



JISC Final Report

Admissions Domain Map (ADoM)

Sandra Winfield

**Project Manager, Centre for International ePortfolio Development,
University of Nottingham**

May 2009

Contents

Acknowledgements	3
Executive Summary	4
Background	5
Aims and Objectives	5
Methodology	6
Implementation.....	8
Understanding admissions	9
Existing documentation	9
Structured interviews and workshops	9
Outcomes and conclusions.....	13
Recommendations	14

Acknowledgements

This project was funded by JISC under the Learning & Teaching Capital Programme – Domain Maps (04/06).

Project partners were:

- The University of Nottingham
- Manchester Metropolitan University
- APS Ltd
- UCAS

The Project Team consisted of:

- Angela Smallwood (University of Nottingham, Project Director)
- Sandra Winfield (University of Nottingham, Project Manager)
- Alan Paull (APS Ltd)
- Charlie Paull (APS Ltd)
- Geoff Ramshaw (UCAS)
- Karen Banks, MMU

The Project Team would like to thank all those who played a part in the project, We are very grateful to the assistance of all the admissions practitioners who consented to be interviewed for the project, in particular Olivia Martin at the University of Derby and Kelly Villiers at Coventry University.

We would also like to acknowledge the support of the SPA programme, in particular Janet Graham and Leslie Currie.

In addition to those mentioned above, our thanks go to:

Delyth Chambers for evaluation work and to Sarah Davies, our JISC Programme Manager for her support throughout. Also to Paul Bailey for his support and interest in the final stages of the project.

Executive Summary

Funded by JISC as one of a small number of projects to explore how technology can be used to support improved admissions practices, ADoM set out to create a domain map for UK undergraduate admissions, building on the work of the previous JISC Reference Model project programme. By modelling both current and intended practice in eAdmissions, ADoM aimed to provide a blueprint enabling HEIs to streamline their emerging practice and offer a basis for potential sharing of best practice across the sector.

Starting with a study of two contrasting HEIs, the University of Nottingham and Manchester Metropolitan University, the project developed an overview of how admissions fits into the institutional framework, touching on a far wider range of policy areas than we had initially expected. We were able to extend this by examining specific practice at other HEIs, especially those taking paper-free and 'paper-lite' approaches to admissions. Further material was contributed arising from work undertaken by members of the project team for the DELIA, PortisHEad and EFIFA projects.

After exploring a number of possible methodologies used by other modelling projects, we developed a metamodel of admissions using the principles developed by the HILDA project, with a view to making the ADoM domain map compatible with a wider JISC view of HE processes. This extended the approach first explored in the eP4LL project, and was intended to be primarily a vehicle for engaging admissions practitioners, who are largely non-technical staff, rather than developers or systems analysts.

The ADoM knowledgebase can be seen at <http://www.alanpaul.co.uk/adom/ADoM-Home.html>.

Background

ADoM was one of two projects, along with P-SPEX¹, funded by JISC in March 2007 under the eLearning Capital Programme eLearning and eAdministration themes to produce domain maps of the key administrative functions that support learning and teaching. This was to build on earlier work carried out for JISC as part of the earlier 'reference model' programme², and this project bridged two areas of the programme by setting out to create a Domain Map for eAdmissions, thereby also contributing to the use of technology to investigate and demonstrate work with the UK undergraduate admissions process³ strand and supporting the two other projects funded under this section of the call, DELIA⁴ and PortisHEad⁵.

The Schwartz report on Fair Admissions⁶ highlighted the need for professionalisation of admissions using transparent processes and efficient administration. Business processes for admissions across the HE sector as a whole are to some extent still predicated upon print-outs of data. However many HEIs are developing electronic admissions systems, ranging from 'paper-lite' to totally paper-free approaches. While these clearly involve a degree of sensitivity specific to the institution, it is also clear that there is a basis for developing a degree of consensus-based practice and shared vision for future development work in this area. This in turn can help to identify the potential benefits of a service-oriented approach to support the associated administrative functions, and to identify those functions which are reusable across processes, supporting a modular, lightweight approach to development of supporting technology.

By modelling both current and intended practice in eAdmissions, ADoM aimed to provide a blueprint enabling HEIs to streamline their emerging practice and offer a basis for potential sharing of best practice across the sector.

Aims and Objectives

Original Aim

To produce a domain map of e-Admissions covering issues around student diversity and the diversity of admissions types (e.g. recruiting and selecting), covering the electronic version of existing practice and suggesting pathways to future practice. This will provide a blueprint enabling HEIs moving towards centralising their admissions processes to streamline their emerging practice and offer a basis for potential shared practice across the sector.

This remained our fundamental aim throughout the project. However we very quickly became aware that there was a wide range of practice both across and even within institutions. We decided early in the project to focus on 'normal' undergraduate admissions via UCAS, which is the model from which all other admissions processes derive.

Original Objectives

- To produce a set of structured centralised processes that can be personalised for specific routes, drawing on the experience of two contrasting HEIs and refined by input from other members of the community. We will produce a variety of models

¹ <http://www.jisc.ac.uk/whatwedo/programmes/elearningcapital/courseinfo/pspex.aspx>

² <http://www.jisc.ac.uk/whatwedo/programmes/elearningframework/refmodels05.aspx>

³ <http://www.jisc.ac.uk/whatwedo/programmes/elearningcapital/admissions.aspx>

⁴ <http://www.nottingham.ac.uk/eportfolio/DELIA>

⁵ <http://www.portisheadproject.org/>

⁶ <http://www.admissions-review.org.uk/downloads/finalreport.pdf>

describing the domain that can be used to focus and prioritise developments and practice in this area

This objective remained throughout the project. Starting from detailed analysis of processes at the University of Nottingham and MMU, we were able to construct some basic models and gain an idea of the variety of practice between two contrasting institutions.

- To build on previous JISC work, including that of the Reference Model projects, revisiting and refining their work to scope and define what we mean by a domain map. We will comment on how well the domain map idea works in this area and how it contributes to the community and the e-Framework, thereby contributing to the growing understanding of e-Framework development processes that began with the Reference Model projects.

We retained this objective: we aimed to consult with other reference model and domain mapping projects to establish a model to work in the admissions domain. It soon became clear to us that as we were aiming to communicate with practitioners, who are primarily not technical people, we needed to find a way to express the domain map that would be accessible to them.

- To explore and document the extent to which existing web services can be refactored and reused in the context of this work, and to contribute new SUM and associated service definitions to the e-Framework.

We have modified this aim to look more at reusable processes and services rather than web services per se.

- To offer a central generalised view of processes and service patterns which will feed into the parallel demonstrator projects DELIA and PortisHEad

We retained this objective and were able to bring out the common processes that exist in admissions

- To offer exposure to major vendors in both FE and HE via a focus on the UCAS process, and build on existing partnerships with vendors, both in the UK and overseas, with a view to building a demonstrator and prototype

We modified this objective slightly, to feed this information into the parallel DELIA and PortisHEad projects and to build a joined-up demonstrator that drew on material developed for all three projects. However our contact with vendors was limited and we did not aim to feed information into them directly through this project.

Methodology

We were very conscious that creating domain models is all about communication. The purpose of the domain model is to communicate knowledge, information and understanding about a particular subject or area of work to various audiences. In essence the domain model could be considered as part of a knowledge transformation process that uses communications and dialogue to share and create knowledge about the systems under consideration or development, and about the methods of knowledge transformation itself. However, the domain model is not the same as the domain map. While the domain model consists of the concepts of the subject and their relationships,

the domain map is a visual representation of the model, or in the words of the HILDA⁷ project, 'a tool which supports navigation through a model of the domain'.

We were committed to using UML diagrams to describe the domain model, but were concerned that these particular diagram types would be unfamiliar to the admissions practitioners in our audience and therefore a barrier to dissemination and discussion. Therefore the domain map would have to be something more palatable.

We used the following criteria to guide us in our decision on the way to show the model. The visuals that we produced must:

- Permit users to explore the model
- Aid understanding and insight
- Be easy to navigate so that users can find relevant information quickly
- Place things in context
- Allow users to comment

We had four main candidates for the 'thing' that would become the ADoM knowledge base:

- A website derived from Visio diagrams

Advantages: Easy to create; industry standard diagramming tool
Disadvantages: Difficult to maintain; unspecialised tool

- ePortfolio for Lifelong Learning model – narrative => scenarios => use cases

Advantages: Team already experienced in the technique (used in a previous project)
Disadvantages: Somewhat wordy; used UML diagrams directly

- The HILDA model – Protégé plus TGViz and web processing

Advantages: Already used in a JISC project with a potential relationship with ADoM; easy to create; easy to maintain; free software
Disadvantages: No easy-to-use publication on the web system; limited to available functionality and team had no experience of the tool

- The FREMA⁸ model – Concept map and semantic wiki

Advantages: Already used in a JISC project with a potential relationship with ADoM; free software; moderately easy to maintain
Disadvantages: Diagrams not easy for the audience; team had no experience of the tool

Through regular communication with staff at UCAS, we expected to work with designated staff members to gain insight into UCAS systems and processes. The project did not, however, commit resources to the main stream of UCAS development projects, except in so far as these developments may interface more productively with ADoM's work.

We explored a number of mapping methodologies and tools in the course of the project, starting with UML (following earlier work for eP4LL⁹ and monitoring work for Covarm and

⁷ High Level Domain Mapping project

http://www.jisc.ac.uk/whatwedo/programmes/programme_jos/project_hilda.aspx

⁸ <http://www.frema.ecs.soton.ac.uk/>

CoVA), and use of BPMN as a possible means of communicating with non-technical practitioners. We explored the semantic wiki approach used by the FREMA project, Business Architecture Modelling Methodology (BAMM) used by the New Zealand Ministry of Education modelling used by New Zealand schools and use of the Archimate tool. We finally settled on a narrative and simple UML use case approach, given the nature of the audience the model was aimed at. We saw this as being admissions practitioners, senior managers and policy makers, rather than technical and information services staff.

After contact with the HILDA¹⁰ project, we redefined the domain using their methodology as far as possible, so that our map could fit into a wider view of HE in the UK. From this we developed the idea of publishing a web-based knowledge base to promote the model, using the Protégé tool to drive the architecture.

Commenting on the model also presented some issues: we entertained the idea of using a semantic wiki for this, following the example of the FREMA project, but felt that this was not appropriate for our audience. We were very reluctant to open the model to free alteration, which we felt might lead to rollback issues, and finally settled on offering a commenting functionality to the web pages so that comments and responses could be easily identified and tracked.

The model's purpose is to provide a description of admissions from the practitioners point of view, so that future eAdmissions development can progress on a foundation of knowledge about common current good practice. The information has been structured, so that we can capture details of the policies, functions, processes and activities that make up 'admissions'.

Implementation

The audiences for our domain model (stakeholders) were:

- Academic, administrative and managerial staff involved in admissions in HEIs
- Business analysts in HEIs
- Developers in HEIs and in software vendors
- Software vendors

The uses of the domain map might be the following¹¹:

- Description of the system and its potential evolution
- Analysis of alternative processes
- Business planning for change
- Communications between those involved in development, production, operation and maintenance of systems
- Input to systems design and development activities
- Planning and budget support
- Review, analysis and evaluation of systems

We used a workshop approach to examine current practice at the University of Nottingham, whose admissions are largely centralised, and at Manchester Metropolitan University, who are moving towards centralised admissions from a devolved system. We aimed to explore practice in both selecting and recruiting disciplines at both institutions and to take into account variations on standard practice (for example, use of admissions tests).

⁹ <http://www.nottingham.ac.uk/eportfolio/ep4ll>

¹⁰ http://www.jisc.ac.uk/whatwedo/programmes/programme_jos/project_hilda.aspx

¹¹ A list derived from the list of uses of architecture descriptions in IEEE 1471

We refined and validated these models with the two initial HEIs and then used them as a basis for a requirements approach to gathering further use cases and services.

Understanding admissions

Our work in the early part of the project was geared to deepening our understanding of admissions processes in the partner institutions, in order to describe them formally and obtain feedback on the descriptions.

Existing documentation

We were fortunate that MMU had recently completed a project that had produced a set of process diagrams for their admissions systems. We were able to use these as the basis for our own baselining work, although we quickly discovered that the diagrams were a more ordered reflection of activities that should have happened, than a true record of the actual processes.

We received very helpful documentation from each of the departments with which we were working and were especially grateful to the staff in the University of Nottingham's new Veterinary School, who provided us with comprehensive explanatory material on the details of their admissions and marketing activities.

However, we found that it was important not to rely on the documentation about activities, but to check the material through interviews and workshops with staff. An important part of our work was to gather information about the perspectives and impressions of staff involved in admissions, so that we could gain an understanding of their priorities and concerns, rather than simply the information flows and bureaucratic processes.

Structured interviews and workshops

We used structured interviews and workshops at Manchester Metropolitan University and the University of Nottingham, involving staff at all levels and including those in departments and in central admissions offices. Our aim was to establish baseline 'as is' models of current processes in a first round of workshops, moving on to more futuristic 'to be' models in a second round. This set of activities worked well, though it proved difficult in both universities to engage practitioners in the second round, owing to pressure of work. This meant that some second round activity had to be via interviews with individuals rather than workshops, leading to less of the very useful interactions fostered by group discussions.

The workshops were based around a standard requirements gathering exercise, in which individuals involved in the processes – admissions tutors, administrative staff and managers – were invited to construct flows of information and activities by sticking Post-It notes to large sheets of paper. This exercise was followed by discussion and refinement. Our team then used various 'systems thinking' techniques (see table below) to give the information a useful structure and to help us to understand and explain the dynamics of admissions.

Table 1: Systems thinking techniques

<i>Technique</i>	<i>Why?</i>
Soft systems methodology (Checkland) ¹²	Generates ideas for 'making things better'

¹² *Systems Thinking, Systems Practice*, Peter Checkland, 1981, ISBN 0 471 27911 0

System map diagrams	Simple for non-specialists to understand
Influence diagrams	
Sign-graph diagrams	Change over time
Control model diagrams	Understanding of checks and balances

Understanding of the UCAS application system

The project team's understanding of the UCAS application system was based on a lengthy association with UCAS staff, conversations with university admissions staff, and, in the case of Alan Paull, periods of employment and consultancy with UCAS in operational roles in the past. However, the project's focus was not on the parts of the application system directly managed by UCAS, and we decided to treat internal UCAS processes as a 'black box'; we did not attempt to model these internal processes.

Putting it all together

A major concern once we had gathered our information and were preparing the model was:

'How can we encourage admissions practitioners to look at, comment on and add to the ADoM knowledge base?'

We completed our requirements gathering work at roughly the same time that the domain mapping work for the HILDA project became available. This was very fortuitous, because we were able to review the HILDA approach as part of our work on defining the domain model and as input to the decisions about the appropriate visualisation technique to adopt.

We reviewed the methodology employed by the COVARM¹³ and FREMA reference model projects, beginning with work in specific institutions and publishing findings for refinement by the community. However, we created visual representations of the model using constraints that were particular to the admissions practitioner audience. We established a useful dialogue with the parallel P-SPEX project at Thames Valley University to compare experiences and methodology in working with the Domain Map concept. Owing to the two projects working in parallel, it quickly became apparent that we had divergent approaches that could not easily be married. There were some links between the P-SPEX 'problem frame' approach and our own 'scenario driven' approach, but we could not readily exploit them in the time scale of the project; perhaps this could be future activity.

After experimentation and discussion about the various methods we decided to capture the information about processes in UML diagrams, using only the simplest forms for dissemination to a wider audience. We would capture other information in a variety of relatively readily understandable systems diagrams, such as systems maps, influence diagrams and sign-graph diagrams, and include descriptive text with them. We would use Protégé to record and structure the information, because this software would allow us to create and maintain the ADoM knowledge base, storing its concepts and their relationships, and permitting the inclusion of generic entities and examples. We generated a user-friendly website using HTML outputs from Protégé, stripping out unwanted material and transforming other bits with Perl scripts¹⁴. We added in a section at the foot of each web page using a php script that permitted readers to add their

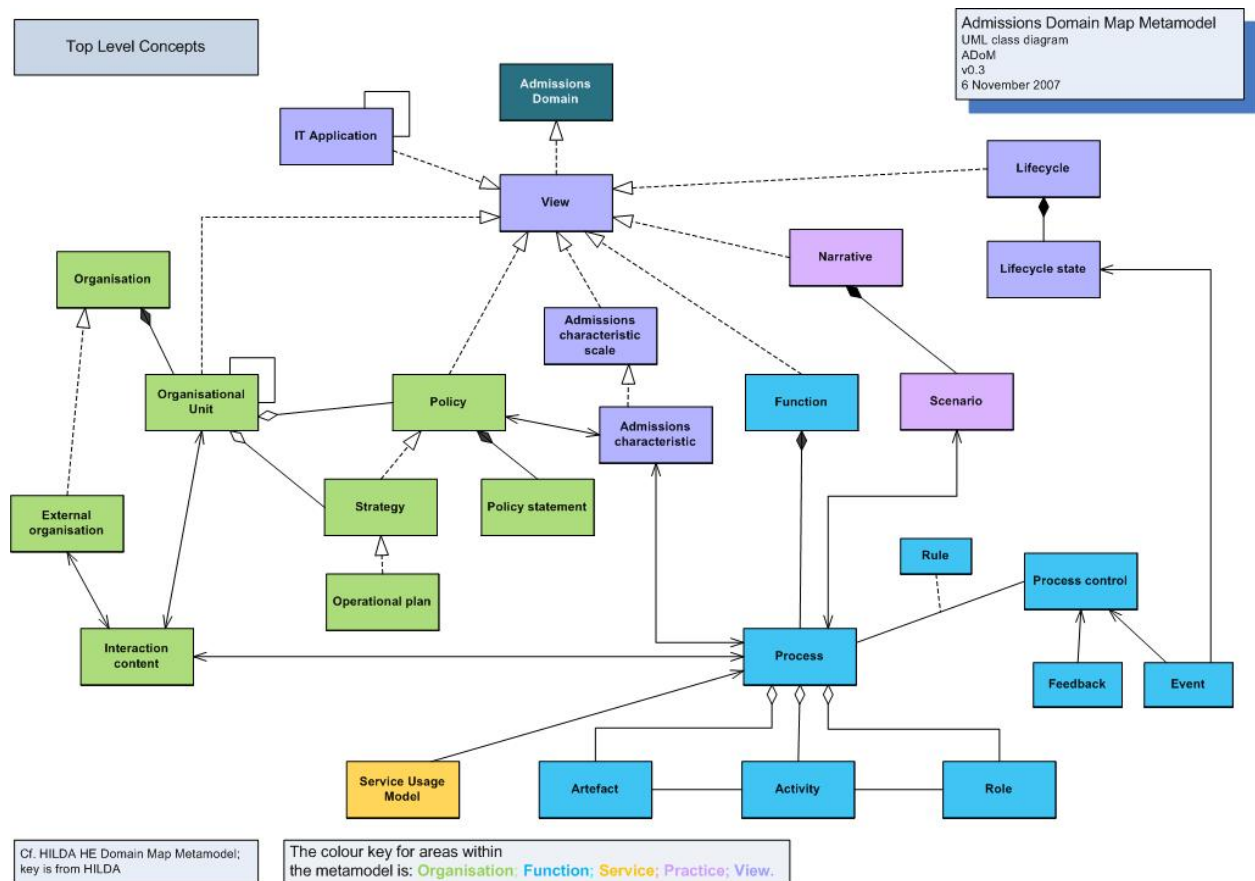
¹³ <http://covarm.tvu.ac.uk/covarm/>

¹⁴ Protégé can produce HTML outputs but configuration mechanisms in the software for this are rudimentary; hence the use of Perl scripts to customise the system.

comments through simple 'point and click' operation. Finally we published the ADoM knowledge base on its own website¹⁵.

This method was used to maintain the ADoM knowledge base through the life of the project. Maintenance required regeneration of the HTML output files and re-publication of the material, a process that took about 15 minutes.

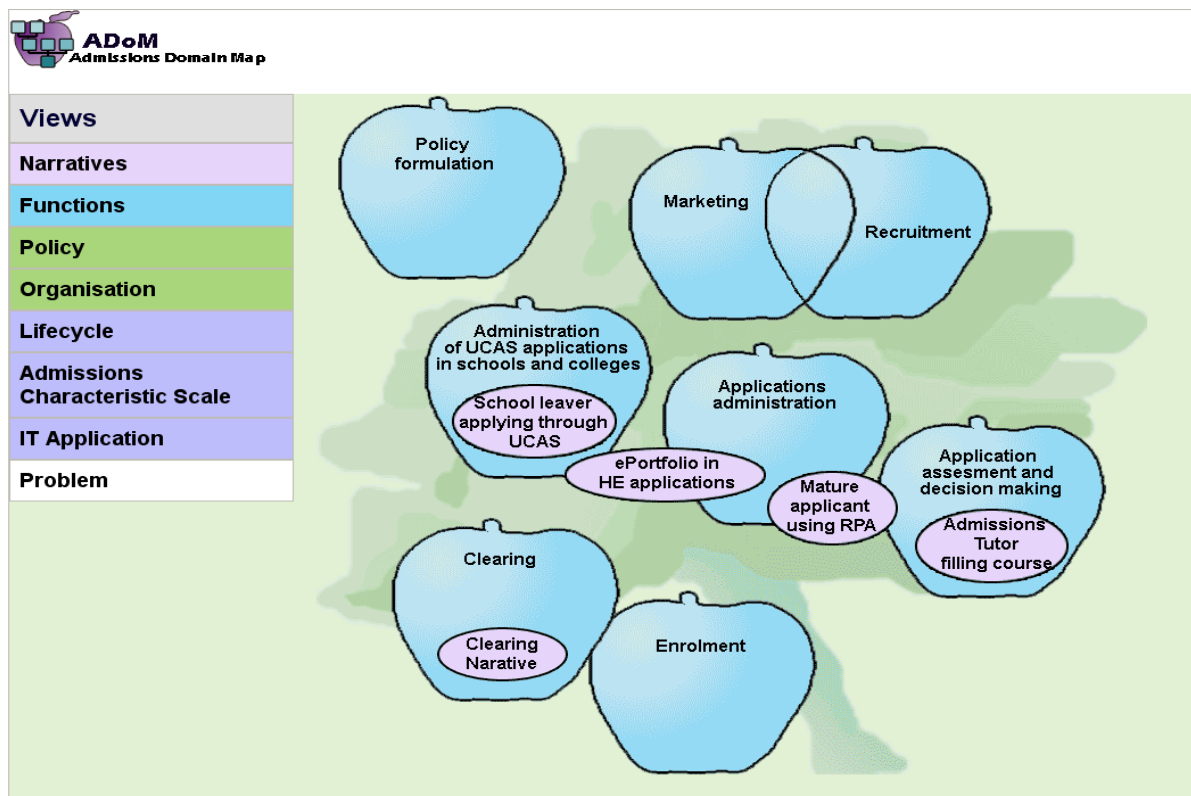
The ADoM Metamodel



Based on the methodology (and colour coding) used by the HILDA project, we devised the above metamodel to show an overview of the admissions domain.

From this basis, we created a front page for the website which allows users to choose from a number of possible views. They can choose to follow specific narratives, or to focus on functions, policy, lifecycle, the admissions characteristics scale or IT applications. After discussion with the P-SPEX project, we also included a problem-based view.

¹⁵ <http://www.alanpaul.co.uk/adom/>



The admissions characteristics scale was created by us for the project. We began from the simplistic view that HE admissions is either centralised or decentralised. Conversations with practitioners quickly led us to the realisation that there are variations on this apparently straightforward division: institutions who have mostly, but not entirely, centralised admissions, for example. We understood that there were further admissions characteristics which affected institutional practice but were not determined by the degree of centralisation. After a number of iterations, we refined these to the following instances:

- Centralised/decentralised
- Extent of rules-based decision-making
- Narrow vs holistic decision-making
- Recruiting/selecting
- Single or multi-site.

This Admissions Characteristic Scale describes a scale on which any individual HEI's admissions policy and practice can be placed; it describes parameters within which the HEI's admissions system lies. Each type is further defined by a set of admissions characteristics (e.g. Centralised/decentralised is realised by Centralised Administration, Decentralised Administration and Partially Centralised). Each Admissions Characteristic has an attribute label with a description and link to narratives in the knowledge base. For each narrative there is a series of constituent scenarios, which in turn link to processes. Processes in turn relate to Artefacts, Functions and Lifecycle States. Artefacts (e.g. UCAS application print-out) are part of Processes and are used in Activities and by Roles.

The knowledge base currently includes scenario information gathered from a specific subset of HEIs: however it is designed to be extendable as more types of practice are uncovered and explored.

Outcomes and conclusions

The most significant outcome from ADoM is the shareable knowledge and experience gained by the project team. This has been shared most immediately with the related projects DELIA, PortisHEad and EFIFA¹⁶, but has been of benefit to other projects which have included work in admissions.

Through presentations at national events including the UCAS Data Matters Conference in 2009 and the UCAS Admissions Conferences in 2008 and 2009, we have also begun to build awareness of the opportunities offered to the sector through electronic admissions. By providing an abstract model which encompasses variations in practice in the domain, we have provided admissions staff and policy makers with a benchmark against which they can measure their own practice and to reflect on how changes in the interests of policy objectives, for example fairness, effectiveness and efficiency, can be achieved. By including examples from institutions pioneering paper-free and 'paper-lite' approaches, we are promoting the value and potential of a more electronic approach to admissions.

We have learned valuable lessons from the experience of building a Domain Map, starting from the models originally proposed for JISC by Bill Olivier and the examples of the previous Reference Model projects. We explored a number of possible methodologies and approaches during the course of the project in our attempts to make our model match those developed by others. The work of the HILDA project was the most influential on our final output, but we found that even then we disagreed with certain definitions in their mode. At the end of the project, we developed some expertise with Archimate; were we to start this work again, this would be our preferred tool.

We are aware of the current limitations of our knowledge base. To become a truly effective tool, it still needs significant input from the practitioner community and from developers working in this area. However we have gathered sufficient information to make a number of reusable patterns clear; while these are demonstrated within 'standard' UK undergraduate admissions via UCAS, they may be equally applicable to other models, including direct and postgraduate admissions. We also feel that these may be of wider use than within HE, with potential models which could be adapted for FE admissions practice, for example.

As with the work on XCRI, we have demonstrated that institutions contemplating paperless admissions need to be prepared to invest time and effort into understanding and streamlining their existing systems. As we have shown that admissions touches on a wide range of policy areas, any approach to changing an institutional admissions system needs to be considered holistically in the context of the whole institution.

Continuing ownership and development of the knowledgebase is an issue we have not yet resolved. We originally envisaged outputs from the project being included in the e-Framework, but as this is a resource primarily aimed at developers, this no longer seems the most appropriate solution. We feel that the work would be better located in the new Innovation Base, and have approached the team setting this up to open discussions about inclusion of the ADoM work there. However to continue to be of use to the practitioner community, which is not closely involved with JISC work, responsibility and continued ownership of the content of the knowledgebase should lie with an impartial professional body working in this area. We have had some early discussions with SPA¹⁷, the UK independent programme for good practice in Higher Education admissions, about taking control of the resource; arrangements for this still need to be agreed.

¹⁶ <http://www.jisc.ac.uk/whatwedo/programmes/elearningcapital/admissions/efifa.aspx>

¹⁷ Supporting Professionalism in Admissions <http://www.spa.ac.uk>

Recommendations

The project would like to make the following recommendations:

- That the ADoM knowledgebase be included in the Innovation Base as an example of a different approach to modelling
- That any further development work in this area be done in close collaboration with SPA, who have a clear overview of UK admissions
- That further work for the knowledgebase be done factoring in the new services offered by MIAP
- That the model be extended to include mapping of direct admissions
- That a closer look be taken at reusable processes across sectors, and the implications this has for future development work
- That the model be extended to include the UCAS processes involved
- That XCRI be more tightly integrated into admissions work, taking into account the outcomes from the DELIA project

DRAFT