

Metadata Pilot at the Department for Education and Skills, UK

Julie Robinson
Assistant Librarian, Library and Information Services Team,
Department for Education and Skills, London, United Kingdom.
Julie.robinson@dfes.gsi.gov.uk

Abstract

This paper describes the Department for Education and Skills' (DfES) practical approach to tackling metadata and surrounding issues. A metadata pilot project was set up by the Library and Information Services Team to develop a metadata scheme for departmental use. Using the Dublin Core based e-Government Metadata Standard (e-GMS), Library staff developed a draft metadata standard for departmental web pages. Library staff applied the metadata standard by metatagging pages on a test web site. The metatagged pages were tested against the search engine. Work started on the pilot in September 2001. The pilot was successfully completed in November 2001. Further developments are ongoing.

Keywords: *Dublin Core, Metadata, Department for Education and Skills, DfES, interoperability, e-Government Metadata Standard, e-GMS, Government metadata.*

1. Introduction

The Department for Education and Skills is an important, central UK Government Department (www.dfes.gov.uk). Its mission is to create opportunity, release potential and achieve excellence in education for all. We rely on the departmental Intranet as an essential communication tool. Metadata is an important part of this tool that will improve the ability of all staff to retrieve the information they need. This is necessary to improve the delivery of public services which is a key goal of the broad agenda to modernise UK Government.

The DfES Intranet has over 100,000 web pages for 4,000 staff, nearly all Civil Servants, who work in four separate locations across the UK. When staff search on the Intranet using the internal search engine, they often have difficulty finding what they are looking for. In addition, searchers are often presented with too many results pages, many of which

are only slightly relevant to what they are looking for. Using the Dublin Core based draft e-Government Metadata Standard (e-GMS) as a starting point, the metadata pilot was set up with the purpose of investigating how this problem might be remedied.

2. Search and retrieval issues at the DfES

In the DfES, web pages are produced for the Intranet and for the Internet site. The Intranet consists of over three hundred web sites. These are all sub sections of the intranet. Effective responsibility for these sites is devolved to 200 web managers. There is little editorial control and web managers are expected to publish according to prescribed web standards. Prior to the pilot, there was no policy of using metatags and only a handful of web managers used them. Internet web pages are published by six well-trained web developers who had just started to add metadata to web pages when the pilot was set up.

Although the Intranet search engine was configured to search in a standard way (i.e. using titles and keywords as indexing terms automatically produced by software agents), the search results produced were often not very relevant for users. The rankings also tended to be questionable. During the pilot, it was found that many web pages did not have meaningful titles and that many still had the default title (i.e. no title). Library staff had worked with Intranet and IT colleagues to successfully redesign the Intranet search interface to help users but these problems still remained. One of the reasons why library staff set up the metadata pilot was to investigate how metadata might solve these problems.

3. Establishing the metadata pilot

- The main drivers behind the pilot were:
- the mandatory requirement to make all government services available electronically by 2005 (81)

- the publication of the UK e-Government Metadata Framework (e-GMF) in May 2001. The e-GMF set out the UK government's policy for standardising metadata use throughout the public sector. (92)
- the circulation of the draft e-GMS in month September 2001. (63)
- the establishment of the DfES extranet project in the Summer of 2001.

Initially, the recently formed extranet development team asked library staff to supply a single metatag to control data transfer from the intranet. (An extranet project had just been set up and the DfES extranet was subsequently launched in April 2002. It links the Department up with its external governmental partners). However, library staff were also aware of the need to add metadata to public sector resources as mandated by the e-GMF which adopted Dublin Core as the UK Government Metadata Standard. Dublin Core was adopted because it is a highly developed, flexible, internationally recognised model. The e-GMF set out the UK Government's policy for standardising metadata use throughout the public sector, and has since been superseded by the e-government Interoperability Framework (e-GIF) v4.(10) This is complemented by the e-GMS which describes the elements and their refinements. Once a draft version of e-GMS was available in September 2001, a sound basis existed for establishing a metadata pilot to test a range of metatags(11)

4. Running the pilot

In September 2001, as a pilot project, library staff set created a metadata schema and a draft metadata framework for departmental use according to the e-GMS. Library staff applied the draft DfES framework, using the metadata scheme, to a test site on the intranet. All pages were metatagged appropriately by the end of October 2001. The metatagged pages were then tested against the intranet search engine. The pilot was successfully completed by early November 2001.

The e-GMS was devised because Dublin Core alone is not sufficient to meet all of the government's information management and information retrieval needs e.g. records management and data security. To meet these purposes, the e-GMS therefore added further elements and refinements whilst following the principles of Dublin Core. That said, the e-GMS is not a one size fits all standard. Local metadata standards, consisting of sub-sets of the e-GMS, need to be developed to meet the specific needs of any given organisation. Thus the need to create a draft DfES Metadata Standard as part of the pilot.

Table one. Metatags, HTML view.

A crucial aspect of exploiting added metadata is that the search engine needs to be configured to

enable field searching. For this, specialist advice will have to be sought.

Library staff decided to add metadata directly to the web pages in HTML. This was the quickest and easiest way of adding metadata for the purpose of the pilot. The other main advantage of this method is that is inexpensive (i.e. we did not have to purchase metatagging or content management software).

```
<html>
<HEAD>
<!-- MetaTager : 0001S -->
<meta name="AUTHOR" content="none">
<meta name="TITLE" content="none">
<meta name="DESCRIPTION" content="none">
<meta name="SUBJECT" content="none">
<meta name="IDENTIFIER" content="http://ntweb1">
<meta name="DATE.CREATED" content="none">
<meta name="DATE.LAST_UPDATED" content="none">
<meta name="DISPOSAL.REVIEW" content="none">
<meta name="ACTION Archive" content="none">
<meta name="RIGHTS.BUSINESS_GROUP_ACCESS_PERMISSION" content="PUBLICDOMAIN">
<meta name="ALTERNATIVE TITLE" content="none">
<meta name="AUDIENCE" content="none">
<meta name="CATEGORY" content="none">
<meta name="CONTRIBUTOR" content="none">
<meta name="COVERAGE.PLACE" content="none">
<meta name="FORMAT" content="Web site">
<meta name="KEYWORDS" content="none">
<meta name="LANGUAGE" content="Eng">
<meta name="PRESERVATION" content="none">
<meta name="PUBLISHER" content="none">
<meta name="RELATION.ISBASEDON" content="none">
<meta name="RELATION.ISPARTOF" content="none">
<meta name="RELATION.ISVERSIONOF" content="none">
<meta name="RIGHTS.COPYRIGHT" content="Department for Education & skills. www.dfes.gov.uk/disclaimer.shtml">
<meta name="TYPE" content="Text">
<meta name="TYPE.DOCUMENT" content="Web Page">
<HEAD>
```

The pilot established four main entry points for searches; author, title, subject and keyword, and established that a special query language had to be used to search on metadata. Finding a method that allowed individual tags to be searched was the difficult part of the pilot. Microsoft, the software provider, produced a guidance listing query language.

However, this was not accurate or complete, being a standard guide and not one for the DfES intranet, so the query language for the tags had to be worked out by trial and error, by testing the method on a few pages set up for this purpose (initially half a dozen). This involved adding and removing meta content and tags, changing the syntax and then running controlled searches. Using unusual search terms helped library staff to do this to confirm that the tags were working. (These terms were later removed).

The result of this was that, initially, the metadata and the syntax used had to be configured to work with the search engine. It should have been the other way round. (IT colleagues later successfully configured the search engine to work on metatags specified by library staff in the metadata scheme).

5. The metadata schema (12)

The short version of the DfES Metadata Schema looks like this:

Table two. DfES Metadata Scheme. Pilot version

The tags were chosen and described according to the e-GMS and the DfES Metadata Framework by Library staff based on our knowledge of the information needs of the Department. We were also aware that, if the metadata scheme were to be widely adopted, it would need to be as simple and easy to apply as possible. These tags were based on the e-GMS current at the time. The standard has since changed and the DfES metadata scheme has changed accordingly. Lack of space prevents a complete discussion of all the elements used, so discussion is based on key issues.

5.1 Author

This should have been "Creator" to conform to Dublin Core and the e-GMS. However, the search engine did not work on 'creator', only 'author'. It would seem that the default metatags recognised by the search engine software included "Author" not "Creator". The search engine was later configured to recognise and use "Creator" which is part of the current metadata scheme.

5.2 Description

The description provided should help users identify the right information in a list of search results. It should also help users identify web pages they are not looking for the information in a list of search results. Library staff wrote the descriptions based on a reading of the resources in question and a familiarity with the test website and the likely needs of users. Seeing that the resource is not relevant immediately saves users/searchers time and prevents them from

getting the wrong information or information that is not required. The searcher reading the description (or abstract as it is called on the Intranet) should be able to tell if the page is worth reading from the description provided without having to go into the page itself and wade through the text. (13)

5.3 Subject

The e-GMS allows Keyword and Category as refinements of Subject. The Category refinement is to be used for terms from the Government Category List (GCL) to aid cross- government browsing.

5.4 Subject (unqualified)

This is a very useful metatag tag because the search engine can pick this up and match it to the search terms entered by someone searching on the Intranet. Library staff used terms suggested by the test site owners supplemented by some of their own choosing. These included buzz words and phrases like "box times". (This is the daily time a document needs to reach a Minister's office to ensure the Minister sees it that evening. Box times are central to our working practices, and they change, particularly during the parliamentary recess). Staff also included abbreviations, e.g. PQs as well as the full term "parliamentary questions". This facilitates better resource discovery. Terms were sometimes suggested by resource content e.g. "ministers' responsibilities". This allows users to find very specific information quickly. These terms are all uncontrolled. This means that they were freely chosen and not limited to a prescribed set. There are no restrictions on the definition or usage of such terms.

5.5 Keywords

These are subject terms but put in a different tag because these terms are all drawn from a controlled vocabulary, the Departmental thesaurus. So we have "Prime Ministers" as a keyword, but "Tony Blair" is a subject term. By combining search terms in this way, we have introduced some synonym control. The important thing is that whatever the search term entered, the resource produced in the hit list should meet the user's needs. Linking search terms in the free text element and the controlled vocabulary will facilitate this discovery. Searching on keywords helps to reduce excessive numbers of hits. This is an important advantage of having a controlled vocabulary.

5.6 Action (n.b. not part of Dublin Core)

This is for archiving purposes and library staff set this value to "Archive" because the test site was considered to be of intrinsic historical value and interest. We would expect that it would be kept, possibly even-

Table 1.

Element Name	Refinement	Definition
AUTHOR		Person, group or organisation responsible for the intellectual content of the resource.
TITLE		The name given to a resource.
DESCRIPTION		A description of the information contained in the resource.
SUBJECT		Uncontrolled key words and phrases indicating the subject matter of the resource.
IDENTIFIER		The unique identifier of the resource (the URL or web page address).
	DATE.CREATED	The date the resource was created.
	DATE.LAST_UPDATED	The last time a resource was updated or altered.
	DISPOSAL.REVIEW	Date on which the resource should be reviewed to determine the need to retain it.
	DISPOSAL.ACTION	If the resources has a long term value.
	RIGHTS.BUSINESS_GROUP -ACCESS_PERMISSION	Defined groups to which access to the resource is limited.
ALTERNATIVE TITLE		Any alternative name or title by which the resource may be known.
AUDIENCE		The target audience of the resource.
	SUBJECT.CATEGORY	Key words and phrases indicating the subject matter of the resource taken from the Government Category List.
CONTRIBUTOR		The person or organisation that has played a part in creating the resource but does not appear in the author element.
	COVERAGE.PLACE	This is place covered by the content of the resource.
FORMAT		This is the physical format of a resource.
	SUBJECT.KEYWORDS	Key words and phrases indicating the subject matter of the resource taken from the Departmental thesaurus.
LANGUAGE		The language of the data of the resource.
PRESERVATION		Data needed to support the perpetual preservation of the resource.
PUBLISHER		The organisation a user needs to contact to obtain permission to re-publish the information contained in a resource or to obtain copies in a different format.
	RELATION.ISBASEDON	The resource is an adaptation, translation, derivation or interpretation of another resource.
	RELATION.ISPARTOF	This is when the resource is a physical or logical part of another.
	RELATION.ISVERSIONOF	The resource is a version, edition or adaptation of the referenced resource.
	RIGHTS.COPYRIGHT	Indicates the User's rights to view, copy, redistribute, republish or otherwise make use of all parts of the resource.
TYPE		This relates to the genre or category of the resource.
	TYPE.DOCUMENT	This relates to kind of information contained within the publication.

tually going to the Public Record Office (PRO). The Public Record Office is the National Archive of England, Wales and the United Kingdom. It brings together and preserves the records of central government and the law courts, and makes them available to all who wish to consult them.

5.7 Date review

Library staff varied this using common sense as to when a reasonable person could or would expect the resource to be updated. UK constitutional requirements for the holding of elections, mean that general elections must be held within five years maximum from the date of the last election, and government web sites need to remove items from the previous administration and replace them with web pages describing the new administration. Even if the same political party wins the next election, the personnel of Government will undoubtedly change and this will need to be reflected in the Department's web content. The review date is therefore often set this to 4 years from date of last election. Again, further guidance would seem to be in order. However, this element does presuppose a content management policy.

5.8 Relation.Is Part of

This gives the URL for the test web site Home Page. This will facilitate resource discovery because it helps the search engine to identify and pick up relevant pages in many cases. Most search engines only skim the surface of a site. However, the really useful, more information rich resources are often located on a deeper level (four or five clicks away). This means they are often not picked up leading to poor results. By filling in this element, retrieval of relevant resources is improved. This is because the metadata links materials/pages thereby producing better search results.

5.9 Rights: Business Group Access Permission

This metatag was included to meet the requirements of the extranet project. This means that it determines if a webpage can be copied over from the intranet to the extranet. Given the presumption of openness which should apply in an open system of government, library staff suggested the default should be "Public Domain". The meaning was of this term was clarified in the Department's metadata framework and guidance produced. Later this was simplified to "Public".

6. The benefits of using metadata

The benefits of metadata fall into two categories: searching and other benefits.

6.1 Searching (14)

The main points to note are:

- Doing searches using metadata produces better search results. Much peripheral or irrelevant material eliminated and the results were noticeably more relevant.
- The quality of the abstracts is an improvement on machine generated descriptions which often do not make sense. This saves user's time by facilitating the quick evaluation of results.
- Metatagged items are ranked higher by search engines, so retrieval of relevant items is improved.
- There are fewer hits in the results lists. Non-relevant material is greatly reduced and precision is improved. There are no false drops.
- In an age of information overload, less is more. If metadata is not used, time creating valuable resources is wasted because they cannot be found or are lost in an overload of "hits".

6.2 Other benefits

Any system produced for one reason will tend to have knock on benefits for other, sometimes unintended, purposes. Metadata is no exception.

The main points to note are:

- It has highlighted the importance of web standards. For example, when doing test searches, library staff noticed that web bots sometimes came up. (Web bots are components of a Front Page Web page that simplify development tasks e.g. an organisational logo). This was because they had not been placed in a private folder where they could not be searched.
- It adds value to resources by adding information not always available in the resource itself e.g. author and date of publication. We take this information for granted with paper resources. However, the ease of web publishing has come with the disadvantage that it often lacks metadata. This is important because metadata adds to our knowledge of the provenance, currency and reliability of web based information resources.
- Content management is enhanced through the review and date tags. This information can be used to keep sites and information accurate and up to date e.g. it is possible to auto generate email to authors to update documents. This has the added advantage of making authors take responsibility for their documents once published. The DfES is currently working on this.
- The preservation tag (n.b. not part of Dublin Core) can be used for records management purposes and may be useful for electronic document and records management systems.
- Useful resources of long-term value can be identified. This avoids duplication of effort and the loss (and costly replacement) of information rich resources.

- It can be used as a tool to facilitate data/resource transfer. The access tags indicate which resources can or should be transferred (and which not).
- Finally, it increases awareness of the importance of information as an asset and its value.

7. Disadvantages

Despite the advantages gained from adding metadata, there is a price to pay in terms of some disadvantages. The main ones are:

- Metatagging does take time, irrespective of who does it.
- Metatagging on a wide scale will cost money. If specialist software is used, this could add to the costs.
- Implicit in our approach is the assumption that tagging will be widely devolved to authors rather than done by a small number of indexing professionals. This means that it may well be difficult to maintain the necessary standards required to gain the full benefits of applying metadata.

8. Outcomes

The main outcomes of the pilot were:

- A rights tag was created to successfully meet the requirements of the extranet project.
- There is a DfES metadata framework for web pages based on the e-GMS, which conforms to Dublin core.
- There is a short guide for web managers on how to metatag web pages.
- The intranet search engine now has much greater functionality having been configured to recognise and use metadata and use it in searching.
- It was decided to implement Metadata across the Department as part of the extranet project. The extranet was launched in April 2001 and metadata is gradually being added to key sites as part of a rolling programme.

Some changes have been made since the pilot e.g. the metadata will be input via a web authoring tool not directly via the HTML and the metadata scheme was amended and improved by the addition of suitable encoding schemes.

9. Next steps/challenges

Staff need to re-write the intranet search interface to allow metadata to be used by the search engine without users needing to know a special query language. Users also need the option to search explicitly on metadata as an advanced option, again without using a special query language or knowledge. This will require further resourcing and development work than was initially anticipated.

The Department will launch a portal later in 2002. The new search engine (Verity), the portal software (Plumtree) and the categorisation software (Semio) will need to be harmonised and configured to use metadata. This will be a large and complex task. The main problem here is that metadata cuts across many aspects of the portal and therefore presents a hurdle in terms of co-ordination.

Library staff will need to revise and update the DfES Metadata Standard in the light of the above. Here, the main problem is coping with a moving target.

More metadata frameworks/standards are needed, especially for word processed documents. This raises the question of whether to have one overarching standard for all formats or to have one standard for each format. The former could be unwieldy whilst the latter approach might lead to confusion on the part of users and authors.

The e-GMS will be updated later in 2002 to take into account the PRO's Records Management Metadata Standard and other requirements that have come to light. This may lead to the DFES Standard being edited. This raises the problem of making changes to standards in a controlled manner and then ensuring that the new standard is understood and implemented. This raises the issue of how to comply with both the e-GMS and the PRO's forthcoming Record Management Metadata Standard.

Methods are needed to make it easier to add metadata to resources, especially adding keyword terms from the Department's thesaurus. The main questions here are how to get staff to metatag and how to deal with the resource in terms of time, staffing and the cost that this involves. Getting users to add keywords from the thesaurus is a particular concern as our experience as information professionals shows that few users use this facility. Yet this is vital to gain the benefits of a controlled vocabulary.

We will need to think carefully about how to expand this pilot to the forthcoming Electronic Document Records Management System. At time of writing, there is no recognised pan-government standard which can be used and there are a limited number of systems which can apply metadata in a way which meets the Department's requirements.

Implementing metadata implies change management. This means that the DfES corporate knowledge and information needs to be more explicitly structured, cohesive and readily accessible and that individuals must assume a greater level of responsibility for the information resources they produce. This will be difficult because it will require a change in accepted practices.

10. Lessons learned and conclusions

The pilot showed that it was possible to implement metadata within the DfES environment. Establishing

good working relationships with IT colleagues outside the library team was very productive. During the pilot, the Library staff gained a greater understanding of the technical aspects of metadata and established effective working relationships with IT. Library staff continue to take metadata work forward from the pilot to implementation across the Department.

We also learned that there are different ways of adding metadata than directly by html. Using the properties option in the web authoring tool and using a template are the other two methods which we realised were also possible. On reflection, library staff concluded that using a template might well be a better way to add metadata. Templates are easy for users to fill in and can be built into the workflow process. However, we do not yet have a way of using a template for this purpose.

As already noted, adding metadata can be costly and time consuming. This is an important issue which we have yet to fully address. This is important as support and compliance are vital. Added to this is the problem of how much to metatag.

We learned that it is important to ensure that the search engine is configured to be compatible with the metadata profile. Otherwise the metatags will not work.

We also learned the importance of standards. If metadata is not consistently applied, the benefits can be lost. This also shows the importance of information policies. Here the main problem is getting high level support for such an approach.

Library staff also realised the limitations of html. The fact that a single character space out of place can make a metatag fail to work properly shows that html is not sufficiently syntactically strict. Using XML (which is syntactically strict) might have produced better results.

The pilot highlighted the need for new search interfaces which will use metadata without the need for special query language or knowledge by the searcher. We are currently working with IT colleagues on developing such an interface.

For library staff an important lesson was that there is a need for a group to co-ordinate and promote metadata in the Department. At time of writing, this is under consideration.

The project also raised the issue of how diverse individual applications of the e-GMS will become. Even with the e-GMS acting as a 'master list' and giving detailed guidance on implementation, variations may begin to appear between different applications. This question cannot be properly answered until further projects are undertaken. It will be interesting to see how other UK Government departments do this and the schemas they produce.

This leads to the question of metadata registries. Although research in this area is still in its infancy, it has been noted that metadata registries are thought to be an answer to the problem of sharing and standardising internet based information. (15)

As yet, there is no e-GMS metadata registry. However, following this concept, the UK Gov Talk website was established enable the Public Sector, Industry and other interested participants to work together to develop and agree policies and standards for e-government. This is achieved through the UK GovTalk consultation processes (<http://www.govtalk.gov.uk>). GovTalk will also hold a repository of XML schemas, which anyone can use to ease the implementation of new systems, this should help standardise application of metadata across the UK public sector.

Finally, it is expected that the DfES Metadata Standard will be published in due course on GovTalk as part of this ongoing process.

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