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Usability on the Edge: The Implementation of u:cris at the University of Vienna

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Abstract

In 2011, the top management of the University of Vienna made a fundamental (and possibly trend-setting) decision to replace the old research information system with a contemporary vendor system. This paper highlights the reasons behind the decision and illustrates the implementation process, which is not only a challenge from a technical point of view. It is an even more challenging political task to involve all the stakeholders and especially those who have to live with the burden of recording research output - researchers and staff alike. Our experience shows that a legal reporting obligation, such as that dictated by the Universities Act 2002, serves as an incentive for users to populate a CRIS with up-to-date information only to a certain extent. Rather, a user- and researcher-centred approach is crucial for a CRIS to gain user acceptance.

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1. Introduction

The higher education system in Austria has its legal foundation in the Universities Act 2002 (Universitätsgesetz 2002) which entered into full force in 2004. It is based on the principles of New Public Management with its premises of increased autonomy, output orientation and performance-based funding. The 22 public universities have the status of legal entities in public law. The state, represented by the Federal Ministry of Science, Research and

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Economy, still plays a supervisory role. Apart from this, universities are able to autonomously change internal organisational structures, introduce study programmes and manage staff. The Universities Act also introduced new steering instruments such as intellectual capital reports, global budgets and performance agreements. The allocation of budgets is based on a performance agreement and a formula-based mechanism which partly rests on predefined performance indicators.[1]

The Intellectual Capital Report collects data in form of comparable key figures to quantify teaching and research activities for management purposes and the financing of the universities. It has to be submitted annually to the responsible Ministry (Federal Ministry of Science, Research and Economy). The performance agreements between the universities and the Ministry, which are negotiated for periods of three years, are also based on these figures.[2]

Many of these figures are based on information in campus management systems, which are generated through the daily administrative work at an institution. At a first glance the number of CRIS-relevant indicators[3] - guest researchers, scholarly publications, talks and presentations held at conferences - seems small but in fact it is difficult to collect them across an institution.

Given the mentioned legal situation, by 2006 every public university had implemented either a Research Information System or at least added a CRIS module to their Campus Management System. All universities have systems that collect data for the Intellectual Capital Report but usually do not provide the same range of services modern vendor systems offer nowadays. Some of the systems at Austrian universities were developed in-house and a couple of universities use CAMPUSonline[†], a campus management system provided by the Graz University of Technology. Contemporary vendor systems such as Pure or Converis are still underrepresented in the country. The University of Vienna is currently the country's only university that implemented a modern vendor system by purchasing Pure from Atira/Elsevier in 2012, which went live under the name u:cris after an implementation period of one year.

This paper aims to present the implementation process of u:cris at the University of Vienna as a case study of a technical but even more a political challenge. Emphasis will be put on the question of how the conflicts between the complexity of ruling data models, fulfilling legal requirements and the needs of the end-users, who are the ones to live with the burden of recording data (researchers and clerical staff alike), can be tackled.

2. About the University of Vienna

The University of Vienna was founded in 1365 and is the oldest university in the German-speaking world. Currently, about 92,000 students are enrolled who can choose from 187 degree programmes: 55 bachelor's programmes, 116 master's programmes, 4 diploma programmes and 12 doctoral programmes. With 9,700 employees, 6,900 of whom are researchers, the University of Vienna is the largest research and teaching institution in Austria.

The University of Vienna is subdivided into 15 faculties and four centres covering a wide range of disciplines: theology, law, business and economics, computer science, historical and cultural studies, philological and cultural studies, philosophy and education, psychology, social sciences, mathematics, physics, chemistry, earth sciences, geography, astronomy, life sciences, translation studies, sport science, molecular biology and teacher education.

Starting in 2006, the University of Vienna was running an in-house developed CRIS called "Research Activities Documentation" (RAD), administrated by the University Library, which was a module in a fully integrated campus management system (i3v). Throughout its life, RAD was confronted with criticism, especially regarding usability issues. While trying to improve the system over the years, by 2011 it had become more than clear that in-house development could never catch up to the latest developments of modern vendor systems, and therefore the decision was made to replace the old system.

[†] http://campusonline.tugraz.at/.

3. Services and usability in exchange for acceptance (and data)

As mentioned above, the directive for certain indicators (University Act 2002 and Regulation for the Intellectual Capital Report at Austrian Universities) serves as a primary guideline on the kind of data that has to be collected in a CRIS. This guideline has functioned as the minimum requirement for the selection of a new CRIS off-the-shelf. However, different stakeholders (researchers, clerical staff, research managers, deans and the rectorate) expect a lot more from a CRIS and have requested a multi-purpose system. Before the implementation of u:cris the goal was not only to replace RAD by upgrading to a state-of-the-art vendor system, but also to convince researchers of the benefits of using a CRIS on a regular basis. Some researchers do not consider reporting duties a compelling reason for collecting research information as it is a time-consuming process. A user satisfaction survey carried out in 2010 indicated that RAD was experienced by users as a black box they could not extract any information from. So it was clear that RAD had to be replaced by a system that meant a significant upgrade in terms of usability and providing sophisticated services for the researchers. It has also been a political challenge which has required a lot of communication, a challenge that continues even after the end of the implementation process.

As the University of Vienna is a full-range university it is crucial to offer a wide range of publication and activity types in a CRIS in order to represent the diverse research output of the 19 faculties and centres. The requirements that have to be met by a CRIS range from documenting, reporting and exporting to presenting research information in a customisable form. In addition, researchers would like to use a CRIS also for documenting supervisory activities in order to promote young researchers. In order to match the current standards it is *de rigueur* that the system also provides repository functionalities for uploading (open access) full texts and datasets.

Apart from the indicators for the annual Intellectual Capital Report other reports are needed for different purposes from all university institutions throughout the academic year . It is crucial that researchers are required to input their research information only once, the “single point of truth”.

Research needs to be promoted and acknowledged in the research communities, but also the public and the enterprise sector are interested in accessing research information. At the University of Vienna the u:cris portal facilitates these requirements and offers standardised representation of organisation and researcher profiles. Currently, research output is presented on institutional webpages[4] that are maintained manually and updated erratically. The portal makes it possible to display up-to-date research information. Detailed profile information can be added in the back-end of u:cris. It is fully linked and searchable by author, title, institution or ÖFOS‡, the official national research classification system that is provided by the national agency Statistics Austria. Nowadays a lot of researchers collaborate in international teams, so research portals are a necessary and helpful tool to find future collaborators. PhD-students-to-be can also benefit from the portal when looking for future supervisors.

It is obvious that a CRIS is primarily a tool for researchers and helps research managers plan strategically and evaluate research activities. But who actually works with u:cris, adding data on a daily basis?

The process of implementing u:cris has shown that there is a gap between its conceptual target group and the users who actually add and manage metadata. Especially at the University of Vienna many members of the clerical staff are obliged to add and manage research information on behalf of the researchers. Within the university different structures have been established depending on the size and financial capacity of a department or a faculty. It is an additional task for clerical staff which the CRIS discourse tends to ignore. Therefore it was crucial to involve the clerical staff already in the implementation process as well as offer special support and training..

4. Acquisition and implementation

4.1. Acquisition approach

In 2011 the Rectorate of the University of Vienna entrusted a CRIS task force with gathering CRIS-relevant service units of the university (Library, Research Services, Finance) to enquire about alternatives for RAD and to

‡ For a detailed list of the ÖFOS 2012 please see: http://www.statistik.at/kdb/downloads/pdf/OEFOS_2012_Struktur_englisch.pdf.

carry out a pre-procurement market analysis. Before surveying the market to identify eligible vendors the task force compiled an analysis of user needs and requirements. Finding alternatives to RAD were based mainly on usability issues, which had accompanied the previous system throughout its lifetime. Reporting tasks for the Intellectual Capital Report in particular were not the challenge. In fact, the needs of the users were elevated to the leading principle because it was the only way to gain acceptance of the system and have the CRIS populated in exchange for services such as export functionalities for generating publication lists in different styles and bibliographical database formats. Having to provide these services, the ongoing maintenance and further development were no longer considered cost-effective. Carrying out development in-house certainly has its advantages, namely full authorship/ownership of development processes and customisation, whereas vendor or so called off-the-shelf systems only offer limited customisability.

Based on this requirement analysis seven eligible vendors were identified and subsequently invited to present their products at a hearing. Already at that point, faculty representatives (researchers and clerical staff alike) were invited to participate in order to ensure a transparent acquisition approach from the very beginning. To avoid limitation to the top-down needs of the university management the prospective users were considered an important stakeholder.After analysing all the requirements, user needs and available systems, the outcome of this process that lasted from January to November 2011 was a recommendation to the rectorate to replace RAD by a commercial vendor system arguing that an in-house system could never meet the high demands of all the different stakeholders at the university. Thus, the University of Vienna is the first Austrian university to follow the trend of purchasing an off-the-shelf product replacing an in-house-developed system.[5]

After getting the go-ahead from the rectorate the task force together with the Office for Public Procurement and Law of the University compiled the procurement document which was published in April 2012. During the evaluation of the bids in the summer of 2012, Atira was taken over by Elsevier. In September, Atira/Elsevier was awarded with the contract and the implementation project started in October 2012.

The core team of the implementation project was staffed by the University Library, Research Service and Career Development and the University Computer Centre. The project office is located inthe University Library, which also provides the mainstay of resources and capacities.

4.2. Technical implementation of Pure at the University of Vienna

Before delving into the process of the implementation itself, the focus should be put on the system context of the new CRIS.

Figure 1 on the next page gives an overview of the system context after completion. Dotted lines and greyed out boxes indicate a currently missing aspect of the system. Research output and activities are already included in the system, while management of projects still lacks implementation.

In the context of the project the interfaces can be categorised by the urgency of resource allocation in the implementation process.

- *Standardised interfaces by Pure, providing inherent capabilities of the system*: These include import of publication metadata via APIs of external bibliographical databases, import and export of publication metadata via supported file formats, the display of information in the portal and export of research information via web services. In general only minor adjustments were needed to meet our requirements.
- *Interfaces specific to the University of Vienna*

  Mandatory for the implementation: Namely the interface to the campus management system i3v for synchronisation of person and organisation master data. Additionally, an update to the interface of the data warehouse was required for the most recent Intellectual Capital Report.

  Optional/ future implementation steps: This refers to the inclusion of project-related data in the system as well as the integration of the CRIS and the institutional repository.

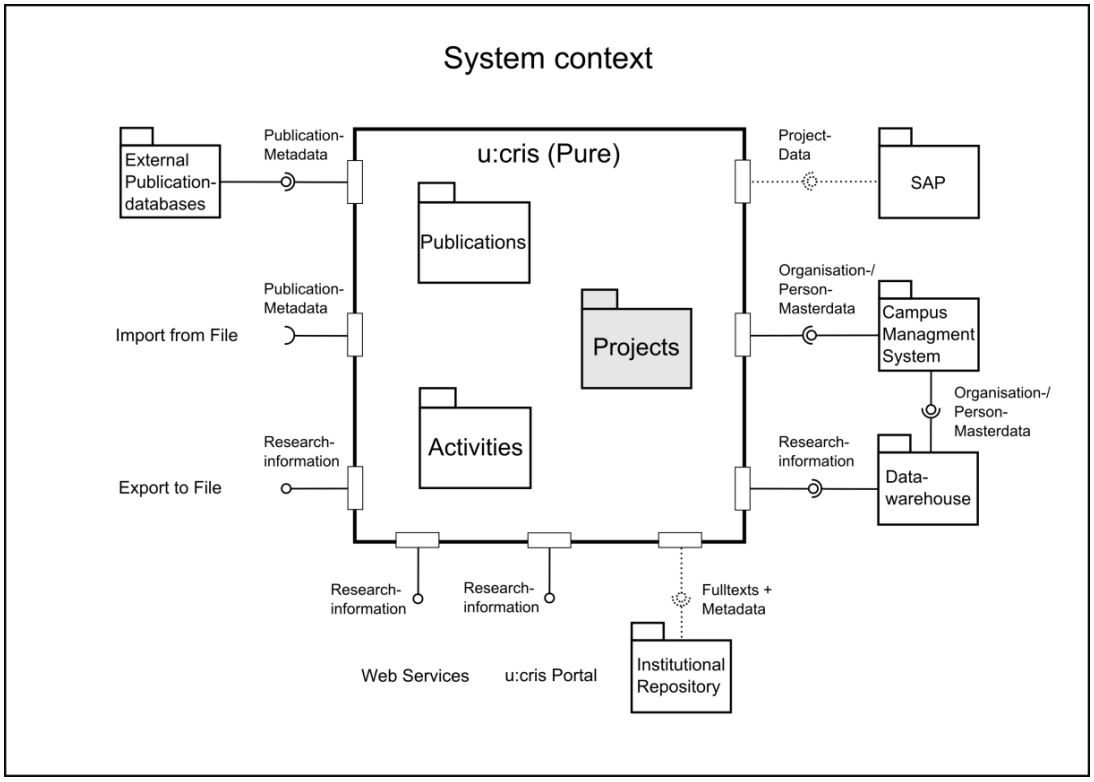

Fig 1. System Context of u:cris

A major task in the implementation process was the integration of the existing campus management system i3v into the new CRIS environment, providing the person and organisation master data and the source for the legacy import of previously collected research information in RAD.

The integration of i3v and Pure - the conceptual restructuring of the existing master data and the actual technical implementation of both - were an iterative process spanning several months, intertwined with the preparations for the legacy import of RAD data. These included a clean-up of errors and inconsistent data and preparation of data enhancement jobs where necessary due to required but missing data.

One of the obstacles to overcome was fundamental differences in the data model which not only affected the technical side but also influenced the organisational culture.

- As Pure bases its data model on CERIF, persons are treated as singular entities – characteristics such as staff-/student-relations to organisations are actual link entities.[6] In the campus management system staff and students are distinct entities - persons do not exist per se as an entity. This is also reflected in organisational processes. While hashed social security numbers can be used to generate a person-specific identifier, the lack of interconnected organisational processes in collecting and handling staff and student information complicates the maintenance of consistent person data in the new CRIS.
- Talks and presentations were previously treated like other publication data, which allowed relating several persons to one talk or presentation. In the new system these activities are a distinct content type with a data model that does not support collaborative contributions. While this was only a minor technical obstacle, it caused (and still causes) quite a bit of frustration among our users.

Differences in the principles and scale of organisations were another cause for gripe. The University Computer Centre employs sequential software development, whereas Pure is developed in a highly agile environment.

Additionally, the difference in scale of the organisations also led to varying response times when handling requests of the other party, which in turn caused a divergence in the development of applications and interfaces. It also led to disappointment on both sides regarding the pace and schedule of the development process itself. Communicative routines like regularly scheduled (telephone) meetings and active communication through other channels (e.g. wikis) helped to defuse this situation to some degree.

4.3. Organizational embedding - establishing u:cris

While the implementation of a new system might appear to be a dry and technical matter, the actual challenge of introducing a new system lies in engaging the users.

The involvement and participation of users was an important consideration right from the outset of the project. As already noted before, the unsatisfactory user experience of the previous system was one of the main reasons for replacing the old system RAD.

Our experience has shown that involving users (and their stakeholders) does not only play an important part in improving and maintaining the usability of a system, but also leads to better acceptance in general.

For this reason one of the first steps in the project was to establish a Sounding Board that explicitly targeted the users, both from the clerical and research staff as well as their representatives in the Works Council. This more or less direct consultation of users proved to be advantageous not only in communicating the aims, scope and progress of the project, but also in creating new ways for cooperation and exchange of ideas.

One form of direct and extensive user involvement was a two-week beta test in late spring 2013, which was not only required to test the technical implementation, but also allowed users to experience the new system for the first time. The collected feedback was analysed and then presented and discussed in the project-related boards and committees and changes were (where possible) implemented as required.

Another approach to engage the users were pre-roll-out training sessions and a pilot phase that enabled four faculties to gain early access to the system. Nonetheless, any interested user outside of these faculties could participate in trainings and become an early adopter as well.

The new CRIS in general and the beta-test in particular were particularly well received by clerical staff that had already worked with the previous system. Their feedback has proven very valuable and they also act increasingly as disseminators of information on the department level.

In parallel to the implementation of the technical infrastructure, the organisational structure had to be established as well. The successful operation of the CRIS relies on a clear concept for workflows and their actual execution.

In RAD workflows were a major issue – the concept did not reflect reality and vice versa. To equal parts this was owed to convoluted workflows and a rather limited roles and right management in the system.

For the implementation of u:cris a major streamlining of workflows was necessary. As Pure already provides rather straight-forward roles, it imposed a certain direction on the process itself. In retrospect, this can be seen as a catalyst for actually re-evaluating our expectations of the workflows and taking another look at established practices, which may not have followed best practice examples but were nonetheless part of the organisational culture.

The result was a streamlined operational concept which mirrored to some degree already existing best practice examples at our university. Publications and activities are entered either by the researchers themselves or by clerical staff with roles for the submission of content. In each respective organisational unit (faculty or department) one or several persons are tasked with the validation of entries to ensure a high degree of data quality and to embed editorial responsibility as close as possible to the source of the data – the researchers.

This concept relies rather heavily on the role of the validator. In the best case scenario, this is a person already involved in the management and documentation of research output with a vested interest in upholding data quality. It also requires corresponding resources in the respective organisational unit and a certain acceptance of the concept of data validation.

In practice the regard for the handling of research information itself varies among research disciplines and sometimes even hinges on the interest of a single individual. Our experience also shows that the appeal of best practice examples and according recommendations often conflicts with the actual reality of budgetary negotiations within the university.

5. Lessons learned

- *Participatory user involvement is important*. An early involvement of the different stakeholders leads to a higher acceptance of a new product and tasks within the universities. It also improves the understanding of changes, developments, opportunities and needs of the scientific communities. It proved crucial to continuously consult the Sounding Board and the Works Council during the implementation of the new CRIS. Direct user involvement during the beta test and the pilot phase reduced misunderstandings on both sides and added to the acceptance by the users.
- *Ample scope for the public procurement.* Enough time and resources should be allocated for the public procurement procedure. It is crucial to have legal advice during the procurement. Most importantly, time for the evaluation of the different proposals coupled with reference visits should be factored in.
- *Composition of the core team matters*. The major stakeholders should be represented in the core team. At the University of Vienna, the following divisions were represented in the core team: University Library, Research Service and Career Development, University Computer Centre. As a lesson to be learned, more emphasis should have been put on researchers continuously participating in the core team.
- *How to handle the internal struggle for resources.* Organisations like universities suffer from curtailments in the sector of personnel. Therefore a high degree of cooperation and communication with the divisions participating in the core team is vital.
- *Strict focus on the project objectives*. New opportunities lead to new expectations. The increased functionality of the new CRIS did not only satisfy existing needs, but also created new ones and even raised expectations by users and stakeholders. It is important to find the balance between focussing on the core objectives and trying to satisfy the new expectations – the latter cannot succeed without the former.
- *New technologies are often underestimated in terms of time exposure.* The implementation of the master data synchronisation involved a higher-than-expected workload for development and debugging. The migration of the existing data also led to problems that had not been considered before.
- *Flexibility of a standardised product is relative.* This applies in particular to workflows and the data model at an institution with a highly diverse internal structure which has grown over the years, if not decades. It also leads to very specific requirements that sometimes conflict with the idea of a standardised product.
- *Scale and complexity of an organisation matters.* Consequences of scale and complexity of an organisation like the University of Vienna are easily underestimated. Intra-university processes and procedures for decision making will take longer than expected. There is an inherent potential for conflict when setting deadlines and planning schedules, as your development partners will not be used to the specifics of your organisation and its culture.

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