of corporate information resources (Cornford, 2000). These challenges were less of a problem when using paper and in face-to-face campuses. Likewise, external pressures due to the rise of the network society pose questions about the role of universities. These questions affect the concept of information systems. Thus, it is time to review the conceptual framework for campus information systems, focusing on strategic information management of higher education institutions in networked environments. Characterisation is established and discussed, with special attention paid to students as the main users of campus information systems.

BACKGROUND: UNIVERSITIES AND THE RISE OF THE NETWORK SOCIETY

Campuses have offered students an information infrastructure, faculty and administrative staff to assist them with the different aspects of university life, ever since the first universities were founded in Europe during the Middle Ages. These infrastructures were traditionally based on two principal elements: documents on paper and face-to-face communication (Brown & Duguid, 2000). However, at the end of the 20th century, the rise of information technology and electronic communication radically altered the potential for exchange of information on university campuses. In the first half of the 1990s, there were perceptible changes in the situation on campus (McClure & Lopata, 1996), but it was widespread use of the *World Wide Web*, from the mid-1990s onwards, which produced a qualitative leap in the potential of online information at universities.

The situation of campus online information infrastructure during the years immediately before and after the widespread use of the *World Wide Web* highlights two interesting features: firstly, the rapid and random spreading of electronic information resources makes them difficult to manage globally, from a strategic point of view (Long, 2000); and secondly, although the technologies for electronic information were largely invented within the university environment, their systematic introduction and use in this environment are neither rapid nor easy (Daniel, 1999). The problem of effective introduction was dealt with by Bates (2000), who focuses particularly on the application of new technologies in university teaching. More recently, these problems continue and represent social and strategic challenges for higher education institutions (Folkers, 2005).

Similarly, the rise of the network society, as conceptualised by Castells (1996), poses a wide range of external pressures on universities coming from the labour market, and political and competitive environment, such as increasing demands for a skilled workforce, informational competence or collaborative work (Duderstadt, 2000); local governments want higher education institutions to contribute to developing the knowledge economy in their geographical area; recruitment of students with new and changing profiles (for instance, international students). All in all, the higher education environment has become much more complex and competitive than before (Barnett, 2000; Michael, 2005). In this context, students increasingly demand higher performance from the campus information system in its widest sense, that is, including not only academic aspects, but also administrative and social support (Cornford, 2003).

The initial, technology-focused concept of "academic networked environment" from McClure and Lopata (1996) and the EDUCAUSE[1] (2003) list of information

resources to be taken into account by students choosing universities are both relevant conceptual landmarks for campus information systems in this new context. Likewise, to enable strategic information management in universities, a socio-technical view of information systems and information resources in organizations (Checkland & Holwell, 1998; Boisot, 1998) must be taken into account.

CAMPUS INFORMATION SYSTEM: CONCEPTUAL FRAMEWORK

Taking into account last section's conceptual basis, as well as Boisot and Canals (2004), we set a conceptual framework about this topic. First, we take the following working definition of a campus information system (CIS): an interrelated group of information resources, accessible by computer through the campus's institutional external and internal Web environment, which a university places at the disposal of its users to enable them to consult it and/or provide a selection of data significant and relevant in the wide context of their university life in its academic, administrative and social senses.

It should be noted that the system is seen as a support infrastructure for the user, in accordance with Star and Ruhleder (1996), Checkland and Holwell (1998) and Srinkanthan and Dalrymple (2005). That is to say it is intended to provide the user with various data to help him or her in university matters. In addition, taking as a reference point the socio-technical concept of information systems (Checkland & Holwell, 1998; Boisot, 1998), it is considered that the existence of contents and services implies the availability of certain technological elements (computer applications), but, in addition, of an adequate organizational environment in order to make it really available and useful. Both kinds of elements form the infrastructure. For instance, the fact that certain online information resources are available to the student user implies their effective adoption by the teaching staff who, in this respect, form part of the organizational infrastructure from the student's point of view.

Therefore, we need a definition for information resource. The working definition of an information resource is as follows: an element of infrastructure which enables the transaction of certain selected significant and relevant data, prepared so as to provide content and information services that can be used directly by the user. It is necessary to establish some minimum socio-technical requirements for an element to qualify as a resource. Examples of resources for students are course information prior to registration and course reading lists.

Similarly, in order to characterise a campus information system, the concept of an information attribute is useful, and defined as: the qualitative aspect of information transactions offered by the resources. Each attribute can be applied to each and every one of the resources and has a finite set of possible values. This implies the definition of certain decision criteria with respect to assigning a value from the group of possible values to a particular attribute. Possible values will be discussed in the next section. Examples of attributes are the level to which the information is structured and the extent to which it can be managed online.

Thus, to broadly characterise the campus information system we can define a matrix, with a number of rows equal to the number of information resources to take into account and a number of columns equal to the number of attributes defined.

As an example, we describe a model used for fieldwork in Spanish universities to compare campus information systems for students in a set of 65 higher education institutions, that is, practically the whole Spanish higher education system, excluding very recently founded institutions (Cobarsí, 2005).

A list of 17 key resources was defined (8 academic, 3 administrative, 6 social). The classification of resources in these three areas of university activities comes from EDUCAUSE (2003) and the list is based mainly on the aforementioned source and Bernstein et al. (2000).

- **Academic:**
  - Information about subjects prior to registration
  - Subject-specific Web site for students from the same class
  - **Library:** Catalogue
  - **Library:** Subject bibliographies
  - **Library:** Document acquisition service
  - **Library:** Electronic bulletin of specialised news
  - **Library:** Complaint and suggestion forms
  - Exam archive

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