



XCRI-CAP implementation manual for postgraduate taught courses

PROSPECTS

In partnership with

Jisc

**“XCRI-CAP Implementation Manual for
Postgraduate Taught Courses”**

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Prospects**



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Foreword

Jisc welcomes this Prospects' XCRI-CAP implementation manual, as it is a valuable source of information that clearly states the benefits of why you should implement XCRI-CAP and how you can do so.

Prospects is committed to supporting a full national rollout of XCRI-CAP to all institutions that provide postgraduate (PG) course information in the UK's higher education (HE) sector; this will realise its full potential, with everyone gaining cost savings and students getting better-quality PG course Information.

This manual is for institutions wanting to produce information about their PG courses using the UK standard for describing course marketing information, XCRI-CAP.

Jisc has been supporting the development of XCRI-CAP over recent years, because implementing this standard across the UK HE sector will provide significant cost savings and deliver other benefits as described in this document. Jisc's investment on behalf of the sector culminated in a **large programme** involving almost 100 colleges and universities reviewing the management of their course information. Over 60 of them implemented XCRI-CAP for different types of courses, including their PG programmes.

A significant number of universities being able to create their PG courses using the XCRI-CAP standard means that Prospects, as the UK PG course aggregator, could also generate savings by implementing XCRI-CAP. Now that Prospects can receive PG course information using this standard, they will work with universities and other institutions wanting to produce their PG course information in the XCRI-CAP format.

In order for the sector to realise the full potential of XCRI-CAP, other aggregators of PG course information like Prospects also need to use the data in the XCRI-CAP format rather than requiring institutions to provide the information in each aggregators' preferred unique format. This will then mean that institutions only have to provide their PG course information in one format for all the different aggregators that want to access it. Some universities have said that they have to provide up to twelve different aggregators with PG course information in their own specialised format and so would benefit from large cost savings if they only had to produce the information once. Aggregators will benefit by getting better-quality and more timely data. Everyone wins!

Prospects will make all of the XCRI-CAP PG course information that they collect freely available to other aggregators. They will also provide information and guidance on how to implement XCRI-CAP so that these other organisations can consume the data into their own systems and reap the shared benefits.

Ruth Drysdale, Jisc
March 2015

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Introduction

XCRI-CAP stands for 'eXchanging Course Related Information, Course Advertising Profile'.¹ The XCRI-CAP 'project' to date has been to get a standard developed, in order to get all course related information following the same structure, so that courses can be easily compared and the data about them is up to a certain quality.

The basis for all of this and its continued development comes from a number of government white papers which show that this is what students want and need.^(1,2,3)

The agreed UK standard for describing course marketing information is XCRI-CAP 1.2. It has been defined within British Standard BS-8581:2012. It advises how to structure the information, defines and names the data components, and specifies the types of data permitted within each component. Where the term XCRI-CAP is used in this document, it is referring to XCRI-CAP 1.2.

The standard is suitable for describing any type of course, but for the purposes of the review stages prior to this point and including this implementation manual, only Postgraduate Taught, or PG(T), courses are relevant.

In 2014, Prospects, the national provider of postgraduate course information and part of HECSU, the Higher Education Careers Service Unit, conducted a feasibility study in conjunction with APS Ltd into aggregators of PG(T) course data accepting the XCRI-CAP feed. The study was successful, and the national rollout of XCRI-CAP feeds to provide course marketing data to aggregators of PG(T) began at Prospects in October 2014.

There is a history of the XCRI-CAP standard's development in [Appendix 1](#).

[1]

1 XCRI refers to the project to standardise the elements within the whole curriculum management process; XCRI-CAP refers to the Course Advertising Profile part of the model

The benefits of XCRI

Benefits to the institution

One of the issues surrounding XCRI-CAP and its adoption within the HE and FE communities is the potential level of resource investment required for that institution to put it in place. It does take effort and commitment from all levels to change internal processes and IT.

Cost savings

Alan Paull, who has been an advocate of XCRI-CAP from the start and has a lot of experience with course marketing data, produced a cost benefit analysis table (see [Appendix 2](#)). He estimates that an average institution would spend nearly £30,000 a year updating course marketing information manually, by keying in course data across various aggregators' systems. An institution which operates an XCRI-CAP feed would only spend an estimated £8,300 per year. Prospects is already committed to accepting the XCRI-CAP feeds. UCAS, Hotcourses and StudyLink are all planning to use the feeds for their aggregation needs.

Prospects carried out an analysis of existing PG(T) aggregators and where they obtain their data from. We then re-mapped this set of relationships with a diagram showing the reduction of work for a university if they implemented an XCRI-CAP feed. Both of these diagrams are in [Appendix 3](#).

Consistency

Aside from simple cost benefits within marketing to provide the data for aggregators, having one central source of course information per institution improves quality, reduces errors, simplifies any approval process, and gives a consistent message to students. It reduces any inconsistency of information given out by individual departments or faculties and helps to streamline processes within an institution. For example, the Open University operates only one method of adding, updating and storing data about all of its courses and it all complies with XCRI-CAP 1.2.

Efficiency

Institutions have said in their **Jisc-funded Stage 2** ([bit.ly/1ScIzHu](#)) reports that the whole process adds efficiency to their institutions:

"In April 2012, we conducted a business process review with colleagues from across Birkbeck's professional services departments (all those directly involved in production of course information): External Relations, Registry, Business and Planning Systems, the ITS web team and Corporate Information Systems. Our aim was to get a better understanding of our current system. This discussion was incredibly helpful, as:

- » It became apparent that the various players in the system weren't entirely aware of what the other players in the system did and how it all fitted together (namely, who did what and when, and how did our information get published?)
- » It enabled us to identify both inefficiencies in our system (e.g. processes that duplicated other data entry points and therefore could lead to inaccuracies in our published content) and processes that could allow incorrect information to be published on our web site

Having identified these issues, we were able to design a better procedural workflow, to be rolled out with our new systems."



Course Data Stage 2 Birkbeck University
of London, Final report, March 2013
[bit.ly/1Bc1Huw](#)

“The project will contribute to a number of the University’s strategic objectives. Improved marketing information will contribute to improved student recruitment. High quality, in-time published information will enhance the applicant and student experience, fulfil external quality assessment requirements and support public accountability. The project will also enable the University to streamline business processes, thereby contributing to our efficiency programme. The impact of these changes will be assessed as part of the internally defined Project Review process, which takes place three months after project completion.”



Course Data Stage 2 Teesside University, March 2013
bit.ly/1LlqHp8

Ease of sharing information

There is also the ease of sharing information if it is in the same format and follows the same rules for compilation. With more aggregators of course data appearing yearly, being able to distribute your course data easily, adds hugely to your marketing potential. Case studies are the best examples of showing the benefits of XCRI-CAP:

“Currently Aston University provides course information in a number of different formats for a variety of different consumers:

- » The website
- » Printed prospectus
- » Internal consumption
- » UCAS
- » School based prospectus
- » Course specific leaflets/flyers

These different formats are produced by different departments within the University from a number of different data sources. These data sources can range from

being in one of the University’s core systems, such as the Content Management System, right through to the data being in a word document on an academics desktop. The management of this information is also controlled manually by staff which takes a huge amount of staff resource.

This in turn means that the information that Aston University pushes out about its courses can be different depending on the format and consumer, which is obviously a cause for concern. Keeping all of these data sources in line is currently an almost impossible task and Aston University realises that the key is to have a single set of information that can be updated easily, be controlled through an auditable workflow, and reside in a core system at the University.”



Course Data Stage 2 Aston University, March 2013
bit.ly/1KOUUnXC

“The benefits of providing an open validated compliant XCRI-CAP feed are likely to become more important as more institutions implement the XCRI standard and generate open feeds of their course data. If, as is expected, the XCRI feeds are used by third parties to provide Higher Education ‘comparison’ sites and to ‘mash’ the data with other information such as KIS data then it is obvious that there are distinct disadvantages in not providing an XCRI feed.”



Course Data Stage 2 University of Kent, Final report, March 2013
bit.ly/1efu327

Better communication within an institution

The University of Cambridge highlights the difference that the project has made in its institution:

“Engagement, understanding and progress to better workflows

- » Departments are communicating with each other to join up work and improve processes
- » The Business Improvement team are joining up key process mapping initiatives so that departments don't redo work that has already been done by another department

Improved processes

- » Processes are being streamlined to reduce duplication of effort and requests for data
- » Supporting documentation is being combined and reduced to match the streamlined processes
- » An online form has been set up to capture information into a central data source, making the data accessible for the future, rather than emailing around numerous documents to be updated and stored on hard drives where they are not available to others looking for the information

Sustainability

- » Internal staff have been involved in the project to make sure knowledge is kept within the department and carried forward when the contract project manager finishes up at the end of the project
- » The project has had sufficient impact on central administration staff that there is a desire, and understood need to develop a central course data repository to manage:

- » Programme specification creation and updating
- » Course information creation and updating
- » Automatic updating of the Student Record System and Undergraduate and Graduate marketing websites
- » Automatic feeding of XCRI-CAP and KIS
- » Senior central administration staff have applied for central funding to buy a system or project team to define, develop and implement the central course data repository”



Course Data Stage 2 University of Cambridge, Final report, March 2013
bit.ly/1PwZ967

Benefits to the student

Comparison of data

One of the key reasons a schema such as XCRI-CAP was developed is to make the comparison of courses easier for students and prospective students. If all of the data in each field is consistent with its scope of content, then it is easier for a student to compare the fields crucial to their decision-making, e.g. qualification gained by a course.

Quality of data

As institutions will be reducing the variance in their course information internally, it will inevitably improve the quality of data for the students. This means that the data that a student can see on an institution's website and the data on an aggregator's site is the same because both are accurate and up to date. Because the course data will be presented in a standard format, it can be more easily combined with other data such as staff:student ratio.

Accessibility of data will be a benefit. Website builds are all individual, but following the latest HTML guidelines and using an XCRI-CAP feed to publish course data means that there is no reason why any course data should be inaccessible to anyone.

Wider benefits

There are various bodies that will see benefits as the XCRI-CAP standard is more widely adopted:

- » The impact of a greater take-up of the XCRI-CAP standard across all course providers would mean that government or national analysis of courses can be more easily achieved, for example, to fit with the **Efficiency Exchange** (efficiencyexchange.ac.uk/) programme, which is supported by Jisc and Universities UK
- » The XCRI-CAP standard is an open vocabulary, so it can be viewed by vendors of student record systems, etc. With increased take-up and demand from customers, they are considering modifying their systems to facilitate the creation of feeds in line with the XCRI-CAP standard. Adoption by vendors will encourage and make it easier for other course providers, who are also customers of these systems, to adapt their processes and produce an XCRI-CAP feed
- » The standard has already encouraged data sharing initiatives, for example the **CADARN** (cadarn.ac.uk/) project in Wales, which is sharing data across a regional group

Guidance on internal processes

From case studies of course providers who have already got an XCRI-CAP feed in place, development usually starts with a collaboration of colleagues from admissions, marketing and IT.

They initiate a number of internal changes:

- » Identifying the sources of course data
- » Identifying the internal and external uses of course data
- » Updating the course planning process
- » Implementation of an application to maintain course and module information
- » Integrating this course/module management application with student records system
- » Generating an XCRI-CAP feed which meets aggregators' needs

One extremely useful resource is the Jisc **Infokit on managing course information** (jiscinfonet.ac.uk/infokits/course-information/) and the process improvement checklist. Details of both can be found in the Resources section.

Cases studies (e.g. London Metropolitan University, Course Data Stage 2 **Final Report, March 2013** bit.ly/1PWA67r) show that developing a purpose-built system might be quicker and easier than buying an off-the-shelf application or getting existing systems to do what is required.

Sometimes changes in a business process can take more time than the associated system development. This is due to tasks such as: identifying stakeholders; getting buy-in from stakeholders; and agreeing requirements and new models of working. As curriculum management affects almost every area of an institution and each department has its own requirements, planning and support from top management is essential. It is important that management is able to realise the benefits. Case studies advise that it is important to set up

the right project team from the start with the right level of staff who can give knowledge and backing to the project.

Alan Paull has produced a simple checklist for the processes that need to be carried out for successful XCRI-CAP implementation. This is included in **Appendix 4**.

There is likely to be a time when projects and systems will be run in parallel, especially with changes to IT systems or introducing new systems. Unfortunately the majority of projects require some overlap in work as downtime is not an option, so while the new system is being developed existing systems still require maintenance and are in use. This needs to be factored in to costs and timescales.

Advice has also shown that implementing changes in steps to make sure that everyone is on board and the changes work is advantageous to do before the next set of developments.

As for the data itself, part of the issue is that course data is normally in various formats across an institution, for example in Microsoft Word documents in one department, a database in another department, and so on. It is likely that there may be some difficulty in agreeing what is the master, what is a duplicate and what is the most up-to-date and accurate data. The master is not always the most accurate.

But many institutions have made headway and changes in their internal processes. The list of institutions who were involved in the **Stage 2 of the Jisc-funded project** (bit.ly/1SclzHu) is evidence that things can change.

Guidance on feed creation

The **British Standard BS8581** (bit.ly/1JA1JDF) documented the XCRI-CAP code of practice and specification. The feasibility study took this standard and produced a Data Definition tailoring this standard to just PG(T) courses, especially from an aggregator's perspective.

This Data Definition is available from Prospects upon request. It does not form part of the British Standard, but is a supplementary document produced to support course aggregation.

It is recommended that institutions provide as much information as possible in their XCRI-CAP feeds. The feeds are a combination of mandatory, preferred, inherited and optional fields. The Data Definition lists minimum information requirements (i.e. those mandatory for PG(T) feeds) and has included those relevant to Prospects and Hotcourses. Other aggregators like UCAS will have additional requirements, so it is encouraged that all feed producers include as many data elements as possible in their feeds to maximize their take-up across a variety of aggregators, all with slightly different requirements. Any users of a feed will simply ignore any field that they are not interested in using.

The pilot study conducted in 2014 on the feasibility of an aggregator using XCRI-CAP feeds highlighted some key issues with existing feeds, including:

- » Schema locations
- » Non-unique identifiers for courses
- » Data in the incorrect format
- » Incorrect handling of special characters including '£' and accents are given directly instead of the code for them
- » HTML or XHTML errors
- » Empty elements or errors in elements (possibly due to the feed being automatically generated from poor or incomplete data)

- » Inconsistent use of course title across institutions - some have just the topic, others have topic and qualification (guidelines advise just the topic)
- » Only three of the feeds contain JACS3 codes for subjects. Some use their own subject coding systems either as well as or instead of JACS3. Others don't have any subject coding present. JACS3 subject codes are required. Any subsequent replacement of JACS3 will be automatically accepted by Prospects

However, the standard of the feeds was very good and most only required a small amount of rework to get them to the PG(T) standard.

Using the data definition

The data definition was written to give precise guidance to creators of an XCRI-CAP feed who wish to supply their course data to aggregators of PG(T) courses. The precision within the guidelines is due to the need for student users of this data to be able to easily compare courses, so the same field from different providers should all contain data in the same format.

Specific issues

1. The structure – the XCRI-CAP standard follows a nested structure, so data is almost “inherited”. There are a series of “core elements” which hold one or more distinct sets of data.

It starts with the ‘Catalog’, which holds the basic XML details for that feed. Each catalog, has to have just one Provider, which holds all of the data about that course provider, which will be applicable to any course run by that institution. Next comes the ‘Course’ which holds key details of the course followed by fields for specific instances of this course within ‘Presentation’ and ‘Qualification’. There are also options for providing different ‘Location’ fields where an institution is multi-sited, or if there are different venues for different presentations.

As you go further down the tree, the data only becomes necessary if it is different from data already provided, e.g. location data per Presentation is not necessary if it is the same location as given for the ‘Provider’.

Catalog	contains basic XML information about the feed, e.g. contributor
Provider	holds the data relating to the learning opportunity provider and all of its courses’ data, e.g. title
Course	holds the data relating to the learning opportunity, e.g. description, subject, title
Credits	details of the credits that can be obtained from completion of this course, e.g. level
Presentation	holds the data relating to an “instance” of this learning opportunity, e.g. cost, duration
Venue	holds the information relating to the main locations where a learning opportunity is presented, e.g. provider
Provider	holds the information relating to the venue, e.g. title
Location	holds information about the spatial location of the venue, e.g. postcode
Qualification	holds the data relating to a named formal recognition of achievement certified by an awarding body that can result from studying a course, e.g. awardedBy
Location	holds information about the spatial location of the provider, e.g. address, phone



A full spreadsheet of the breakdown and relationship of these fields is available from:

xcrico.uk/KbLibrary/SummarySpreadsheet.xls

This was initially created by University of Cambridge as part of its Stage 2 final report. bit.ly/1PwZ967

2. Optional v mandatory - the XCRI-CAP 1.2 vocabulary advises whether fields are mandatory, preferred, optional, or only mandatory in certain situations, for instance, if other data is also present. The feasibility study into the use of XCRI-CAP by aggregators produced an alternate Data Definition, where some fields became mandatory for PG aggregators. These have been kept to a minimum, but the pilots felt that the requests were reasonable.

3. Course type identification - it is expected that most feeds will include more than just PG(T) courses. Part of the feasibility study looked at how aggregators manage data that is sent within a feed. One issue was being able to identify course type. This is necessary because different aggregators will collect different data, for example, Prospects holds the national database for postgraduate courses, whereas UCAS also collects undergraduate data. Within the course data, one field which is relevant to this is 'Type'. This field aims to group courses together for their target audience. It is an optional field within the British Standard, but the data definition states that it is mandatory for postgraduate collection. Identifiers need to be added to this field to show whether a course is postgraduate, undergraduate, CPD or other.

4. Department - both Prospects and Hotcourses collect the department (or faculty or school). This is not a mandatory field within the current XCRI-CAP 1.2 standard. It is recommended that, within the 'Provider' element, the <hasPart> element is used to list each department, faculty or school which runs courses. The <hasPart> element is used in conjunction with the <isPartOf> element within the 'Course' element, which can state what department runs each course.

5. Qualification - within XCRI-CAP 1.2, the guidelines advise that the (course) title is kept as a title and the 'Qualification' element holds the details about the qualification. So, a title would be something like "Marine Biology" and the qualification abbreviation would show "MSc". Prospects will be encouraging a standard form for abbreviations.

6. Subject - there are a variety of subject coding classification schemes available within the education sector, for example, JACS3 or LDCS, as well as an institution's own bespoke subject lists. For the purpose of aggregation, Prospects require JACS3 ⁽⁵⁾ codes to be added, which will then be mapped to its bespoke list. Hotcourses uses the LDCS, but auto-categorises them, so these do not necessarily need to be supplied. Again, it is important to try and provide as much data with each record, so it would be perfectly reasonable to add one or more JACS3 subjects, as well as one or more subjects from a bespoke list to a course record. Each aggregator will only take what they need.

7. Use of additional standards - as well as following the guidelines set out in the Data Definitions document, some other standards also need to be adhered to. For example, date and time formats should follow the ISO 8601. These are all clearly detailed.

There is a sample XML record from the Open University in [Appendix 5](#).

Feed validation and supply

Validation

One of the stages that Prospects asks of any institution who wishes to submit an XCRI-CAP feed to an aggregator is that it has first been checked by a validator. Within the earlier stages of the XCRI-CAP development, an external validator was created at the request of Jisc.

Prospects has proposed to have an open validator for XCRI-CAP 1.2 PG(T) available by the end of March 2015. It is available from gp.prospects.ac.uk/coursecheck.



Providing a feed to an aggregator

The Prospects system which accepts XCRI-CAP feeds of PG(T) data is called Course Exchange. It will pull feeds from universities and present the course information within the postgraduate search at prospects.ac.uk



Other aggregators might have slightly different requirements, so it is important to include as much information within a feed as possible.

As part of the feasibility study, Prospects produced a statement of alternatives for the data architecture. The key requirements are listed in [Appendix 6](#).

Working with other aggregators and sector stakeholders

For XCRI-CAP to be successful, one of the pivotal factors is the take-up and adoption across all relevant parties. This includes HE and FE institutions, aggregators of course data and providers of student record systems.

Prospects is committed to integrating and promoting XCRI-CAP, so will be working closely with other aggregators to encourage take-up. Prospects already has relationships with Hotcourses and StudyLink, both of whom are keen to use XCRI-CAP feeds. UCAS will be accepting feeds from the end of 2016.

Prospects undertook some analysis of all of the PG(T) course data aggregators (as of Feb 2015). This is included in [Appendix 3](#). It shows the already existing relationships between aggregators and the sharing of data. Prospects

has revealed an intention to work with these relationships and either encourage take-up of XCRI-CAP feeds by aggregators, or share the XCRI-CAP data that it has collected with others.

The Higher Education Data Information Improvement Programme (HEDIIP) at HEDIIP.ac.uk has specific projects on data management, data collection and data language which Prospects is contributing to. The rollout of the XCRI-CAP standard will act as an exemplar in the programme.

As part of the XCRI-CAP feasibility study, Prospects was asked to ensure that the PG(T) vocabulary and the feed aggregator would deliver the recommendations of the HEFCE report into the information needs of postgraduate students (April 2014) ⁽³⁾. This has now been achieved.

Networking and support

Prospects is aware that support for the rollout of XCRI-CAP is key to its success. It has been proposed that a user group be set up, with one of its key aims to assist those who are in the early stages of their XCRI-CAP development. Prospects is hosting a series of regional workshops throughout the year with details to be posted on the LinkedIn XCRI group page.

Prospects has set up a LinkedIn group called "XCRI" to try and encourage participation and the sharing of knowledge and experiences (see resources). This currently unmoderated group is open for anyone to join.

JISCMAIL also has an "XCRI" (jiscmail.ac.uk/lists/XCRI.html) group, and queries can be posted on there.

Prospects is working closely with the consultant Alan Paull, managing director of APS Ltd. They provide consultancy to institutions who are keen to get their feed up to PG(T) standard or are completely new to XCRI-CAP and require more advice and support.

Overview of the XCRI-CAP process

To summarise, there is a process that postgraduate course providers are recommended to follow to generate a working XCRI-CAP feed:

- » Update internal processes to reduce duplication of course data
- » Create an XML feed of courses that follow XCRI-CAP 1.2 guidelines, and the PG(T) Data Definition
- » Check the feed against the Prospects Course Check validator
- » Make the XML feed publicly available
- » Contact aggregators of PG(T) courses to let them know that this feed is available
- » Prospects will be able to accept the feed for PG(T) courses from March 2015 through the Course Exchange system

Resources for extra information

jiscinfonet.ac.uk/checklists/process-improvement-information-data/ - Jisc's Process improvement checklist

xcri.co.uk/ - useful starting point if new to the XCRI-CAP standard

jisc.ac.uk/whatwedo/programmes/elearning/coursedata.aspx - includes links to the institutions' reports who were involved in Stage 1 and Stage 2 of the Jisc-funded course data programme

[linkedin.com/groups/XCRI-8161137?home=&gid=8161137&trk=my_groups-tile-grp](https://www.linkedin.com/groups/XCRI-8161137?home=&gid=8161137&trk=my_groups-tile-grp) - the XCRI LinkedIn discussion group

vimeo.com/58370744 - video link to Staffordshire University XCRI-CAP Course Data Project 2013

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JACS3 codes - hesa.ac.uk/content/view/1776/649/

Appendix 1 – History of XCRI-CAP development

When	Who	What
2005-2006	JISC funded	Project to produce a vocabulary and appropriate technical advice for describing course-related information
2006	XCRI community	XCRI-CAP 1.0 released
2007-2009	JISC funded	JISC fund a number of projects aimed at exploring new approaches to the course management lifecycle
2009	ISB	The UK government's Information Standards Board (ISB) approves XCRI-CAP 1.1 as the UK eProspectus standard
2011	JISC funded	JISC fund a forum for projects working on initiatives using XCRI and XCRI-CAP. Led by the University of Nottingham and Middlesex University
2012	BSI	The British Standard BS8581:2012 published. It is based on XCRI-CAP 1.2
2012	JISC funded	Stage 1 projects - 93 institutions received funding from JISC to identify changes to course data flows that are needed within their institution
2013	JISC funded	Stage 2 projects - 63 institutions (a subset of Stage 1) received funding from JISC to build an XCRI-CAP feed
Jan-Jun 2014	JISC funded	Prospects and APS Ltd conduct a feasibility study on whether XCRI-CAP is suitable for aggregators of PG(T) courses
Oct 2014 -	Prospects	Acceptance of XCRI-CAP feeds for PG(T)

Appendix 2 – Cost benefit of XCRI-CAP v manual keying

Keying only

Cost per update	#/hr	Time (mins)	Cost per record	Cost per HEI
Large record update				
New record, 5/hour [A]	5	12	£3.33	
Maintenance of existing record, 10/hour [B]	10	6	£1.67	
Checking, 20/hour [C]	20	3	£0.83	
20% new records: $0.2 * [A] * [G]$				£364.58
80% maintenance: $0.8 * [B] * [G]$				£729.17
Checking (100%): $[C] * [G]$				£455.73
Management costs (10%)				£154.95
TOTAL for a major update				£1,704.43
Small record update				
New record, 10/hour [D]	10	6	£1.67	
Maintenance of existing record, 20/hour [E]	20	3	£0.83	
Checking (data quality), 40/hour [F]	40	15	£0.42	
20% new records: $0.2 * [D] * [G]$				£182.29
80% maintenance: $0.8 * [E] * [G]$				£364.58
Checking (100%): $[F] * [G]$				£227.86
Management costs				£77.47
TOTAL for a minor update				£852.21
Updates per annum				
		Requests	Frequency	Cost per annum
Large record updates		4	2	£13,635.42
Small record updates		8	2	£13,635.42
Total				£27,270.83



Data supplied by APS Ltd

XCRI-CAP bulk upload

Cost per update				Cost per HEI
Large record update				
No per record cost EXCEPT for checking				
Update cost, 30 mins (max) at Level 3 rate				
Checking, 20/hour, as for keying				
20% new records: standard update cost				
80% maintenance: standard update cost				£11.33
Checking (100%): QA and bespoke additional data items				£455.73
Management costs (10%)				£46.71
TOTAL for a major update				£513.77
Small record update				
No per record cost EXCEPT for checking				
Update cost, 30 mins (max) at Level 3 rate				
Checking, 40/hour, as for keying				
20% new records: standard update cost				
80% maintenance: standard update cost				£11.33
Checking (100%): QA and bespoke additional data items				£227.86
Management costs (10%)				£23.92
TOTAL for a minor update				£263.12
Updates per annum				
Large record updates		Requests	Frequency	Cost per annum
Small record updates		4	2	£4,110.15
Total		8	2	£8,320.03

Supporting data

Number of records in HEI

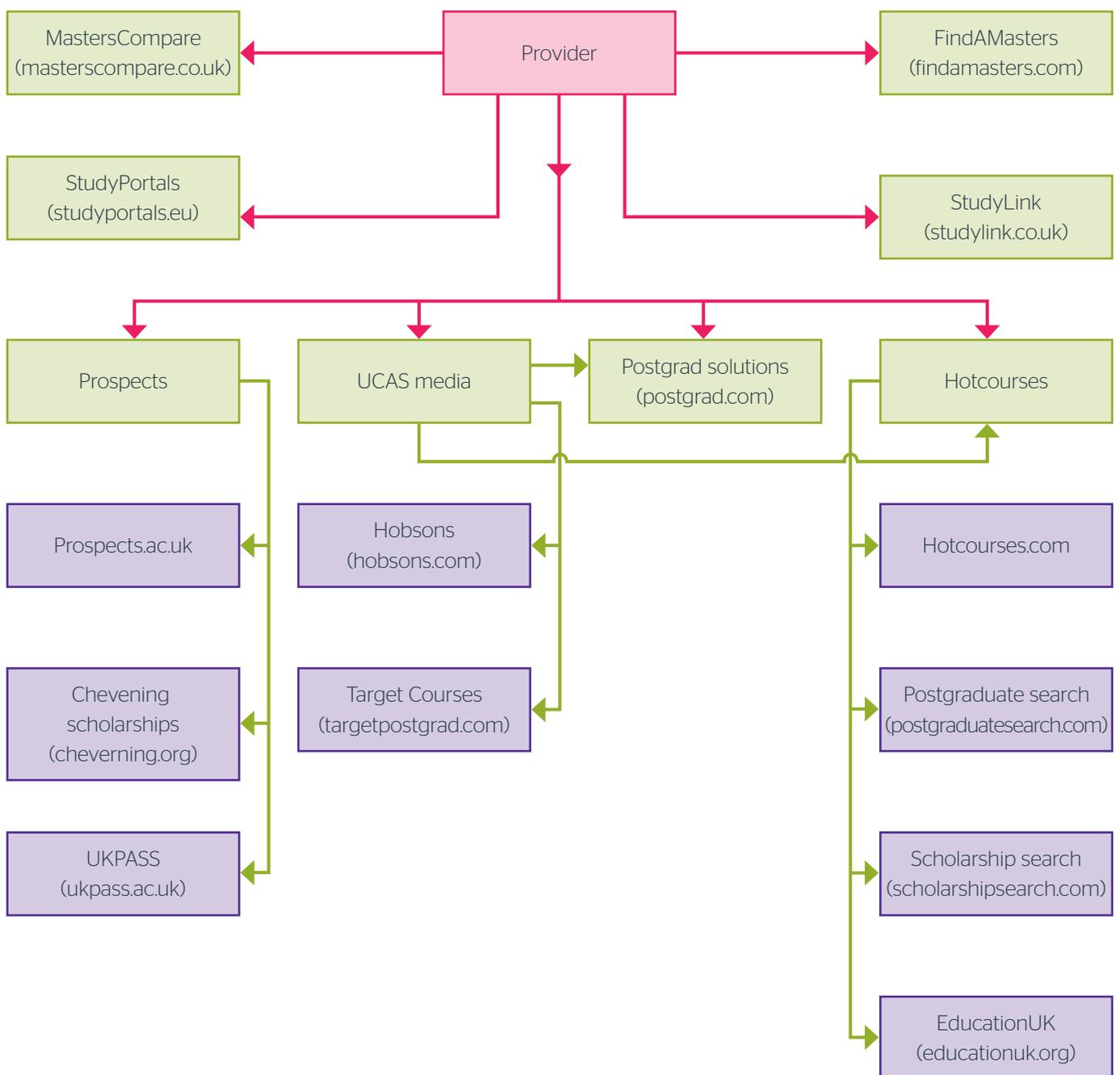
Total HE courses for UK > 100 in inst	87,500
160 (being double the 80 take-up estimated).	
Represents those insts with greater than about 100 HE courses.	160
Average (mean) number of courses per institution [G]	547

Salary costs

		Per hour
Level 2 (£22k to £28k) Middle range, including on costs	£25,000	£16.67
Hours (200 days per year, 7.5 hours/day)	1500	
Level 3 (£31k to £37k) Middle range, including on costs	£34,000	£22.67

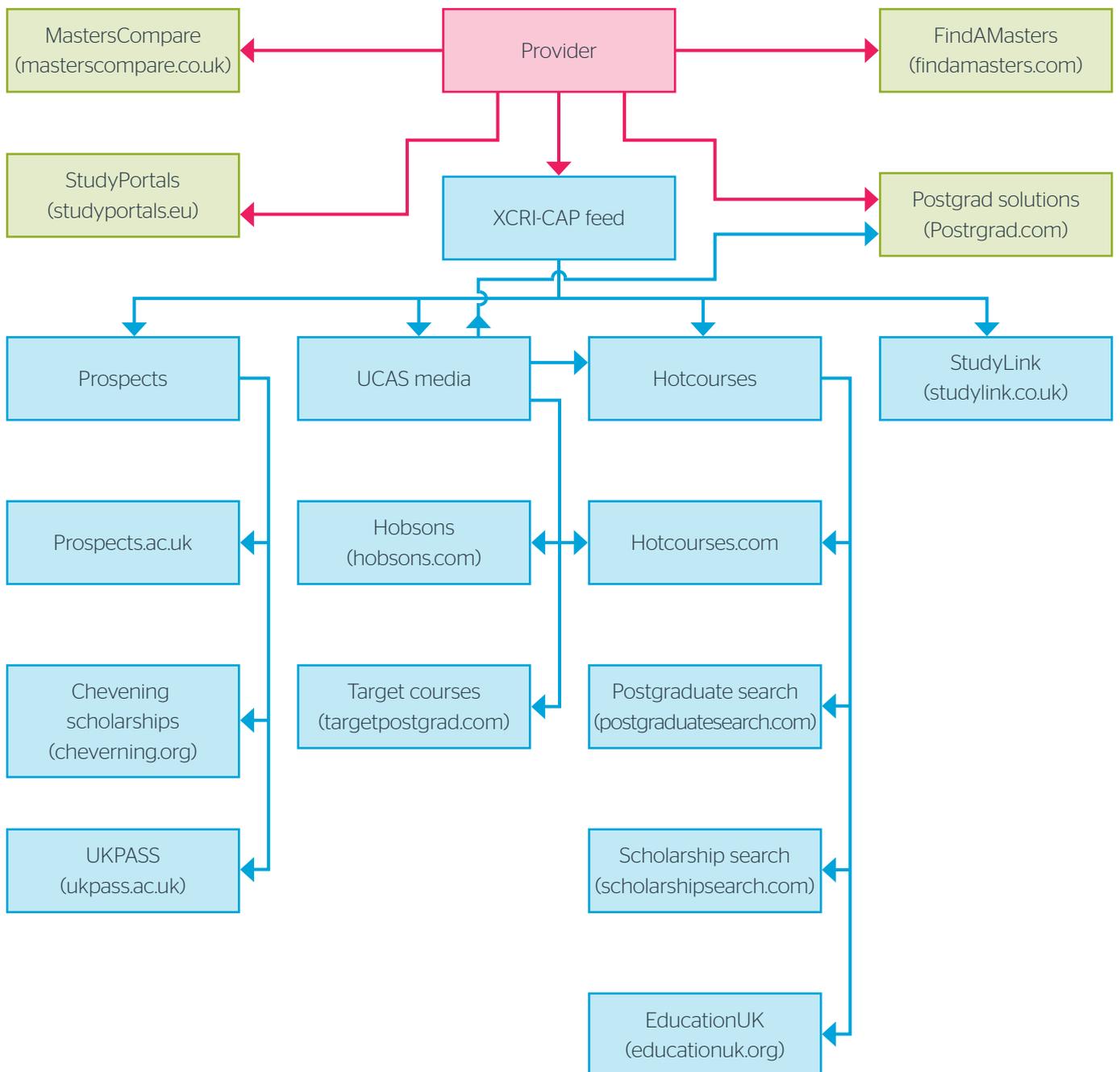
Appendix 3 - PG(T) course data aggregator landscape

PG Data Collection Landscape Map - before XCRI-CAP



NB: This landscape map represents the main data collectors providing course marketing information to websites

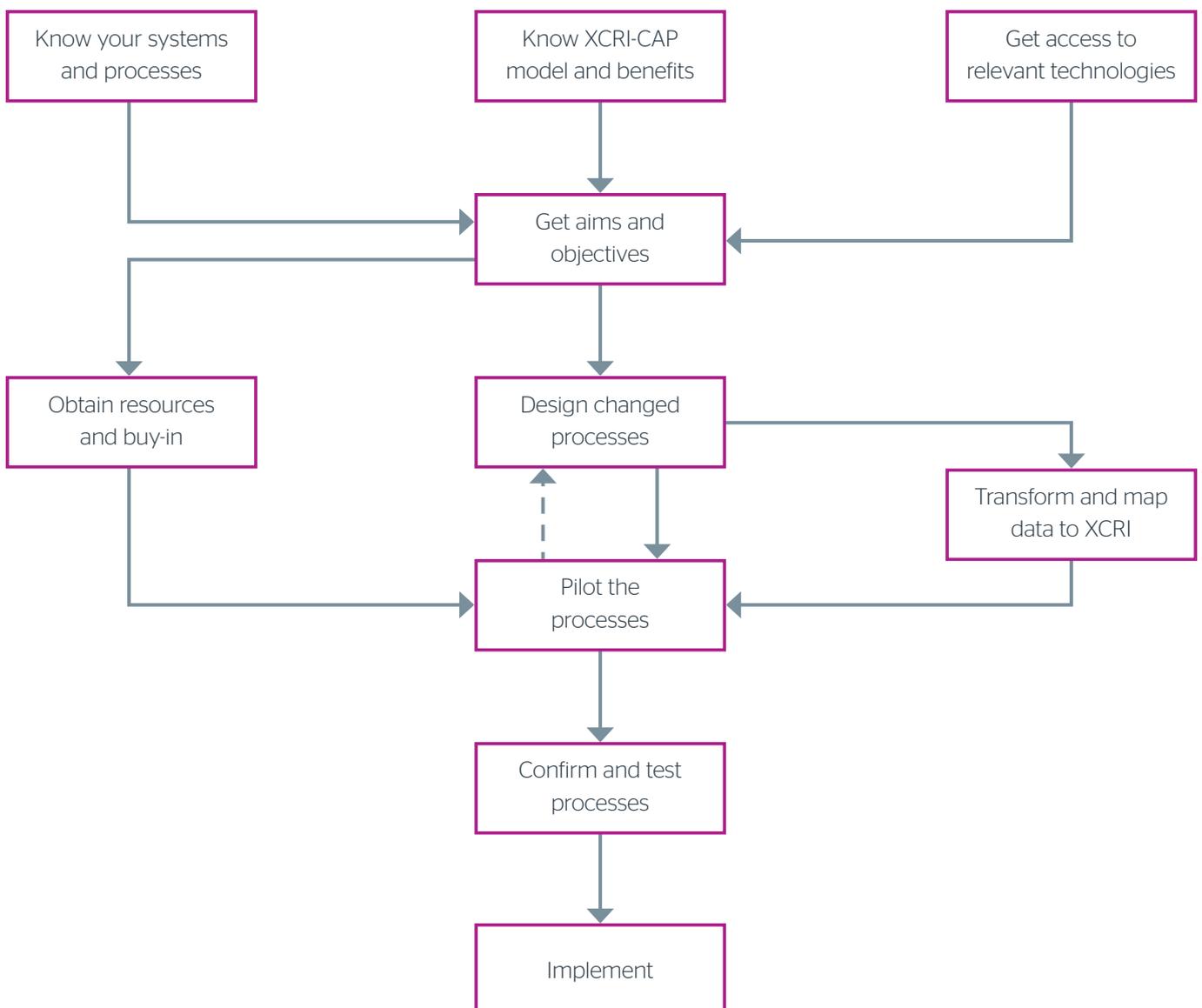
PG Data Collection Landscape Map - with XCRI-CAP feed



NB: This landscape map represents the main data collectors providing course marketing information to websites

Appendix 4 - Brief guide to implementing XCRI-CAP

XCRI-CAP implementation in your institution will be specific to your circumstances. This brief guide is an overview of the steps to consider when planning your XCRI-CAP project.



Item		Check?
Know your systems and process	<ul style="list-style-type: none"> » Review policies, systems and processes using Jisc’s course information maturity model » Document your current course data management processes » Identify relevant data sources for XCRI-CAP (inputs) 	<input type="checkbox"/>
Know XCRI-CAP model and benefits	<ul style="list-style-type: none"> » Get information about XCRI-CAP (from Prospects, APS Ltd, xcri.co.uk, Jisc, etc.) » Get support if needed, available from Prospects or APS » State benefits of XCRI-CAP implementation for your organisation 	<input type="checkbox"/>
Get access to relevant technologies	<ul style="list-style-type: none"> » Check each type needed, for example XML, Web Services, database management, data analysis, transformation and mapping, software development. Refer to support websites for technical details if needed 	<input type="checkbox"/>
Set aims and objectives	<ul style="list-style-type: none"> » Consider requirements for specific outputs. These may include your organisation’s main website, other internal sources, Prospects and other third parties » Define how you will publish the feed what that will require 	<input type="checkbox"/>
Obtain resources	<ul style="list-style-type: none"> » Identify funding sources » Identify required staff » Identify required ICT systems » Sign off resource allocations » Obtain buy-in from relevant managers 	<input type="checkbox"/>
Design changed processes	<ul style="list-style-type: none"> » Involve operational staff » Decide on appropriate model of information flows, data sources, outputs » Define needed activities, staff and objects » Design interfaces to other processes 	<input type="checkbox"/>
Transform and map data to XCRI	<ul style="list-style-type: none"> » Design transformation and mapping to XCRI-CAP » Carry out testing and iteration where needed 	<input type="checkbox"/>
Pilot the process	<ul style="list-style-type: none"> » Try out all changed processes from end-to-end » Confirm that valid XCRI-CAP is produced (e.g. use a validator such as Prospects Course Check) » Confirm changed processes and outputs are acceptable to recipients 	<input type="checkbox"/>
Confirm and test processes	<ul style="list-style-type: none"> » Carry out testing of end-to-end processes » Iterate where needed » Confirm implementation plan with all staff 	<input type="checkbox"/>
Implement	<ul style="list-style-type: none"> » Implement solution » Test solution » Make solution live 	<input type="checkbox"/>

Appendix 5 - Sample XML record

```

<?xml version="1.0" encoding="UTF-8"?>
<catalog xsi:schemaLocation="
  http://xcri.org/profiles/1.2/catalog http://www.alanpauill.co.uk/xcri/xcri_cap_1.2.xsd
  http://xcri.co.uk http://www.alanpauill.co.uk/xcri/coursedataprogramme.xsd
  http://xcri.org/profiles/1.2/catalog/terms http://www.alanpauill.co.uk/xcri/xcri_cap_terms_1.2.xsd
  http://www.w3.org/2003/01/geo/wgs84_pos http://www.craighawker.co.uk/xcri/validation/xsds/geo.xsd"
  generated="2014-10-27T08:17:15Z"
  xmlns="http://xcri.org/profiles/1.2/catalog"
  xmlns:credit="http://purl.org/net/cm"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:dcmitype="http://purl.org/dc/dcmitype/"
  xmlns:dcterms="http://purl.org/dc/terms/"
  xmlns:mlo="http://purl.org/net/mlo"
  xmlns:xhtml="http://www.w3.org/1999/xhtml"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:geo="http://www.w3.org/2003/01/geo/wgs84_pos"
  xmlns:xcri="http://xcri.co.uk"
  xmlns:xcriTerms="http://xcri.org/profiles/1.2/catalog/terms"
  xmlns:fo="http://www.w3.org/1999/XSL/Format"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:fn="http://www.w3.org/2005/xpath-functions">
  <dc:description>XCRI-CAP 1.2 feed</dc:description>
  <provider>
    <mlo:hasPart>Faculty of Arts</mlo:hasPart>
    <mlo:hasPart>Faculty of Humanities</mlo:hasPart>
    <mlo:hasPart>Faculty of Science</mlo:hasPart>
    <mlo:hasPart>Faculty of Mathematics, Computing and Technology</mlo:hasPart>
    <mlo:hasPart>Faculty of Education and Language Studies</mlo:hasPart>
    <mlo:hasPart>Faculty of Business and Law</mlo:hasPart>
    <mlo:hasPart>Centre for Inclusion and Collaborative Partnerships</mlo:hasPart>
    <mlo:hasPart>Faculty of Social Sciences</mlo:hasPart>
    <mlo:hasPart>Faculty of Health and Social Care</mlo:hasPart>
    <mlo:hasPart>Institute of Educational Technology</mlo:hasPart>
    <dc:description>The Open University is a world leader in modern distance learning, the pioneer of teaching and learning methods which enable
  people to achieve their career and life goals studying at times and in places to suit them.</dc:description>
    <dc:identifier>http://www.open.ac.uk/</dc:identifier>
    <dc:identifier xsi:type="xcri:ukprn">10007773</dc:identifier>
    <dc:title>The Open University</dc:title>
    <mlo:url>http://www.open.ac.uk/</mlo:url>
    <course>
      <mlo:isPartOf>Faculty of Humanities</mlo:isPartOf>
      <dc:description>
        <xhtml:div>
          <p xmlns="http://www.w3.org/1999/xhtml">This postgraduate diploma course offers you an opportunity both to broaden and deepen your understanding of
  professional engineering. By combining modules from engineering analysis and technology management, you can shape a qualification to suit your career aspirations. You will
  also take a project module, working collaboratively as part of a small team via email, telephone and virtual conferencing. The postgraduate diploma also provides a route to a
  masters level engineering qualification if you fall outside the entry requirements for our MEng. This qualification can help you progress towards Chartered Engineer
  registration.</p>
        </xhtml:div>
        </dc:description>
          <dc:description lang="en">You will need a computer with internet access to study for this qualification.
  For most OU qualifications a Microsoft Windows (new since 2007), Apple Mac (OS X 10.6 or later) or Linux computer should be adequate.
  However, some qualifications require more specific IT equipment, in which case you will need additional software to use an Apple Mac or Linux computer.
  A detailed technical specification for your modules will be made available when you register.
  Please note, technical specifications do change over time to match computer developments and the way we teach.</dc:description>
          <dc:identifier>http://www3.open.ac.uk/study/postgraduate/qualification/E22aok.htm</dc:identifier>
          <dc:identifier xsi:type="xcri:internalID">A1000</dc:identifier>
          <dc:subject xsi:type="xcri:JACS3" identifier="1300">Software engineering</dc:subject>
          <dc:title>Computational Science </dc:title>
          <dc:type>Masters</dc:type>
          <dc:type xsi:type="xcri:courseTypeGeneral" xcri:identifier="PG">Postgraduate</dc:type>
          <dc:type xsi:type="mlo:RTCourseTypeFlag" mlo:RT-identifier="T">Taught</dc:type>
          <mlo:url>http://www3.open.ac.uk/study/postgraduate/qualification/E22.htm</mlo:url>
          <abstract>This diploma offers professional development for engineers at postgraduate level. It's ideal if you're aiming towards chartership,
  or need an entry route to a high level engineering qualification.</abstract>
          <mlo:assessment>
            The assessment details can be found in the facts box above. You will be expected to submit your tutor-marked assignments
            (TMAs) online through the eTMA system unless there are some difficulties which prevent you from doing so. In these circumstances, you must negotiate with your tutor to get
            their agreement to submit your assignment on paper.
          </mlo:assessment>
          <mlo:prerequisite>
        </xhtml:div>
      </course>
    </provider>
  </catalog>

```

```

                <p xmlns="http://www.w3.org/1999/xhtml">There are no entry requirements, but we do assume that you have
already done some study up to HNC, HND or bachelors degree level in a relevant subject area, or have equivalent experience from your employment.</p>
                <p xmlns="http://www.w3.org/1999/xhtml">
                Your spoken and written English must be of an adequate standard for postgraduate study. If English is not your first language, we recommend that you will need a
minimum overall score of 6 and minimum score of 5.5 in each of the four components: reading, writing, speaking and listening under the International English Language
Testing System (IELTS). Please see the
                <a href="http://www.ielts.org/">IELTS website</a>
                for details.
                </p>
                <p xmlns="http://www.w3.org/1999/xhtml">If you have any doubt about the suitability of the module, please
contact our Student Registration & Enquiry Service.</p>
        </html:div>
    </mlo:prerequisite>
    <mlo:qualification>
        <dc:title>Postgraduate Diploma in Engineering</dc:title>
        <abbr>PG Dip (Eng)</abbr>
        <dcterms:educationLevel>Postgraduate</dcterms:educationLevel>
        <awardedBy>The Open University</awardedBy>
    </mlo:qualification>
    <mlo:credit>
        <credit:scheme>The Open University</credit:scheme>
        <credit:level/>
    </mlo:credit>
    <presentation>
        <dc:identifier>P100-Oct</dc:identifier>
        <mlo:start dtf="2015-10-01">OU qualifications have up to three start points in the year, October, February or April.</mlo:start>
        <mlo:duration interval="P2Y">Part time - 2 years</mlo:duration>
        <applyTo>http://www.open.ac.uk/study/</applyTo>
        <studyMode identifier="FT">FT</studyMode>
        <mlo:languageOfInstruction>en</mlo:languageOfInstruction>
        <languageOfAssessment>en</languageOfAssessment>
        <mlo:cost>Costs are paid per unit not per qualification.</mlo:cost>
    </presentation>
    <presentation>
        <dc:identifier>P100-Feb</dc:identifier>
        <mlo:start dtf="2016-02-01">OU qualifications have up to three start points in the year, October, February or April.</mlo:start>
        <mlo:duration interval="P2Y">Part time - 2 years</mlo:duration>
        <applyTo>http://www.open.ac.uk/study/</applyTo>
        <studyMode identifier="FT">FT</studyMode>
        <mlo:languageOfInstruction>en</mlo:languageOfInstruction>
        <languageOfAssessment>en</languageOfAssessment>
        <mlo:cost>Costs are paid per unit not per qualification.</mlo:cost>
    </presentation>
    <presentation>
        <dc:identifier>P100-Apr</dc:identifier>
        <mlo:start dtf="2016-04-01">OU qualifications have up to three start points in the year, October, February or April.</mlo:start>
        <mlo:duration interval="P2Y">Part time - 2 years</mlo:duration>
        <applyTo>http://www.open.ac.uk/study/</applyTo>
        <studyMode identifier="FT">FT</studyMode>
        <mlo:languageOfInstruction>en</mlo:languageOfInstruction>
        <languageOfAssessment>en</languageOfAssessment>
        <mlo:cost>Costs are paid per unit not per qualification.</mlo:cost>
    </presentation>
    </course>
    <mlo:location>
        <mlo:town>Milton Keynes</mlo:town>
        <mlo:postcode>MK7 6BJ</mlo:postcode>
        <mlo:address>PO Box 197</mlo:address>
        <mlo:address>Milton Keynes</mlo:address>
        <mlo:phone>0845 3006090</mlo:phone>
        <mlo:fax>01908 653744</mlo:fax>
        <mlo:email>general-enquiries@open.ac.uk</mlo:email>
    </mlo:location>
</provider>
</catalog>

```

Appendix 6 – Statement of alternatives for data architecture

Push/Pull

- » Prospects will develop an aggregator which pulls feeds from each provider in turn – Prospects Course Exchange
- » Prospects will access XCRI-CAP feeds via HTTP using their public URL
- » It will use the IF-MODIFIED-SINCE HTTP header, where available, to determine whether the feed should be downloaded
- » It will use the “generated” attribute of the feed to determine whether the feed should be processed – if the generated date and time is the same as the last import of the feed, then the feed does not need to be processed
- » It will use a checksum on the fd to determine whether the feed should be processed. The checksum will ignore the “generated” attribute. If the checksum is the same as the last import of the feed, then the feed does not need to be processed
- » As the number of feeds grows, the frequency of pulling a feed cannot be guaranteed to be daily, but will be at least once per week
- » A provider may activate a pull request by the aggregator by sending a certain HTTP request to Prospects
- » Prospects will attempt to prioritise providers who have sent a pull request. However, Prospects will initially make no guarantee of how quickly it will respond to pull requests

- » Prospects may implement a policy of prioritising providers who can accurately communicate to the aggregator when a feed has changed and needs to be processed, or providers who have used less aggregator time in the past. Providers who cannot accurately communicate when a feed has changed, or who have recently consumed a lot of aggregator time, may be polled less often
- » Fuller guidance will be issued by Prospects to an HEI during its XCRI-CAP feed adoption

Complete refresh versus delta

- » Prospects will expect a complete list of all current courses every time it pulls a feed
- » Prospects will carry out a comparison on each course to determine whether the course has changed since the last import of the feed. If the course is identical to last time, the course will not be re-imported. This will help to minimise required manual activities

Validation

- » Prospects will reject in its entirety any feed which is invalid according to the XCRI-CAP validator, Course Check, or which does not meet the extra rules defined by the Data Definition for PG(T) specification. Errors will be reported back to the HEI, so that the feed can be corrected and re-submitted

Integration of feeds into the Postgraduate Database Aggregator “Course eXchange”

- » Prospects will assume that the provider’s feed always represents the complete list of courses that should be advertised at any moment in time
- » Any new course in the feed which is valid and complete according to our specification will become “live” in our postgraduate search shortly after it is uploaded and processed
- » Any course in the feed which is valid and complete but is already present in our search will be updated in our search if any details have changed
- » Any courses which were present in the previous feed upload but are not present in the current upload will be withdrawn from our postgraduate search shortly after the feed is uploaded and processed
- » If a course’s identifier changes, then Prospects will consider it to be a new course, and the course with the old identifier will vanish from our search. We cannot associate these two courses with one another

Non-compliance

- » If a provider finds it impossible to adapt their feed to meet Prospects’ rules, Prospects will consider relaxing some rules for that provider. If this happens, some courses from the feed could be incomplete and Prospects will not put them live on its search. The provider is responsible for logging into the Course Handling System to supply the information that could not be provided in the feed. They may need to do this each time a course changes in the feed
- » If, at any point, a provider is unhappy with the quality or accuracy of their feed, they can (temporarily) disable their feed

Departments and faculties

- » Prospects uses a model whereby all courses not only belong to an institution but also to a faculty, department, school etc. within that institution. Prospects maintains a tree structure which organises the parts of an institution hierarchically. We use the name “department” to refer to any sub-group of an institution
- » Prospects maintains a “deep” hierarchy of faculties, departments, schools etc. If a new department is added in the XCRI-CAP feed which is not yet in this hierarchy, we will need to add the new department to the hierarchy before any courses which are part of the department can be automatically processed and published
- » It is recommended that Faculties, Departments, Schools etc. will be present in the feed as <hasPart> elements within the <provider> element

Administration

It is expected that providers will login to Prospects Course Handling System (CHS) to access the following functions:

- » Request an unscheduled pull of their feed
- » Configure the location of their data file
- » Disable/enable their feed
- » View the Service Level Agreement and fuller guidance on XCRI-CAP feeds

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