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Assessing the Business Case for Standards

An introduction for strategy planning and resourcing committees

Briefing paper

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Making a business case for interoperability and standards is a challenging task for those involved in the strategic planning of IT systems in educational institutions. This briefing with its accompanying references is intended to provide advice and supporting materials to help people to incorporate standards in their ICT-related business cases. It assumes some familiarity with the way IT systems are presently deployed and maintained in educational institutions, and will be of interest to Information Services managers and senior managers for strategy planning and resourcing.

Should Universities and Colleges Care About Standards?

It is almost too obvious to state but over the past 20 years, Information and Communications Technology (ICT) has become an indispensable part of the operation of all universities. We are utterly dependent on ICT systems for collecting and transferring information in order to survive, yet we often struggle either to exploit the information we have as intelligence to improve our educational offerings and be more effective, or to move ICT systems forward fast enough to adapt to new pushes and pulls in the education marketplace.

The cause of much of that latency in adapting to change, and the failure to exploit untapped information, has its root in the close connection of information to the software applications that store and process it. The information is locked into a 'black box'. This is no accident but a consequence of the realities of software development and the marketplace: it is easier for software developers to develop applications with their own information formats; buyers do not demand appropriate standards, they specify them too loosely or they do not know what they need; and the migration of data from, and integration with, 'black box' systems provides revenue for many suppliers.

There is also an ever-increasing need to exchange information with other organisations, be they peers, companies or government agencies. In the past, these extra-institutional information exchanges were often effectively imposed by funding and accountability arrangements, but the modern trend to a more diverse range of external relationships and partnership delivery models presupposes that the data is usable in more than one system in more than one organisation. In the educational world this is now exemplified in the way universities and colleges are building partnerships to develop foundation degrees, for example, or to create international campuses. If you care about participating in this world, information needs to be separable from applications, and in a common format which can be read and operated upon by many such applications.

The best means of separating information from applications are **interoperability standards**. By storing or exchanging information in a format that is the result of an open consensus process, and that can be freely implemented by anyone (ie it is an **open standard**), information can be extracted and exchanged from one application to another whenever you want it, ideally without expensive custom code or recourse to a supplier.

Seven key roles can be defined for information standards:

- **Reduction of re-keying:** cost savings and quality improvement are possible when standards are used alongside good information management principles
- **Reduced maintenance cost and disruption:** ad-hoc system integration is more likely to require a rework when new software releases occur and risks disruption to business continuity in the event of loss of the software developers who were responsible
- **Durability of data:** data formatted to a widely supported standard will remain usable for longer and even less-widely supported open standards will be easier and cheaper to migrate
- **Avoidance of supplier lock-in**
- **Easier development paths:** coupled with a strategic approach to technology change, incremental ICT service migration and development of new services is possible

> *Standards codify the boring, so that the exciting can happen on top of them*

- **A platform for collaboration:** standards are a neutral territory for multilateral business relationships, including institutional mergers. They can enable a more fluid set of relationships and reduce the risk of backing the wrong horse
- **Whole system economies:** shared services without standards are a nonsense

Standards: Liberation or Straightjacket?

In a world where 'agility' is a much-used word, are standards a relic of a manufacturing-industry age? There certainly is a view that standards limit freedom; that they close down innovation or impose unacceptable limitations. Incorrectly chosen standards certainly put you at risk of falling into these pitfalls but they do not arise from standards per se.

The liberation of information standards is in not having to make decisions about those parts of ICT systems where there is little or no scope to add value. Time and effort can be applied to those parts that matter most which can lead to either more value realised or less time or cost entailed. It is easy to see that an engineer who has to choose between a set of standard machine screw sizes and materials rather than determine diameter, head size, thread form and pitch ab initio can spend more time designing the machine. The same principle applies to ICT systems – almost no-one cares about how email is exchanged but they do care about the services built on the assumption of an infrastructure that uses standards. In other words, standards codify the boring, so that the exciting can happen on top of them. Using standards doesn't mean you have to only use standards: that would be a serious straightjacket.

How To Decide Where Standards are Relevant?

If standards are to be a liberation and not a straightjacket, you need to identify where there is consistency or repeatability in your institutional processes. The key idea here is that the ICT systems match your operating processes, and are flexible enough to change to support changes in those processes. This is the realm of 'Enterprise Architecture', and from this point of view, the starting point is an understanding of your operating model which can generate the knowledge of your standardised tasks, job roles, systems, infrastructure and data. This kind of analysis naturally supports decisions about standards; it helps avoid straightjackets and should be part of any business case involving standards.

In the context of external relations, a more persuasive case for standards could be made since an analysis can be conducted more cleanly at the level of business models and without the complexity of existing internal operations. If both provider and receiver of data benefit from the transaction, then standards are relevant. Sometimes the standards and their implementations already exist, for example to support the mutual benefit of an institution in exposing the contents of its institutional repository to Google Scholar. In other areas whilst there may be incomplete coverage, for example to support graduate recruitment, there may be sufficient potential to warrant investment. JISC and JISC CETIS can help in driving consensus and supporting innovation in this area.

Interoperability Without Open Standards: a Middle Way?

While open standards are the ideal way to separate information from applications, they are not the only way to achieve that goal, and are frequently either not available or not implemented by suppliers. It will often be the case that an intermediate technology is a pragmatic choice.

One such alternative is to use what has been termed 'glueware'; this is software that can take data in one format and translate it into another. This means that the differences in the way two or more applications handle information can be compensated for. The approach presupposes that the formats are reasonably similar, so that no important information gets lost in translation. Glueware is frequently used to ease the transition from proprietary formats to open standards.

Proprietary standards may not offer all of the safeguards that an open standard does, and they may be used as commercial weapons, but they can be of value for most of the 'seven key roles' described in the box above.

Another approach is to negotiate collectively with a vendor. A consortium of customers and potential buyers with a common need could provide the justification for commercial investment in either a proprietary or an open standard. One aim of the JISC Flexible Service Delivery programme is to support the formation of such consortia and their subsequent negotiation with suppliers.

Generic (Web) Standards or Education-specific Standards?

As is often remarked, the great thing about standards is that there are so many to choose from. There are many reasons for this, but one of the main ones is the difficulty of striking the right balance between generic versus domain-specific functionality (eg web-wide versus education-only), and the widest possible reach versus politically practicable consensus.

What are standards?

What do we mean by 'interoperability standards'?

Interoperability is the capacity of different ICT systems to communicate information. This is more than communicating numbers or text: it must be meaningful to the recipient. Interoperability standards may be created by formal bodies such as the British Standards Institute or the International Standards Organisation or by consortia. They may also be entirely proprietary.

Interoperability standards may be usefully divided into standards for data and standards for message protocols. The web has only been possible thanks to a data standard for the pages (HTML) and a protocol for getting them (HTTP). The incredible success of the web is one reason why we are encouraging you to consider standards.

Other classes of standard that are not considered in this briefing are: service-level, process or quality standards; platform standards (eg 'in our institution we use Viglen computers running MS Windows'); best-practice standards or codes of conduct.

What do we mean by 'open standards'?

The term open standard is commonly used loosely and care should be taken to determine how a given author is using it. Our usage adopts the meaning given in the European Interoperability Framework for Pan-European eGovernment Services; to be 'open', a standard should possess the following minimal characteristics:

- It is adopted and will be maintained by a not-for-profit organisation
- Ongoing development occurs on the basis of an open decision-making procedure available to all interested parties
- The standard has been published and the specification document is available for access, use, copy and distribution either freely or at a nominal charge
- The intellectual property is made irrevocably available on a royalty-free basis

Standards and models...

The complexity even of one sector of the education system makes the negotiation of a single set of technical standards, each with its own scope and purpose, a practical impossibility. Furthermore, often there will be no existing technical standard to meet your needs. In both cases, a foundation of clear and thoroughly developed models can be a significant mitigating factor; ICT systems built to support common models of process or information are likely to be much easier to adapt to work with other systems or to use standards, should these become available. Thus, even when there is not a convincing case for adoption of a technical standard, there will be a case for adopting designs that enshrine common models.

Standards everywhere?

Here are some indicative strategic concerns for the key functional areas of a higher education institution where standards, and interoperability generally, offer value:

- **Research and scholarship:** longevity of data and publications; the intrinsically extra-institutional nature of research
- **Teaching and learning:** avoid content and assessments becoming locked-in to a supplier's product; enable a best-of-breed approach to match your various needs; break down the monolithic Virtual Learning Environment and improve your ability to adapt to an ever-changing educational technology landscape
- **Administrative systems:** efficiency and data quality; agility in implementing new models of delivery, both internally and partnership delivery models

System 1	System 2	Possible benefit of join-up
Student record system (defines which courses a student is on)	Timetabling system (denotes where and when courses take place)	Provides knowledge of student location
Course catalogue (what courses are available)	Student record system	Helps to assess course viability and identify areas for curriculum development
Finance system (fee collection)	Library system	Helps identify which students have neither paid fees nor borrowed books, and are possibly about to drop out

Table 1. Some simple examples of the benefits of joining up systems

All other things being equal, the more generic, web-wide standards have proven to be preferable to education-specific ones. Part of the reason is that generic standards get implemented more widely, and are therefore more likely to be mature and implemented in a wider range of applications and so have more momentum. Both older and more recent web specifications for documents and security apply just as well in education as they do anywhere else; so it is advisable to use these as a foundation with domain-specific standards or bespoke technology built on top.

Education-specific standards can then be reserved for education-specific requirements such as information on course offerings or question and test assessment items.

above for some examples of these). However, even for those considerations that may be directly expressed in financial terms, the robust costing of the current situation and candidate scenarios is not an area where there is yet much experience in educational establishments.

The Strategic Technologies Group of the JISC Flexible Service Delivery programme is addressing exactly these questions. The JISC CETIS publication Technology Change in Higher and Further Education delves into some deeper technology strategy considerations and provides guidance. Also, JISC CETIS represents the sector on international standardisation bodies and works with the educational community to facilitate the use of standards-based e-learning.

What To Do Next?

It is worth noting that the business case for standards is often a mix of considerations that may be directly expressed in financial terms, and those that may be less tangible yet equally important enablers of future institutional success (see table

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Alternative formats of this briefing paper can be found at: www.jisc.ac.uk/publications

Further Information and Reading

JISC CETIS is the Centre for Educational Technology and Interoperability Standards. It supports JISC and the educational community and runs a website which provides journalism, news, events and resources in this area.
http://jisc.cetis.ac.uk

British Standards Institute White Paper: Standardization as a Business Investment. This paper takes a general view on standardisation, thus presenting a background to our briefing.
www.bsigroup.com/upload/Standards & Publications/Government/BSI_WhitePaper.pdf.

Enterprise Architecture as Strategy: Creating a Foundation for Business Execution, 2006, ISBN-10: 1591398398

Enterprise Architecture: an introduction. A JISC briefing paper.
www.jisc.ac.uk/publications/documents/bpenterprisearchitecturev1

European Interoperability Framework for Pan-European eGovernment Services v1.0, 2004
http://ec.europa.eu/idabc/servlets/Doc?id=19528

Strategic Technologies Group, JISC Flexible Services Delivery programme
https://fsdsupport.pbworks.com

Technology Change in Higher and Further Education. An online guide for those involved in strategic planning, deployment and implementation of IT systems in educational institutions.
http://soa.cetis.ac.uk

eXchanging Course Related Information (XCRI): a specification to support the exchange of course related information
www.xcri.org/download/overview.pdf

For more information go to **http://jisc.cetis.ac.uk**, email **cetis@bolton.ac.uk** or go to **www.jisc.ac.uk/elearningprogramme**

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