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DOSSIER "INNOVATION AND GOOD PRACTICES IN UNIVERSITY GOVERNMENT AND MANAGEMENT"

DOSSIER

Innovation and Good Practices in University Government and Management

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Abstract

This brief introductory article t akes a look at the main topics of this Dossier (innovation, good practices, government and management) in order to put them in context, to guide their scope and to open them up to experts with an interest in them.

Keywords

university; innovation; good practices; government; governance; management

Innovación y buenas prácticas en el gobierno y la gestión de las universidades

Resumen

Se presenta un breve artículo introductorio sobre los principales ejes de este monográfico (innovación, buenas prácticas, gobierno y gestión), con ánimo de situarlo en contexto, orientar acerca de su alcance y abrir perspectivas a los expertos interesados en estos temas.

Palabras clave

universidad, innovación, cambio, buenas prácticas, gobierno, gobernanza, gestión

The Dossier of this monographic number of *RUSC*-Universities and Knowledge Society Journal focuses on a theme that is high on the agenda of many university managers and stakeholders in countries where the socioeconomic situation is similar to that of Spain. The reason for this choice of theme was not the situation that Spain is currently experiencing, though it does make it all the more relevant.

The title contains four key concepts: innovation, good practices, government and management. It may sound overblown, but the aim is to draw attention to a problem[1] that affects interuniversity teams' teaching and/or research (and even the RD&I system). Given that such teams make important and vital contributions to every facet of life outside the sphere of higher education, it goes without saying that the impact of the problem can also be discussed from the perspective of the UOC (Open University of Catalonia). This introductory article therefore intends to provide a general overview, without being exclusive or excluding.

The concepts referred to in the title are issues that have a major impact on many national university systems, and public systems in particular. In principle at least, the government and the management of institutions in private university systems are autonomous and more flexible, and they can more readily implement changes than those in public systems. This is, of course, assuming that they have leaders with vision and values.

Innovation and good practices are considered or interpreted differently in the various national systems:[2] European, North American, Latin American, Australian, North African, South African, Asian or Far Eastern. That is why anyone interested in these issues should have a global overview while focusing on the systems that are either closest to them or more relevant to their vision and interests.

1. Innovation and change

The word 'innovation' has been fashionable for several decades. It may have different meanings and content for different people. It is connected with the introduction of changes, with new of ways of seeing or doing things. The most intensively or extensively cited definition is perhaps the one by the Austrian economist J. Schumpeter, with the updated view of M. Porter. In reality, that point of view, which is very popular in the world of business, implies that innovation is the creation or modification of a product in order to introduce it in the market. Many variants of that concept have developed over the years, possibly around its core, which is 'creating, modifying or changing', with the addition —as an essential complement— of the answer to the question: Why?

In our case, it is a matter of innovating or changing: Why? And also how? This is an important matter to which attention is not always paid. Change may be sought without really knowing which direction to take or what the destination is. In this case, any innovation or change in any direction might be right and proper.

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1. A problem to which, *a priori*, there is neither a solution nor a perceived solution.
2. And even within them.

It would seem logical to think that a change in the form (and also the content?) would be sought, since this is where various aspects of the functions of universities at the service of society have been implemented.

2. A network society

We live in a society that has changed and is changing a lot. This may sound redundant, since society has always changed, and a lot, and that is the feeling its members no doubt had at a given time. Recently, however, that change is also being modulated by the persistent and very deep structural crisis of the current economic system of the so-called 'developed world'.

Current change is fast, deep and global, in a network world and on the World Wide Web. Changes have always existed, and most of them were probably considered equally as 'deep' for the generations living through them at a given time. But 'fast' and 'global' are the distinguishing traits of the current model; we are experiencing a fast global change. And, playing a major role in that process are information and communication technologies (ICTs), which are not just a technological support for the current network society. Although the term was not coined by the sociologist M. Castells, he has used it widely and endowed it with content.

As alluded to earlier, in order to change or innovate, it is essential to know which direction to take and why.[3] This is perhaps the point where the reason for and the direction of the change begin to diverge. This is a matter of content, which began to discussed and guided at the World Conference on Higher Education (UNESCO, Paris, 1998). Many years have gone by since then, but it is considered to be the last effort that was made on a global scale. It is a document that scholars and change managers really ought to revisit.

However, content issues that have such enormous scope were not intended to be dealt with in this monographic number, and that is why the concept of 'good practices' accompanies the word 'innovation': this is much more modest and, needless to say, practical.

3. Aspects of innovation

Innovation or change[4] can occur in any of the functions of universities at the service of society:[5] 1) teaching; 2) research; 3) management. It should be noted that this is the order in which they are usually expressed. Though the logical order would be 2-1-3 (research, teaching, management), since the creation and application of knowledge should come first. However, the order that

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3. By the way, it is quite hard to reach any agreement on either in the socioeconomic context.

4. Change, why and how? Without wishing to shock anyone, here it would be worth thinking about what their target audience is (to enable them to be considered as innovations). In other words, who benefits from them, who needs them and who wants them?

5. In this article, the assumption is that they are the traditional ones, so as not to introduce greater complexity.

society appears to demand is 1-3-2 (teaching, management, research). Something appears to be amiss.

From the internal viewpoint of universities, it would be worth considering the following as current functions:

A) Learning, for both students and lecturers (instead of simply teaching in the case of the latter). In other words, transferring, sharing and disseminating knowledge. Here, the meaning of the term 'knowledge society' comes into play, with the help of the network society; thus, the shared creation and application of knowledge can also be included.

B) Promoting and being a distinctive, important and renowned hub of the global RD&I system. In other words, creating, applying and questioning knowledge.

C) Managing the system that supports the two previous functions, thereby adding value to it. Here, various innovations occurring in general management and talent management can be considered. This implies deep-seated changes in mindsets and actions in relation to the views generally held on this function, which is even considered to be residual.

D) Governing, considered as running the university community and guiding it towards achieving its goals (in terms of its raison d'être and values), based on the formulation, implementation and evaluation of a strategy. And doing so in a context where the 'Ivory Tower' notion of universities is dwindling and interaction with university system stakeholders is increasing.

In theory, interaction can occur in every single one of the aforementioned functions. Depending on the function, change is easier or harder, has a greater or lesser impact, and requires more or less funding. In the case of Spain, these issues are well addressed in the Report of the Committee of International Experts EU2015.

First of all, the biggest and best innovations have occurred in the RD&I system, as a result of both the power of the human mind and accumulated knowledge; in the current era, development and technological innovation have revolved around ICTs. Such innovation, the least regulated and most dependent on the capacities of teams, is nuanced and modulated by the funding system, as has always been the case.

Secondly, innovations are occurring in aspects of teaching (learning, for both students and lecturers). Such aspects might be:

a) Content: What to learn?

b) Methodology: How to learn?

c) Time: When to learn?

d) Place: Where to learn?

These changes are probably the ones with which university teach staff are most familiar, as are the most experienced students. In principle, they are not actually hard to implement, because universities have quite a lot of autonomy in this respect. They are often driven by the sheer determination and

hard work of isolated lecturers or groups, who either give up or disband because they do not receive the appropriate backing.

Changes in management and, above all, in government are rare and complex, and not necessarily because they require greater funding, which is not the case. In recent years, the term 'governance' has been introduced as a conceptual innovation of the term 'government'. The change[6] is interesting, especially when taking account of the definition of the term contained in the dictionary of the Royal Spanish Academy (the body in charge of regulating the Spanish language): Art or way of governing, the objective of which is to achieve lasting economic, social and institutional development by fostering a healthy balance among the State, civil society and the market economy.

The Dossier of this monographic number of *RUSC*-Universities and Knowledge Society Journal comprises a selection of six articles that either present specific cases of good practices or reflect on important issues for innovation and change, as described in this introductory article.

References

CASTELLS, Manuel (1999). "Internet y la sociedad red". Inaugural lecture of the UOC's doctoral programme on the Information and Knowledge Society. [Accessed: 5 June 2012].
<http://www.uoc.edu/web/cat/articles/castells/castellsmain2.html>

MINISTERIO DE EDUCACIÓN, CULTURA Y DEPORTE (2011). "Daring to reach high: strong universities for tomorrow's Spain". Report of the Committee of International Experts EU2015. Madrid. [Accessed: 5 June 2012].
<http://www.educacion.gob.es/dctm/ministerio/horizontales/prensa/documentos/2011/10/ingles-informe-finaleu2015.pdf?documentId=0901e72b80f76c29>

PORTER, Michael (1998). *On Competition*. Harvard Business School Publishing.

PORTER, Michael (1990). *The Competitive Advantage of Nations*. New York: Free Press.

SCHUMPETER, Joseph (1978). *Teoría del desenvolvimiento económico*. Mexico: Fondo de Cultura Económica. Fifth edition.

UNESCO (1998). "World Declaration on Higher Education for the Twenty-First Century: Vision and Action". World Conference on Higher Education. Paris. [Accessed: 5 June 2012].
<http://www.unesco.org/education/educprog/wche/declaration_eng.htm>

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6. Which is not simply semantic.

About the Author

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He has undertaken his academic work (research, innovation, teaching and university management) at a number of universities: Complutense University of Madrid, University of Zaragoza, University of La Laguna (Tenerife), Polytechnic University of the Canary Islands, University of Las Palmas de Gran Canaria, UOC (Open University of Catalonia) and UNED (Spanish National University of Distance Education).
He held the post of senior visiting scholar at the University of British Columbia (Vancouver, Canada) and at the University of Guadalajara (Mexico).
The university managerial posts that he has held include vice-rector of the UOC, vice- rector of the University of La Laguna (Tenerife), rector of the Polytechnic University of the Canary Islands, rector-founder of the University of Las Palmas de Gran Canaria and director of the UNED Regional Network Centre for Catalonia. Other notable positions that he has held include general manager of the Strategic Plan for Las Palmas de Gran Canaria, member of the team that drafted the Universia Strategic Plan and creator-promoter of three UNESCO Chairs at two different universities.
His current lines of work and interest are: managing change and complexity at universities; governance, leadership, strategy and human capital; talent management and open innovation; knowledge workers' skills; development of personal and interpersonal competencies.

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Dossier "Innovation and Good Practices in University Government and Management"

Higher Education Governance Reform in Practice. Matching Institutional Implementation Practices and Policies

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Abstract

Governance is one of the most important higher education policy reform areas in the European Commission. The experience of many years in this field shows that in Europe the diversity of both higher education systems and higher education institution typologies is an important aspect to consider when assessing which governance model to apply in each case. Due to this diversity, there is no ideal governance model for each institution and/or higher education system, and the most ap-

propriate strategy to follow varies depending on the mission and typology of each higher education institution. The increasing tendency towards the globalization of higher education and the economic crisis are impacting directly on universities, forcing them to position themselves in this context. Implementing an appropriate governance model according to the corporate strategy of choice is essential, although good practice models in one case might not be directly applicable to another.

The European Commission works in parallel with two types of governance instruments: firstly, policy instruments to promote the exchange of good practice and mutual learning between and among governments, countries and institutions. In recent years, the need for transparency regarding how different higher education institutions perform in the various fields where they operate is of increasing interest. Moreover, financial instruments available through programmes such as Erasmus facilitate the development of pilot projects and studies presented at the initiative of transnational consortia. This article reviews the latest trends in higher education governance in Europe, with special emphasis on the need to preserve the diversity of higher education systems and institutions through transparency tools, showing relevant examples of cooperation projects for improving governance practices.

Keywords

La reforma de la gobernanza de la educación superior en la práctica. Puesta en práctica de los objetivos políticos en la gestión universitaria

Resumen

La mejora de la gobernanza es uno de los temas más importantes de la agenda política de la educación superior en la Comisión Europea. Tras muchos años trabajando en este campo, la experiencia demuestra que en el caso de Europa es importante considerar la diversidad de sistemas educativos y de tipologías de instituciones de educación superior a la hora de analizar los modelos de gobernanza que han de aplicarse en cada caso. Esto conlleva que no exista un modelo de gobernanza ideal para cada institución y/o sistema de educación superior, y que la estrategia varíe según los objetivos y el tipo de cada institución de educación superior. La creciente globalización de la educación superior y la crisis económica están afectando directamente a las instituciones, obligándolas a posicionarse en este contexto. Implantar un modelo de gobernanza adecuado a la estrategia institucional elegida es esencial, si bien los modelos de buenas prácticas que pueden usarse en un caso no son directamente aplicables a otro.

La Comisión Europea trabaja con dos tipos de instrumentos en el área de gobernanza: por un lado, los instrumentos políticos fomentan el intercambio de buenas prácticas, el aprendizaje mutuo entre gobiernos, países e instituciones, y la creación de herramientas para la rendición de cuentas. Por otro lado, los instrumentos financieros a través de programas como Erasmus facilitan la elaboración de proyectos piloto y estudios que se presentan a iniciativa de consorcios transnacionales. Recientemente está cobrando importancia la necesidad de proporcionar mayor transparencia en cuanto a la actividad y la eficiencia con la que trabajan las instituciones de educación superior. Este artículo revisa las últimas tendencias de la gobernanza en Europa, con especial énfasis en la necesidad de preservar la diversidad de sistemas y tipos de instituciones a través de las herramientas de transparencia para líderes institucionales, dando ejemplos de los proyectos de cooperación más relevantes en materia de gobernanza.

Paraules clau

1. Introduction

Governance is one of the main policy reform areas on higher education modernisation agendas. Higher education governance involves not just aspects of internal university governance, but also the roles of the state and external stakeholders. This is a complex reform area covering many aspects of higher education systems and their day-to-day operation, such as human resource management, funding, quality assurance, course planning, access and internationalisation.

The importance of this reform area is underlined in the European Commission's 2011 communication on the modernisation agenda for higher education, which signals higher education governance (together with funding) as one of the key areas for action. The focus on governance reform in the 2000/2010 period was characterised by widespread reform efforts in EU member states, where the main trend was to increase institutional autonomy. Higher education institutions are legally autonomous in all EU states, although the degree of autonomy varies from country to country. Supported by the assumption that institutions with greater autonomy are more capable of focusing their institutional strategies on their particular strengths and of adapting to a changing environment at regional and international levels (European Commission 2006, 2011), all European countries have framed institutional autonomy national accountability systems (involving assessment and checks) to ensure that institutions respond to societal needs. At the same time, institutional autonomy has been combined with appropriate accountability mechanisms such as performance contracts and multi-year agreements between states and institutions. As a reaction to this, the position of executive heads of institutions has been strengthened and new institutional governance bodies such as advisory or supervisory boards have been introduced in a number of institutions, usually including external stakeholders. However, it remains essential for higher education institutions not to be constrained by over-regulation that would otherwise prevent them from achieving the aspirations that society expects from them.

In parallel, institutions nowadays have to justify their performance to a greater extent than in the past, notably as a result of introducing external quality assurance systems. This is placing new demands on senior management within higher education institutions, which calls for a professionalisation of such management, including through training. This need for further leadership and management is also reflected as a priority topic in EU programmes.

At systemic level, the challenge posed by the diversity of typologies and missions of higher education institutions is a very important related aspect, which raises challenges for governance and quality assurance in higher education. In Europe, this diversity is regarded as a positive characteristic since diverse higher education systems are more responsive to rapidly changing social and economic needs. For instance, it is considered positive to respond to challenges such as those that seek to better serve the needs of an increasingly heterogeneous population of learners. Furthermore, reforms such as those promoted within the framework of the Bologna Process have resulted in the creation of even more diverse typologies of higher education institutions with different missions, and the economic crisis will probably reinforce this tendency towards diversity by forcing institutions to better place themselves by analysing their strengths and weaknesses within their context and by defining strategic action plans accordingly.

Increasing diversity calls for transparency as a key element in the EU strategy for the modernisation of higher education systems. Clearer information on the performance of institutions can inform the choices of students, employers and policy makers. University managers are also direct beneficiaries of transparency since many institutions are unaware of the areas in which they excel (apart from specific cases mainly within the research mission). Higher education institution leaders and managers could increase the effectiveness of their decisions, in particular to strengthen the relevance and quality of teaching and research, labour market outcomes, and innovation and entrepreneurship. Institutions benefit from transparency since it allows them to better position themselves and improve their development strategies, quality and performance.

This article reviews the contribution of the European Commission to issues of governance and transparency in relation to the challenge of modernising European higher education. To that end, the EU has a number of policy and funding instruments. Furthermore, policy priorities within EU funding programmes are aligned with such objectives. The review examines the main actions in this area, with a focus on specific examples of tools and actions directly related to the improvement of institutional governance. Section 2 presents the impact of diversity in higher education governance reforms, and section 3 briefly describes the main EU policy instruments in this area. Section 4 presents examples of projects addressing the improvement of institutional governance funded by the EU.

2. Higher education governance in a diverse landscape

The importance of diversity as regards governance reform is underlined in the main European documents on higher education, both at national and EU levels, stressing the need to take account of the variety of higher education system types (with national characteristics) and institutions (which vary in size, missions and profiles). Institutional diversity is considered one of the key strengths of higher education in Europe.

Some of the reasons for increased diversity in Europe are connected with Bologna Process reforms, which have a direct impact on the quest for new governance models: one of the effects is the creation of new types of institutions in some countries, which demand non-traditional governance models for their success; another is the increasing tendency of higher education institutions to merge into bigger organisations to foster cooperation and efficiency, which has led to discussion about the most appropriate governance models for managing such institutions.

The importance of the link between governance and diversity gave rise to a meeting of Director Generals for Higher Education of EU Member States on this topic under the Hungarian Presidency of the EU in Budapest in April 2010. The need to address diversity was not only reviewed at systemic level, but in particular at institutional and programme levels. At the meeting, there was general agreement on the need to encourage institutions to profile themselves in all missions, identifying their main strengths and resources; it was also felt that institutions could excel in many important dimensions other than research, such as teaching quality, knowledge transfer and innovation, or even internationalisation.

In order to achieve a greater diversity of profiles, efforts are required to give higher visibility and rewards to dimensions other than research, and in particular to teaching quality. These dimensions/profiles should be reflected more clearly in career paths and instruments, such as quality assurance and funding mechanisms, particularly ensuring that academic staff that demonstrate excellence in teaching quality are recognised adequately. As a reaction to this aim, countries such as Finland, Denmark and the Netherlands are now working on the development of funding that is more multi-dimensional, awarded according to missions, performance targets and/or quality assessments. In some countries, this can represent up to 30% of total funding, while it is considered expedient to keep a strong funding basis related to student numbers and graduates. Unfortunately, an optimal model with a full set of performance and assessment indicators for the non-research dimensions does not yet exist. European initiatives such as U-map and U-multirank, described later, aim to bring more transparency to these other important missions of higher education systems and institutions, and to improve existing tools along those lines.

As positive as diversity may be, it also has the consequence of making it impossible to propose an ideal governance model for all higher education institutions and systems, thus rendering the debate on the subject more complex. Diversity in demographic changes, national enrolment targets and expected further expansion affects the appropriateness of governance models, of the best typology of institutions or of the nature of study programmes.

Furthermore, increasing diversity puts strain on existing quality assurance and evaluation systems. There is a need for flexibility in quality assurance applied to more innovative and required activities. Efforts need to be made, for example, on the evaluation of institutional capacities for self-evaluation and internal quality assurance, on the assessment of lifelong learning activities, and on the strengthening of the role of various feedback mechanisms (such as surveys of graduate labour market success). In parallel, funding mechanisms and appropriate incentives for academic staff should be adapted to the conditions of increased diversity to recognise their involvement. Moreover, the involvement of academic staff is considered essential to ensure the quality of actions such as the international mobility of students and excellence in teaching, and in some countries the lack of recognition of such activities on the same level as research activities is considered to be demotivating even. Quality assurance systems must also address this diversity for a fair evaluation of the work of each institution according to its profile, recognising excellence in its various dimensions.

At programme level, tailor-made programmes for non-traditional learners and flexible learning paths are increasingly required, especially nowadays due to the impact of the economic crisis. There is consensus on the need to reduce the existing gap between societal needs and the institutional perception of such needs. This and some of the aforementioned challenges call for a better involvement of relevant stakeholders in decision-making processes, including those outside the higher education sector (e.g., employers or civil society representatives). Such involvement of external stakeholders can be articulated by representation on the governance bodies of institutions, by specific project-based cooperation agreements, by staff and student mobility actions, and by other means.

3. Main European Union policy initiatives on governance

This section reviews the main lines of action within the European Commission's policy instruments on the governance reform area, notably those related to diversity, transparency and cooperation with relevant higher education stakeholders. These can be divided into three categories as follows:

3.1 Reports on the impact of governance reforms across Europe

At the time of writing this article, the latest state-of-the-art research on governance reform at European level was an independent study providing an in-depth overview of policy changes and reforms in the governance domain of European higher education over a period of 10 years. This study entitled "Impact of Higher Education Governance Reforms across Europe (2006-2010)" was conducted together with independent studies on curricular and funding reform areas in higher education.

The study highlights the diversity of the European Higher Education Area: the different governance aspects of higher education modernisation agendas have been addressed to varying degrees in different countries, although further reforms are deemed necessary, especially to allow universities more institutional freedom. The report concludes that under the right conditions, with sufficient funding and smart financial incentives, institutional autonomy has a direct positive effect in terms of performance in the primary processes of universities. As the study underlines, there appears to be a link between the output of the primary processes (numbers of graduates and articles published) and the level of institutional autonomy.

The study provides recommendations on the need to revisit the balance between autonomy and accountability, mentioning that what seems to be gained in terms of autonomy might too easily be lost on excessive accountability requirements. Traditional means of state regulation and state micro-management tend to be replaced by new methods of accountability and reporting to other authorities, calling for the need to assess the means and ends of accountability in European higher education.

Finally, the report underlines the need for increased investment in higher education and research across Europe, without which it is unlikely that universities will be able to completely fulfil the growing expectations of their role within the European knowledge society and their overall contribution to European competitiveness. Governance reforms in combination with sufficient levels of funding are likely to contribute to enhanced system performance. This requires the balance of public and private investment in higher education and research to be revisited.

3.2 Strengthening university-business cooperation

Business involvement in higher education is a horizontal topic with clear positive effects on funding and governance reforms, as well as on ensuring that curricula are up to date and meet the needs of employers and society. With the aim of supporting closer cooperation between the worlds of

academia and work in Europe, the European Commission annually organises the University-Business Forum, a platform to foster dialogue and actions on issues like lifelong learning, mobility, entrepreneurship, knowledge transfer, curriculum development and delivery, and governance.

The Forum contributes to a structured dialogue between the two spheres, demonstrating both parties' interest in working in partnership. In order to support implementation, a pilot action called "knowledge alliances" was launched in April 2011 (with a view to continue being implemented annually) to ensure greater societal and economic relevance and outreach of higher education by strengthening the employability, creativity and innovative potential of graduates and lecturers, and the role of higher education institutions as drivers of innovation.

3.3 Transparency initiatives on mapping and ranking missions and performance

The European Union's higher education modernisation agenda underlines the importance of transparency and diversification based on the strengths of the different higher education institutions. In order to identify these strengths, institutions need tools that allow them to benchmark themselves against other higher education institutions at national and international levels.

The European Commission supports several initiatives to develop tools and policies to improve transparency. One of the most relevant is the EU sponsored U-map project. U-map developed a classification model to categorise the rich diversity of higher education institutions, taking inspiration from the well-established Carnegie Classification in the United States. This methodology categorises higher education institutions according to different missions: teaching and learning, research, innovation and knowledge transfer, regional engagement and internationalisation.

The relatively recent existence of higher education rankings had a considerable influence over governance decisions in many institutions. Unfortunately, in many cases this reaction was unexpected and has a dubious positive impact, especially as regards diversity: the vast majority of existing rankings focus narrowly on the research dimension, ignoring performance in areas such as teaching, internationalisation, innovation and community outreach. In doing so, they do not cover the diversity of higher education and, in practice, they are known to include no more than around 3% of higher education institutions worldwide.

In order to improve this situation, and since it is commonly accepted that despite the drawbacks of exiting rankings they are here to stay, the European Commission launched in 2009 the feasibility study entitled "Design and testing the feasibility of a Multidimensional Global University Ranking", also known as U-multirank, which designed and tested a personalised multi-dimensional ranking concept, covering performance in five dimensions: research, teaching and learning, innovation and knowledge transfer, regional engagement and internationalisation. The main aim of the approach is to serve as a useful tool for decision making for any end user, not resulting in a single overall listing of universities (the end result would not lead to a league table). Its main characteristic is to offer users the possibility to make a personalised ranking tuned to their own personal preferences and objectives in the different areas of interest (dimensions). The study proved the feasibility of this multidimensional ranking concept, underlining that further work was still required to develop some

indicators. Furthermore, it also identified several challenges, among which the most critical is the need to further improve data in terms of availability, robustness and comparability, as well as the need to implement a strategy for periodic data collection. Some 159 higher education institutions of diverse profiles took part in the initiative, proving that institutional managers could be provided with valuable information to enable them to define governance measures and strategic plans.

As a follow-up of this study, the European Commission has recently launched (March 2012) a new call to implement a first version of this ranking towards the end of 2013, with the aim of it being published annually. This subsequent phase will build on the findings of the U-multirank study and will create a web tool enabling users to choose the type of institutions of interest (e.g., e-learning institutions, those from just a small number of countries, etc.) and then select the performance indicators of any of the five dimensions that are relevant to their search. This transparency tool is intended to provide users, such as institutional leaders, students and policy makers with more accurate performance information than the that offered by existing rankings on which to base their decision making, although as explicitly mentioned in the call, this ranking is regarded by the European Commission as complementary (and not a substitute) to other relevant higher education tools, such as quality assurance.

4. European projects on higher education governance

As one of several funding instruments of the European Commission, and as a complement to the policy initiatives presented earlier, the Erasmus programme (mainly known for student and staff mobility actions) offers the possibility to fund cooperation projects to support the objectives of the higher education modernisation agenda.

Taking the form of a call for proposals (usually with two to three year-long projects with a minimum of three partners from three European countries), the topic of higher education governance has been a priority area since 2009, and several projects have focused on pilot studies in relation to improving governance at systemic or institutional levels.

Outlined below are just some of the projects focusing on the most significant challenges relating to governance at institutional level, all of which have the highest potential to improve existing governance models both at systemic and institutional levels. They have been signalled by independent experts of the European Commission as the most innovative and/or for being examples of good practice:

- **Autonomy Scorecard:** The main outcome of this project is a report comparing university autonomy across 26 European countries. In addition to an in-depth analysis of the current state of institutional autonomy in Europe, the study includes four scorecards which rank and rate higher education systems in four autonomy areas: organisational, financial, staffing and academic autonomy.
- **European University Quality Management Tools for Lifelong Learning:** This project created a model and tools for quality management in lifelong learning (LLL) organisations and

continuing education. Its motivation is to respond to the lack of systematic tools to analyse university processes and outcomes focusing on lifelong learning. The model and tools are based on applying the EFQM model to the LLL field.

- **Shaping Inclusive and Responsive University Strategies:** Also focusing on the area of management of LLL actions, this project provides different profiles and interests in LLL, which are at different stages of LLL implementation, and an opportunity to develop and enhance their strategic LLL approaches.

- **European Higher Education Management and Development:** This project contributes to the professionalisation of institutional senior management and to improving areas such as business-university cooperation governance. It focuses on improving relevant competencies of higher education institutional leaders. It proposes a master programme to provide these professionals with the necessary qualifications for top-level higher education management competence.

- **Strategic University Management: Unfolding Practices:** This project aims to identify good practices and to exchange university strategic management practices. A platform will be created for best practice knowledge transfer. One of its main activities is desk-research into the current state-of-the-art of strategic university management projects, tools and techniques to facilitate the continuous improvement of strategic management of higher education institutions.

- **European Benchmarking Initiative on Higher Education:** Building on previous benchmarking initiatives in higher education, this project proposes a modern management tool to support progress on institutional reforms, increased operational efficiency and the capacity for innovative changes in order to adapt to new challenges in their context. Target groups are university leaders and decision makers, staff at various levels from all over Europe and other relevant stakeholders. The project focuses on four key areas: governance, university-enterprise cooperation, curriculum reforms and LLL.

- **Indicators for Mapping and Profiling Internationalisation:** This project attempts to measure the internationalisation of higher education, proposing a methodology to improve transparency and accountability in internationalisation. It is expected to provide a set of relevant indicators, a choice of individual internationalisation profiles and a potential comparison with other Europe-wide institutions.

- **Innovative OER in European Higher Education:** Beyond a strong conceptual basis for open educational resources (OER) in Europe, this project examines the innovation cycle in awareness raising, strategy building (institutional frameworks), pedagogical models, business cooperation and pilot experiments. It conducts pilot studies into areas where OER functionalities can be achieved, such as OER multi-campus (stakeholder engagement sessions) and OER internationalisation (manuals). Best practices in institutional OER development plans (with scenarios for multi-campus approaches) and institutional and multi-campus pilot experiments are analysed, and a report will be created with multi-campus best practices.

References

CHERPA Network (2011). *U-multirank: Design and testing the feasibility of a multi-dimensional global university ranking*. Project funded by the European Commission's Lifelong Learning Programme. <http://www.u-multirank.eu/>

EGGINS, Heather; WEST, Peter (2011). "The global impact of the financial crisis: main trends in developed and developing countries". *Higher Education Management and Policy*, Vol. 22, No 3.

EHEMD Consortium (2009). *European Higher Education Management and Development*. LLP/Erasmus project 133973-LLP-1-2007-1-AT-ERASMUS-ECDSP. <http://www.ehemd.eu/>

EUROPEAN UNIVERSITY ASSOCIATION (2011). *Autonomy scorecard*. LLP/Erasmus project 503328-LLP-1-2009-1-BE-ERASMUS-EMHE. <http://www.eua.be/eua-work-and-policy-area/governance-autonomy-and-funding/projects/university-autonomy-in-europe/>

EUROPEAN ASSOCIATION OF DISTANCE TEACHING UNIVERSITIES (2009). Innovative OER in European HE. LLP/Erasmus project 504004-LLP-1-2009-1-NL-ERASMUS-EVC. <http://www.eadtu.nl/oerhe>

EUROPEAN CENTRE FOR STRATEGIC MANAGEMENT OF UNIVERSITIES (2010). *European Benchmarking Initiative on Higher Education*. LLP/Erasmus project 142420-LLP-1-2008-1-BE-ERASMUS-EMHE. <http://eacea.ec.europa.eu/llp/project_reports/documents/erasmus/multilateral_actions_2008/eras_emhe_142402.pdf>

EUROPEAN COMMISSION (2011a). *Supporting growth and jobs – an agenda for the modernisation of Europe's higher education systems*. COM(2011) 567 final, 20.9.2011

EUROPEAN COMMISSION (2011b). *Progress towards the common European objectives in education and training: Indicators and benchmarks 2010/2011*. Commission Staff Working Document SEC(2011)526.

EUROPEAN COMMISSION (2010a). *The EU contribution to the European Higher Education Area*. <http://ec.europa.eu/education/pub/pdf/higher/ehea_en.pdf>

EUROPEAN COMMISSION (2010b) *New Skills for New Jobs: Action Now*. Report by the Expert Group on New Skills for New Jobs. <http://ec.europa.eu/social/main.jsp?catId=568&langId=en&eventsId=232&furtherEvents=yes>

EUROPEAN COMMISSION (2010c) *Efficiency and effectiveness of public expenditure on tertiary education in the EU, EPC and DG ECFIN*. <http://europa.eu/epc/pdf/joint_report_on_tertiary_education_-_ecofin_final_en.pdf>

EUROPEAN COMMISSION (2009). *Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Report on progress in quality assurance in higher education*. COM(2009) 487 final, 21.9.2009. <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0487:FIN:EN:PDF>

EUROPEAN COMMISSION (2006). *Delivering on the modernisation agenda for universities: Education, research and innovation*. COM(2006) 208 final, 10.5.2006. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0208:FIN:EN:PDF>

EUROPEAN UNIVERSITY ASSOCIATION (2011a). *The impact of the economic crisis on European universities*.

EUROPEAN UNIVERSITY ASSOCIATION (2011b). *Financially Sustainable Universities II - European universities diversifying income streams*.

<http://www.eua.be/Pubs/Financially_Sustainable_Universities_II.pdf>

EURYDICE (2008). *Higher Education Governance in Europe - Policies, structures, funding and academic staff*.

<http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/091EN.pdf>

IMPI consortium (2009). *Indicators for Mapping and Profiling Internationalisation*. LLP/Erasmus project 502054-LLP-1-2009-1-DE-ERASMUS-EMHE.

<http://www.impi-project.eu/>

MODERN consortium (2009). *Higher Education governance reforms across Europe*. LLP/Erasmus project 142354-LLP-1-2008-1-BE-ERASMUS-ENW.

<http://www.utwente.nl/mb/cheps/publications/Publications%202009/C9HdB101%20MODERN%20PROJECT%20REPORT.pdf>

REICHERT, Sybille (2009). *Institutional diversity in European higher education: Tensions and challenges for policy makers and institutional leaders*. European University Association publications.

ROLLWAGEN, Ingo (2011). "Diversifying the revenue base of German universities". *Higher Education Management and Policy*, Vol. 22 No 3.

SIRUS Consortium (2011). *Shaping Inclusive and Responsive University Strategies*. LLP/Erasmus project 502784-LLP-1-2009-1-BE-ERASMUS-EMHE.

<http://www.eua.be/eua-work-and-policy-area/building-the-european-higher-education-area/projects/shaping-inclusive-and-responsive-university-strate.aspx>

SUMUP Consortium (2011). *Strategic University Management: Unfolding Practices*. LLP/Erasmus project 517868-LLP-1-2011-1-ES-ERASMUS-EMGR.

UNI-QM Consortium (2010). *European University Quality Management Tools for LLL*. LLP/Erasmus project 133830-LLP-1-2007-1-ES-ERASMUS-EMHE.

<http://www.cfp.upv.es/webs/uniqm/inicio/background.jsp>

van VUGHT, Frans et al. (2010). U-Map: *The European Classification of Higher Education Institution*. Center for Higher Education Policy Studies (CHEPS), University of Twente. Project funded by the European Commission's Lifelong Learning Programme.

<http://ww.u-map.eu>

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ARTICLE

Information Technology Incident Management: A Case Study of the University of Oviedo and the Faculty of Teacher Training and Education

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Abstract

Since their introduction into higher education institutions, information technology (IT) resources have become an indispensable, dynamic and controversial component of teaching- and research-related activities. This article explores some of the complex issues surrounding such resources through a study of the most representative IT incidents that occurred at the University of Oviedo and in one of its faculties, specifically the Faculty of Teacher Training and Education. It also aims to provide some guidelines to improve decision making in this particular field, and also to disseminate a number of significant findings in relation to the use of such technologies by higher education centres.

To that end, incidents reported at the University of Oviedo (with 30,000 people across four campuses) over three consecutive academic years are analysed. Incidents occurring in computers (which may include software and peripheral devices) used by students and lecturers in the Faculty of Teacher Training and Education's classrooms are also analysed. The results obtained show that, while the number of IT devices has increased, the number of incidents has remained constant. This indicates that users are able to use them better. Most of the problems reported by the university and faculty alike were connected with software. This suggests that robust centralised services for program updating and maintenance are required.

Keywords

new technologies; IT incidents; education centre management; higher education

Gestión de incidencias informáticas: el caso de la Universidad de Oviedo y la Facultad de Formación del Profesorado

Resumen

Las instituciones educativas universitarias incorporan progresivamente los recursos informáticos, que se convierten en instrumentos indispensables, dinámicos y controvertidos en la acción docente e investigadora. Este trabajo ex post facto intenta descubrir algunos rasgos de tal complejidad, a través del estudio de las incidencias informáticas más representativas que tuvieron lugar en la Universidad de Oviedo y en una de sus facultades (Formación del Profesorado y Educación). También pretende aportar pautas para tomar mejores decisiones en este ámbito y difundir las actuaciones significativas de uso de estas tecnologías en los centros de educación superior.

Para ello se analizan las incidencias recogidas durante tres cursos sucesivos en la Universidad de Oviedo, institución que acoge a unas treinta mil personas, repartidas en cuatro campus. También se analizan las actuaciones de los equipos que utilizaron los estudiantes y profesores de las aulas de la Facultad de Formación del Profesorado y Educación. Los resultados obtenidos destacan que, aunque aumenta el número de dispositivos informáticos, la cantidad de incidencias generadas permanece constante. Esto apunta a que los usuarios saben emplearlos mejor. La mayoría de los problemas, tanto en cuanto a la institución universitaria como a la facultad, están relacionados con el software, por lo que se sugiere la implementación de potentes servicios centralizados de actualización y mantenimiento de los programas utilizados.

Palabras clave

nuevas tecnologías, incidencias informáticas, gestión centro educativo, educación superior

1. Introduction

Nowadays, education centres systematically incorporate information technology (IT) resources into every area of activity. They have become an indispensable component of teaching- and research-related activities. Rather than information processors, computers have become the cornerstones of most academic activities, both for content development and subject methodologies. Technology helps to bring the cost of such activities down, and computers (which, for the purposes of this article, may include software and peripheral devices) are ever-more accessible, powerful and portable. This evolution has a quantitative and qualitative impact on education institutions' processes (Gutiérrez, Palacios & Torrego, 2010a). Mobile telephony devices allow computer services to be used anywhere, thus blurring the boundaries between specific computing spaces and their configuration. The Internet also changes the substantial use of computers, which become media for communication and personal expression (Acikalin, 2010). Underlying this dynamic, complex phenomenon are the IT incidents that occur and the software updating and maintenance that is required.

Managers in charge of buying, distributing and maintaining computers and their network services have to re-adapt their spaces, times and educational methodologies. Such managers occasionally focus their efforts on buying resources and software; after doing so, they realise that it is not easy to find reports or comparative experiences that serve as guidance for the proper use, servicing and maintenance of such resources. This evolution marks the difference between those institutions that are able to manage technological advances and complexity effectively, and those that are not (Bozionelos, 2004)..

2. The unique, dynamic ecology of IT resources and spaces

While reviewing the literature on IT incidents, the authors considered works that analysed the following: the use of IT resources in higher education centres (Lowerison et al., 2006; Selwyn, 2007); experiences describing the unique relationship between IT resources and users in the field of education; and the direct impact of IT resources on curricular development (Biscomb, Devonport & Lane, 2008; Gutiérrez, Palacios & Torrego, 2010b; Inan et al., 2010). The authors also analysed the IT management designs of Gibert (2006) and Oyewole (2010), as well as works by Menchaca and Contreras (2009) on networked educational activities.

These studies underscore the fact that education centres are formed by people with diverse profiles and social and cultural backgrounds. As a result, IT resources have a variety of users and heterogeneous uses, thus making the phenomenon a unique case in each education institution (Shell & Husman, 2008). Moreover, the academic context dictates the handling of such resources in a unique environment of experimentation and learning, where many members of the community share the same computer. At one and the same time, this leads to innovative academic achievements and inappropriate uses, breakdowns and deviations from the educational objectives set. The close interaction between a person and a machine, and the high phenomenological potential associated

with that, means that operational guidelines are necessary. In this respect, institutions publish operational rules for IT in internal usage documents and regulations.

In the early days, computers were concentrated in specific rooms to which students had access at certain times, basically when their activities required the use of computers. They were conceived as enclosed, isolated spaces. Subsequently, they were connected via local networks so that printers and other services could be shared. Today, computers are everywhere and are open to external communications, to local interactions via Intranets and to global access via the Internet.

Many applications have become dynamic and are available on remote servers and from virtual libraries in the cloud (Witten et al., 2009); this means that users have no option but to be online, though it does relieve from having to install and maintain such programs.

While the initial goal of IT resources in education institutions is to allow users to do academic work or administrative tasks, it is easy to establish that computer users actually use such devices for other, occasionally ambiguous purposes, such as recreational activities. With access to the Internet, the choice of objectives multiplies while new activities emerge, such as visiting social networking sites or communicating via them. Although they provide a communicational dimension, they may lead to deviations from academic objectives and potential problems (Sureda et al., 2010), and that is the reason why some works suggest strict rules for the use of networked computers (Flowers & Rakes, 2000). In contrast, other works defend the unrestricted, open exploration and innovation that IT offers. In this respect, it would seem that a new profile for the 'superquick' student has emerged: the digital native (Bennett et al., 2008; Prensky, 2001; Selwyn, 2009) or the net generation (Carlson, 2005; Judd & Kennedy, 2011). This is the type of student that has the ability to multitask; he or she can do several tasks at the same time without losing attention on any of them or needing more time to do them (Bowman et al., 2010; Junco & Cotten, 2010; Willingham, 2010).

This new context is broad and hard to delimit, and centres should offer their members the opportunity to use hardware and software with certain restrictions and under specific rules, that is to say, an institution's own set of applications and computers, whether connected to a server or not, that is available to students, lecturers and administrative staff.

3. IT and communications incident management at the University of Oviedo and in its faculties

At the University of Oviedo, there are 30,000 people across four campuses: Oviedo, Gijón, Avilés and Mieres. It was essential to define the types of user of each IT resource, since software services and specific security levels vary accordingly. As a result, three types of user were defined: students (25,000), lecturers (2,020) and administrative and services staff (1,680). There are no strict boundaries between these three types of user because, on some occasions, students and lecturers may share computers and, on others, lecturers perform administrative and managerial tasks.

Incident management is performed at two action levels (Figure 1): institution level and education centre level. At institution level is the User Care Centre (UCC). This type of service is

commonplace in higher education institutions. It sorts out IT problems for the academic and administrative communities as a whole. At education centre level, which can be a specific faculty, the service provides lecturers and students with assistance for incidents arising from teaching-related activities.

Figure 1. Process of distributing IT incidents between the vice-rector's office and faculties.
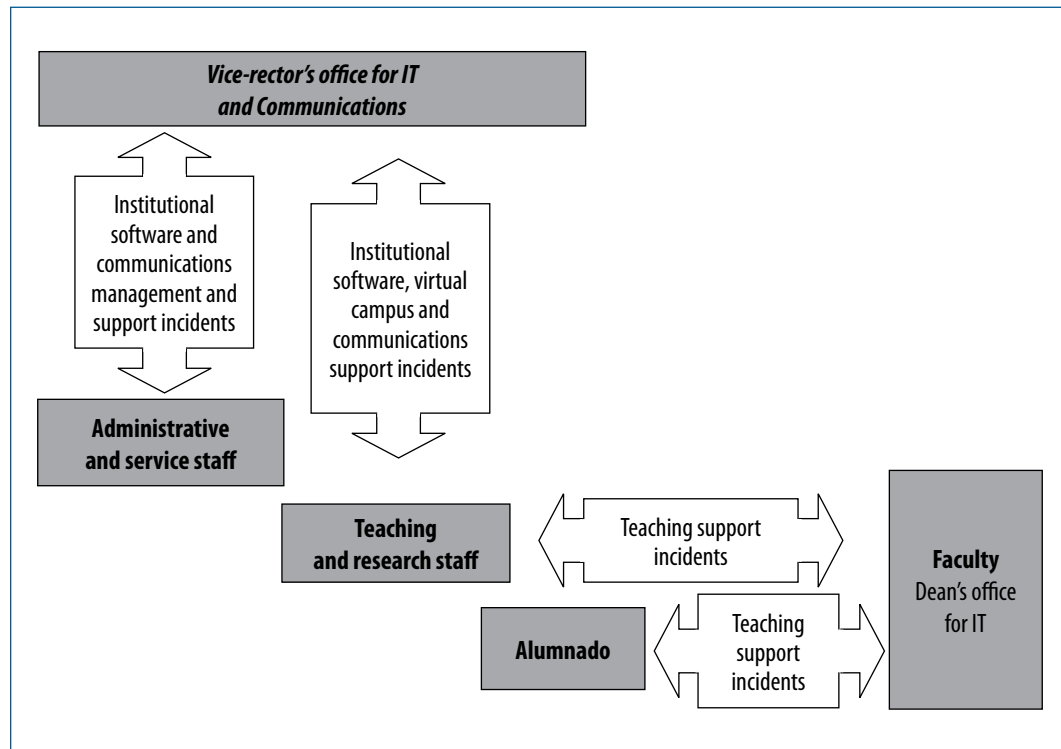
At institution level, the UCC is formed by two coordinators, 11 technicians and three telephone operators, who deal with an average of 70 incidents a day, 25 of which require the staff to visit the place where the broken down computer is located. The centre receives 833 e-mails a month. There is an automated IT incident management tool (XPERTA), as well as an institutional website for support.

At faculty level, there is a service for sorting out problems and breakdowns connected with teaching-related activities, which collaborates very closely with the university's UCC. In this case, incidents occurring in computers used by students and lecturers in the Faculty of Teacher Training and Education's classrooms were also analysed. There were 1,912 students in this faculty in the 2010/11 academic year, during which it had 170 computers for teaching-related activities (Table 1) located in a number of different spaces, as well as the associated 48 flat-screen monitors, 123 CRT monitors and 13 printers.

Table 1. Educational spaces and resources in the Faculty of Teacher Training and Education

IT resources		Non-IT resources	
Spaces	Number	Number of spaces	Resource
For teaching the students (joint lectures and seminars)	37 spaces (with 1 PC)	30	1 VHS player
For lecturers' meetings	4 spaces (with 2 PCs each)	34	1 television
Open access to students	1 space (with 25 PCs)	15	1 DVD player
IT room for teaching (a)	With 44 PCs	13	1 audio amplifier for a public-address system
IT room for teaching (b)	With 21 PCs	37	1 overhead projector
IT room for teaching (c)	With 11 PCs	39	1 video projector
IT room for teaching (d)	With 24 PCs	11	1 interactive board
Total PCs managed	170		

4. Methodology

4.1 Aim

The aim of this descriptive study is to show the most representative IT incidents that occurred at the University of Oviedo and in one of its faculties, specifically the Faculty of Teacher Training and Education. It also aims to provide some guidelines to improve decision making in this particular field, and also to disseminate a number of significant findings in relation to the use of such technologies by higher education institutions.

4.2. Data management procedure

The study was carried out at two levels: institution level and education centre level. In order to analyse the institution-level incidents affecting the university's lecturers and administrative staff, reports of breakdowns and malfunctions of IT resources were collected for the 2008/09, 2009/10 and 2010/11 academic years.

For the compilation of the incident reports, the vice-rector's office for IT and Communications had an e-mail, telephone support and fax services, all of which were centralised in the UCC. Users also had the opportunity to report an incident directly via an automated IT incident management tool (helpdesk-XPERTA). These were the means through which a user was able to report an incident to IT Services, which would then send a technician to sort out the problem. The data about the user reporting an incident were included in a log. In addition, the incidents were classified by topic, response time and resolution time.

In order to analyse education centre-level incidents affecting the Faculty of Teacher Training and Education, a short incident report form was chosen, similar to the one used by the Polytechnic University of Valencia. The form contained the following eight items:

– Incident date
– Lecturer reporting the incident
– Incident location
– Description
– Person dealing with the incident
– Incident follow-up: resolved, with the date and a brief description of its origin
– Incident follow-up: pending further action
– Remarks

These incidents were dealt with by the respective members of staff from the dean's office and by four grant-holding IT students responsible for sorting out any problems with the computers in the first instance, and then for updating software and for performing inventories and preventive maintenance of IT resources.

5. Results

5.1 Institution-level data

The number of institution-level incidents reported between the 2008/09 and the 2010/11 academic years varied between a minimum of 181 in August 2009 and a maximum of 767 in March 2009: for the 2008/09 academic year, the mean (M) was 518.75 (with a standard deviation [SD] of 150.19; for the 2009/10 academic year, M=490.08 (SD=109.9); and for the 2010/11 academic year, M=501.83 (SD=98.66). With the distribution by the months shown in Table 2, there were no statistically significant differences in the aforementioned means between the 2008/09 and 2009/10 academic years (t(11)=1.283, p=0.226), between the 2009/10 and 2010/11 academic years (t(11)= 0.655, p=0.526) or between the 2008/09 and 2010/11 academic years (t(11)=-0.549, p=0.594)

Table 2. Incidents reported to the UCC at the University of Oviedo

Incidents raised	2008/09 academic year (September-August)	2009/10 academic year (September-August)	2010/11 academic year (September-August)
Total in the academic year	6,225	5,881	5,614
Incidents raised	2008 calendar year (January-December)	2009 calendar year (January-December)	2010 calendar year (January-December)
Total in the calendar year	6,078	6,014	5,910

Table 3 shows the incident data, by type: mechanical or hardware breakdowns such as problems with a computer's mother board, power source or internal devices; program problems; network and voice or data connection failures; problems with malware and viruses; and other atypical incidents difficult to classify. Having analysed the year-on-year evolution of each incident type, there were no significant differences in hardware, software, network or any other types of incident apart from viruses.

For that variable in the 2008/09 academic year, M=32.333 (SD=15.86); in the 2009/10 academic year, M=34.66 (SD=16.42); and in the 2010/11 academic year, M=15.58 (SD=6.82). There were statistically significant differences between the 2008/09 and 2009/10 academic years (t(11)=3.788, p=0.003) and between the 2008/09 and 2010/11 academic years (t(11)=4.010, p=0.002).

Table 3. Distribution of incidents reported to the UCC at the University of Oviedo, by type and academic year

Academic year	Hardware			Software			Network			Viruses			Others		
	2008/ 2009	2009/ 2010	2010/ 2011	2008/ 2009	2009/ 2010	2010/ 2011	2008/ 2009	2009/ 2010	2010/ 2011	2008/ 2009	2009/ 2010	2010/ 2011	2008/ 2009	2009/ 2010	2010/ 2011
TOTAL	1,166 (18.3%)	1,061 (18%)	1,140 (19.1%)	3,941 (61.8%)	3,612 (61.4%)	3,790 (63.6%)	213 (3.3%)	147 (2.5%)	207 (3.5%)	388 (6.1%)	416 (7.1%)	187 (3.1%)	668 (10.5%)	645 (11%)	634 (10.6%)

The number of IT incidents, by type (Table 3), remained constant over the period analysed. Most of the problems were found to be connected with software, maintenance and program installation issues (around 61-63%). To a much lesser extent, around 18-19% of the incidents were found to be connected with mechanical and component breakdowns, 3% with communications network failures and 6% with viruses.

The times taken to sort out the incidents were analysed by distinguishing between internal hardware and peripherals (printers and mice for example). A distinction was also made between issues connected with basic software (operating system, Microsoft Office and similar programs) and corporate software (Gauss, Sies, Sicalwin). In nearly 90% of the cases, the incidents were sorted out in a period of two weeks; those connected with corporate software were the quickest to be resolved, while those connected with a computer's hardware and basic software were the slowest.

The UCC's web-based service was visited 32,118 times in 2010; visits per month varied between 1,950 in August 2011 and 4,321 in September 2011. It should be noted that the section receiving the most visits was the one for obtaining software under the university's corporate licence, which accounted for 27.4% of all visits. There was also a high number of visits connected with the configuration of Wi-Fi access, which accounted for around 10% of the searches.

5.2 Education centre-level data for the Faculty of Teacher Training and Education

At the specific faculty level, it was calculated that each computer for teaching (which, as mentioned earlier, may include software and peripheral devices) had been in operation for 10 lecture hours a day for eight months per academic year, which represented around 1,600 hours of total operating time.

Among the incidents occurring in the 2010/11 academic year, which were specifically distinguished by type (Table 4), worthy of note are those connected with software, which accounted for 53%; the most frequently requested actions were the full or partial installation of programs connected with teaching and with a computer's basic operation.

Table 4. Incidents, by type, in the 2010/11 academic year in the Faculty of Teacher Training and Education

Incident type	Number	%
Network incidents	**140**	**11.1**
Network failures, IP or Proxy checking, network management system restart	60	4.8
Password changes, username unification and/or problems with user accounts	45	3.6
Wi-Fi and software installation or laptop configuration	32	2.5
Remote desktop configuration	3	0.2
Software incidents	**671**	**53.3**
Installation/uninstallation/partial update of software in classrooms	312	24.8
Installation/uninstallation/partial update of software in open access rooms	190	15.1
Video problems (projectors or monitors)	71	5.6
Audio problems	46	3.7
Full installation of software and disk cloning	38	3
Video problems (monitors)	14	1.1
Hardware incidents	**224**	**17.8**
Replacing/checking hardware in classrooms or open access rooms	155	12.3
Replacing/checking hardware in the meeting room or lecturers' room	44	3.5
Replacing network/mains/splitter cables	25	2
Printer incidents	**78**	**6.2**
Printer problems in the open access room (including toner replacement)	37	2.9
Printer problems in the lecturers' room (including toner replacement)	19	1.5
Software and hardware incidents	**78**	**6.2**
Repairing and/or checking computers in rooms	75	6
Viruses, internal hardware breakdowns, general check, memory	3	0.2
IT management	**90**	**7.2**
Recycling/replacing computers and/or materials	40	3.2
Inventory tasks and computer labelling	26	2.1
Orders for consumables (paper, etc.) and hardware (cables, splitters, etc.)	20	1.6
Requests for IP addresses	4	0.3
Total	**1,259**	**100%**

6. Discussion

A statistical analysis of the computer incidents and breakdowns showed what had happened over three academic years. On the basis of that analysis, it is possible to extract inferences about the strengths and weaknesses of IT resources, mainly to guide preventive action efforts to ensure that incidents do not occur.

The average number of incidents reported per day to the UCC at the University of Oviedo was 25. There were some months when the level of IT activity and number of incidents were low, such as the month of August, and there were others when they were high, coinciding with the start of each semester. The total number of incidents in each academic year remained constant at around 6,000; it dropped slightly in the period from 2008 to 2010, though not significantly. This data would seem to suggest that as the number of IT resources and applications increases, so too does the users' level of knowledge with respect to sorting out problems on their own.

In the faculty, of particular note are the incidents arising from software installation and maintenance. Monitor and projector problems should also be underscored.

Even though the design of operational rules should be precise and effective, in higher education such rules are usually minimal and open to interpretation. It would seem that, at this educational level, their design does not have an impact on the number of incidents (Garlan & Noyes, 2004); furthermore, such guidelines are actually enhanced by unexpected events that occur in academic life (Koh & Frick, 2009). On other occasions, rules are considered known and are adhered to in a self-regulated way (Schraw, 2010).

These premises are combined with the challenge of providing fast incident management. To that end, a small, clear protocol was designed, as was a free-flowing communication channel with the coordinator in order to achieve problem-solving speed. So, in the faculty analysed, the rules applied to computer users were reduced to the following guidelines:

For students:

- Access with credentials and identity documents
- Opportunity to save documents on the computer or server, and on user devices
- Quota of free printouts (50 pages)
- Initial and final obligation to check the state of the computer
- No penalties

For lecturers:

- In the event of a problem, an incident form must be completed and sent to the staff in charge of following it up.

These rules were complemented by online instructions on the web page of the vice-rector's office for IT, which provided guidance on the proper use of hardware devices and software.

The compulsory nature of the initial incident report, identifying both the problem and the user, helped to ensure that the user took responsibility for the proper handling of shared resources. The education institution provided usernames that were valid throughout the students' academic periods. Using computers that required personal password authentication by a server provided security and prevented any improper use. Four hierarchical user types were created according to their permissions:

– Username and password access for a personal user, authenticated by a central server, with administrative restrictions (guest user or student) or full software management and computer control rights (administrator or lecturer).
– Generic "SUBJECT" user, showing a subject's typical documents during a session.
– Specific username and password access for the computer used; easily accessible data that are repeated across all computers in the same activity area.
– Open access without a password

The users did not completely shut down the computers, but simply closed the sessions. This reduced the boot time and prevented new users from getting access to other people's profiles. Keeping computers on at all times meant that software could update automatically at night when they were not being used.

Of particular note are specific printer-related incidents. Due to the high cost of printing consumables, classroom computers were usually connected via a network to a single printer, which maximised resources in nearby rooms or offices that might also have shared a printer. A flexible control of the permitted number of free printouts for each student (limited to 50 pages a day) was also carried out. This had a dissuasive impact on excessive consumption. Now, the tendency is to manage all documents on digital media to avoid having to print them out.

7. Conclusions

The new technological ecosystem offers people greater flexibility in terms of how and where they work. The specific barrier of the IT room is vanishing while portable personal devices are being systematically incorporated (laptops, notebooks, PDAs, pocketPCs, iPads, etc.), all of which are connected to networks via Wi-Fi technology anywhere. This makes information and communication technology (ICT) management essential in any space, including the management of computers that do not belong to the institution.

The number and variety of IT devices is increasing yet the number of incidents remains constant, and this indicates that users are better able to manage them. Most of the problems reported by the university and faculty alike were connected with software. This suggests that robust centralised services for program updating and maintenance are required. This coincides with the increase in incidents in online spaces and servers. The education centre is expanding its scope of action, and

responds to incidents in virtual places, where students and lecturers coincide in asynchronous and synchronous real time, far from traditional academic infrastructures. As a result, incidents occur in study rooms, in corridors or recreational areas, where Wi-Fi access to networks is also provided, as is access to the power supplies required to keep students' portable devices working. Such openness can compromise IT security, so it is essential to effectively manage computer access protocols. Such protocols must also ensure that they do not prevent sessions from being quickly launched.

It is necessary to share solutions to IT challenges connected with new spatial needs and new uses, where personal and academic activities come together. The management of delocalised software and the influx of portable, interconnected hardware devices mean that responses to incidents have to be given anywhere, anytime. This involves the provision of versatile, fast solutions, with minimal, flexible rules and comprehensive online support.

References

ACIKALIN, Mehmet (2010). "Exemplary social studies teachers' use of computer supported instruction in the classroom". *Turkish Online Journal of Educational Technology*. Vol. 9, No 4, pages 66-82.

BENNETT, Sue; MATON, Karl; KERVIN, Lisa (2008). "The 'digital natives' debate: A critical review of the evidence". *British Journal of Educational Technology*. Vol. 39, No 5, pages 775-786.

BISCOMB, Kay; DEVONPORT, Tracey; LANE Andrew (2008). "Evaluating the use of computer aided assessment in higher education". *Journal of Hospitality Leisure Sport & Tourism Education*. Vol. 7, No 1, pages 82-88.

BOWMAN, Laura [et al.] (2010). "Can students really multitask? An experimental study of instant messaging while reading". *Computers & Education*. Vol. 54, No 4, pages 927-931.

BOZIONELOS, Nikos (2004). "Socioeconomic background and computer use: the role of computer anxiety and computer experience in their relationship". *International Journal of Human Computer Studies*. Vol. 61, No 5, pages 725-746.

CARLSON, Scott (2005). "The Net generation goes to college". *The Chronicle of Higher Education*. Vol. 52, No 7, pages 34.

FLOWERS, Beverly; RAKES, Glenda (2000). "Analyses of acceptable use policies regarding the Internet in selected K-12 schools". *Journal of Research on Computing in Education*. Vol. 32, No 3, pages 351-365.

GARLAND, Kate; NOYES, Jan (2004). "The effects of mandatory and optional use on students' ratings of a computer based learning package". *British Journal of Educational Technology*. Vol. 35, No 3, pages 263-273.

GIBERT, Guillén (2006). *Diseño de un aula informática*. Barcelona: Universidad Politécnica de Catalunya. [Accessed: 6 June 2010].
<http://upcommons.upc.edu/pfc/bitstream/2099.1/2991/1/546841.pdf>

GUTIÉRREZ, Martín; PALACIOS, Andrés; TORREGO, Luis (2010a). "La formación de los futuros maestros y la integración de las TIC en la educación: anatomía de un desencuentro". *Revista de Educación*. No 353, pages 267-293.

GUTIÉRREZ, Martín; PALACIOS, Andrés; TORREGO, Luis. (2010b). "Tribus digitales en las aulas universitarias / Digital Tribes in the University Classrooms". *Comunicar*. Vol. 27, No 34, pages 173-181.

INAN, Fethi [et al.] (2010). "Pattern of classroom activities during students' use of computers: Relations between instructional strategies and computer applications". *Teaching and Teacher Education*. Vol. 26, No 3, pages 540-546.

JUDD, Terry; KENNEDY, Gregor. (2011). "Measurement and evidence of computer based task switching and multitasking by 'Net Generation' students". *Computers & Education*. Vol. 56, No 3, pages 625-631.

JUNCO, Reynol; COTTEN, Sheila. R. (2010). "Perceived academic effects of instant messaging use". *Computers & Education*. Vol. 56, No 2, pages 370-378.

KOH, Joyce; FRICK, Theodore (2009). "Instructor and student classroom interactions during technology skills instruction for facilitating preservice teachers' computer self efficacy". *Journal of Educational Computing Research*. Vol. 40, No 2, pages 211-228.

LOWERISON Gretchen [et al.] (2006). "Student perceived effectiveness of computer technology use in postsecondary classrooms". *Computers & Education*. Vol. 47, No 4, pages 465-489.

MENCHACA, Rolando; CONTRERAS, Salvador (2009). "Knowledge System for Application of Computer Security Rules". *Advances in Intelligent and Soft Computing*. Vol. 63, pages 9-17.

OYEWOLE, Samuel; HAIGHT, Joel; FREIVALDS, Andris (2010). "The ergonomic design of classroom furniture/computer work station for first graders in the elementary school". *International Journal of Industrial Ergonomics*. Vol. 40, No 4, pages 437-447.

PRENSKY, Marc (2001). "Digital natives, digital immigrants. Part 1". *On the Horizon*. Vol. 9, No 5, pages 1-6.

SCHRAW, Gregory (2010). "Measuring self regulation in computer based learning environments". *Educational Psychologist*. Vol. 45 (4), pages 258-266.

SELWYN, Neil (2007). "The use of computer technology in university teaching and learning: a critical perspective". *Journal of Computer Assisted Learning*. Vol. 23, No 2, pages 83-94.

SELWYN, Neil (2009). *The digital native - myth and reality*. Paper presented at the Aslib Proceedings. London: New Information Perspectives.

SHELL, Duane; HUSMAN, Jenefer (2008). "Control, motivation, affect, and strategic selfregulation in the college classroom: A multidimensional phenomenon". *Journal of Educational Psychology*. Vol. 100, No 2, pages 443-459.

SUREDA, Jaume; COMAS, Rubén; MOREY, Mercé (2010). "Menores y acceso a internet en el hogar: las normas familiares". *Comunicar*. Vol. 27, No 34, pages 135-143.

WILLINGHAM, Daniel (2010). "Have technology and multitasking rewired how students learn?" *American Educator*. No 23. [Accessed: 6 June 2010].
<http://www.aft.org/pdfs/americaneducator/summer2010/Willingham.pdf>

WITTEN, Ian; BAINBRIDGE, David; NICHOLS, David (2009). *How to Build a Digital Library*. Burlington: Morgan Kaufmann.

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"La conciencia morfológica: tendencias de desarrollo y patrón evolutivo en educación infantil y primaria" (2011). *Psicothema*.
"Nuevas técnicas de evaluación en el Trastorno por Déficit de Atención e Hiperactividad (TDAH)" (2011). *European Journal of Education and Psychology*.
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Dossier "Innovation and Good Practices in University Government and Management"

Pluralist University Government. An Analysis Proposal Based on Stakeholder Theory

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Abstract

The main aim of this article is to reflect on the possibilities of developing pluralist university government in the current political and social context, which requires university institutions to be much more open and connected to their social environments, particularly from a knowledge society perspective.

It analyses a number of aspects relating to the implementation of stakeholder participation in university government, including decision-making processes and the supervision of university activities by society, as an expression of universities' greater social responsibility.

Taking a stakeholder theory approach, it identifies the main characteristics of people, groups and institutions either affected by or interested in university affairs, and considers the importance of striking up positive relationships with the social environment.

Based on the literature in this field, the authors put forward a number of theoretical proposals to identify not only the interested parties, but also their roles in the decision-making processes of universities' day-to-day operations.

Keywords

Gobierno universitario pluralista. Una propuesta de análisis desde la teoría de los stakeholders

Resumen

El objetivo principal del trabajo es reflexionar sobre las posibilidades de desarrollar un gobierno universitario pluralista en el actual contexto político y social, que demanda a las instituciones universitarias un mayor grado de apertura y vinculación con su entorno social, especialmente desde la perspectiva de la sociedad del conocimiento.

El artículo analiza algunos aspectos relacionados con la implementación de procesos de participación de los stakeholders *en el gobierno universitario, en algunos ámbitos del proceso de toma de decisiones y fiscalización de las actividades universitarias por parte de la sociedad, como expresión de una mayor responsabilidad social de las universidades.*

El ensayo se desarrolla desde la perspectiva de la teoría de los stakeholders *para identificar las principales características que poseen las personas, los grupos o las instituciones que son afectadas por el quehacer universitario, o se encuentran interesadas en él, así como respecto de la importancia de establecer relaciones positivas con el entorno.*

A partir de cierta bibliografía relacionada con el tema, se proponen algunos esquemas teóricos para identificar cuáles son las partes interesadas de la universidad, así como el rol que les compete en la toma de decisiones en diferentes procesos asociados al día a día universitario.

Palabras clave

gobierno universitario, teoría de los stakeholders*, responsabilidad social universitaria, participación social, toma de decisiones, educación superior*

1. Introduction

Since university access was opened up to the masses, the importance of the relationship between universities and society has grown. Higher education is now among the range of aspirations, claims and needs of diverse individuals and social groups, all of whom identify knowledge and education with success and social and economic benefit.

From a theoretical perspective, one aspect that influences stakeholder identification is the way in which the analysis is shaped by an organisation's approach to social responsibility, which requires that stakeholders be placed at the centre of an institution's management practices (Cortina, 2006).

Properly identifying the interested parties is the first step in the process of implementing the concept of social responsibility in organisational management, a situation endorsed by Moneva (2007), who asserts that the first step in the strategic process of CSR[1] is to define the parties participating in the organisation. Along with this comes the need to identify who the stakeholders of the organisation are.

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1. Corporate social responsibility.

Since it is so important for organisations to identify such stakeholders, there is an obvious need to speak of decision-making from an institutional viewpoint, a subject which, within the organisational management sphere, is related directly to its government.

This article discusses the possibilities of applying stakeholder theory to shape pluralist university government that enables the various interested parties to participate in the decision-making processes of university affairs, beyond the typically passive role of stakeholders in accountability procedures that universities implement (e.g., by publishing social responsibility reports).

2. Stakeholder theory

Stakeholder theory was first systematised by R. Edward Freeman in 1984 (Donaldson & Preston, 1995; Lozano, 1999; Post et al., 2002; Matten et al., 2003). From a strategic management perspective, it defines this concept as "any group or individual who can affect or is affected by the achievement of the organisation's objectives" (Freeman, 1984).

A key aspect in this theory is to identity the stakeholders in each organisation, since it is often unclear who the interested parties are due to the many forms, characteristics and definitions that interest groups may take (Lozano, 1999; Hax, 2006; Setó, 2007).

Some criteria for identifying the stakeholders in an organisation are related to the distinction as to whether they are internal or external. Executives, employees and shareholders form the first group, while the second encompasses customers, suppliers, public organisations and financial entities, among others (Lozano, 1999; Moneva, 2005; Marín, 2008).

In turn, stakeholders can be classified as primary or secondary (Clarkson, 1995; Marín, 2008); all the actors connected with an enterprise's production process are *primary* stakeholders. The environment and public administrations are *secondary* stakeholders.

It is usual for organisations to limit their identification of stakeholders to formally instituted groups (e.g. trade unions) or to groups with which they have contractual relationships (e.g., employees, customers and suppliers) (Post et al., 2002; Antonacopoulou & Meric, 2005; Hax, 2006).

Yet Mitchell et al. (1997) indicate that both the stakeholder theory put forward by Freeman in 1984 and later versions are missing the same aspect: they do not provide objective criteria for determining clearly and accurately when an individual or group qualifies as a stakeholder of an organisation.

So those authors propose three criteria that an individual, group or institution must fulfil in order to be recognised as stakeholders in an organisation:

- Power: the capacity to achieve the results they desire in a co-active manner, by using physical force, money or rules;
- Legitimacy: the generalised opinion of citizens that the actions of individuals or organisations are desirable and suitable, in accordance with the rules, values, beliefs and definitions particular to that social system;

- Urgency: the degree to which the claims of the interested parties require immediate attention, based on the existence of two conditions: (1) the claim is time-sensitive; (2) the claim is important or critical to the stakeholder.

Under these criteria, Mitchell et al. (1997) identify a typology of stakeholders based on the presence of one or more proposed elements, recognising the more dominant nature of urgency with regard to claims that stakeholders place on an organisation.

Table 1. Categories, attributes and types of stakeholders.

Stakeholder category	Attribute held	Stakeholder types
Latent	Power	1. Dormant: their most immediate concern is to acquire a second attribute (legitimacy or urgency).
	Legitimacy	2. Discretionary: their relationship with the organisation moves in a philanthropic sphere, given that they neither hold power nor have any urgent claims to satisfy.
	Urgency	3. Demanding: they have a clearly formed claim, but do not possess enough force or social recognition for their claim.
Expectant	Power and legitimacy	4. Dominant: the interest, expectations and claims of these individuals or groups are important for the organisation.
	Power and urgency	5. Dangerous: because the claim lacks legitimacy, it could be imposed by the use of power or regulations, or even by coercion.
	Legitimacy and urgency	6. Dependent: because they lack power, they become dependent on other internal or external stakeholders to ensure that their claims are met by the organisation.
Definitive	Power, legitimacy and urgency	7. Because they hold all three attributes, they become a priority stakeholder for the organisation and will demand that their claims are satisfied in a very short time.

Source: Based on Mitchell et al. (1997)

Organisations wishing to implement a stakeholder system of management must first identify who the interested parties in their affairs are; that is, which parties will be affected by or show interest in the actions taken and decisions made by that organisation.

Then it is essential to make changes to the organisation's management to enable the interests and needs of the individuals, groups or institutions identified previously to be incorporated. It is therefore fundamental to generate spaces, instances and mechanisms in order to integrate the stakeholders into corporate government and management.

3. Universities' relationship with their stakeholders as a key factor for achieving pluralist university government

According to the European Commission (2008), the government structure of European universities is organised around four main bodies: (1) an executive body, represented by the figure of the university rector or president; (2) a collegiate academic body, responsible for teaching and research; (3) a decision-making body in charge of the university's strategic planning and main orientation; and (4) an advisory or supervisory body, appointed to monitor university activities, both academic and financial.

The European Commission itself (2008) states that there is a dominant, majority participation of external actors in decision-making bodies —and especially those charged with the evaluation and supervision of universities— in some European countries.

Universities as institutions created by society are not exempt from making efforts to identify stakeholders and their concerns, needs and interests. Indeed, according to Pérez and Peiró (1997), they should place more emphasis on doing so because:

> universities are only legitimised if they respond to the social claims and needs for which they were created and which justify their continued existence and social dimension. If universities' sensitivity to social claims and needs is lost or annulled, then decision-making begins to be determined basically by internal politics and by the logic of corporate interests and power games played out by the different groups and bodies of the institution itself.

The European Commission (2008) also states that it is important to identify the sources that legitimise the decisions taken in the higher education sphere. Therefore, university government:

> "… focuses on the rules and mechanisms by which various stakeholders influence decisions, how they are held accountable, and to whom. […] refers to 'the formal and informal exercise of authority under laws, policies and rules that articulate the rights and responsibilities of various actors, including the rules by which they interact'…"

Thus, the concept of 'stakeholder universities' arises, which according to Jongbloed and Goedegebuure (2003) implies that universities must be in constant dialogue with their interest groups to survive in a system where claims are heterogeneous and unpredictable. Therefore, it is possible to speak of universities that are sensitive to their environment, which are capable of effectively managing relationships with their interested parties and of developing permanent links with their stakeholders that, over time, guarantee reciprocity and receptiveness.

But above all, it is possible to speak of universities' capacity to identify what the needs and problems of their stakeholders are, shouldering them as their own when defining their institutional objectives, normally described in their strategic plans, where the presence of interested parties should be explicit and manifest (Gaete, 2010).

Nevertheless, Burrows (1999) claims that simply identifying universities' interested parties is not

sufficient, since it is a first step that offers no efficient solution for understanding or prioritising stakeholders' claims. Burrows proposes four dimensions according to their concerns and claims: location, state of participation, potential for cooperation or threat, and their relevance in and influence over the organisation.

The location of stakeholders describes the classic dimension that distinguishes between organisations' internal and external interested parties. The state of participation refers to both active and passive stakeholders: the former are those with whom the organisation maintains some form of exchange, transaction or legal obligation; while passive stakeholders are those who have been or may be affected involuntarily by university actions.

The third dimension proposed by Burrows distinguishes between the interested parties' potential for cooperation or threat with regard to achieving their objectives, which implies integrative or defensive strategies in each case. Finally, a distinction should be made between the type of interest (institutional, financial and social dependence) and the type of influence (formal, economic and political) used by stakeholders to achieve their aims.

In short, 'stakeholder universities' according to Brunner (2011) are characterised by the following aspects:

- They combines the collegiate traditions and self-government of universities with the claims of external stakeholders.
- They give priority to the public good while operating in a competitive environment, applying the postulates of new public management.
- They separate strategic management bodies from academic affairs.

Universities in the 21st century cannot be oblivious to the need to incorporate stakeholders into corporate government. The presence of society's representatives in university government strengthens interdependence and interactivity between universities and society (Pérez & Peiró, 1997); it entails multiple benefits for all the actors that interact in this form of university government; and it is vital to go beyond the figure of the Board of Trustees in Spanish universities, for example, with regard to the incorporation of stakeholders into university government and also, albeit gradually, into other spheres of university affairs.

Likewise, Rodríguez et al. (2007) state that participation in corporate government implies building interest networks and applying collaboration strategies, thus reinforcing stakeholders' joint supervision of others' actions, and they propose various mechanisms for pluralist government to identify different levels of interested parties' participation:

According to Kehm (2011), greater stakeholder participation in universities' decision-making presupposes an evolution from the concept of government to 'governance', which reflects a weakening of state-led and academic-led coordination models, as a result of which the model based on stakeholder needs is strengthened. Furthermore, Kehm states that the concept of governance implies the participation of social actors in decision-making, their inclusion in decision-making structures and, concurrently, greater coordination of decision-making procedures, which is why it is necessary to determine the degree of legitimacy that each stakeholder possesses to participate in university decision-making processes.

Table 2. Mechanisms for pluralist corporate government

Level	Aim	Focus of the relationship
Remaining passive	No aim or relationship exists.	The organisation does not relate to its stakeholders. Their concerns are voiced through protests, letters, the Internet, etc.
Monitoring	To find out stakeholders' opinions.	Monitoring the media and the Internet. Second-hand reports from other stakeholders (one-off interviews).
Informing	To inform or educate stakeholders.	Bulletins, letters, pamphlets, reports and websites. Speeches, talks and public presentations. Access to the facilities and routes. Press releases and press conferences, advertising.
Performing transactions	To work together in a contractual relationship in which one partner directs the objectives and provides the funds.	Alliances between the public and private sectors, private funding initiatives, subsidies, marketing with cause, lobbying.
Consulting	To obtain information and opinions from stakeholders on which to base internal decisions.	Surveys, focus groups, evaluation of work environments, individual and public meetings, work meetings, consultation forums, online forums, opinion surveys.
Participating	To work directly with stakeholders to ensure that their concerns are understood and taken into account in decision-making processes.	Multiple stakeholder forums, consultation panels, processes for reaching consensus, participatory decision-making processes.
Collaborating	To join or form a network of stakeholders to reach consensus and develop joint action plans.	Joint projects, voluntary initiatives involving two or more stakeholders.
Delegating	To delegate decisions on a specific topic to stakeholders.	Democratic stakeholder government (e.g., members, shareholders, members of special committees, etc.).

Source: Based on Rodríguez et al. (2007)

Lastly, it should be noted that certain obstacles arise from the university system itself, hindering stakeholder participation in university decision-making:

Table 3. Obstacles that hinder stakeholder participation in universities

Internal sphere	External sphere
Excessive rigidity of the organisational structure, organised in an extremely vertical, hierarchical manner, making participation by external actors unfeasible or not sufficiently operational.	The genuine interest that stakeholders show in actively participating in university decisions.
The high degree of specialisation existing in faculties fragments the organisational culture, which leads to power groups that are not interested in opening up participation spaces.	The stakeholders' negative perception of the importance and relevance of their participation, due to the fact that it is either a legal imposition on universities or a passing fad.
Regulations governing administrative procedures, especially those of public universities.	Excessive technical and procedural complexity impedes effective participation in decision-making.
Universities' inexperience when it comes to implementing more participatory decision-making processes.	The incapacity of stakeholders to see participation as an opportunity to solve their own problems.

Source: Adapted from Gaete (2009)

Thus, universities will operate more efficiently and successfully if they manage to adapt their government and governance structures and procedures to the claims of their environment (Brunner, 2011). Of particular importance here is the implementation of processes of greater stakeholder participation in university management and decision-making, as a strategy whereby universities adapt to the requirements of the current knowledge society.

4. Proposal for incorporating stakeholder participation in university government

This proposal seeks to place emphasis on identifying and analysing university stakeholders from the viewpoint of their characteristics or attributes, to facilitate their participation in the evaluation of decisions and the supervision of activities relating to university affairs, as an expression of pluralist university government.

4.1. Identification and classification of university stakeholderss

Based on the approaches of Mitchell et al. (1997) and Burrows (1999), we propose the following matrix for analysing the characteristics or dimensions that each stakeholder possesses, as well as their location in relation to university affairs.

In terms of the way in which this matrix works, the first column should contain all the individuals, institutions or groups that each university considers to be its interested parties; these are the parties that it intends to identify and classify as stakeholders. In the example, the classification of interested parties is the one proposed by the European Commission (2008), marking their location as internal or external.

Next, in relation to the stakeholders' dimensions or main characteristics, three of the dimensions proposed by Burrows (1999) are used, without incorporating information on the degree of interest in and influence over the organisation into the matrix, due to the fact that these aspects are related to the power, legitimacy and urgency noted by Mitchell et al. (1997); this avoids a duplication of information on similar matters.

The dichotomous nature of the matrix in this sphere encourages universities to evaluate stakeholders according to each pair of proposed alternatives (location, role and stance), which may change according to the topic for which the analysis is being performed.

In the third part of the matrix, in order to characterise the stakeholders' interest in or influence over university affairs, the three stakeholder categories that can be configured in line with the approach of Mitchell et al. (1997) are collated according to the combination of criteria proposed by those authors (power, legitimacy and urgency).

Table 4. Stakeholder identification matrix

Stakeholders	Dimensions (according to Burrows)			Stakeholder categories (according to Mitchell et al.)						
				Latent			Expectant			Definitive
	Location Int. / Ext.	Participation Active / Passive	Potential Cooperation / Threat	Dormant	Discretionary	Demanding	Dominant	Dangerous	Dependent	Priority
				1	2	3	4	5	6	7
Regional government	X									
Employers	X									
National students' associations	X									
Trade unions	X									
Civil society	X									
Graduates	X									
Students' parents	X									
University government		X								
Employees		X								
Students		X								

Source: Own elaboration (2012)

4.2. Stakeholder participation in university government and management

In the quest to provide specific examples of this type of participation, worthy of note is the existence of various good practices on this matter in Spanish universities' social responsibility reports:[2]

From these reports, it was found that several Spanish universities are making efforts to balance out the distribution of university government posts according to gender, through their equal opportunities offices. In university management, some institutions acknowledge the application

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2. An analysis of content of a comparative nature was performed on fifteen university social responsibility reports, of Spanish universities that provide online access to such documents.

of social responsibility criteria when contracting and selecting suppliers, or the fact that they have signed up to the principles of the Global Compact. They stress that both initiatives promote greater interaction with their stakeholders and expand participation spaces.

Table 5. Good practices of stakeholder participation in university government and management in Spain

University	Good practices	Report period
UNED – National University of Distance Education	• Institutional social responsibility committee formed by internal actors and representatives of social organisations.	2009/2010
UNIA – International University of Andalusia	• UNIA environmental steering group, formed by representatives of specialist external organisations and academics from other Spanish universities.	2008
University of Murcia	• Multi-stakeholder dialogue with an active listening system, via an online questionnaire to evaluate university actions.	2009/2010
University of Santiago de Compostela	• Existence of a trade union participation board.	2006/2007
University of A Coruña	• Implementation of an electronic voting system to elect university government representatives.	2010
University of Cadiz	• Participation of social and economic actors in: the development of new curricula; identification of society's educational needs; and competencies that graduates need to acquire.	2008/2009
University of Cantabria	• Consultation with stakeholders on their relationship with the university, using semi-structured interviews and focus groups.	2009/2011

Source: Own elaboration (2012)

Finally, a proposal for participatory evaluation techniques and categories is being developed so that stakeholders can participate in some of the main affairs of university government and management.

In the case of the matrix shown above, certain aspects of university management are identified where the participation of different kinds of stakeholders can be incorporated, in accordance with the topic being analysed.

In the last two columns of the matrix, various aspects relating to the interested parties' participation in universities are proposed. The levels of participation and the evaluation techniques are distinguished to act as a guide for the roles and ways in which each stakeholder can participate in university decision-making.

Table 6. Matrix for stakeholder participation in university management

Sphere of participation	Participating stakeholders (examples)	Level of participation (Rodríguez et al., 2007)	Participatory evaluation technique[3]
Strategic plan development	Teaching staff	Collaboration	Consensus conferences
	Non-academic staff		
	Senior managers		
	Unions		
	Board of trustees		
	Students		
	Businesses		
Accreditation processes	Teaching staff	Consultation	Citizen panels
	Students		
	National accreditation agency		
	Employers		
	Graduates		
	Conference of rectors		
	Ministry of education		
Annual budget formulation	Board of directors	Participation	Participatory budgets
	Trade unions		
	Students		
	Regional government		
	City council		
Definition of institutional policies and procedures	Teaching staff	Participation	Quality circles or studies
	Non-academic staff		
	Students		
	Senior managers		
	Trade unions		
	Board of trustees		
	Suppliers		

Source: Adapted from Gaete (2009)

3. The classification of instruments and mechanisms to facilitate civil society's participation in decision-making is the one proposed by Gomà and Font (2001).

5. Conclusions

In recent decades, universities have been exposed to the impact of numerous social changes, and in particular to the phenomenon of mass access to higher education, thus eliminating the elitism that had been the dominant expression of university education for many centuries. A large and growing sector of post-modern society has the need and aspiration to become involved in university affairs, especially in relation to the training of university professionals.

Thus, one of the most important challenges that 21st-century universities face is the formation of permanent, reciprocal relationships with society, and in particular with individuals, groups and institutions that are affected by or interested in university affairs; that is, their stakeholders.

In that context, it seems logical and consistent that universities should develop government structures of a participatory nature, in which stakeholders can become actively involved in decision-making processes and in the supervision of university activities, especially of the results obtained by such higher education institutions.

Pluralist university government should not be associated with one specific or isolated practice; on the contrary, opening up participation spaces in university decision-making processes should be linked to their social responsibility, thus enabling them to meet the claims and needs that society currently demands of universities.

The possibilities for stakeholder participation in university government will undeniably be limited by the legal frameworks of each country, especially in the case of public universities. This is not, however, an excuse for university institutions not to apply —or to curtail the application of— the approaches formulated in this article, especially those relating to the strengthening of an organisational culture in which actors outside the university participate.

The proposals made and the analysis performed in this article clearly do not seek to impinge upon the principle of autonomy that university institutions possess in order to carry out their fundamental tasks: teaching and research. On the contrary, the possibilities of stakeholder participation described here aim to incorporate the contributions of interested parties into decision-making processes, and particularly so in the areas of university government and management.

Thus, universities are faced simultaneously with the opportunity and the challenge of implementing spaces, processes or instances of stakeholder participation in university government, transforming universities into a sphere into which society not only feels effectively integrated, but also involved as part of an institution that should have no other purpose than to respond to social concerns. This will counteract the endogamy that has generally existed in universities since their creation in the Middle Ages.

References

ANTONACOPOULOU, Elena; MERIC, Jérôme (2005). "From Power to Knowledge Relationships: Stakeholder Interactions as Learning Partnerships". In: *Stakeholder Theory. A European Perspective*. New York: Palgrave-Macmillan. pages 125-147.

BRUNNER, José Joaquín (2011). "Gobernanza universitaria: tipología, dinámicas y tendencias". *Revista de Educación*. No 355, pages 137-159.

BURROWS, Joanne (1999). "Going Beyond Labels: A Framework for Profiling Institutional Stakeholders". *Contemporary Education*. Vol. 70, No 4, pages 5-10.

CLARKSON, Max (1995). "A Stakeholder Framework for Analyzing and Evaluating Corporate Social Performance". *Academy of Management Review*. Vol. 20, No 1, pages 92-117.

CORTINA, Adela (2006). "La responsabilidad social corporativa y la ética empresarial". In: *Mitos y realidades de la responsabilidad social en España. Un enfoque multidisciplinar*. Navarre: Thomson Civitas. Pages 109-120.

DONALDSON, Thomas; PRESTON, Lee (1995). "The Stakeholder Theory of the Corporation: Concepts, Evidence and Implications". *Academy of Management Review*. Vol. 20, No 1, pages 65-91.

EUROPEAN COMMISSION (2008). *Higher Education Governance in Europe. Policies, structures, funding and academic staff*. Brussels: Eurydice. 167 pages.

FREEMAN, R. Edward (1984). "Strategic Management: A Stakeholder Approach". Massachusetts: Pitman. 275 pages.

GAETE, Ricardo (2010). "Discursos de responsabilidad social universitaria. El caso de las universidades de la macro zona norte de Chile pertenecientes al Consejo de Rectores". *Perfiles Educativos*. Vol. 32, No 128, pages 27-54.

GAETE, Ricardo (2009). "Participación de los stakeholders en la evaluación del comportamiento socialmente responsable de la gestión universitaria: perspectivas, obstáculos y propuestas". XV Congreso de la Asociación Española de Contabilidad y Administración de Empresas (AECA), Valladolid.

GOMÁ, Ricard; FONT, Joan (2001). "La democracia local: un mapa de experiencias participativas". In: *Ciudadanos y decisiones públicas*. Barcelona: Ariel. Pages 61-76.

HAX, Herbert (2006). "The Role of Entrepreneurial Ethics in a Market Economy". In: *Economy, Entrepreneurship, Science and Society in the XXI Century*. Alcalá de Henares: Universidad de Alcalá. Pages 393-404.

JONGBLOED, Ben; GOEDEGEBUURE, Leo (2003). "De la universidad emprendedora a la universidad stakeholder". In: *Universidades y desarrollo territorial en la sociedad del conocimiento*. Vol. 1. Barcelona: Diputación de Barcelona   Universitat Politècnica de Catalunya. Pages 153-177.

KEHM, Barbara (2011). *La gobernanza en la enseñanza superior. Sus significados y su relevancia en una época de cambios*. Barcelona: Octaedro. 63 pages.

LOZANO, Josep (1999). *Ética y empresa*. Madrid: Trotta. 320 pages.

MARÍN, Francisco (2008). *Responsabilidad social corporativa y comunicación*. Madrid: Fragua. 240 pages.

MATTEN, Dirk; CRANE, Andrew; CHAPPLE, Wendy (2003). "Behind the Mask: Revealing the True Face of Corporate Citizenship". *Journal of Business Ethics*. Vol. 45, Nos 1-2, pages 109-120.

MITCHELL, Ronald; AGLE, Bradley; WOOD, Donna (1997). "Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts". *The Academy of Management Review*. Vol. 22, No 4, pages 853-886.

MONEVA, José Mariano (2007). "¿Es la responsabilidad social corporativa rentable para la empresa?". In: *Responsabilidad Social Corporativa*. Barcelona: ACCID. pages 55-76.

MONEVA, José Mariano (2005). "Información sobre responsabilidad social corporativa: Situación y tendencias". *Revista Asturiana de Economía (RAE)*. No 34, pages 43-67.

PÉREZ, Francisco; PEIRÓ, José (1997). "Gobierno de la universidad: un diseño alternativo". In: *Órganos de gobierno de la Universidad*. Castilla y La Mancha: Forum. Pages 105-128.

POST, James; PRESTON, Lee; SACHS, Sybille (2002). "Managing the Extended Enterprise: The New Stakeholder View". *California Management Review*. Vol. 45, No 1, pages 6-28.

RODRÍGUEZ, José Miguel; MELLÉ, Mónica; SASTRE, José (2007). *Gobierno y responsabilidad social de la empresa*. Madrid: Asociación Española de Contabilidad y Administración de Empresas (AECA). 128 pages.

SETÓ, Dolores (2007). "Una nueva actitud de la empresa hacia su entorno: la responsabilidad social". *Revista Alta Dirección*. Year XLII, No 251/252, pages 49-57.

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ARTICLE

A Hyperlink-based Model for the Management of Teaching Documents in a University Centre

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Abstract

Documents containing teaching information (course guides, curricula, rules, etc.) constitute an essential resource in higher education, particularly for students. Their importance has been stressed over the last few years, on the one hand by the creation of the European Higher Education Area (EHEA), which has re-emphasised the need for sources of teaching information, and on the other by the widespread use of information and communication technologies (ICTs), which provide easy access to such sources. Consequently, the management of such documents is now one of the key procedures that university centres need to apply to the organisation of teaching. With this in mind, the main objective of this article is to present a new centre-level model for the management of

teaching documents, implemented via a new software package developed for that purpose: SGD2F2. This new model represents an attempt to overcome the drawbacks that many centres experience when using the current model to manage teaching documents. Although this proposal has been developed for a particular faculty, by making a few alterations it could be adapted for use by any university centre or body responsible for the management of teaching.

Keywords

Modelo de gestión de documentos docentes en un centro universitario, basado en hipervínculo

Resumen

Los documentos con información docente (guías docentes, temarios, normas, etc.) constituyen un recurso imprescindible en la enseñanza superior, especialmente para el alumnado. Su relevancia se ha acentuado en estos últimos años, por un lado, con la puesta en marcha del espacio europeo de educación superior (EEES), que ha relanzado la necesidad de fuentes de información docente, y, por otro, con la difusión del uso de las tecnologías de la información y la comunicación (TIC), que ha facilitado el acceso a dichas fuentes. Por este motivo, la gestión de tales documentos constituye en la actualidad uno de los procedimientos clave en la organización de la docencia de centros universitarios. El objetivo de este artículo es presentar un nuevo modelo de gestión de documentos docentes en relación con el centro implementado a través del desarrollo de un software: SGD2F2. Este modelo trata de solventar los inconvenientes evidenciados en el modelo de gestión de documentos docentes habitualmente utilizado en los centros. Aunque esta propuesta ha sido desarrollada en el ámbito de una facultad en concreto, podría ser aplicada, con algunas modificaciones, a cualquier centro u órgano universitario de gestión de docencia.

Palabras clave

1. Introduction

Today, documents containing teaching information (course guides, curricula, etc.) are one of the cornerstones of the organisation of teaching for any university degree course. Therefore, ensuring that university centres manage such documents properly is a challenge in a context marked by two particularly significant factors: the implementation of the European Higher Education Area (EHEA) and the widespread use of information and communication technologies (ICTs).

Implementation of the EHEA

In the new EHEA paradigm, course guides play a leading role. They are a source of information about each subject, encompassing everything from general aspects to detailed activity planning; in other

words, they contain a teaching-learning plan (Pérez Martell et al., 1999). Course guides contribute to the materialisation of the principle of transparency (Marcellán Español, 2005) and, furthermore, they are a help tool for students, the aim of which is to support the 'learning-to-learn' premise. These documents express the lecturers' and students' commitment to the work required by a particular subject ("Guía docente: el esqueleto de una asignatura"), in the sense that such documents contain all the activities that need to carried out. Moreover, they are publicly available, even during the enrolment period ("Estatuto del Estudiante Universitario", 2010).

Quality assurance is a key concept of the new degrees within the EHEA framework in Spain, which is incorporated by means of quality assurance systems (QASs). In order to assist with the design of QASs, the AUDIT Programme sets out a series of guidelines that enable priority actions aimed at improving the quality of higher education to be identified. In this respect, the problem discussed in this article —optimising the management of teaching documents— falls under guidelines 1.4 and 1.6 of the "AUDIT Programme: Guidelines, definition and documentation for internal quality assurance systems in higher education". Respectively, Guideline 1.4 and 1.6 stipulate that a centre must be provided with mechanisms "so it can design, manage and improve its services and physical resources in order for student learning to develop appropriately" and "to ensure that updated information on degrees and programmes is published periodically". In short, the model presented here is associated with the notion of the quality of teaching on new degree courses.

The implementation of the EHEA implies a process of phasing out the types of degree offered previously (Royal Decree 861/2010). At the University of Granada (UGR), this is a gradual process: each year, lectures for such degree courses stop being taught, although students have the right to sit an exam for two years following that academic year. For students on such degree courses, curricula, practical class criteria and assessment criteria constitute a valuable set of reference documents, especially for those subjects for which lectures are no longer given, because they guarantee the right to be examined under the best circumstances. In short, the teaching context is changing, and it requires that teaching documents should faithfully meet their objectives.

Widespread use of ICTs

The other decisive factor is the growing use of ICTs. This emerging factor has turned the Internet into the primary medium for providing students with documents (Collis & Moonen, 2006). In fact, the advantages that such technologies offer (no constraints with regard to time or distance, low costs, greater dissemination, usability, etc.) have led their use in higher education to be encouraged, as evidenced by the UGR's strategic plans ("Plan Estratégico 2006-2010 de la UGR") or the programme agreements (Barón & Roca, 2006; ODAP 2009, 2010 and 2011, for UGR centres) within the Spanish university context ("Modelo de Financiación 2007-2011 de las Universidades Públicas de Andalucía"). However, ICTs can play a role over and above that of serving as a medium for the dissemination of teaching documents. As explained later, there are some technical aspects of ICTs that can be used for the management of teaching documents.

2. Management of teaching documents in university centres

The usual (straightforward or naïve) model for the management of teaching documents in university centres can be analysed from the students' or lecturers' perspective; that is to say, from the viewpoint of the main audience that such documents —and their authors— target.

A student, for example, might ask this simple question: How do I get hold of a teaching document? Using ICTs, there are now several answers to that question because they may, for example, be available on institutional websites (university, centre or department), a learning management system (Moodle, SWAD, etc.), a lecturer's website, a lecturer's subject blog, a social networking site (Facebook, Tuenti, etc.) and so on. So there are myriad alternatives for obtaining such documents from the Internet. However, if the question is about which of the (very likely) high number of files available for download from the Internet is the most up to date version, then the answer is not as straightforward, particularly for a student.

In order to analyse the usual model for the management of teaching documents in centres, course guides for new degrees are a good example to take. After the teaching staff has produced them, they are usually submitted independently by their respective authors to a number of bodies or websites. Copies (files) of such documents are hosted on website servers by their respective webmasters, which may occasionally lead to maintenance operations on such destination websites. For example, at a faculty's or department's request, whether at the start of the academic year or during the elaboration of programme agreements, it is usual for lecturers to submit course guides independently to such bodies. For the centre, this management model is simple because it emulates the way in which such documents are published in paper form, even though their format is now electronic.

In theory, when a course guide is updated or amended, this model requires that every copy available on the Internet should be instantly replaced. This involves initiating the process of submitting copies to bodies that make such documents available on the Internet (centre, department, etc.) and pursuing website maintenance tasks on various sites, all of which ought to take place immediately. However, the reality of the matter is that files may not have been submitted to one or other of the bodies that make such documents available, basically because it is hard to remember the whole list of bodies or website servers that maintain copies of them. Likewise, even when files are submitted, there is a risk that, in the case of a centre, the total submission-receipt-website maintenance time will be too long, which may mean that there is too much of a delay with regard to updating teaching documents on a centre's website.

From the above, it is possible to deduce that the traditional management model involves both a laborious task for the teaching staff and a significant chance of there being a mismatch between the various versions of course guides available on the Internet. In fact, it is quite likely that some of the course guides submitted and made available on a centre's website at the start of an academic year will not have been updated midway through the year, probably due to an oversight by a lecturer after amending one of them. In addition, lecturers authoring the course guides often submit copies to the websites that they use the most, which are not necessarily the same as those used by students.

These oversights are likely, especially given the number of course guides that the teaching staff may actually have to manage, and the number of bodies to which they have to submit them. These shortcomings, illustrated for the case of course guides, can be extrapolated to all other teaching documents.

Consequently, it is possible to conclude that the usual model for the management of teaching documents is both lacking in reliability (for students) and laborious (for lecturers). Thus, such documents do not actually fulfil the function that is required of them within the EHEA framework. Indeed, they become a source of regrettable confusion for students. It is precisely with the intention of overcoming such mismatches that the authors are proposing an alternative model, which is now being used successfully in the UGR's Faculty of Pharmacy.

The need to seek out and find a new model was determined by the implementation of new degree courses and the phasing-out of the types of degree offered previously. This new and changing context will last for several years in the UGR's Faculty of Pharmacy. So, for every upcoming academic year, a new degree course year will be taught and an old-style approved degree course year will be phased out. In short, in a context of high volatility across all subjects that the Faculty has to organise and manage over this adaptation period, the number of documents is twice what it used to be.

Appendix 1 contains a SWOT (strengths-weaknesses-opportunities-threats) analysis of the usual model for the management of teaching documents in the context prior to the 2010/2011 academic year in the UGR's Faculty of Pharmacy (Casanueva et al., 2000). Both the number and severity of the weaknesses and threats led the authors to seek out and find an alternative model with the following priority objectives:

i. To increase the reliability of teaching documents available on the Faculty's website. Specifically, to ensure that such documents are the most up-to-date versions.
ii. To simplify both the Faculty's receipt of such documents and the updating of web pages on which they are made available.

3. Proposed model for the management of teaching documents

The management of teaching documents in a centre should be conceived as a flexible, dynamic and efficient process. It has to be flexible and dynamic because the context of application may change over time, in the short and medium terms, either as a consequence of implementing/phasing out degree courses, the introduction/elimination of subjects or documents, or even the need to supply new types of document. For its part, efficiency is imposed as a requirement, the aim of which is to minimise the delay with regard to updating documents on the Internet. These are the principles that guided the development of the new document management model that the authors propose, which is implemented via the software package called SGD2F2 (Sistema de Gestión de Documentos Docentes de la Facultad de Farmacia).

Given the problems encountered with the usual model for the management of teaching documents (Section 2), the Academic Planning Committee of the UGR's Faculty of Pharmacy considered the need to seek out and find a solution. As a first step, it was agreed that only uniform resource locators (URLs) or hyperlinks to teaching documents for subjects included in the UGR's Faculty of Pharmacy's degree courses would be stored on the centre's website server. Only the respective hyperlink for each document —a copy of which (a file) would therefore only be found on the department's website server, on a lecturer's website server or, in general on the website chosen by the document's author— should be submitted to the centre. Owing to the fact that it is compulsory to provide teaching documents on the department's web page (ODAP 2009, 2010 and 2011, for UGR departments) and given the proximity of that body to the lecturers, the decision taken was feasible in practice. Figure 1 shows a diagram of that decision and its context.
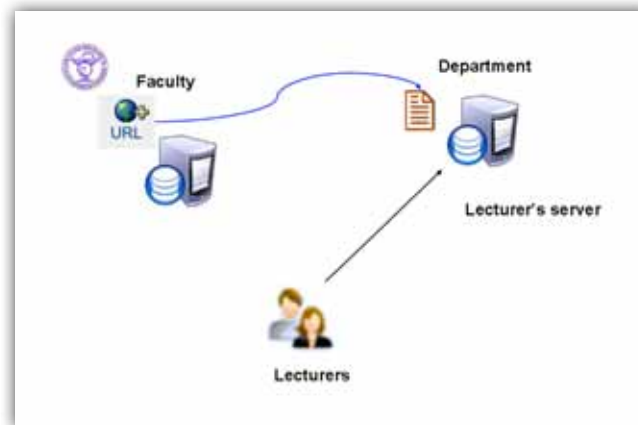

Figure 1. Diagram of the decision on which the new document management model is based. Only the hyperlinks for teaching documents are stored; their associated files can be found on the websites chosen by their authors (lecturer's server, department's server, etc.).

On the basis of that restrictive decision, it was possible on the one hand to increase the reliability of the documents made available on the UGR's Faculty of Pharmacy's website because it linked to the most up-to-date versions (chosen by the author), and on the other to simplify the Faculty teaching staff's work because the submission of files (when produced or amended) to the Faculty was not necessary, with the resultant savings in website maintenance. In essence, the idea behind the decision was to take advantage of HTML hyperlink facilities, thus defining a new management model. Figure 2 shows a diagram of how it functions: access to a document via the Faculty's website directs to a copy of it (file) specified by the author (lecturer) available somewhere on the Internet.
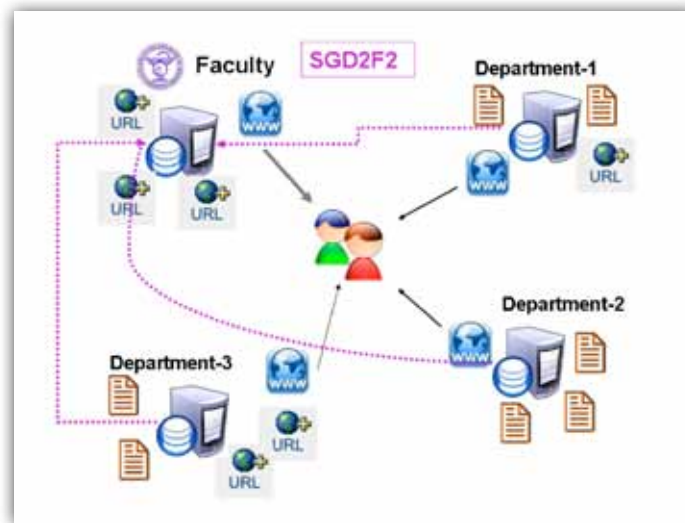
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Figure 2. Diagram of how the new model for the management of teaching documents functions. Access to a teaching document via the UGR's Faculty of Pharmacy's website directs to the file specified by the lecturer on the Internet.

Unfortunately, the proposed model gave rise to a serious problem in practice: How would it be possible to obtain a hyperlink efficiently and reliably for each and every one of the teaching documents for the subjects of the various degree courses taught in the UGR's Faculty of Pharmacy? Bearing in mind that the string of characters forming a URL has to be one-hundred percent accurate, this question posed a technical problem in terms of collecting the necessary data (hyperlinks). In order to solve this problem, the development of a new software package (SGD2F2) was initiated. This software package implements the procedures associated with the new model, among which there is a module dedicated to data collection.

Generally speaking, the management of teaching documents in a centre can be divided into two stages. In the first stage, documents are received and then classified by a university centre. In the second stage, such documents are made available on the centre's website; this involves uploading the documents to the Internet and possibly editing web pages on the centre's website. Taking the proposed model into account, the development of the SGD2F2 software package initially focused on automating the following procedures:

1. Collecting information about the teaching documents produced for the subjects taught at the centre
2. Classifying such documents
3. Editing the centre's web pages on which such documents are made available

For the first two procedures, a metadata structure to codify the necessary information for each document and the aforementioned data compilation module were designed. For the third procedure, an SGD2F2 software-package module was produced to generate the web pages, given that the task of uploading the documents to the Internet had been outsourced as a result of the decision taken.

3.1. Description of the SGD2F2 software package

The SGD2F2 software package was programmed in PHP (a general-purpose server-side scripting language) using functionalities for connection to MySQL databases. The functioning of some of the modules into which the software package was structured is presented below. The purpose of such modules was to automate processes originating from the management model introduced. In fact, without such automation, the applicability of this model would probably have been rendered uncompetitive due to the shortcomings it would otherwise have had.

The data (metadata) required by the SGD2F2 software package are channelled through the departments. To a text (ASCII) file called an SGD2F2 file and by following a specific syntax, each department saves information about the teaching documents for the subjects taught in the UGR's Faculty of Pharmacy. The syntax design focused on basic aspects of the documents (location), without considering other details (HTML styles, etc.). In essence, an SGD2F2 file is nothing more than a sketch of the web page containing the department's teaching documents. In fact, changes to the web page or, more generally, to websites containing such documents do not affect the SGD2F2 file, as long as the internal structure of teaching document directories is maintained. In addition, given that it is text based, an SGD2F2 file can be created using any word processor on any platform. Figure 3 summarises the SGD2F2 approach to data collection.

Figure 3. Diagram of SGD2F2 data processing and its interaction with web pages on which teaching documents are made available on the Faculty's website.

Each SGD2F2 file defines a set of metadata, where each element references one document. In turn, every field of a metadata item is located in a row in the file, following an order that identifies it. Each metadata item (document) includes details of the document and information about the subject to which it refers. The syntax rules for SGD2F2 files can be found at http://farmacia.ugr.es/guiasdocentes/docu/IndicacionesFicheroTXT.htm. In order to simplify the creation of SGD2F2 files, a program called leesgd2f2.exe was developed. This program automatically checks the syntax for errors.

After processing all the departments' files, the SGD2F2 software package stores their content on

an initial MySQL database, which can be described as temporary. Once the temporary database has been satisfactorily checked, and on request by the SGD2F2 administrator, it immediately becomes final. The final database is the one that interacts with the SGD2F2 module that is responsible for generating web pages containing teaching documents on the UGR's Faculty of Pharmacy's website. By using the two MySQL databases, the process of proofing/reviewing the information supplied to the SGD2F2 software package does not negatively interfere with the functioning of the centre's website. Figure 4 shows a diagram of the general functioning of the SGD2F2 software package.
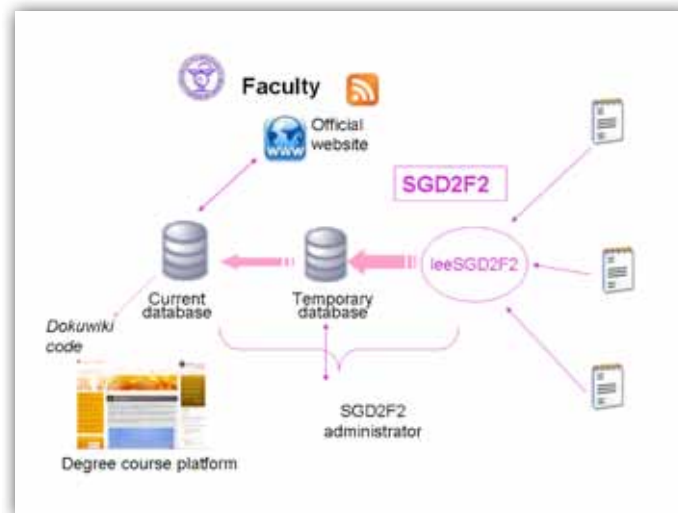

Figure 4. Diagram of the internal functioning of the SGD2F2 software package, as well as the additional functionalities available for the current academic year (information export in DokuWiki code and RSS feed).

Besides the functionalities described earlier, the SGD2F2 software package has three additional ones that are briefly described below.

RSS feed
The SGD2F2 software package has an RSS feed (see Figure 4), via which news about teaching documents that students might be interested in is disseminated.

DokuWiki code
The SGD2F2 software package has a module that allows the content of web pages containing teaching documents to be exported to DokuWiki code. This functionality (see Figure 4) simplifies the maintenance of information about the UGR's Faculty of Pharmacy's degree courses (including information about their teaching documents) that is available on the UGR's degree course platform (http://grados.ugr.es/). This platform requires DokuWiki code. Thus, the work is cut down to copying and pasting text using that platform's code editor.

Teaching documents for the next academic year
Article 23 in Chapter 6 of the "Estatuto del Estudiante Universitario" (2010) stipulates that subject teaching information must be available in the enrolment period.
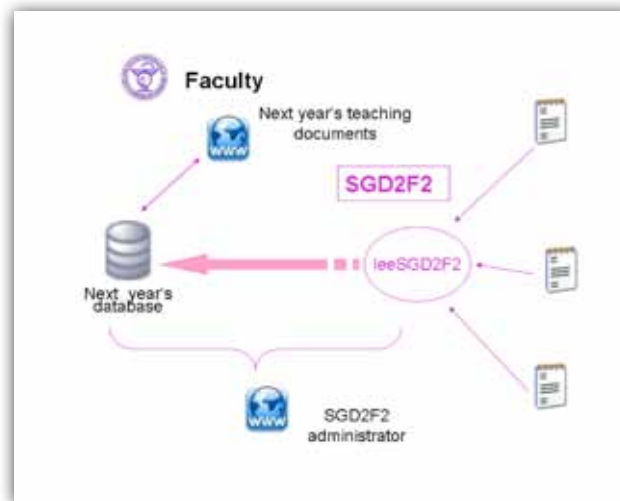
Figure 5. Diagram of the internal functioning of the SGD2F2 software package for the management of the next academic year's teaching documents.

This rule has led to the development of an SGD2F2 module that, using existing basic functionalities, allows teaching documents for the next academic year to be managed independently from those already in force. Figure 5 shows its internal functioning, which follows the steps described earlier, albeit with slight differences because it was designed as a simplified version of the SGD2F2 module described earlier for the current academic year.

To conclude this description, the authors performed a joint SWOT analysis (Casanueva et al., 2000; Guerras Martín & Navas López, 2007) of the proposed management model and the SGD2F2 software package, while also incorporating the findings of its application in the UGR's Faculty of Pharmacy. This analysis, which is collated in Appendix 2, shows that the behaviour of the system developed is good and that it is a potential solution to overcome the weaknesses and threats posed by the usual management model (Appendix 1).

The proposed model requires the collaboration of departments, and more precisely of one of their members, who should be responsible for the SGD2F2 file. So, to counteract the threat that a lack of collaboration would pose, the Faculty has implemented the following measures:

– Public information about the SGD2F2 software package is provided. This information is aimed at departments and particularly at those responsible for creating their respective departments' SGD2F2 files (http://farmacia.ugr.es/guiasdocentes/info/).
– Collaborating departments are acknowledged. News of their participation is published on a website. This was the case for 2010/11 academic year (http://farmacia.ugr.es/guiasdocentes/info/ListaDptoyResp2010_11.htm).
– The work done by those responsible for creating SGD2F2 files is acknowledged..

4. Conclusions

The model for the management of teaching documents implemented via the SGD2F2 software package is an improvement on the model usually used in centres because it solves the problems that the latter model poses (analysed in Section 2) and it offers a series of additional functionalities (described in Section 3). Likewise, its application allows management synergies to be created between the centre and the departments involved in teaching. In essence, this system provides the departments with a flexible mechanism for the dissemination of documents aimed at students via the centre's website. Bearing in mind that the departments are jointly responsible for the development of teaching, this service makes the centre's website a very valuable asset.

The SGD2F2 software package has been in use in the UGR's Faculty of Pharmacy since the start of the 2010/11 academic year. One year after its implementation, 80% of the departments had collaborated in the initiative, including every department responsible for more than one subject in the UGR's Faculty of Pharmacy (http://farmacia.ugr.es/guiasdocentes/info/ListaDptoyResp2010_11.htm). These data are evidence of the following:

1. The majority of departments collaborated with the UGR's Faculty of Pharmacy via the SGD2F2 software package in its first year of implementation.
2. The departments that did not provide the SGD2F2 in the 2010/11 academic year did not actually submit any information about teaching documents to the UGR's Faculty of Pharmacy. In some cases, the SGD2F2 files of certain departments were produced by the Dean's Office of the UGR's Faculty of Pharmacy. This happened when a minimum of information had been submitted and none of those departments' members had produced them. Oddly, a common denominator for both types of department was that they participated in the UGR's Faculty of Pharmacy by teaching just one subject.
3. The moderate difficulty of the SGD2F2 file syntax is outweighed by the following advantages, particularly when a department is responsible for more than one subject:

   • Flexibility in terms of submitting a broad range of document types to the Faculty (see document types in the definition of the SGD2F2 file syntax), which vary from one subject to another.
   • Ease of jointly managing all teaching documents in a single text file, which, in essence, can be considered a sketch of the web page on which the department's teaching documents are made available. In fact, in the majority of cases, the person responsible for collating the course guides for the department's website was the person responsible for creating the SGD2F2 file.

The model presented in this article falls within the framework of what Collis and Moonen (2006) refer to as "the logistics of participating in education". It is a solution to the problems related to teaching documents identified in the UGR's Faculty of Pharmacy, and is implemented via a strategy

that has taken account of the educational context and its expectations (Duart & Lupiáñez, 2005). The changes that have been implemented in the UGR's Faculty of Pharmacy represent an attempt to make improvements by following a planned process, and not simply by incorporating new features or one-off fads for a limited period of time (Salinas, 2004). The process's development in general and its implementation in particular are the result of teamwork (Duart & Lupiáñez, 2005), in which the UGR's Faculty of Pharmacy has been fully involved (Salinas, 2004). In essence, the proposed system has allowed the UGR's Faculty of Pharmacy to make the management of teaching documents more flexible by integrating ICTs, an initiative that responds to the UGR's Faculty of Pharmacy's commitment to improving the quality of teaching (Salinas, 2004).

Finally, although the proposed model has been developed as a solution for a particular faculty, it is not limited to it. In fact, by making a few alterations, the SGD2F2 software package could be adapted for use by any university centre or body responsible for the management of university teaching.

Appendices

A.1. SWOT analysis of the usual model for the management of teaching documents in centres (used in the University of Granada's Faculty of Pharmacy in the 2009-10 academic year)

Internal analysis

Strengths:
- It does not require any special software infrastructure because it can be applied directly by making use of the administration tools available on the University of Granada's (UGR's) Faculty of Pharmacy's website.
- It does not require any type of information for the teaching staff or departments. It is very intuitive (similar to classic paper-based publishing).

Weaknesses:
- It requires every document, including every updated or corrected version of it, to be submitted to the Faculty.
- There is a high likelihood that documents made available on the UGR's Faculty of Pharmacy's website will not be the most up-to-date versions of them.
- Continuous file storage on the Faculty's server, with the ensuing consumption of physical resources.
- Constant updating of the Faculty's web pages on which documents are made available.
- After their receipt by the Faculty, documents are classified manually by the administrator.
- There is a considerable delay with regard to updating teaching documents on the UGR's Faculty of Pharmacy's website due to the total submission-receipt-website maintenance time required.

External analysis

Opportunities:

– It does not require any coordination with departments.

Threats:

– There is a high risk of generating misinformation among students due to obsolete versions of documents on the centre's website.
– It is laborious for teaching staff, particularly for authors of the various documents.
– Responsibility is assumed by the UGR's Faculty of Pharmacy, since it provides documents (that have not been updated) containing incorrect information.
– Implementing new degree courses and phasing out the types of degree offered previously (introduction and elimination of course years). High volatility across all subjects.
– The changing organisation of teaching over a period of seven years will lead to constant amendments of the Faculty's teaching web pages.
– In the preparatory months leading up to the next academic year, the Faculty must also manage its new course guides.
– A significant increase in the number of documents that the centre needs to manage.

A.2. SWOT analysis of the hyperlink-based model using the SGD2F2 software package

Internal analysis

Strengths:

– Support provided by the UGR's Faculty of Pharmacy.
– There is a high likelihood that files linked from the Faculty's website will be the most up-to-date versions.
– Simplifying the task for lecturers because they do need to submit files to the Faculty.
– It does not give rise to a long-term increase in financial or human resources for the Faculty because the automation of the process will compensate for the initial investment.
– Simplifying the management of teaching documents in the Faculty, since the process is automated and also shared with departments.
– Freeing up part of the memory of the server used to store teaching document files.
– SGD2F2 files are text based, so they can be created using any word processor on any platform. They are also very small.
– The Faculty's web pages containing teaching documents are automatically generated by the SGD2F2 software package. The web pages do not require any maintenance when there is a change to an existing document, when a new document needs to be added, or when new degree courses are implemented and the types of degree offered previously are phased out.

– There is a minimal delay with regard to updating teaching documents on the centre's website because the submission-receipt-website maintenance process is automated.

– An SGD2F2 file syncretically contains elements of a department's web pages on which teaching documents are made available, but it does determine what they look like because it does not include style specifications. The syntax of such files is robust with regard to the style of a department's website.

– Maintenance of the SGD2F2 file from one academic year to the next requires minimal changes.

– A syntax-check program is available: leesgd2f2.exe.

– The SGD2F2 software package provides departments with a channel for disseminating a broad range of teaching documents.

– An RSS feed is available to disseminate information about the management of teaching documents.

Weaknesses:

– Requires a minimum of collaboration of departments, and more precisely of one of their members, to create the SGD2F2 file.

– The complexity of the syntax rules for SGD2F2 files.

External analysis

Opportunities:

– Implementing new degree courses and phasing out the types of degree offered previously, on an annual basis. High volatility across all subjects.

– In the preparatory months leading up to the next academic year, new course guides must also be managed ("Estatuto del Estudiante Universitario", 2010).

– A significant increase in the number of documents that the Faculty needs to manage.

– Public administrations and universities encourage the dissemination of teaching documents on departments' and centres' websites.

– Departments must disseminate teaching documents on their respective web pages (programme agreements).

– Each department usually has a person in charge of producing and coordinating the web pages of the programme agreement or of its teaching documents, for whom the creation of the SGD2F2 file would not be complicated.

Threats:

– Departments responsible for one or two subjects may not have the necessary motivation to create the SGD2F2 file.

– Lack of collaboration by some departments.

References

ANECA. *AUDIT Programme*. [Accessed: 21/02/12].

<http://www.aneca.es/eng/Programmes/AUDIT>

ANECA; AQU; ACSUG (2007). *AUDIT Programme. Guidelines, definition and documentation for internal quality assurance systems in higher education*. Agencia Nacional de Evaluación de la Calidad y Acreditación, Document 02, V. 1.0-21/06/07. [Accessed: 21/02/12].

<http://www.aneca.es/eng/content/download/12370/153491/file/audit_directrices_eng_080221.pdf>

CAÑAS, A. *SWAD: Sistema Web de Apoyo a la Docencia*. [Accessed: 04/08/11].

<http://swad.ugr.es>

CAÑAS, A.; CALANDRIA, D. J.; ORTIGOSA, E. M. [et al.] (2007). "SWAD: Web System for Education Support". In: FERNÁNDEZ-MANJÓN, B.; SÁNCHEZ PÉREZ, J. M; GÓMEZ-PULIDO, J. A. [et al.] (eds). *Computers And Education: E-learning - from Theory to Practice*. Berlin: Springer. Pages 133-142.

<http://www.springer.com/computer/general+issues/book/978-1-4020-4913-2>

BARÓN, A.; ROCA, S. (2006). "El contrato programa para la financiación de la universidad en función del logro de objetivos. La experiencia de la Universidad Politécnica de Cataluña, España". In: *La educación superior en el mundo 2006: la financiación de las universidades*. Barcelona: Mundiprensa.

<http://hdl.handle.net/2099/7301>

CASANUEVA, C.; GARCÍA DEL JUNCO, J.; CARO, F. J. (2000). *Organización y gestión de empresas turísticas*. Madrid: Ediciones Pirámide.

COLLIS, B.; MOONEN, J. (2006). "Information technology in higher education: emergent paradigms". *RUSC*. Vol. 2, No 2. UOC. [Accessed: 10/08/11].

<http://www.uoc.edu/rusc/2/2/dt/eng/collis.pdf>

GOHR, A.; THE DokuWiki COMMUNITY. *DokuWiki*. [Accessed: 21/02/12].

<http://www.dokuwiki.org/ >

DUART, J. M.; LUPIÁÑEZ, F. (2005). "La perspectiva organizativa del e-learning". *RUSC*. UOC. Vol. 2, No 1. [Accessed: 12/08/11].

<http://rusc.uoc.edu/ojs/index.php/rusc/article/view/v2n1-perspectiva-organizativa-elearning>

"Estatuto del Estudiante Universitario" (2010). Real Decreto 1791/2010, de 30 de diciembre". *Boletín Oficial del Estado* (31 December 2010). Pages 109353-109379.

<http://www.boe.es/boe/dias/2010/12/31/pdfs/BOE-A-2010-20147.pdf>

GUERRAS MARTÍN, L. A.; NAVAS LÓPEZ, J. E. (2007). *La dirección estratégica de la empresa. Teoría y aplicaciones*. Madrid: Civitas. Fourth ed., 650 pages.

"Guía docente: el esqueleto de una asignatura". *Universia*. [Accessed: 04/08/11].

<http://noticias.universia.es/ciencia-nn-tt/reportaje/2010/05/03/647368/guia-docente-esqueleto-asignatura.html>

"Ley orgánica 4/2007, de 12 de abril, por la que se modifica la Ley Orgánica 6/2001, de 21 de diciembre, de Universidades". *Boletín Oficial del Estado* (13 April 2007). No 89, pages 16241-16260.

<http://www.boe.es/aeboe/consultas/bases_datos/doc.php?id=BOE-A-2007-7786>

MARCELLÁN ESPAÑOL, F. (2005). "Criterios de garantía de calidad en educación superior: praxis europea". *Educatio*. No 23.

<http://revistas.um.es/index.php/educatio/article/viewFile/119/103>

"Modelo de Financiación 2007-2011 de las Universidades Públicas de Andalucía". *Boletín Oficial de la Junta de Andalucía (*25 July 2007). No. 146.

<http://www.juntadeandalucia.es/boja/boletines/2007/146/d/1.html>

ODAP (2009). *Contrato Programa 2009 de la UGR*. Universidad de Granada. [Accessed: 21/02/12].

<http://wdb.ugr.es/~odap/ContratoPrograma>

ODAP (2010). *Contrato Programa 2010 de la UGR*. Universidad de Granada. [Accessed: 21/02/12].

<http://wdb.ugr.es/~odap/ContratoPrograma2010>

ODAP (2011). *Contrato Programa 2011 de la UGR*. Universidad de Granada. [Accessed: 21/02/12].

<http://wdb.ugr.es/~odap/ContratoPrograma2011>

PÉREZ MARTELL, E.; RUBIO MICHAVILA, C.; RUBIO ROYO, F. (1999). "Modelo de enseñanza. Aprendizaje basado en tecnologías de la información". In: *I Symposium Iberoamericano de Didáctica Universitaria*. [Accessed: 04/08/11].

<http://redaberta.usc.es/aidu/index2.php?option=com_docman&task=doc_view&gid=118&Itemid=8>

"Real Decreto 861/2010, de 2 de julio, de Ordenación de las Enseñanzas Universitarias Oficiales". *Boletín Oficial del Estado* (3 July 2010). Pages 58453-58468.

<http://www.boe.es/boe/dias/2010/07/03/pdfs/BOE-A-2010-10542.pdf>

RSS BOARD. *Really Simple Syndication specifications, tutorials and discussion*. [Accessed: 21/02/12].

<http://www.rssboard.org/>

SALINAS, J. (2004). "Innovación docente y uso de las TIC en la enseñanza universitaria". *RUSC*. UOC. Vol. 1, No 1. [Accessed: 21/02/12].

<http://www.uoc.edu/rusc/dt/esp/salinas1104.pdf>

UNIVERSIDAD DE GRANADA (2006). *Plan estratégico 2006-2010 de la Universidad de Granada*. Granada: Universidad de Granada. [Accessed: 21/02/12].

<http://wdb.ugr.es/~odap/PlanEstrategico.php>

WORLD WIDE WEB CONSORTIUM. *W3C HTML*. [Accessed: 21/02/12].

<http://www.w3.org/html/>

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ARTICLE

Opportunities for Managing Human Capital in University Spin-offs. A Dynamic Analysis

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Abstract

Creating university spin-offs (USOs) should be one of the cornerstones of a country's business development. Yet a number of studies have identified two factors that limit their growth: access to funding difficulties and a lack of management skills among entrepreneurial teams. In order to identify potential solutions for the latter of those factors, an analysis was performed to determine how the implementation of certain human resources policies affects the creation and retention of

human capital in USOs. If successfully implemented, such policies can contribute to a more efficient management of the market value of such organisations. So, after diagnosing what the human capital component of Spanish USOs is considered to be, a causal analysis was performed. The approach taken to the analysis was that acquiring and retaining human capital is a strategic problem for such organisations. The outcome of the analysis is a series of policy proposals that, taking account of the differential characteristics of USOs, aim to foster the recruitment, development and retention of human capital as the basis of such organisations' business competitiveness.

Keywords

human capital; spin-off; human resources management; entrepreneurship; strategic management

Oportunidades de la gestión del capital humano en las spin-offs *universitarias. Un análisis dinámico*

Resumen

La creación de spin-offs universitarias debería constituir uno de los pilares sobre los que sustentar el desarrollo del tejido empresarial de un país. Sin embargo, de los análisis realizados se desprenden dos factores que limitan su crecimiento: las dificultades de acceso a fuentes de financiación y la falta de habilidades de gestión del equipo emprendedor. Para poder contribuir a solucionar la segunda de las dificultades detectadas, se ha realizado un análisis destinado a explicar cómo la implantación de determinadas políticas de recursos humanos puede afectar a la creación y mantenimiento del capital humano en las spin-offs universitarias, y con ello contribuir a una gestión más eficiente de su valor en el mercado. A partir del diagnóstico de cuál es la consideración del capital humano en las spin-offs españolas, se ha desarrollado un análisis causal que plantea la adquisición y mantenimiento del capital humano como un dilema estratégico para este tipo de organizaciones. Del análisis realizado se han derivado una serie de políticas propuestas que, teniendo en cuenta las características diferenciales de las spin-offs universitarias, están encaminadas a favorecer la captación, el desarrollo y retención de su capital humano como base de su competitividad empresarial

Palabras clave

capital humano, spin-off, recursos humanos, emprendimiento, dirección estratégica

1. Introduction

The creation of new businesses generally has a number of positive effects such as job generation, economic and social development and innovation, among others. Likewise, businesses created within a university environment, which are known as 'university or academic spin-offs', have several advantages over other, more traditional technology transfer mechanisms such as patents. Businesses of this type are usually located close to where they are created, thus fostering local economic development (Zucker et al., 1998); they generate revenue that benefits both the founders and the host universities (Bray & Lee, 2000); they drive changes in institutions (Brooks & Randazzese, 1998); and they increase the level of interaction between universities and their social environments (Dorfman, 1983). In addition, spin-offs provide alternative job opportunities for staff working in public research

centres, who often find it impossible to further their scientific careers in such organisations, or even to find a job in the first place (Hernández et al., 2003).

Most university spin-offs (USOs) take the form of small technology consultancies. Attracting and retaining human capital, which is represented by the stock of senior professionals in them, constitutes the cornerstone of their competitive edge (Calvo, 2011). However, managing such human capital is complex and requires skills that entrepreneurs do not usually have.

This article therefore intends to answer the question that managers of USOs so often ask: What differential policies for human resources should be taken into account in organisations of this type in order to attract and retain the value of their human capital? Two assumptions serve as the starting point: a) a USO's competitive edge stems from the recruitment, development and retention of its human capital, and b) a USO's human capital management is not comparable to that of other businesses. Two differential factors of USOs that should be taken into account are their small size and their proximity to universities.

This article is divided into four sections: the first is this introduction; the second is an initial diagnosis that allows the current situation of USOs' human capital to be determined; based on that diagnosis and a prior causal analysis, the third is a series of policy proposals regarding the recruitment, development and retention of human capital in organisations of this type, all of which are aimed at fostering their market competitiveness; the fourth and final section provides the main conclusions drawn from the study.

2. Initial diagnosis of Spanish USOs' human capital

While there is no commonly accepted way of defining the concept of human capital, most definitions point to a set of distinctive basic competencies of an intangible nature (Bueno Campos, 1998) that are capable of providing a durable competitive edge (Cañibano et al., 1999).

If human capital is considered to be the stock of individual knowledge that experienced employees of an organisation possess (Bontis et al., 2000), then it is possible to assert that businesses created within a university context have a significant human capital component (Correa, 2009). In Spain, USOs are mainly created on the basis of tacit, uncodified knowledge; it is the entrepreneurs' personal know-how that underpins the potential development of such businesses (Rodeiro et al., 2008).

As a framework of reference for the analysis, some data relating to general aspects of Spanish USOs will be shown, as will others relating to their human capital. For that purpose, the studies by Rodeiro et al. (2008) and Ortín et al. (2007) were taken as the reference. Respectively, those studies analysed a total of 72 and 70 USOs created in Spain (Table 1).

Table 1. General characteristics of USOs and their human capital

General characteristics of USOs		
	Ortín et al. (2007)	Rodeiro et al. (2008)
Mean number of employees	8.34	8.01
Sales/Mean turnover volume (Euros)	16,737,022	291,972
Mean balance figure	832,967	378,779
Characteristics of technology inventors		
Mean number of people that develop technology	Not available	4.5
Source knowledge area — Technical teaching	Not available	50%
Source knowledge area — Experimental sciences	Not available	25%
Source knowledge area — Health sciences	Not available	9.2%
Percentage of inventors who are also business founders	Not available	80%
Role of the inventor in the business — Advisor/consultant	7%	33%
Role of the inventor in the business — Director	43%	32%
Role of the inventor in the business — Managing director	Not available	17%
Characteristics of business founders		
Mean number of people that set up a business	2.66	3.6
Mean age (years)	39.2	33.8
Percentage of doctors	20%	20%
Percentage of businesses having a founder with prior business experience in the USO sector	57.7%	59.7%
Percentage of businesses having a founder with prior experience of setting up businesses	26%	32%
Main reason for setting up a business	Identifying a business opportunity	Identifying a business opportunity
Main barrier to growth	Access to financial resources	Access to financial resources

Source: own elaboration based on Ortín et al. (2007) and Rodeiro et al. (2008)

One of the conclusions that can be drawn from the above data is that the majority of the creators of technology exploited by USOs actually plays an active role in them. The study by Rodeiro et al. (2008) shows that 50% of the people that develop a technology eventually become directors of their respective businesses, whereas 33% become consultants. The study by Ortín et al. (2007) shows that 43% of the founders eventually become directors, whereas 7% become consultants. This means that the characteristics of the 'inventors' have a major impact on a business and its management.

The mean age of USO founders is below 40 (the mean age of entrepreneurs in Spain is 41, GEM, 2010), and 'Identifying a business opportunity' is the main reason for creating them. It is also possible to see that the entrepreneur group is highly qualified; indeed, 20% are doctors.

As the main factors limiting the growth of USOs, the literature points to a shortage of financial resources (Tobar, 2004; Sbragia & Ozório, 2004; Díaz, 2004) and the entrepreneurs' lack of management skills (Bruderl et al., 1992; Lee & Tsang, 2001; Rodeiro & Calvo, 2011).

The latter of those factors, the lack of management skills, is connected with businesses' intellectual capital creation (Madrigal Torres, 2009); entrepreneurs of such businesses also highlight it as one of the main problems that they encounter (Rodeiro et al., 2008). The people that create USOs usually have a high level of technical skills, but they do not have the required training in the field of management (Ortín et al., 2007).

This lack of university entrepreneurs' management skills may have direct consequences, such as poor work team coordination, the inability to meet deadlines according to the business plan, minimal market orientation of technologies and products created, small networks of contacts and inadequate business management. Consequently, many USOs may not achieve any considerable growth (Harrison & Leitch, 2005; Lockett et al., 2005). The failure of such businesses is often due to management team problems, basically because managing a business is very different from managing a research laboratory (Timmons, 1994). In order to improve business management, both know-how and know-who are vital (Mustar, 1997). Problems such as these, which USOs have to grapple with, may go some way to explaining why their growth has slowed down (Chiesa & Piccaluga, 2000; Cardozo & Engleman, 2004; Harrison & Leitch, 2005).

Moreover, the institutional framework does not appear to be adequate in terms of ensuring a smooth university-business relationship that is capable of generating USOs, or indeed of achieving the virtual organisation flexibility that has become the norm in business relationships (Ritter & Gemüden, 2003; Hakansson, 1982). The financial results of patent commercialisation, commissioned research or collaboration agreements between research groups or institutes and business organisation do not manage to achieve what is expected from a process of networked business value generation (Pérez-Astray & Calvo, 2011). Seen from an innovation lifecycle approach (Figure 1), such a poor impact (Pekerman & Walsh, 2007) may be explained by the type of know-how that science usually offers, and by the demand for such know-how in a business's innovation cycle.
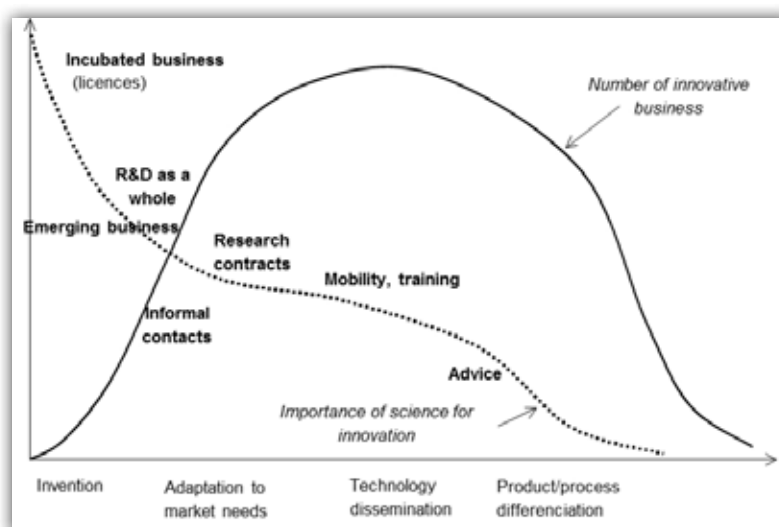
This situation suggests that human capital management in USOs is of paramount importance. Rather than by their investment in assets, the value of USOs is mainly determined by the perceived value of their professionals' know-how and experience. In this respect, the role of training (formal and informal) in the value creation processes of USOs is fundamental. From a dynamic viewpoint, it is worth bearing in mind the approach put forward by Warren (2000), who asserts that, while training programmes increase the development of skills, oversight and a lack of continuous reinforcement are mechanisms that lower the level already achieved (Figure 2). This feedback loop allows a dynamic balance to be maintained with regard to the skills levels of professionals in businesses that invest in continuing development, a key aspect of the USO value chain.

Figure 2. Limits on growth of professional skills.
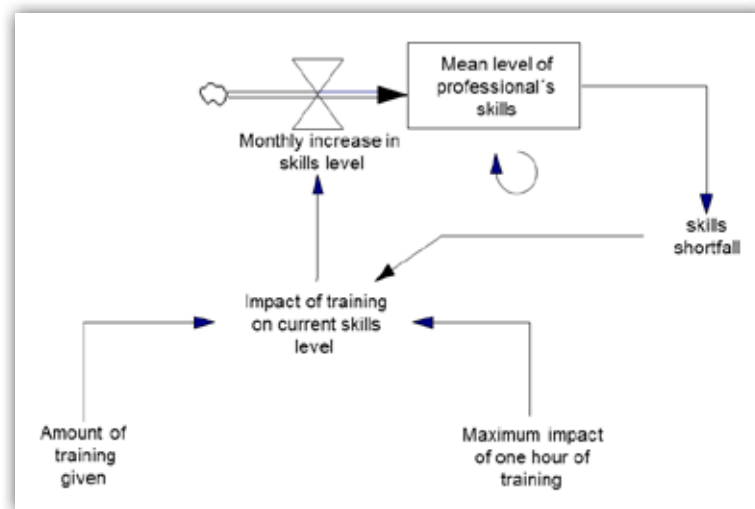
Source: adapted from Warren (2000)

The analysis performed makes it possible to assert that human capital constitutes the cornerstone of USOs when it comes to generating their competitive edge. Consequently, its absence is one of their main barriers to growth. So, in the authors' opinion, it is necessary to identify management practices that allow such organisations' strategies to focus on creating and retaining their human capital.

3. Selection of best practices and their relationship to human capital generation

3.1. Causal and sensitivity analysis

For more than two decades, theoreticians of strategic thinking have considered the impact of certain human resources practices on organisational strategy. Various studies support the positive relationship between certain human resources practices and better organisational performance (Kaufman, 1992; Terpstra & Rozell, 1993; Bartel, 1994). Taking that approach as a reference, and on the basis of the

specific dynamics of human resources management in USOs (Calvo, 2011; Stearman, 2000), a series of policy proposals regarding the recruitment, development and retention of human capital in organisations of this type have been made, all of which aim to foster their market competitiveness.

Regarding the approach taken to the analysis in this study, the strategic aspect governing the survival of USOs is their capacity to acquire and retain human capital that the market requires, in the form of their stock of professionals or know-how. In order to offer differential, innovative services, such businesses must allocate resources to training their professionals, not only to increase and enhance their technical know-how, but also to develop their business skills. At the same time, owing to their small size and minimal financial resources, they have to make a turnover in the short term in order to survive. Professionals forming part of such organisations, whose salaries are often lower than average for the sector, value the ability to learn and the employability aspects that organisations of this type can offer them. However, trying to combine short-term survival with medium-term growth potential through investment in Research, Development & Innovation (RD&I) is tough and often thwarts their professional expectations. They leave as a result, and this leads to an intellectual decapitalisation of such businesses.

Given that the situation was found to be a dynamic problem, the authors identified a series of feedback loops to help them take an in-depth look at the strategic problem posed (Figure 3).

Figure 3. Basic loop
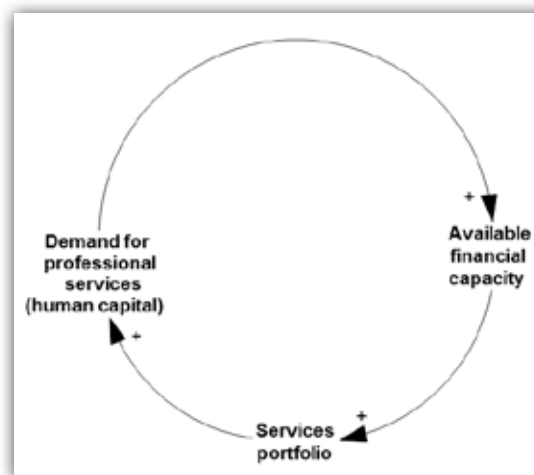
Source: own elaboration

External demand for services determines the financial capacity of a business and allows it to create its portfolio of professional services, linked to the training of its human capital (Figure 4). If demand goes up and the business manages its professionals' knowledge well, then that will lead to a USO's growth in the long term. The greater the human capital offered by a USO, the greater the client's perceived competitive advantage of the business. This will lead to a higher demand for services, which in turn will strengthen the business-client relationship and foster its growth (positive loop).

However, creating a greater stock of human capital, which requires bigger investment in R&D and professional development, will increase the internal cost of services. This will lead to higher prices, which in turn will weaken future demand for services (negative loop).

Figure 4. Competitive edge loop
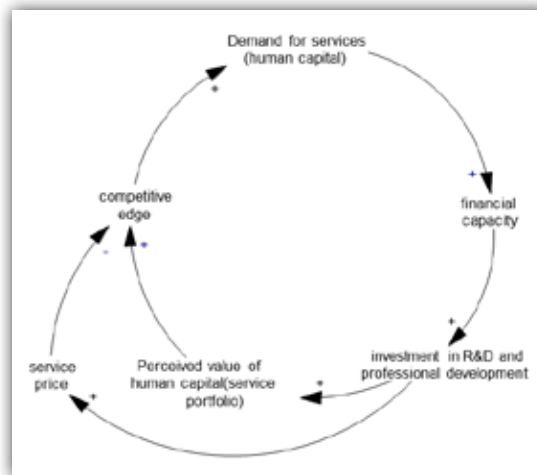
Source: own elaborationa

On the basis of this prior causal analysis, managed with a focus group formed by 16 human capital management experts in professional service businesses, a flow model was designed. This flow model enables an evaluation of the relationship between investment in training, the existence of human capital (number of senior professionals recruited through internal selection processes) and an organisation's growth (retaining the number of senior professionals over time). A constant factor to bear in mind is that USOs usually take on inexperienced junior members of staff and train them internally, but that during the process, many of those professionals resign from the organisation, thus rendering the process of skilled human capital management and retention more difficult (Figure 5).

Figure 5. Flow of human capital
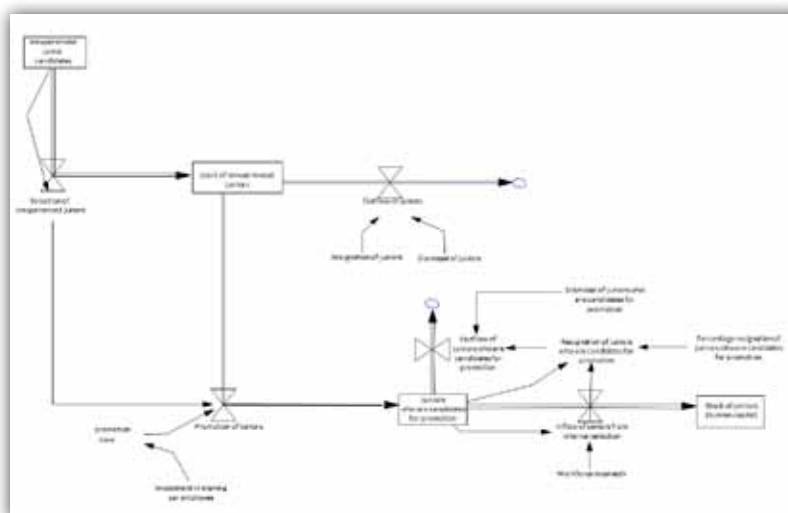
Source: own elaborationa

If account is taken of the fact that consolidating the professionals' experience takes time, then the main impact of greater investment in training will be a shortening of the time in which inexperienced

professionals (genuinely inexperienced junior members of staff) will get the required promotion to join a business's team of senior professionals, on the assumption that the demand for projects is sufficient to generate vacancies on that team. Also taking account of the fact that businesses value the existence of human capital in organisations of this type, having a workforce of senior professionals will provide a USO with a competitive edge over other businesses, which will foster its growth.

Thus, considering a scenario of demand of professional services equilibrium, the sensitivity analysis (Figure 6) shows that investment in training becomes a point of leverage for the growth of organisations of this type. This is so because an increase in investment in training per employee above the sector's mean increases the stock of senior professionals, which allows an organisation to adapt to the requirements of demand (conversely, investment in training below the sector's mean has the opposite effect).

Figure 6. Sensitivity of training investment in the stock of senior professionals (human capital)
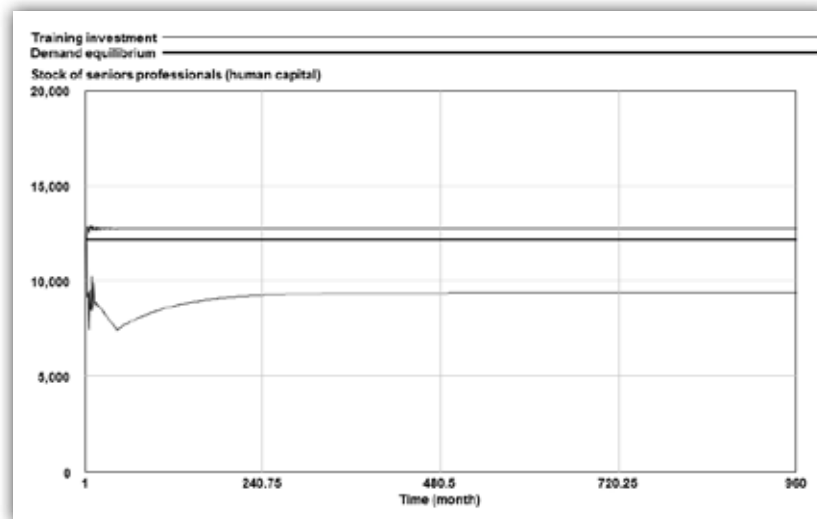
Source: own elaborationa

However, the difficult balance between the flow of professionals and demand for projects makes it essential to define a series of specific human resources policies for USOs, the aim of which is to align the internal capacities of an organisation with the intellectual capital demand of the market.

3.2. Human capital recruitment and selection

Thanks to their privileged relationship with niche universities and research groups, USOs are able to lower the costs (Fama & Jensen, 1983) associated with recruiting and selecting human capital. From this perspective, USO managers have privileged access to specialised human capital with high potential, since they can take advantage of the information asymmetry (Eisendhardt, 1989; Fama & Jensen, 1983) that prior knowledge of the candidates —through their participation in academic activities— provides them with. Likewise, they may be able to maintain differential recruitment and selection advantages by entering into favourable agreements with academic institutions.

3.2.1. Access to different knowledge areas

USOs can recruit employees with different skills from different areas. The directors of such businesses have the direct opportunity to recruit staff from the departments in which a technology has been developed. They can also recruit staff from other knowledge areas, which will facilitate the future growth and development of such organisations.

> RECOMMENDATIONS and POLICIES: USOs should approach university graduates and researchers in knowledge areas that are different from those of their founders. In this respect, including people with profiles that are more entrepreneurial, such as graduates or students on master's degree or postgraduate courses in Business Administration and Management, would allow a USO's lack of business skills and knowledge of the market to be overcome. Other studies such as Labour Relations, Languages and International Relations could be sources of qualified staff, who would be able to collaborate on a USO's management tasks or internationalisation processes.

3.2.2. Knowledge retention

USOs originate from certain research groups and departments of a university, so they know their members directly. This situation is maintained over time because many of their founders keep in touch with the departments in which a technology has been developed. In addition, USO founders often use their network of contacts within a university to obtain information about students or researchers in other departments. Therefore, such links with source institutions mean that USOs have prior knowledge of the potential candidates that it might want to employ and are able to identify which of them could increase their stock of human capital in the future. Thus, when it comes to taking on new staff, one of the major problems is eliminated: information asymmetry.

> RECOMMENDATIONS and POLICIES: For USOs to continue counting on universities as potential sources of employees, who are known directly or indirectly, such businesses and their directors should maintain links with source institutions.
>
> In this respect, the proposal is to strengthen the use of shared facilities, the temporary employment of staff and the promotion of cooperation agreements.

3.2.3. Flexible employment

By temporarily employing students and researchers, USOs are able to find out about the real skills of university members employed in them. It also allows a degree of labour flexibility and certain advantages with regard to employing people in the future. Currently, the Torres Quevedo programme offers three-year subsidies when R&D staff (doctoral students and technologists) are employed by businesses, technology centres, entrepreneurial associations and science and technology parks.

The aim of the programme is to stimulate the supply and demand for researchers, and to foster the transfer of R&D outcomes and their implementation in the productive system.

> RECOMMENDATIONS and POLICIES: To strengthen the use of programmes of this type, which allow doctoral students to be employed to undertake internships in businesses. To do that, it will be necessary to increase the dissemination of such programmes and to highlight the positive outcomes obtained from these or earlier ones.[1]

3.3. Human capital development

In the previous causal analysis, the problem posed by either investing in professional development (investment connected with R&D) or allocating the selected professionals' time to the commercial exploitation of already acquired know-how determines the strategic importance of this policy.

The policy proposal involves maintaining strategic alliances with research groups and university teaching staff. Relationships with research groups will allow USOs to access one-off elements of already developed know-how to exploit them in the market, shaping a make-buy mixed human resources system (Miles & Show, 1984) that is favourable from a competitive viewpoint.

Relationships with university lecturers will enable USOs to benefit from the specialised training of their professionals at a lower cost than on the open market.

3.3.1. Greater time and financial constraints

The literature points out that financial constraints are some of the main problems that USOs face, and this has repercussions for the development of their human capital. USOs cannot afford to maintain permanent R&D departments. They do not have the financial capacity to do so, in the early years at least. Yet, not allocating time and resources to training their professionals may give rise to a moral hazard problem (Eisendhardt, 1989; Fama & Jensen, 1983). Employees with knowledge-worker profiles take on greater workloads in exchange for lower pay in the hope of furthering their development and innovative capabilities. Yet USOs wholly allocate their staff to the commercial exploitation of their stock of know-how. In the medium term, this policy will lead junior professionals, who are candidates for promotion, to resign, with the ensuing intellectual decapitalisation of such businesses and loss of competitiveness. In addition, USOs have to cope with a constant re-adaptation of their capacities in their early years of existence, when many of them are still positioning themselves in the market. This gives rise to time constraints for training their staff; most employees spend most of their time on day-to-day operations and short-term activities.

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1. The IDE (incorporation of doctors into enterprises) programme ran from 1997 to 2001, and was then replaced by the Torres Quevedo programme for doctors and technologists. According to the evaluations carried out, the impact of the programme was positive (Sanz Menéndez, Cruz Castro & Aja, 2004) In fact, several years after forming part of it, six of the 10 doctors still had stable employment in the same business.

RECOMMENDATIONS and POLICIES: To ensure that the development of USOs' human capital fits into their time and financial constraints, such organisations will have to carry out a prior selection of their staff, by taking advantage of their privileged relationships with the university community. Moreover, strategic alliances with research groups will allow USOs to access one-off elements of already developed know-how to exploit them in the market, shaping a make-buy mixed human resources system that is favourable from a competitive viewpoint. In addition, relationships with university lecturers will enable USOs to benefit from the specialised training of their professionals at a lower cost than on the open market.

3.4. Human capital retention

The retention of professionals in USOs is directly related to the fulfilment of their professional development expectations, to the consistency of selection and development policies, and to their pay (in relation to what they might be able to command in the market). When such employees leave, especially if that happens after they have been working for a USO for some time (senior professionals), it will lead to a loss of competitiveness stemming from the total non-recovery of the investment made in their training, a decline in its portfolio of commercial services linked to the stock of human capital, and to a loss of financial resources because money will have to be spent on selecting and training new professionals.

3.4.1. Greater commitment

On many occasions, employees that join the workforce of USOs have a direct link with the founders or directors of such businesses and/or are entering into their first contract of employment. This means that they have a greater moral commitment to the business and to the people managing it.

RECOMMENDATIONS and POLICIES: USOs should create a formal commitment, binding on both parties, in the form of tie-in agreements, training commitments or confidentiality agreements (to keep research outcomes secret) in order to strengthen the commitment created during their foundation. Likewise, USOs should design policies to strengthen their employees' identification with the general business objectives. The purpose of doing so is to align the creation of specialised human capital with the needs of the market.

3.4.2. Business growth potential

Since USOs are businesses that originate from universities, a high level of growth is expected from them. However, their growth is often moderate (OECD, 1998) and their impact on the economy is relatively low (Callan, 2001). If the growth, size, profits and products of such businesses are modest, then retaining their human capital will be more difficult. In contrast, if USOs expand their markets, then they will be in a better position to retain their employees.

RECOMMENDATIONS and POLICIES: USOs should pursue real growth, working in global markets that allow them to expand. In order to do so, it is vital for them not to limit themselves to consultancy activities alone. Rather, they should become the holders of technologies with direct applications in the market.

4. Conclusions

USOs need to maintain a degree of rationality and dynamic balance in the decisions they take on the use and management of their resources and capacities (Foss & Knudsen, 2003; Diedrickx & Cool, 1989; Amit & Schoemaker, 1993; Rumelt, 1984).

From a dynamic perspective, if USOs design their human resources practices to serve as the cornerstone of their competitive edge, then they will take decisions on which policies to implement in order to retain a certain level of human capital in their respective organisations.

Table 2. Human capital management in USOs

Human capital management actions	Differential aspects of USOs	Policy proposals
Recruitment and selection	• Privileged access to specialised human capital (technical and entrepreneurial) • Information asymmetry • Favourable contractual relations (temporary employment and lower costs)	• Participation in academic activities • Recruitment of researchers from the same knowledge area or complementary areas • Employment of internship students • Participation in the Torres Quevedo programme • Dissemination of their activity and image among the university community • Demand for favourable contracting regulation of lecturers and researchers
Development	• Lack of financial capacity in development investment • Moral hazard problems • Speed and lower cost	• Strategic alliances with research groups • Training assignments awarded to university teaching staff • Occasional employment of researchers for business activities • Maintaining training links with source universities
Retention	• Greater commitment • Future employment • Growth potential	• Consistency of selection and development policies • Training assignments awarded to university teaching staff, in line with the needs identified • Systems for the explicit storage of know-how • Design of a framework of confidentiality in relation to the use of know-how • Incentive systems for training and participation in commercial objectives • Subsequent collaboration agreements with research groups and temporary employees

The outcome of the analysis performed is a series of policy proposals that, taking account of the differential characteristics of USOs, aim to foster the recruitment, development and

retention of human capital. Making full use of the information asymmetry that knowing and having privileged access to valuable candidates (in terms of their know-how and potential) offers, fostering collaboration agreements with research groups and university teaching staff to stimulate the growth of their portfolio of services and the development of their professionals, and implementing retention mechanisms based on reducing moral hazard problems and promoting new collaboration agreements to increase relational capital are some of the measures proposed. This will allow the commercial activities and human capital development of such businesses to be aligned, which will help them to overcome the formulated strategic problem and foster their future growth (Table 2).

In the authors' opinion, this analysis represents a good starting point for future research into the strategic management of USOs, a field in which few studies have been undertaken.

References

BARTEL, A. P. (1994). "Productivity gains from the implementation of employee training programs". *Industrial Relations*. Vol. 33, No 4, pages 411-425.
<http://dx.doi.org/10.1111/j.1468-232X.1994.tb00349.x>

BECKER, B.; GERHART, B. (1996). "The impact of human resource management on organizational performance: progress and prospects". *Academy of Management Journal*. Vol. 39, No 4, pages 779-801.
<http://dx.doi.org/10.2307/256712>

BONTIS, N.; CHUA, W. C.; RICHARDSON (2000). "Intellectual capital and business performance in Malaysian industries". *Journal of Intellectual Capital*. Vol. 1, No 1, pages 85-100.
<http://dx.doi.org/10.1108/14691930010324188>

BRAY, M. J.; LEE, J. N. (2000). "University Revenues from Technology Transfer: Licensing Fees *vs* Equity Positions". *Journal of Business Venturing*. Vol. 15, Nos 5-6, pages 385-392.

BROOKS, H.; RANDAZZESE, L. (1998). "University-industry relations: the next 4 years and beyond". In: Branscomb, L.; Keller, J. (eds). *Investing in Innovation: Creating a Research and Innovation Policy that Works*. Cambridge: MIT Press, MA.

BRUDERL, J.; PREISENDORFER, P.; ZIEGLER, R. (1992). "Survival chances of newly founded business organizations". *American Sociological Review*. Vol. 57, No 2, pages 227-242.
<http://dx.doi.org/10.2307/2096207>

BUENO CAMPOS, E. (2000). "Capital intelectual: cuenta y razón". In: *Curso de verano. Valoración de empresas y medición de intangibles*. San Lorenzo de El Escorial.

CALLAN, B. (2001). "Generating spin-offs: Evidence From the OECD". *Science Technology Industry Review*. Vol. 26, No 1, pages 13-56.

CALVO, N. (2011). "Is the contraction of demand an excuse for the laissez-faire human resource practices at professional services companies?". *System Dynamics Review*. Vol. 27, No 3, pages 294-312.

CAÑIBANO, L.; GARCÍA-AYUSO, M.; SÁNCHEZ, M. P. (1999). "La relevancia de los intangibles para la valoración y la gestión de empresas: revisión de la literatura". *Revista Española de Financiación y Contabilidad*. No 100, pages 17-88.

CARDOZO, R.; ENGLEMAN, R. (2004). "University technology and business opportunities. Frontiers of entrepreneurship research". *24th Babson-Kauffman Entrepreneurship Research Conference*. Glasgow.

CHIESA, V.; PICCALUGA, A. (2000). "Exploitation and diffusion of public research: the case of academia spinoff companies in Italy". *R&D Management*. Vol. 30, No 4, pages 329-339. <http://dx.doi.org/10.1111/1467-9310.00187>

CORREA GARCÍA, J. A. (2009). *Diseño de una metodología de valoración para proyectos de transferencia tecnológica derivados de grupos de investigación*. Universidad Nacional de Colombia.

DÍAZ, S. (2004). "Una experiencia de transferencia tecnológica: un estudio de casos DICTUC". In: *Seminario-Curso internacional Gestión de empresas tecnológicas universitarias*. Universidad Curitiba: Brazil.

DORFMAN, N. S. (1983). "Route 128: The Development of a Regional High-Technology Economy". *Research Policy*. No 12, pages 299-316.

EISENDHARDT, K. M.; MARTIN, J. A (2001). "Dynamic capabilities: what they are". *Strategic Management Journal*. Vol. 22, pages 387-401.

FAMA E.; JENSEN, M (1983). "Separation of ownership and control". *Journal of Law and Economics*. Vol. 26, pages 301-325. <http://dx.doi.org/10.1086/467037>

GLOBAL ENTREPRENEURSHIP MONITOR (2010). *Informe ejecutivo España 2010*. IE Business School. Ministerio de Economía.

HAKANSSON, H. (1982). "An Interaction Approach". In: Håkansson, H. (ed.) *International Marketing and Purchasing of Industrial Goods: An Interaction Approach*. Chichester: John Wiley & Sons. Pages 10-27.

HARRISON, R.; LEITCH, C. (2005). "Growth dynamics in university spin-out companies: entrepreneurial ventures or technology lifestyle businesses". In: *The role of private equity in growing new ventures*. Cheltenham: Edward Elgar Publishing.

HERNÁNDEZ, C.; GRAÑA, R.; LÓPEZ, J. (2003). "¿Y por qué no? La experiencia del programa de creación de empresas UNIEMPRENDE en Galicia". *Iniciativa emprendedora*. No 41, pages 75-87.

LEE, D.; TSANG, E. (2001). "The effects of entrepreneurial personality, background and network activities on venture growth". *Journal of Management Studies*. Vol. 38, No 4, pages 583-602. <http://dx.doi.org/10.1111/1467-6486.00250>

LOCKETT, A.; SIEGEL, D.; WRIGHT, M. [et al.] (2005). "The creation of spin-off firms at public research institutions: managerial and policy implications". *Research Policy*. Vol. 34, No 7, pages 981-993. <http://dx.doi.org/10.1016/j.respol.2005.05.010>

MILES, R. E.; SHOW, Ch. (1984). "Designing strategic human resource systems". *Organizational Dynamics*. Vol. 13, No 1, pages 36-52. <http://dx.doi.org/10.1016/0090-2616(84)90030-5>

MADRIGAL TORRES, B. (2009). "Capital humano e intelectual: su evaluación". *Observatorio Laboral Revista Venezolana*. Vol. 2, No 3, pages 65-81.

MUSTAR, P. (1997). "Spin-off Enterprises. How French Academics Create Hi-tech Companies: The Conditions for Success or Failure". *Science and Public Policy*. Vol. 24, No 1, pages 37-43.

OECD (2001). "Fostering high-tech spin-offs: a public strategy for innovation" [Special issue]. *STI Review*. No 26, Paris, OECD.

ORTÍN, P.; SALAS, V.; TRUJILLO, M. [et al.] (2007). *El spin-off universitario en España como modelo de creación de empresas intensivas en tecnología*. Madrid: Ministerio de Industria, Turismo y Comercio.

PEKERMAN, M. & WALSH, K. (2007). "How firms source knowledge from universities: partnerships versus contracting". In: Bessant, J.; Venables, T. (eds). *Creating Wealth from Knowledge*. Cheltenham: Edward Elgar.

PÉREZ-ASTRAY, B.; CALVO, N. (2011). "Analysis of the interface systems as mediating agents in university/industry relations. Proposal of the 'Relationship promoter' as a strategic role in the R&D transference". *European Research Studies*. Vol. 14, No 1, pages 55-76.

PETERAF, M. A.; BARNEY, J. B. (2003). "Unraveling the resource-based tangle". *Managerial an Decision Economics*. No 24, pages 309-323.
<http://dx.doi.org/10.1002/mde.1126>

RODEIRO, D.; CALVO, N.; FERNÁNDEZ, S. (2011). "La gestión empresarial como factor clave de desarrollo de las spin-offs universitarias. Análisis organizativo y financiero". *Cuadernos de Gestión*. Vol. 12, No 1, pages 59-82.

RODEIRO, D.; FERNÁNDEZ, S.; RODRÍGUEZ, A. [et al.] (2008). *La creación de empresas en el sistema universitario* español. Universidad de Santiago de Compostela.

STEARMAN, J. (2000). *Systems thinking and modeling for a complex world*. Irwin McGraw-Hill: USA.

SBRAGIA, R.; OZORIO, E. P. (2004). "Determinantes de êxito de empresas tecnológicas de base universitária: um estudo de multiplos casos no contexto do CIETEC/USP". *Seminario internacional gestión de empresas tecnológicas universitarias*. Barcelona.

TERPSTRA; ROZELL (1993). "The relationship of staffing practices to organizational level measures of performance". *Personnel Psychology*. Vol. 46, pages 27-48.

TIMMONS, J. (1994). *New venture creation. Entrepreneurship for the 21st century*, Boston: McGraw-Hill/ Irwin.

TOBAR, M. (2004). "Análisis de experiencias y factores claves en la formación de empresas tecnológicas universitarias". In: *Seminario internacional gestión de empresas tecnológicas universitarias*. Barcelona.

WARREN, K.; KOURDI, J. (2003). *People power. Developing the talent to perform*. Great Britain: Vola Press.

ZUCKER, L. G.; DARBY, M. R.; BREWER, M. (1998). "Intellectual human capital and the birth of US biotechnology enterprises". *American Economic Review*. Vol. 88, No 1, pages 290-306.

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Digital Scholarship and the Tenure Process as an Indicator of Change in Universities

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Abstract

In this paper, the author aims to demonstrate that a practical barometer of how universities are dealing with the changes wrought by a digital, networked world can be found in the manner in which their reward and tenure processes recognise digital scholarship. The use of new technologies by academics to perform research, construct knowledge, disseminate ideas, engage students in learning and conduct a wide range of scholarly activities generates a number of issues for established reward and tenure systems, which can be seen as a representative microcosm of the issues facing universities more generally.

Keywords

La producción académica digital y el proceso de obtención de la titularidad académica como indicador del cambio en las universidades

Resumen

Con este artículo el autor quiere demostrar que el reconocimiento a la producción académica digital en los procesos de recompensa y titularidad académica es un barómetro útil para saber cómo las universidades abordan los cambios introducidos por el mundo digital y en red. El uso de las nuevas tecnologías en la investigación, en la construcción de conocimiento, en la difusión de las ideas, en los procesos para que el alumnado participe en el aprendizaje y en una amplia gama de actividades académicas da lugar a una serie de problemas para los sistemas de recompensa y titularidad académica establecidos, que pueden entenderse como un microcosmos representativo de los problemas a los que deben enfrentarse las universidades desde un punto de vista más general.

Palabras clave

Proceso de titularidad académica, producción académica digital, promoción, investigación, mediciones

Digital scholarship

The term 'digital scholarship' can be viewed as a convenient shorthand to contrast with traditional, 'analogue' forms of scholarship. However, Weller (2011) suggests that 'digital' is only one aspect of a trilogy, the convergence of which makes for significant change. It is the combination of digital content with a global network and open approaches that is significant in higher education, proposing a definition of "someone who employs digital, networked and open approaches to demonstrate specialism."

There are different interpretations as to the scope of digital scholarship; an information science perspective emphasises the curation and collection of digital resources, whereas a digital humanities perspective uses it in a broader sense to cover a range of scholarly activities afforded by new technologies. It is this more wide-ranging interpretation which is intended in this paper.

As the American Council of Learned Societies Commission on Cyberinfrastructure for the Humanities & Social Sciences observes, there are multiple interpretations of digital scholarship:

"In recent practice, 'digital scholarship' has meant several related things:
1. Building a digital collection of information for further study and analysis
2. Creating appropriate tools for collection-building
3. Creating appropriate tools for the analysis and study of collections
4. Using digital collections and analytical tools to generate new intellectual products
5. Creating authoring tools for these new intellectual products, either in traditional form or in digital form" (http://cnx.org/content/m14163/latest/)

Perhaps more fruitful is to consider an example of a particular technology-based approach in order to demonstrate the issues that digital scholarship raises. Blogging is one of the more well-established approaches that would be included under the banner of digital scholarship, and so acts as a microstudy of all the issues in digital scholarship, although almost any of the new Internet technologies would suffice. Firstly, it has the digital, networked and open approach central to its use – these are not attributes that have been grafted onto it. So we see bloggers linking to each other, operating open comments, using 'open' services such as YouTube and Flickr to embed content to make their posts multi-media. Moreover, such services are democratic and easy to set up.

Blogs are also the epitome of the type of technology that can lead to rapid innovation. They can be free to set up, are easy to use and, because they are at the user's control, they represent a liberated form for expression. There is no word limit or publication schedule for a blog; the same blog may mix posts about politics, detailed subject analysis, sport and personal life. Blogs can remain unread or have thousands of subscribers.

It is this freedom of expression and open approach that is both their appeal and their problem for scholarship. The questions one might ask of blogs in relation to academic practice are true of all digital scholarship:

1. Do they represent 'proper scholarship' (however that might be defined)?
2. Are they central or peripheral to practice?
3. Are they applicable to all domains?
4. Are they more applicable for some scholarly functions than others e.g., teaching?
5. How is quality recognised?
6. Do they complement or replace existing channels?
7. Should they be rewarded through official routes such as tenure?
8. Should bloggers use institutional systems or separate out their blogging and formal identities?
9. What is their impact in academic communities?

It is the consideration of such issues that is at the heart of the dilemma facing many universities when they seek to engage with the digital culture. In the next section, the existing reward and tenure process will be examined, and then how this is brought into conflict with digital scholarship because of the types of issues listed above. Lastly, some of the approaches universities are adopting to deal with this are examined.

The tenure process

Promotion and tenure is usually judged on a combination of three factors: research, teaching and service or management. Some universities expand on these to include factors such as contribution to society and academic esteem, but these three represent the main categories. These are supposedly weighted equally, often with candidates required to demonstrate outstanding achievement in at least two of the three. It is often rumoured that there is an unspoken rule that research is regarded as

more significant. As Harley et al. (2010) summarise it, "advancement in research universities is often described as a 'three-legged stool,' with a 'research' leg that is far more important."

In putting together a case for promotion, an academic then needs to provide evidence to support their case in these three areas (although not all three may be represented equally). For teaching, this is usually straightforward – a list of courses that have been taught (perhaps with student ratings). Service can equate to work on committees or to management responsibility, but can also be a little more nebulous, like making the case for external work with a professional body for example. Research is the most difficult to accurately represent, particularly to a committee whose members are unlikely to be experts in the subject area of the individual, and thus will require explanation and clarification on the nature of that individual's contribution to the field.

Across a university with many different niche subject areas, this generates a task of considerable complexity. Whereas teaching will usually conform to an understood and agreed curriculum, and service is predominantly represented by university committees, research is precisely the area of a scholar's activity where they are at their most individual and most specialised. It is the area that is thus most difficult for a general committee to assess. There is thus something of a conundrum around research in the promotion process – it is the most highly regarded of the three strands, and yet the most difficult to judge. It is this complexity in quantifying research combined with its significance that sits at the heart of many of the issues relating to digital scholarship and tenure.

The digital scholarship barriers

Before examining some of the approaches institutions have taken to recognising and rewarding digital scholarship, it is worth considering the barriers and obstacles that many perceive in its recognition.

In a comprehensive study on scholarly communication, Harley et al. (ibid.) found that the strong lock-in with the published journal article and monograph was the overriding factor in consideration for promotion, commenting "enthusiasm for the development and adoption of technology should not be conflated with the hard reality of tenure and promotion requirements in highly competitive and complex professional environments. Experiments in new genres of scholarship and dissemination are occurring in every field, but they are taking place within the context of relatively conservative value and reward systems that have the practice of peer review at their core."

The first, and fundamental, barrier is the recognition of digital scholarship as activity that is worthy of appreciation. This is distinct from concerns around how best to represent and measure it. Cheverie et al. (2009) argue that there is a strong bias towards print, or traditional, publication: "While this community talks about 'publication', the language used implies that digital scholarship is of significantly lesser value, and word of mouth to younger colleagues discourages digital scholarship in the hiring, tenure and promotion process."

More significantly, the resistance to recognising digital scholarship reflects a more intractable problem – their benefits are often experiential in nature, so users have to engage with these technologies over a prolonged period to appreciate their value and the nature of interactions. Given

that many senior managers and professors in universities are not people who are disposed towards using these tools, then there is a lack of understanding about them at the level which is required to implement significant change in the institution. The membership of promotion committees is most likely to be drawn from senior academics, who have largely been successful with the traditional model of scholarship. Although these academics will have a wealth of experience, they come from a background that may have a limited understanding of the new forms of scholarly practice that utilise different media and technologies.

But, there does seem to be a move in many universities to recognise digital scholarship to some extent. This starts with the reasonably uncontroversial recognition that online journals have a similar standing to print ones, particularly when many major publishers are converting many existing titles to online only. Schonfield and Housewright (2010) report that there is a general move to online journals with most academics now content to see this shift happen, away from print.

In the arts, there has been a tradition of recognising a portfolio of work when considering promotion, and this has inevitably led to the inclusion of digital artefacts. In the sciences, other components have been recognised prior to more recent developments, including software and data.

A willingness to recognise new types of output and activity brings into focus the next significant barrier, which is how to measure or recognise quality in these widely varied formats. In order to overcome the problem highlighted above of dealing with complexity in research, evaluators have relied upon metrics such as the impact factors of journals. The peer-review process that leads to publication combined with a journal's impact factor acts as a quality filter, thus removing the necessity for the promotion committees to assess the quality of the outputs themselves. Journals have quality rankings, and therefore publication in any journal of sufficient standing is an indication of quality. As Waters (2000) puts it, "to a considerable degree people in departments stopped assessing for themselves the value of a candidate as a scholar and started waiting for the presses to decide."

Peer review is at the core of this practice and is seen as fundamental. Harley et al. stress that "The degree to which peer review, despite its perceived shortcomings, is considered to be an important filter of academic quality, cannot be overstated." This highlights the problem with recognising new types of output and activity. The power of many of the new forms of communication lies in the democratisation of the publishing process. They have removed the filter that the tenure process has come to rely on so heavily. Without this filter in place, promotion committees are back in the position of having to find a means of assessing the quality of an individual's research activity in a field they know little about. This is now confounded, as it may be in a format they know little about too.

Recognising digital scholarship

Many universities have begun to acknowledge both a need to recognise digital scholarship, and also the existing limitations of their current systems in doing so. A number of different responses have

been implemented, some more radical than others. The approaches are summarised below and then examined in more detail:

- Recreating the existing model
- Finding digital equivalents
- Generating guidelines that include digital scholarship
- Using metrics
- Peer review
- Micro-credit

Recreating the existing model

Recreating the existing recognition model is a reasonable first step. Methods of recreating the existing model in digital scholarship terms include adding in a layer of peer review to blog-like practices, or making conventional journals more open. For instance, several journals now operate a model where the author (or, more likely, the author's institution) pays to have an article made open access. Publishers charge between $500 and $3,000 for this model and, as Waltham (2009) reports, take-up has been limited, with 73% of publishers reporting 5% or less adoption of this model. This is hardly surprising, and highlights one of the problems with attempting to recreate current practice. Simply recreating the existing model, however, often fails to adequately address many of the issues raised at the start of this paper.

Digital equivalents

An improvement on this is to seek digital equivalents for the types of evidence currently accepted in promotion cases. In making a case for excellence in one of the three main promotion criteria, the scholar is required to provide evidence. For example, a good track record in peer-review publication is seen as indicative of effective research as judged by the individual's peers, of impact upon their subject area and of effective scholarly communication. The publication record can be seen as a proxy for these scholarly activities, but is often interpreted as the artefact itself, rather than a representation.

If each of the accepted pieces of evidence are examined for what they are seen to represent, then it may be possible to find equivalents in an open, digital networked context that demonstrate the same qualities. For example, a keynote talk at a conference is often cited as a valid piece of evidence of esteem for an individual seeking promotion. The reasons are twofold: Reputation – it demonstrates that they have gained significant standing in their field to be asked regularly to give a keynote talk at a conference; Impact – if they are giving the keynote, then everyone at the conference hears it, and they can therefore claim a significant impact in their subject area.

The important element, then, is not the keynote itself, but what it *signifies*. What might a digital equivalent of this be, which meets the two criteria above? For example, if someone gives a talk and converts this to a slidecast of that presentation (a slideshow with synchronised audio), a certain number of views might equate to impact, often with numbers greater than those present at a live

performance. And if the presentation is retweeted, linked to, embedded, and shared in different means, then this might give an indication of reputation.

It would be overly simplistic to provide straightforward translations along the lines of 500 views + 5 embeds = 1 keynote, but by focusing on the existing criteria and considering what it is they are meant to demonstrate, it is then possible to consider online equivalents.

The New Media Department at the University of Maine have taken a similar approach in suggesting a number of "alternative recognition measures" (Blais, Ippolito & Smith, 2007):

- Invited / edited publications – if an individual is invited to publish in an online journal, then that is an indication of reputation.
- Live conferences – they suggest raising the profile of the conference (both face-to-face and virtual) to a par with peer-review publication, particularly in fast moving subjects.
- Citations – using Google and databases to find a better measure of citations and impact
- Download / visitor counts – downloads of articles or visits to an academic site can be seen as equivalent to citations.
- Impact in online discussions – forums, discussion lists and blogs are "the proving grounds of new media discourse" with significant impact and a high degree of scrutiny and peer evaluation.
- Impact in the real world – this might be in the form of newspaper references, but they also argue that Google search returns can be a measure of real-world impact.
- Net-native recognition metrics – online communities can have their own measures of value, and these represent a more appropriate measure than one imposed upon the contributor from outside.
- Reference letters – they suggest reference letters which may counteract some of the difficulty with traditional recognition systems.

The faculty of the Humanities at the University of Nebraska-Lincoln have similarly developed a set of specific equivalents for recognition, including links to the scholar's research, peer review of digital research sites and technical innovation (http://cdrh.unl.edu/articles/promotion_and_tenure.php).

Digital scholarship guidelines

An approach being adopted by a number of universities is to produce general guidelines which set out broad criteria for assessing the quality of scholarly activity. These can include a catch-all term to accommodate new forms of outputs. For example, the Open University promotion guidelines state that "other appropriate outputs from scholarship can be taken into account including a demonstrable influence upon academic communication mediated through online and related web mediated technologies that influences the discipline."

The Committee on Information Technology within the Modern Languages Association (MLA) has developed its own guidelines for promotion committees to consider when dealing with digital media in the modern languages (http://www.mla.org/guidelines_evaluation_digital):

- Delineate and communicate responsibilities. When candidates wish to have work with digital media considered, then the expectations and responsibilities connected with such work and the recognition given to it should be clearly delineated and communicated to them at the point of employment.
- Engage qualified reviewers. Faculty members who work with digital media should have their work evaluated by persons knowledgeable about the use of these media in the candidate's field. At times this may be possible only by engaging qualified reviewers from other institutions.
- Review work in the medium in which it was produced. Since scholarly work is sometimes designed for presentation in a specific medium, evaluative bodies should review faculty members' work in the medium in which it was produced. For example, web-based projects should be viewed online, not in printed form.
- Seek interdisciplinary advice. If faculty members have used technology to collaborate with colleagues from other disciplines on the same campus or on different campuses, departments and institutions should seek the assistance of experts in those other disciplines to assess and evaluate such interdisciplinary work.
- Stay informed about accessibility issues. Search, reappointment, promotion, and tenure committees have a responsibility to comply with federal regulations and to become and remain informed of technological innovations that permit persons with disabilities to conduct research and carry out other professional responsibilities effectively.

Some of these will seem straightforward, like reviewing work in the medium in which it was produced for example, but even such a small step may come up against opposition when there is a strictly regulated promotion process which has been designed to suit the needs of print outputs.

Metrics

One approach to overcoming, or at least easing, the complexity of judging individual cases is the use of metrics or statistical calculations to measure impact or influence. This has been an area of increasing interest even with traditional publications. This measure of impact is often represented by a statistical measure such as the 'h-index', which is based upon bibliometric calculations of citations using a specific set of publisher databases. This measure seeks to identify references to one publication within another giving "an estimate of the importance, significance, and broad impact of a scientist's cumulative research contributions" (Hirsch, 2005). Promising though this may sound, it is a system that can be cheated or gamed (Falagas & Alexiou, 2008), for instance by authors referencing previous papers or between groups, and so a continual cycle of detecting such behaviours and then eliminating them is entered into, rather akin to the battle fought between computer virus makers and anti-virus software.

There are at least three further degrees of separation from this walled garden approach to citations. The first is to use data outside of a proprietary database as a measure of an article's impact. This 'webometrics' approach was identified early on as offering potential to get richer information

about the use of an article, by analysing the links to an article, downloads from a server and citations across the web (e.g., Marek & Valauskas, 2002). Cronin et al. (1998) argue that this data could "give substance to modes of influence which have historically been backgrounded in narratives of science."

The next step is to broaden this webometrics approach to include the more social, Web 2.0 tools. This covers references to articles in social networks such as Twitter, blogs, social bookmarking tools such as CiteULike and recommendation tools such as Digg (Patterson, 2009). This recognises that a good deal of academic discourse now takes place outside of the formal journal and there is a wealth of data that can add to the overall representation of an article's influence.

The ease of participation, which is a key characteristic of these tools, also makes them even more subject to potential gaming. As Priem and Hemminger (2010) report, there are services which can attempt to increase the references from services such as Digg to a site (or article) for a fee. But they are reasonably optimistic that gaming can be controlled, proposing that "one particular virtue of an approach examining multiple social media ecosystems is that data from different sources could be cross-calibrated, exposing suspicious patterns invisible in single source."

A more radical move away from the citation work that has been conducted so far is to extend metrics to outputs beyond the academic article. A digital scholar is likely to have a distributed online identity, all of which can be seen to represent factors such as reputation, impact, influence and productivity. Establishing a digital scholar footprint across these services is problematic because people will use different tools, so the standard unit of the scholarly article is lacking. Nevertheless, a representation of scholarly activity could be established by analysing data from a number of sites, such as the individual's blog, Twitter, Slideshare and YouTube accounts, and then also using the webometrics approach to analyse the references to these outputs from elsewhere. A number of existing tools seeks to perform this function for blogs. For example, PostRank tracks the conversation around blog posts, including comments, Twitter links and Delicious bookmarks. These metrics are not without their problems, and achieving a robust measure is still some way off, but there is a wealth of data now available which can add to the overall case an individual makes.

Peer review

The issue of gaming is even more prevalent with metrics, and this is confounded by the mix of personal and professional outputs that are evident in many of these tools. This is likely to increase the need for the effective use of peer assessment in evaluating work. When the filter of peer-review publication is removed, or lowered in significance, then arguably the significance of peer review in the tenure process increases. It will be necessary to determine that the output and activity is indeed scholarly (after all, one could have a popular blog on a subject which had no relevance to the academic case). It is also a response to the increased complexity of judging digital scholarship cases. The MLA guidelines above recommend using external experts to perform this peer review for tenure committees that may be unfamiliar with both the subject matter and the format.

Others have taken this approach further, soliciting commendations from their wider online network (e.g., Becker, 2009). There is obviously an issue around objectivity with this approach, but as

promotion committees seek to deal with a wider range of activity and outputs, then judging their impact will need to involve feedback from the community itself.

Micro-credit

Another approach, related to that of finding digital scholarship equivalents, may be to shift to awarding 'micro-credit' for activity. So, for example, a blog post that attracts a number of comments and links can be recognised, but to a lesser degree than a fully peer-reviewed article. Finer granularity in the types of evidence produced would allow recognition of not just outputs, but also the type of network behaviour that is crucial to effective digital scholarship. Smith Rumsey (2010) suggests that "perhaps there should be different units of micro-credit depending on the type of contribution, from curating content to sustaining the social network to editing and managing the entire communication enterprise of a collaborative scholarly blogging operation."

Alternative methods

All of the approaches above can be viewed as modifications of the existing practices, which have largely been determined by the practicalities necessitated by a print medium. Many of the attempts to gain recognition for digital scholarship seem to be focused around making it behave like traditional scholarship. For example, webometric data for journal article analysis still foregrounds the peer-reviewed article as the main form of evidence.

Bending new technology to fit existing practice is a common reaction, partly because we are unaware of its potential. Stephen Heppell (2001) declares that "we continually make the error of subjugating technology to our present practice rather than allowing it to free us from the tyranny of past mistakes." Arguably, this is the case with current methods for recognising digital scholarship.

Promotion committees can play a significant role in this, not only by recognising new forms of scholarship, but also by positively encouraging them, either through guidelines or specific projects. For example, a committee might seek to develop the sort of Web 2.0 metrics mentioned above or to encourage alternatives to the peer-review model. In analysing the peer-review process, Fitzpatrick (2010) makes a strong case that we need to move beyond merely seeking equivalence measures:

> "What I am absolutely *not* arguing is that we need to ensure that peer-reviewed journals online are considered of equivalent value to peer-reviewed journals in print; in fact, I believe that such an equation is instead part of the problem I am addressing. Imposing traditional methods of peer review on digital publishing might help a transition to digital publishing in the short term, enabling more traditionally minded scholars to see electronic and print scholarship as equivalent in value; but it will hobble us in the long term, as we employ outdated methods in a public space that operates under radically different systems of authorization."

Conclusion

Recognising and rewarding digital scholarship has a significance beyond the promotion of individuals. For universities, as they seek to manage change to a digital, networked society, it acts as a strong indicator and vehicle for change.

There are two main reasons for prioritising the recognition of digital scholarship. The first is the message it sends to individuals within the university. Because they operate in an open, digital, networked manner, digital scholars are often well known in their institution (for example, many of their colleagues will read their blogs). If a well-known digital scholar struggles to get their work recognised, then it sends a message to the rest of the university that this is not the type of activity that is likely to be rewarded, with a subsequent decline in its uptake. The reverse happens if that digital scholar is rewarded; it sends the positive message that academics should engage in this type of activity.

The second reason for recognising digital scholarship is to encourage institutional innovation. For example, universities are beginning to explore the use of Facebook to support students, or the use of blogs to disseminate research findings to the public, or new models of course development based on third-party content and crowdsourcing. There are very real benefits to the institution from these approaches, such as reaching new audiences, increasing the university profile without advertising, increasing student retention through improved peer support, lowering the costs of course production, developing new research methodology, etc. But it is difficult to realise any of these institutional approaches to new media if the university does not have a solid base of digital scholarship experience to draw upon. Having a range of digital scholarship experience amongst the faculty will be the key resource in realising the change required for many universities, and an appropriate reward and tenure process acts as a means of facilitating and encouraging this.

This is not to underestimate the complexity of the task however. The already difficult task of assessing research and scholarly activity in highly specialised fields is only going to be made more difficult by introducing digital scholarship. Previously, there has been an agreed set of evidence that could be seen as acting as a proxy for excellence in research. Not only does this list need to be expanded to include digital scholarship outputs, but it may be that no such definitive list can be provided anymore.

There are a number of ways in which promotion committees can begin to address digital scholarship. What they may be leading to is a more portfolio-based approach, perhaps more akin to that found in the arts. Anderson (2009) suggests that the sciences have an advantage in recognising digital scholarship because they are more ready to adopt new technology, but it may be that the arts, with their more individual assessment models, are well disposed towards incorporating different forms of output. Such a portfolio-based approach is likely to draw on a range of tools and pieces of evidence. These may include a range of digital outputs, metrics demonstrating impact, commendations from the community and recognised experts, and an overarching narrative making the case for the work as a whole.

It is worth emphasising that monetary reward and promotion are not the sole, or even main, driver for most scholarly activity. The reasons why scholars engage in research, disseminate their

findings and teach on courses are varied, but are primarily driven by intellectual curiosity. It is not, therefore, the suggestion of this paper that digital scholars should pursue any of the digital, networked and open approaches *because* they can lead to tenure. Rather, the purpose is to argue that if these approaches are achieving scholarly functions via a different means, that they should be recognised as such, and the tenure process acts as something of a proxy for this recognition. To ignore the context in which scholars operate within their institutions would be to disadvantage new practices compared with established ones.

References

BECKER, J. (2009). "What I've Learned from/with Dr Alec Couros".
<http://edinsanity.com/2009/11/25/what-ive-learned-fromwith-dr-alec-couros-a-k-a-courosa-alec/>

BLAIS, J.; IPPOLITO, J.; SMITH, O. (2007). "New Criteria for New Media". *Leonardo*. Vol. 42, No 1, pages 71–5.

CHEVERIE, J. F.; BOETTCHER, J.; BUSCHMAN, J. (2009). "Digital Scholarship in the University Tenure and Promotion Process". *Journal of Scholarly Publishing*. Vol. 40, No 3, pages 219–230.
<http://muse.jhu.edu/citation/journals/journal_of_scholarly_publishing/v040/40.3.cheverie.html>
<http://dx.doi.org/10.3138/jsp.40.3.219>

CRONIN, B.; SNYDER, H. W.; ROSENBAUM, H.; MARTINSON, A.; CALLAHAN, E. (1998). "Invoked on the Web". *Journal of the American Society for Information Science*. Vol. 49, No 14, pages 1319–1328.
<http://dx.doi.org/10.1002/(SICI)1097-4571(1998)49:14%3C1319::AID-ASI9%3E3.0.CO;2-W>

FALAGAS, M.; ALEXIOU, V. (2008). "The Top Ten in Journal Impact Factor Manipulation". *Archivum Immunologiae et Therapie Experimentalis*. Vol. 56, No 4, pages 223–226.
<http://dx.doi.org/10.1007/s00005-008-0024-5>

HARLEY, D.; ACORD, S.; EARL-NOVELL, S.; LAWRENCE, S.; KING, C. (2010). *Assessing the Future Landscape of Scholarly Communication: An Exploration of Faculty Values and Needs in Seven Disciplines*. Center for Studies in Higher Education, UC Berkeley.
<http://escholarship.org/uc/cshe_fsc>

HEPPELL, S. (2001). "Preface". *ICT, Pedagogy and the Curriculum*. London: Routledge. Page xv.
<http://books.google.co.uk/books?id=i8a0qAOsBiMC>

HIRSCH, J. E. (2005). "An Index to Quantify an Individual's Scientific Research Output".
<http://arxiv:physics/0508025>

MAREK, K.; VALAUSKAS, E. J. (2002). "Web Logs as Indices of Electronic Journal Use". *Libri*. Vol. 52, No 4, pages 220–230.
<http://dx.doi.org/10.1515/LIBR.2002.220>

PATTERSON, M. (2009). "Article-Level Metrics at PLoS – Addition of Usage Data". *PLoS BLOGS*.
<http://www.plos.org/cms/node/485>

PRIEM, J.; HEMMINGER, B. (2010). "Scientometrics 2.0". *First Monday.* Vol. 15, No 7.

<http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2874/2570>

SCHONFELD, R. C.; HOUSEWRIGHT, R. (2010). *Faculty Survey 2009: Key Strategic Insights for Libraries, Publishers, and Societies.* Ithaka.

<http://www.ithaka.org/ithaka-s-r/research/faculty-surveys-2000-2009/Faculty%20Study%20 2009.pdf>

SMITH RUMSEY, A. (2010). *Scholarly Communication Institute 8: Emerging Genres in Scholarly Communication.* University of Virginia Library.

<http://www.uvasci.org/wp-content/uploads/2010/09/SCI-8-report-final.pdf>

WALTHAM, M. (2009). *The Future of Scholarly Journals Publishing among Social Science and Humanities Associations.* Report on a study funded by a Planning Grant from the Andrew W. Mellon Foundation.

<http://www.nhalliance.org/bm~doc/hssreport.pdf>

WATERS, L. (2000). "A Modest Proposal for Preventing the Books of the Members of the MLA from Being a Burden to Their Authors, Publishers, or Audiences". *Publications of the Modern Language Association of America.* Vol. 115, No 3, pages 315-317.

<http://dx.doi.org/10.2307/463452>

WELLER, M. (2011). *The Digital Scholar: How technology is transforming academic practice.* London: Bloomsbury Academic.

<http://dx.doi.org/10.5040/9781849666275>

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