

CITY UNIVERSITY

An evaluation of SOAS Research Online, the Institutional Repository of the School
of Oriental and African Studies

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Abstract

This research project aimed generally to evaluate SOAS Research Online, the institutional repository of the School of Oriental and African Studies, to determine if it is a successful and trustworthy repository. A trustworthy digital repository is one that can demonstrate that it provides reliable long-term access to digital information resources to its user community, now and into the future.

The repository was assessed, using the Digital Repository Audit Method Based on Risk Assessment (DRAMBORA), and a risk register produced. The assessment highlighted several areas that must be improved before the repository can be deemed trustworthy – primarily the development of a comprehensive set of policies and procedures, a mechanism for their regular review, and active engagement with the user community to ensure that the repository meets their needs.

One of the key measures of success of a repository is the deposit of materials. SOAS Research Online contains both full text papers and metadata only (descriptive) records of research carried out by SOAS staff members. It was formally launched in 2008 and deposit of metadata only records has grown rapidly since the launch. However, deposit of full-text articles has been much slower. A questionnaire was circulated to SOAS academics in order to better understand the reasons for this. It was found that many academics found the repository too time consuming and difficult to use, and there is some confusion and concern over copyright infringement and publishers' policies.

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1. Introduction

SOAS Research Online is a free, publicly accessible repository of the research outputs of the School of Oriental and African Studies (SOAS). The repository contains both full text papers and metadata only (descriptive) records of research carried out by SOAS staff members. SOAS Research Online was set up in 2007, following a pilot as part of the SHERPA project, hosted at University College London (UCL). It was formally launched in 2008, and currently holds 6,401 records. Since its launch in 2008 deposits have grown rapidly.

In 2007 a research project was carried out which evaluated best practice for implementing and populating institutional repositories, with the objective of identifying the 'success factors' and identifying the lessons that could be learned and applied at SOAS (Kalmar, 2007). Alongside this, a survey was carried out to solicit the views of the user community (SOAS academic staff) on SOAS Online, in order to determine reasons for their use, or non-use of it (SOAS, 2007b). However, SOAS Research Online has not been evaluated since its launch.

This project will evaluate SOAS Research Online, and produce a risk register that can be used to mitigate risks within SOAS Research Online and compared to other institutions for benchmarking purposes. The evaluation will aim to determine whether SOAS has met the success factors identified by Kalmar (2007), whether its methods are robust and meet industry standards, and that intrinsic and extrinsic risks are being managed.

Any institutional repository needs appropriately designed policies and procedures to ensure that it can be relied on by the user community to store and disseminate this scholarship. In order to be able to demonstrate their reliability and integrity, repositories need to be able to evaluate their successfulness. As McHugh et al write (2008) 'as repositories of various shapes and sizes continue to appear across the digital preservation landscape, means are urgently required to facilitate their evaluation'.

As this remains a relatively immature field, evaluation methods are new and are still being developed. This project will explore the approaches used to evaluate repositories in general, and go on to use the Digital Repository Audit Method Based on Risk Assessment (DRAMBORA), (DCC 2007) to evaluate objectives, activities and risks within SOAS Research Online. This project will further investigate the needs of SOAS academics relating to the Institutional Repository in order to gain a better understanding of how best to encourage them to deposit research, and to assess whether advocacy carried out to date has been effective.

This chapter (chapter 1) gives a brief overview of the project and goes on to clarify the aims and objectives followed by the project's scope and definition. It then discusses the research context and explains the reasons for undertaking this project. Chapter 2 discusses the findings of a literature search conducted to support the project and gather sufficient background knowledge. The literature search discusses the literature on open access, institutional repositories and their assessment, and explores topical themes surrounding institutional repositories and the methods used to evaluate them. Chapter 3 provides an outline of the methods used to evaluate SOAS Research online. It moves on to describe the methods used to gather and analyse data obtained from current SOAS academics regarding SOAS Research Online. Chapter 4 presents the results of the research. Chapter 5 provides an overview of the recommendations for SOAS Research online and summarises the limitations of the study and recommendations for future research.

1.1 Aims and Objectives

The main aim of this project is to evaluate SOAS Research Online, in order to determine whether it is a trustworthy repository.

In order to gather the evidence to provide an evaluation of SOAS Research Online, a number of objectives have to be met. These are as follows:

- To carry out a comprehensive risk analysis of SOAS Research Online using the DRAMBORA toolkit, and produce a risk registry which can be used as a management tool to mitigate risks and for benchmarking purposes.
- To investigate the opinions of SOAS academics with regard to SOAS Research Online – in particular looking at what factors affect the deposit of full text articles and what they perceive to be the benefits offered by the repository.
- To identify, using the risk analysis and survey of academics above, whether the success factors identified by Kalmar (2007) have been successfully learnt and applied at SOAS.

1.2 Scope and Definition

This project will focus solely on SOAS Research online, the institutional repository of the School of Oriental and African Studies.

A commonly cited definition of an institutional repository is that it is a web-based database (repository) of scholarly material which is:

- institutionally defined (as opposed to a subject-based repository)
- cumulative and perpetual
- open and interoperable
- collects, stores and disseminates information as part of the process of scholarly information
- provides long-term preservation of digital materials (Ware, 2006)

One of the objectives of this project is to carry out a risk based analysis of SOAS Research online and producing a risk register which can be used to help mitigate risks within the repository. Risk management is an integral component of good management. By adopting risk management strategies, organisations have learned to prevent losses and improve business performance and quality of services. Risk

management involves applying a systematic method of establishing the context, identifying, analysing, evaluating, treating, and monitoring risks associated with any activity or process to enable organisations to minimise losses and maximise gains.

This project will use the DRAMBORA toolkit (DCC, 2007) to identify and suggest treatments for risks within SOAS Research online. This will be limited to evaluating whether SOAS Research online meets the following desirable characteristics of long-term digital repositories:

1. The repository commits to continuing maintenance of digital objects for identified community/communities.
2. Demonstrates organisational fitness (including financial, staffing structure, and processes) to fulfil its commitment.
3. Acquires and maintains requisite contractual and legal rights and fulfils responsibilities.
4. Has an effective and efficient policy framework.
5. Acquires and ingests digital objects based upon stated criteria that correspond to its commitments and capabilities.
6. Maintains/ ensures the integrity, authenticity and usability of digital objects it holds over time.
7. Creates and maintains requisite metadata about actions taken on digital objects it holds over time.
8. Fulfils requisite dissemination requirements.
9. Has a strategic programme for preservation planning and action.
10. Has technical infrastructure adequate to continuing maintenance and security of its digital objects. (CRL, 2007)

These characteristics are focused on as they are the industry standard used to demonstrate trustworthiness of repositories. As Patel and Cole (2007) point out, 'To owners of content looking to deposit their data for long-term survival, a repository's trustworthiness will be of paramount importance'. The resulting risk register and risk mitigation strategies will apply only to SOAS Research Online,

although the risk register could be used as a benchmarking tool to compare SOAS Research Online with other institutional repositories.

The definition of risk in this project is that put forward by the UK Treasury (2004):

'Risk is defined as this uncertainty of outcome, whether positive opportunity or negative threat, of actions and events.'

The questionnaire will focus only on the opinions of current SOAS academics. One of the success factors identified by Kalmar (2007) was the deposit of material (in particular full text material) in the repository. Currently, the majority of deposits in SOAS Research Online are bibliographic details or abstract only, rather than full text articles. The purpose of the questionnaire is to discover the reasons that SOAS academics are not depositing full text material, and what they perceive the benefits and drawbacks of using the repository to be. The needs of those who access SOAS Research Online has not been investigated in this project, and is a potential area for future research (see Chapter 5.3)

1.3 Research Context

The project stems from SOAS setting up an in-house institutional repository and launching it in 2008. The repository has not been evaluated since it was set up to determine whether it has met its objectives, or whether its policies and procedures are robust. SOAS has no way of being able to identify whether the repository is successful or not.

In 2006, SOAS set up a pilot repository as part of the JISC-funded SHERPA project which was hosted by UCL. In August 2008 the SHERPA-LEAP project ended and UCL were no longer able to host the repository. There was therefore a need to bring the repository in-house if it was to continue. An in house repository was set up in 2007 and formally launched in 2008.

The objectives of SOAS Research online are:

- To provide a central repository of SOAS' research which will act as a showcase for SOAS' research
- To provide an easy to use database of research publication information which staff members can use themselves
- To encourage deposit of full text research papers created by SOAS staff members
- To increase dissemination of SOAS' research to a worldwide audience (measurable by number of downloads of papers and citations)
- To streamline processes and save staff time administering multiple databases of research information
- To embed the repository within the workflow of the institution
- To establish institutional policies to govern the administration of the Repository, including IPR/ copyright policies
- To anticipate future research needs of the School.

The repository supports many of the objectives outlined in SOAS strategic plan 'SOAS 2016: a vision and strategy for the centennial' (SOAS, 2007). In particular, the School's purpose is to advance through teaching and research the knowledge and understanding of Africa, Asia and the Middle East – the Repository does this by disseminating SOAS research to a global audience. The repository is therefore important to SOAS' mission and strategy, and it is important that it can prove it is successful and trustworthy. One way to do this is by carrying out risk management procedures. This project will develop a risk register and risk mitigation strategies for this purpose.

In 2007 research was carried out which evaluated best practice for implementing and populating institutional repositories and was undertaken as part of a work placement at SOAS. (Kalmar, 2007) The aims of this research were twofold:

- To identify the 'success factors' by exploring political, cultural, and technological aspects affecting the setting up of an institutional repository and encouraging its use.
- To identify the lessons that can be learned and applied at SOAS to encourage the use of their institutional repository.

Success factors were identified as:

1. A place in the normal working practices of the university
2. Integration within the technical infrastructure
3. Regular pattern of self-archiving by academics. (Kalmar, 2007)

Lessons learned which could be applied at SOAS were identified as:

1. The importance of advocacy.
2. Project management for planning and implementation including identification of objectives, risks and benefits.
3. Clear policies on preservation and types of content accepted as deposits in the institutional repository. (Kalmar, 2007)

One of the objectives of this project is to follow up the findings of the previous research and investigate whether the lessons have indeed been learnt and applied.

When the repository was set up, it was adapted to hold not only full text academic research papers, but also descriptive bibliographic records of SOAS' research publications (metadata) so it could also be used as a publications database. At the time SOAS had a publications database that was difficult to use and no longer suitable for purpose, so the repository was designed so that it could replace the legacy publications database. As such, the repository has been embedded into the organisation at SOAS as all publications must be deposited (at least in bibliographic format) into the repository if they are to be counted in the RAE assessment. In addition, for researchers' publications to show on their staff pages, they must be deposited in the repository. This has meant quite a high success rate in getting academics to deposit research - there are currently over 6,000 items archived. An April 2004 survey of 45 institutional repositories found the average

number of documents to be only 1,250 per repository, with a median of 290 (Foster and Gibbons, 2005). However, at present, the majority of deposits to SOAS Research online are metadata (descriptive bibliographic records) only, rather than full text.

Prior to the setting up of an in-house repository at SOAS, a questionnaire of SOAS academics was carried out (SOAS, 2007b) to determine their needs with regard to an institutional repository. This found that 36% of respondents did not know SOAS had an online research repository, and only 35% of respondents had used the repository to deposit their research. The most commonly cited reasons for not using the repository were that it was too time consuming (45.5%) and the concern that publishers' policies do not allow deposit of work (36.4%). Since then, SOAS Research online has been formally launched, with a great deal of internal publicity, the repository has been embedded within the organisation as a publications database, and a number of training sessions (on, for example, copyright and the SHERPA ROMEO project) and presentations have been undertaken.

This project will carry out a follow-up survey to determine whether the advocacy and embedding of the repository within the organisation has changed the attitudes of SOAS academics toward depositing material in the repository, and why they are reluctant to deposit full-text materials.

2. Literature Review

2.1 Introduction

The literature review will serve two functions. Firstly, it will provide a discussion on the literature concerning open access and repositories, focussing on issues relating to institutional repositories in particular. Secondly, it will explore methods of evaluating institutional repositories for trustworthiness. As this is an emerging and evolving topic there is a limited range of literature and there is not much information available in textbooks. Therefore the literature review focused mainly on journal articles, conference proceedings, policy documents, reports on pilot projects and discussion lists.

2.2 Open Access

'A commitment to the value and quality of research carries with it a responsibility to extend the circulation of such work as far as possible and ideally to all who are interested in it and all who might profit by it'. (Willinsky, 2006).

An accepted understanding of what digital repositories actually are is a necessary precursor to any work that seeks to determine their effectiveness. Institutional repositories form part of the wider Open Access movement. Therefore, it is important to understand what Open Access means. It can be regarded as an extension of the open source movement for computer software, which allows developers free access to software to adapt it for their own use.

The Budapest Open Access Initiative (BOAI) conference in 2001 is regarded as the beginning of efforts to formalise and define the movement. As the BOAI website explains, the purpose of the conference was to accelerate progress in the effort to make research articles freely available on the internet. This conference resulted in the Budapest Open Archive Initiative (2002), which has been signed by research

and publishing organisations from around the world, and sets out the background, aims and definition of open access.

According to the BOAI then, open access is a movement born of continuing a tradition of scholarly communication and a belief in the benefits to society of sharing research output. This has combined with the technological capabilities represented by the Internet and the significant reduction in costs associated with computer storage, personal computers and broadband communications to enable easy online access to databases of research outputs. (Budapest Open Access Initiative 2002).

Open access is based on the premise that free access to academic research will benefit researchers, research institutions and the wider community. Brown, Eisen, & Varmus (2003) also point out that most research is publicly funded, and the results of the research should be available to the taxpayers who have funded it.

Willinsky (2006) describes open access as a fundamental human right, which not only serves the personal interest of academics, but is also of global benefit. The output of research is a public good which should be freely available.

Open Access is being promoted by governments worldwide. In the UK, Tony Blair emphasised the need to compete in the knowledge economy (Blair, 2006) and open access to research output is seen as a fundamental part of that. In 2004 the House of Commons Science and Technology Committee recommended that the UK should set up a network of interoperable institutional repositories both for access to scientific information and for the preservation of digital materials. Its recommendations went so far as to include the introduction of a mandate for deposit where the research is publicly funded:

‘This report recommends that all UK higher education institutions establish institutional repositories on which their published output can be stored and from which it can be read, free of charge, online. It also recommends that Research Councils and other Government funders mandate their funded researchers to

deposit a copy of all their articles in this way' (House of Commons Science and Technology Committee, 2004).

The UK Government did not officially follow up the recommendations of the committee, possibly due to lobbying by the academic publishing industry. The anti-open access movement believes that government and institutional involvement could hamper or censor academic freedom and independence. Frank, Reich and Ra'anani (2004) argue that 'a government-imposed solution could have the effect of hampering the ability of this complex and diverse industry to respond to the on-going revolution in information technology'.

Open access is widely supported amongst higher education institutions and research funding bodies. In 2006, a statement from the Joint Information Systems Committee (JISC), Research Councils UK (RCUK), Council for the Central Laboratory of the Research Councils (CCLRC) and the Research Libraries Network announced:

'Our four organizations believe that, as a matter of principle, the outputs of publicly funded research should be made available as widely and rapidly as possible. Hence we are taking steps to encourage free online access to research results. To stimulate these changes, we are encouraging researchers to place their papers in digital repositories'. (JISC, 2006b).

In 2008, Research Councils UK (RCUK) funded an independent study into open access, to identify the effects and impacts of open access on publishing models and institutional repositories, including the impact of open access on the quality and efficiency of scholarly outputs, specifically journal articles. RCUK state that:

'The Research Councils are committed to the guiding principles that publicly funded research must be made available to the public and remain accessible for future generations...[The Research Councils] will support increased open access, by building on their mandates on grant-holders to deposit research papers in suitable repositories within an agreed time period, and extending their support for

publishing in open access journals, including through the pay-to-publish model.' (RCUK, 2009).

The European Union also has a commitment to open access; in 2006 the European Commission C recommended 'guaranteed public access to publicly-funded research results shortly after publication' (European Commission, 2006).

Projects funded in the UK include the Joint Information Systems Repositories (JISC) and Preservation Programme, which encouraged institutions to establish their own repositories, and the establishment of a national repository called 'The Depot'. The Depot archives research content for those researchers who do not have access to an institutional repository, or directs them to more local services if they exist.

In Europe projects include SciX and DRIVER, while in the USA developments include the DSpace open access repository software developed at Massachusetts Institute of Technology (MIT).

In the developing world open access is considered of great economic benefit and projects are being funded in several countries in Asia and Africa (the openDOAR directory provides a list of institutional repositories by geographical region).

Open Access has two main strands:

1. Open Access journals
2. Repositories

Additionally, authors may publish material on their own websites. There are advantages and disadvantages associated with this. Advantages include low costs and low risk of copyright infringement due to the nature of the material published. The material tends to be either preprints (an article that has not been published) or an article that has been published in a non-open access journal (postprint) but the publisher has given explicit permission for it to be made available on the author's

website. The main disadvantage is that there is a risk of lack of longevity as the web pages are not maintained and links can be lost.

2.2.1 Open Access Journals

Open Access journals are freely available electronic scholarly journals. Harnad (2006b) has identified two routes to open access via open access journals. The 'gold' route describes journals that have either been established as freely available electronic journals (such as BioMed Central), or are traditional print journals which also have an open access electronic version. Harnad's 'green' route describes traditional print journals, such as those published by Elsevier, that allow authors to deposit their published articles in Open Access repositories. Open Access journals are not the subject of this research project.

2.2.2 Repositories

So, what is meant by a digital repository? A frequently cited definition of a digital repository was proposed by the Research Libraries Group (RLG) in 2002:

'An organisation that has responsibility for the long-term maintenance of digital resources, as well as for making them available to communities agreed on by the depositor and the repository'. (RLG/OCLC Taskforce, 2002)

The Digital Curation Centre (DCC) has identified the key services that repositories might provide:

- Enhanced access to resources
- New modes of publication and peer review
- Corporate information management (records and content management systems)
- Data sharing (re-use of research data, learning objects etc.)
- Preservation of digital resources (for the long term) (DCC/DPE 2007).

An increasing range of digital archives are referred to as 'repositories'. Not all repositories are created for the same purpose or deliver similar services. A study by Heery and Anderson (2005) proposed that a digital repository be defined by the following characteristics:

- 'content is deposited in a repository, whether by the content creator, owner or third party;
- the repository architecture manages content as well as metadata;
- the repository offers a minimum set of basic services, e.g. put, get, search, access control;
- The repository must be sustainable and trusted, well-supported and well-managed.' (p2)

Open Access repositories can be either subject-specific or institutional. Subject-specific repositories collect literature relating to one specific subject area, and were first established in 1991, with the creation of arXiv, a repository that provides access to research in physics, mathematics, computer science, quantitative biology, quantitative finance and statistics. They tend to be small-scale and run by volunteers, with associated low costs. Institutional repositories are the subject of this research project and will be discussed in detail below (2.3).

2.3 Institutional Repositories

Much of the literature relating to institutional repositories is within the broader open access arena, and it can be difficult to identify elements which relate specifically to institutional repositories. What, then, do we mean by institutional repository?

'In my view, a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of the digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of

these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution' (Lynch, 2003)

The definition provided by Lynch is an oft-cited definition of an institutional repository. Kalmar proposes that institutional repositories are 'electronic databases, publicly and freely accessible via the internet, where organisations can hold full text and bibliographic records of the institution's research papers and other research output'. (Kalmar, 2007)

Differing terminology is often used in the literature. In the UK the usual term is 'institutional repository'. However, some literature refers to 'e-print archives' or 'e-print repositories' or 'open access archives'. They all essentially amount to the same thing. Chan, Kirsop and Arunachalam offer a definition of an open access archive:

'Open Access Archives (OAAs) are electronic repositories that may include already published articles (post-prints), pre-published articles (pre-prints), theses, manuals, teaching materials or other documents that the authors or their institutions wish to make publicly available without financial or other access barriers'.

There are repositories providing open access to educational resources – for example, the JISC Jorum project provides access to free learning and teaching resources, created by teaching staff from UK Further and Higher Education Institutions. Storage of a range of content is recognition of the role of the institutional repository in preservation of digital information assets which are otherwise vulnerable to loss. However, due to institutional and funding mandates, in practice the typical content of an institutional repository is the research articles published by the researchers in that institution. This can be in full text or just the bibliographical details (metadata). Theses and primary research data may also be deposited.

There is general agreement in the literature on the purpose of establishing an institutional repository. This is summarised by Jones, Andrew & MacColl (2006):

'...more efficient use of the institution's resources, allows the digital content to be preserved over time, provides a comprehensive view of the institutional product, supports high-quality searching and permits interoperability with similar repositories across the Web, so contributing to a global service'.

Commonly cited benefits of using an institutional repository are:

- to increase the visibility and citation impact of the institution's scholarship
- to provide unified access to the institution's scholarship
- to provide open access to the institution's scholarship
- to preserve the institution's scholarship (Bailey, 2008)

Long-term preservation is regarded as one important benefit of institutional repositories. As Bjork notes 'universities and their libraries are in a better position than individual academics to guarantee that the material is available even after decades and that the collection is systematically maintained, for instance, to take account of changing file formats and media'. (Bjork, 2005)

Long-term sustainability of digital data requires a mandate to undertake curation and preservation duties in maintaining the data so it is usable and understandable for its useful lifetime. However, as Patel and Coles (2007) argue 'such a commitment is likely to be influenced by a whole host of factors including social, political, organizational, financial and technical'. One way of assessing the risks posed by these factors is to use the tools provided by the rapidly developing area of repository audit and certification. This is discussed in Section 2.2 below.

The literature focuses primarily on deposit of content as an indicator of success or institutional repositories. However, one of the key problems identified in the literature is that of populating the archives once they have been established (Rowland et al, 2004). Jones and McCall (2006) write, 'acquiring the content is slow and laborious work' (p38), while Chan, Kirsop and Arunchalam (2005) note that 'a further concern relates to the slow pace with which institutional archives are filled.' (p6)

Several reasons have been identified for the failure of researchers to archive their material. Geroni (2004) attributes the slow progress to a lack of consensus on the purpose and content of institutional repositories and the need for clear policies and standards. Nixon and Greig (2005b) found that academics do not like to deposit the content in institutional repositories themselves (self-archiving), and prefer it to be done for them by a central body (mediated deposit). This failure to self-archive is widely identified as the reason for the slow progress of institutional repositories. Chan, Kirsop and Arunchalam (2005) argued that 'the primary reason for [the slow pace of deposit] appears to be a lack of awareness on the part of authors and a lack of clear institutional policy'. One clear barrier to deposit is the fear of transgressing copyright laws. Proudman (2007b) discovered that authors in humanities and management in particular have fears of infringing copyright laws and that this affects their willingness to deposit in institutional repositories.

Approaches to confronting these barriers have been put forward. Advocacy, or marketing of the repository is widely supported. Bjork (2005) and Jones, Andrew and MacColl (2006) compare the process of acquiring 'buy-in' to an institutional repository in terms of 'diffusion innovation' similar to the increased use of mobile phones or the spread of the environmental movement. The more 'units' are added globally, the more the benefit of taking part can be perceived and more people join the club. Offering mediated deposit is an obvious solution to the failure to self-archive. However, Proudman (2007b) found that while a mediated service appears to be most successful in generating bibliographic records of articles, self-archive is more successful in generating full-text deposit.

With regards to copyright infringement, in the UK the SHERPA ROMEO website can be used to find a summary of permissions that are normally given as part of each publisher's copyright transfer agreement.

2.4 Evaluation of Repositories

'A critical component of digital archiving infrastructure is the existence of a sufficient number of trusted organisations capable of storing, migrating and providing access to digital collections' (Task Force on Archiving of Digital Information (1996) in the Introduction to the TRAC checklist (R:LG/NARA 2007)).

As Ross and McHugh (2005) state, digital repositories must engender, establish, and maintain trusted status. Further, the Task Force on Archiving of Digital Information argued that 'a process of certification for digital archives is needed to create an overall climate of trust about the prospects of preserving digital information'. (RLG/NARA, 2007)

2.4.1 Trustworthy Repositories

So what is a trusted repository? This is a subject of a great deal of debate. In 2002 RLG and OCLC published 'Trusted Digital Repositories: Attributes and Responsibilities' which provided a framework of attributes and responsibilities for trusted, reliable digital repositories, and reiterated the need for a certification process. The definition of a trusted digital repository within this framework states that it must start with 'a mission to provide reliable, long-term access to managed digital resources to its designated community, now and into the future' (OCLC/RLG 2002). They found that trust relationships are complex and dependent on many different aspects of a repository's processes. Further, different stakeholders are interested in different aspects of trustworthiness. For example, users are concerned about the integrity and authenticity of information, funding bodies are interested in usage statistics, and depositors are worried about intellectual property rights. The nestor working group agree that a trusted long-term repository is 'a complex and interrelated system'. (NESTOR 2006).

RLG/NARA assert that it is more than just the digital preservation system that is important:

'In determining trustworthiness, one must look at the entire system in which the digital information is managed, including the organization running the repository: its governance; organizational structure and staffing; policies and procedures; financial fitness and sustainability; the contracts, licenses, and liabilities under which it must operate; and trusted inheritors of data, as applicable.' (RLG/NARA 2007)

Indeed, as Patel and Coles (2007) argue 'the trustworthiness of a content provider depends on several things, including the expertise of the staff, the workflows and the quality control measures that are in place'.

Rosenthal et al (2005) point out that a trusted digital repository will understand, monitor and manage risks within its systems. These include media failure, hardware failure, software failure, communication errors, failure of network services, media and hardware obsolescence, software obsolescence, operator error, natural disaster, external attack, internal attack, economic failure, and organisational failure.

Related to the question of trustworthiness is the question of digital repository standards and what repositories should be evaluated against. The Reference Model for an Open Archival Information System (OAIS) standard was designed to create a consensus on what is required for an archive to provide reliable long-term preservation of digital information. It defines the archive as 'an organisation that intends to preserve information for access and use by a designated community' (CCSDS, 2002). The Reference model was adopted as an ISO standard (ISO 14721:2003) in 2003.

The standard influences preservation metadata, architectures and systems design of repositories. It establishes a framework of terms and concepts for use in the preservation of information and recommends the setting up of certification processes. This has been built upon by several project teams working on the evaluation of repositories, in particular the work on trusted repositories by the RLG/OCLC working group (2002) and NESTOR (2006).

In 2007, the Center for Research Libraries held a meeting of project teams working on developing mechanisms and standards for the audit and certification of repositories. This meeting resulted in the development of a standard set of criteria to which all digital repositories should adhere:

1. Commits to continuing maintenance of digital objects for its identified community (ies).
2. Demonstrates organisational fitness (including financial, staffing, structure, processes) to fulfil its commitment.
3. Acquires and maintains requisite contractual and legal rights and fulfils responsibilities.
4. Has effective and efficient policy framework.
5. Acquires and ingests digital objects based upon stated criteria that correspond to its commitments and capabilities.
6. Maintains/ ensures the integrity, authenticity and usability of digital objects it holds over time.
7. Creates and maintains requisite metadata about actions taken on digital objects during preservation as well as about the relevant production, access support, and usage process contexts before preservation.
8. Fulfils requisite dissemination requirements.
9. Has strategic programme for preservation planning and action.
10. Has technical infrastructure adequate for continuing maintenance and security of digital objects. (CRL, 2007b)

Proponents of repository audit and certification believe that the development of metrics to measure the trustworthiness of a repository will create more standardised and reliable archives that better meet the long-term needs of digital information users.

2.4.2 Current Evaluation Methods

Standards to ensure the quality, authenticity, reliability and integrity of digital information include:

- ISO 15489 records management standard
- ISO 17799 IT security standard
- ISO 9001 quality management standard.

However, as Patel and Coles (2007) point out, the long-term preservation requirements of digital information in a repository is dependent not only on the authenticity and integrity of its records and the reliability of the repository's system security, but also the repository organisation's financial, physical, political and cultural viability. For this reason, as McHugh et al (2008) note, '[there is an] ongoing international effort to conceive criteria, means and methodologies for audit and certification of trustworthy digital repositories'.

Currently, the three principle methods are the Trustworthy Repositories Audit and Certification Checklist (TRAC), the Network of Expertise in Long-Term Storage of Digital Resources (NESTOR) and the Digital Repository Audit Method Based on Risk Assessment (DRAMBORA).

TRAC was developed by the US National Archives and Records Administration (NARA) and the Research Libraries Group (RLG) in 2007. TRAC takes the OAIS as its foundation and splits the audit criteria into three categories:

- Organisational infrastructure
- Digital object management
- Technologies, technical infrastructure and security

TRAC describes approximately 90 characteristics of a trustworthy repository and a trustworthy repository must provide documentary evidence be provided for each.

NESTOR was developed in Germany in 2006. The NESTOR catalogue comprises 14 criteria, grouped into three categories:

- Organisational framework
- Object management
- Infrastructure and security.

A trustworthy repository must provide measurability, documentation and transparency in regard to the identified criteria.

DRAMBORA was developed by the Digital Curation Centre (DCC) and Digital Preservation Europe (DPE) in 2007. It offers a toolkit to enable self-audit and is 'a process that encourages repositories to consider and document their mission, objectives, constraints and activities, before planning to address the challenges that threaten overall success (McHugh et al, 2008). A trustworthy repository is determined by the assessment and management of risks, and evidence must be documented. The DRAMBORA toolkit approach is explored more in Chapter 3 – Methodology.

There are several criticisms to be made of the checklist method of evaluating the trustworthiness of repositories. The fundamental problem of using a checklist is associated with the generalisation of optimal repository characteristics. As McHugh et al (2008) note, 'to do so equates to an assumption that all repositories share a singularity of purpose, and that their priorities are uniform, irrespective of where or why they exist'. In addition, they explain that the checklist criteria are expressed in necessarily vague terms, and it is therefore difficult to understand how success may be measured. Steinhart et al (2009) state that 'we observed...that some organizations directed their efforts towards compiling evidence that reflected the content of the checklist itself.' As they explain, this makes sense if the primary goal is to satisfy auditors. However, if the goal is to satisfy the stakeholders of the repository, aiming at certification alone is not sufficient. Finally, Kaczmarek et al (2006) point out that the checklist is not easily adapted to enable repositories to compare themselves with other institutions as a benchmarking exercise. This is something that can be achieved with the DRAMBORA method by comparing risk impact scores.

However, the risk assessment method is not without criticism either. The main issue is that the audit is only as good as the auditor's horizons. McHugh et al (2008) note that 'self-assessment alone can only indicate problems within the bounds of what repositories believe they should be doing. Problems arise when organisations are oblivious to their shortcomings, or unaware of the potential benefits available to them and which they might usefully seize'.

3. Methodology

3.1 Introduction

The first section of the methodology chapter looks at the DRAMBORA toolkit used to audit SOAS Research Online. The second looks at the design and delivery of a questionnaire used to gather data from current SOAS academics. These chosen methodologies are examined and any limitations or problems arising are discussed in section 3.

3.2 Audit

The first objective of this project was to carry out a risk based audit of SOAS Research online using the DRAMBORA toolkit (see 1.1 above). This is a tool that facilitates self-audit of repositories, with the aim of managing inherent risks:

‘The DRAMBORA self-audit tool is designed to encourage auditors to identify and classify the risks posed in each stage of the repository’s activities, to assess their probability and potential impact, and to consider how well they are being dealt with. Evidence is afforded considerable significance, with repositories expected not only to identify risks and manage them appropriately, but also to demonstrate their ability to do so’. (DPP/DPE 2007)

3.2.1 Why DRAMBORA?

There are several tools available that can be used to audit repositories. Why, then did this project decide to use the DRAMBORA toolkit?

Central to establishing repositories’ trustworthiness are issues of:

- Criteria for assessment
- Evidence
- Risk management.

The DRAMBORA toolkit is designed with all three in mind. As Ross and McHugh (2007) state 'any mechanisms to facilitate the assessment of trustworthiness in digital information preservation repositories must be supported by sound and transparent evidence demands'. Alternative methods, notably TRAC and NESTOR, have concentrated on the establishment of check-lists to document the key criteria that ought to be identifiable within trustworthy repositories. However, doubts have been raised about these methods.

1. They are too static a 'one-size fits all' approach.
2. They are too fixed on the OAIS reference model with little room for flexibility.
3. There is too little emphasis on evidence in the auditing process.
4. There is insufficient detail into the mechanics of the audit
5. They are a 'one-off' evaluation, rather than a tool to help manage the repository better continuously.

Both TRAC and nestor are examples of a top-down assessment methodology. Both aim to define an objective set of the policies and procedures that should exist in any repository environment. As McHugh et al (2008) point out, 'this implicitly disregards the great variety that is visible across contemporary digital repository platforms'. There is a great deal of diversity in repositories in (amongst other things) terms of scale, content types, technology and funding. This means that generally defined criteria can be either too vague and lack meaning, or too specific and therefore irrelevant to a large part of their target audience.

DRAMBORA has been designed to combat these problems. It uses a bottom-up, rather than top-down methodology, enabling repositories to relate their benchmarks of success to their own aims and objectives. DRAMBORA is based upon established risk management principles and facilitates the auditor in:

- 'defining the mandate and scope of functions of the repository
- identifying the activities and assets of the repository
- identifying the risks and vulnerabilities associated with the mandate, activities and assets

- assessing and calculating the risks
- defining risk management measures
- Reporting on the self-audit'. (Ross et al 2007)

DRAMBORA attempts to answer questions such as:

- 'Is a repository capable of identifying and prioritising the risks that may impede its activities?
- Is a repository managing the risks to mitigate the likelihood of their occurrences
- Is a repository establishing effective contingencies to alleviate the effects of the risks that may occur?' (Patel and Coles, 2007)

The benefits of the DRAMBORA method are that it is flexible, and can be adapted to repositories with varied missions, mandates and activities. It allows repositories to analyse and respond to their own strengths and weaknesses. In addition, it is not just a one-off snapshot of the state of the repository at the time of the audit, but provides a tool for continuing management of risks within the repository. Finally, although it is not specifically used as a benchmarking tool, it is possible to compare risk impact scores repositories of a similar scale and scope, to see where the repository may be improved.

There are of course, drawbacks to the bottom-up approach. Firstly, DRAMBORA is a subjective process. The risk is that repositories may not identify threats to their success, or find it difficult to accurately assess the potential impact of a risk they have not experienced. DRAMBORA has attempted to overcome this problem by providing a list of approximately 90 example risks that can be modified by repositories for inclusion in their own risk analysis. However, this obviously suffers from the same drawbacks as the checklist approach described above. Secondly, as McHugh et al (2008) discuss although it is possible to compare risk impact scores with repositories of a similar impact and scope, comparability and reproducibility of results is lessened without objective consensus on the definition of success.

In the initial proposal for this project, the aim was to evaluate SOAS Research online using both a checklist and the DRAMBORA toolkit (Appendix I 0 7.1). However, after further consideration it was decided to use the DRAMBORA toolkit only. This was for several reasons:

1. It was only possible to carry out one method of evaluation during the time available.
2. It was felt that the TRAC and nestor checklists were more appropriate for use when designing and setting up a new repository, rather than evaluating a repository that is already well established.
3. It was felt that the benefits of the flexibility of the DRAMBORA toolkit outweighed the drawbacks related to its objectivity.
4. The DRAMBORA toolkit used the TRAC and nestor checklists when designing the audit toolkit, therefore using both methods could mean duplication of work, which did not seem a worthwhile use of the time available.
5. It was considered that the DRAMBORA approach would be more useful as it provides an ongoing management tool (the risk analysis) as a result of the process.

3.2.2 Risk management

'In DRAMBORA, risk is used as a convenient means for identifying repository success – those repositories most capable of demonstrating the adequacy of their risk management are those that can more reasonably claim a trustworthy status.'
McHugh et al, 2008.

As mentioned in Section 3.2.1, the DRAMBORA methodology is based upon risk assessment. In order to understand DRAMBORA, it is necessary to explore what risk and risk management mean.

As DCC/DPE (2007) note 'risk management is an integral component of good management and decision-making at all levels'. All organisations continuously

manage risk. As the UK Treasury (2004) state: 'Good risk management allows stakeholders to have increased confidence in the organisation's corporate governance, accountability and ability to deliver. They go on to explain that risk is considered as the exposure to the consequences of uncertainty, or potential derivations from what is planned. In risk management, the risk is assessed in terms of the likelihood of it happening, and the impact it would have if it did occur. Risk management, then, includes four main stages:

- 'Identifying the context where risks have to be managed.
- Identifying risks.
- Assessing and evaluating risks.
- Defining measures to address and manage risks.' (DCC/DPE 2007)

Digital preservation is commonly described as a risk management exercise. As McHugh et al write (2008):

'Preservation is fundamentally a risk management process. Numerous uncertainties or threats relating to any number of social, semantic and technological factors are capable of inhibiting long-term access to digital materials. Successful repositories are those that plan for these uncertainties, and convert them to risks that can be managed to mitigate the likelihood of problems occurring and limit their potential impact.'

McHugh et al (2008) explain that, in DRAMBORA, repository risk is assessed as an all-encompassing issue:

'In common with the ten principles to which a digital repository should adhere (see section 2.4.1), consideration is made of not just the service-oriented procedure and policies, but also of organisational, legal, resource-related and technological risks.'

3.2.3 The audit process

For this project, DRAMBORA interactive was used (<http://www.repositoryaudit.eu/>), which is an online version of the toolkit. It takes the auditor through the six stages of the audit process:

1. Identification of objectives.

- Specify mandate of the repository
- List goals and objectives of the repository

2. Identification of policy and regulatory framework.

- List repository's strategic planning documents
- List the legal, regulatory, and contractual frameworks or agreements to which the repository is subject
- List the voluntary codes to which the repository has agreed to adhere
- List any other documents and principles with which your repository complies

3. Identification of activities and assets.

- Identify the repository's activities, assets and their owners

4. Identifying risks related to activities and assets.

- Identify risks associated with activities and assets of the repository

5. Assessing risks.

- Assess the identified risks

6. Managing risks.

- Manage the risks identified with mitigating strategies

The outcome of the audit is a comprehensive catalogue of pertinent risks, including the probability and potential impact of each risk, together with suggested mitigating strategies.

3.3 Questionnaire

One of the objectives of this research project is to determine whether Kalmar's (2007) success factors and lessons to be learned have been applied at SOAS.

Success factors were identified as:

4. A place in the normal working practices of the university
5. Integration within the technical infrastructure
6. Regular pattern of self-archiving by academics. (Kalmar, 2007)

Lessons learned which could be applied at SOAS were identified as:

4. The importance of advocacy.
5. Project management for planning and implementation including identification of objectives, risks and benefits.
6. Clear policies on preservation and types of content accepted as deposits in the institutional repository. (Kalmar, 2007)

In addition, SOAS were interested in finding out why academics are tending to deposit abstracts and bibliographic only, rather than full text articles.

A questionnaire was developed to help answer some of these questions (success factors 1 and 3, lesson 1 and the matter of lack of full-text deposit). It was circulated electronically to all SOAS academics. This was the most convenient way of collecting the data, and it was hoped could ensure a relatively high response rate.

3.3.1 Design of questionnaire

A user needs analysis relating to SOAS repository was undertaken in 2007. Most of the questions were taken from this questionnaire as it had already been used successfully to collect effective data. It would also be useful to compare results from the two surveys and see how the attitudes of SOAS academics have changed since the repository has been formally launched and advocacy efforts undertaken.

The main change was that the survey was adapted to include questions on full-text deposit in particular. In addition, surveys from projects looking at participation of authors and factors affecting contribution were researched to gather ideas for appropriate questions to ask SOAS academics. The experiences of the researchers were taken into account when designing the SOAS survey. It was found that the primary reasons for non-contribution (such as worries about infringement of intellectual property rights and amount of time taken to deposit articles) had already been included in the 2007 SOAS survey. The 2009 survey undertaken for this project is at Appendix IV – 7.4).

The questionnaire was designed to have a logical flow and each question was meant to follow on from the previous one. This helps to ensure that the academics understood clearly what was being asked of them. In addition, the use of jargon was avoided and simple, clear language used. In addition, an introductory text was provided when the questionnaire was circulated explaining the purpose of the questionnaire. It was hoped that all this would reduce the potential for misunderstandings.

The questionnaire was deliberately designed to be short, simple and quick to complete, in order to encourage completion. There is a risk of survey fatigue amongst SOAS academics, particularly as during the same period as the research for this project was undertaken, SOAS library was surveying all academics regarding their collection development policy, and had also circulated the annual electronic resources survey.

A mixture of quantitative and qualitative questions was used to collect both statistical data and more detailed data on academics' views and opinions on the institutional repositories. Both open-ended and closed questions were designed. Closed questions (for example multiple choice) provided a complete set of responses to choose from, but the academics also had the option to provide a different answer or add further detail in a text box. Open-ended questions enabled academics to give their views on the topic in their own words.

The first set of questions (questions 1 – 4) were designed to find out whether the academics were aware of SOAS Research Online, whether they had used it to deposit research, and if not why not. The answers should go some way to discovering the extent of the success of advocacy and marketing for the repository, particularly when compared with the 2007 survey. Academics were also given an opportunity to provide comments on how they find using SOAS Research Online and any enhancements they would like to see.

The fifth question provided a set of commonly cited benefits of institutional repositories and asked how important SOAS academics felt these benefits were. Responses available ranged from very important to not important. This question was a way to provide useful information that could be used in future efforts to encourage contribution, and as a way of ascertaining the culture of SOAS in relation to open access.

Questions 6 and 7 provide a set of reasons for academics to choose from relating to concerns to submitting articles to SOAS Research online and what would encourage submission to SOAS Research online respectively. Academics could select more than one response and add their own response if they wished. These questions were designed to answer the question of why SOAS academics are reluctant to submit full text articles to the repository.

Finally, academics were asked to provide contact details if they wanted further information on SOAS Research Online, and to specify which department they are a member of. These are not discussed here for confidentiality reasons. However, this information is valuable to SOAS in order that it can direct marketing efforts to faculties or departments that may be reluctant to deposit articles due to cultural barriers.

The final questionnaire was circulated on the SOAS academic staff mailing list, together with an introductory email explaining the purpose of the questionnaire and encouraging them to fill it in, emphasising that their participation would help the development of the repository. A reminder email was sent at a later date

encouraging academics to complete it and warning them that this was their last chance to do so.

3.4 Limitations and problems

One obvious limitation is that the audit focused solely on the use of the DRAMBORA toolkit. The limitations of DRAMBORA are discussed above (Section 3.2.1). In this project the subjectivity was a particular risk as the auditor had no previous experience of institutional repositories or digital information management, and therefore identification of a complete set of potential risks could prove difficult. This was mitigated by the fact that the auditor has several years' experience of internal and external audit, examining organisations' systems and processes, identifying risks and mitigating controls. In addition, a thorough review of the literature available on institutional repositories and assessment of institutional repositories was undertaken prior to the audit.

However, for this project, an assessment of SOAS Research Online using a combination of both the TRAC checklist and DRAMBORA would have been ideal. It would also have provided an opportunity for a direct comparison of the results of the two methods. This is an area identified for further research (see section 5.3 below).

Further limitations to the audit include the fact that SOAS Library and Information Services Directorate, where the repository is hosted, is currently undergoing a restructure. This is currently in the consultation stage, and there are a lot of uncertainties regarding the future organisation and staffing of the directorate. For this reason, staff were suspicious of the motives behind an 'audit' and reluctant to be open about weaknesses in policies and procedures.

It also proved quite difficult to gain access to all the documentation needed to complete the audit. In the main the audit had to rely on documents publicly available on the SOAS website, or the SOAS intranet. It was particularly difficult to

obtain documents relating to IT procedures (although policies are available on the internet). There could be several reasons for this:

- A fear of the motivations behind the audit as discussed above
- A general lack of openness and transparency at SOAS
- The auditor's perceived lack of authority due to their role at SOAS
- Lack of time due to the audit being carried out at a busy time in the academic year (autumn term).

Ultimately, whatever the reasons, it does mean that the risk analysis may not be complete, or could contain some risks that are irrelevant to SOAS.

Further to this, the research is quite narrow as it concentrated on SOAS Research Online only. It would have been useful to compare the results of the audit to those of similar scope and scale in order to contextualise the results.

There were also a number of issues with the questionnaire. Firstly, there was quite a low response rate (62 academics responded out of a total of 345). One factor could be that it was distributed during the busiest time of the year for academics – the autumn term. Only 34 academics had completed the questionnaire before the original deadline. The deadline for completing it was extended over the Xmas period and this garnered a further 28 responses. Another contributing factor could be that no incentive was given for completing the questionnaire. A prize (such as book vouchers) could have been offered to attract more interest. In addition, the questionnaire was only distributed by email mailing list. It could have got lost amongst the plethora of emails that are received every day, and binned without being read. Distributing paper copies to departments might have meant academics were more likely to see it and fill it in. Further to this, publicising the questionnaire by attending departmental meetings could have increased uptake. Finally, SOAS academic staff could be suffering from survey fatigue – the library is currently updating its collection development policy, so is surveying all academics relating to their academic interests, there is an annual electronic resources survey which

came out in the same month, and the School is surveying staff due to the ongoing reorganisation of the School.

There is also a risk that those who did respond are those who hold strong opinions and the views of the 'average' academic might have been excluded. This can lead to misleading results and inaccurate data.

A further limitation to this research, is that it only sought the views of SOAS academics on the repository. Two useful exercises would have been to identify the users of SOAS Research online through link analysis, and to survey the users of the information in the repository to find out their views. This is an area for further research (See section 5.3 below).

Lastly, follow-up interviews could have been organised with interested academics. These would have produced more detailed and accurate qualitative data. However, time constraints excluded this option.

Despite these limitations and problems it is felt that the results of the research have provided useful information for the future development of the repository and the risk register in particular will prove a useful management tool which can be carried forward. It has also highlighted the need for further research in this area.

4. Results

4.1 Audit

SOAS Research Online was audited using the DRAMBORA Interactive Toolkit discussed in Section 3.2 above. A number of problems were encountered using DRAMBORA Interactive. Firstly, the website was regularly unavailable, which meant that the audit stage of this project overran. Secondly, the interactive toolkit does not allow the auditor to go back and edit entries once they have been filled in. This is frustrating, particularly for the novice auditor, as inevitably there are several changes of opinion as the process is followed. Finally, the reporting function is not very satisfactory. Fields that have been completed online show as blanks in the exported report, and the tables are out of alignment. This meant that the risk register had to be completed manually which was very time consuming.

Despite these problems, using the DRAMBORA toolkit enabled relevant risks and risk management strategies to be identified, and these are discussed below in sections 4.1.1 – 4.1.6. A comprehensive risk analysis was completed and a risk register produced (see Appendix III at 7.3 below).

In the DRAMBORA toolkit the core functions of a digital repository are divided into 'functional classes' which encompass activities which are related. These are: organisational management, technical infrastructure and security, acquisition and ingest, preservation and storage, metadata management, and access and dissemination. The findings related to each of these functional classes are described below.

4.1.1 Organisation Management

The functional class organisation management relates to those functions that can be found in any organisation such as management, staffing and financial management. The audit identified twenty three risks that apply to organisation management within SOAS Research Online (risks R01-R23 in the risk register at Appendix III).

The main issues identified were:

1. While SOAS Research Online has documented objectives (in the business case) there is no documented mission statement.
2. Lack of documented policies and procedures. While SOAS Research Online does have publicly available policies, these are not complete or sufficiently detailed to provide assurance that the related risks are being managed. In addition, there are no formally documented procedures, or, the day to day activities of the repository. Currently, the procedures are only known to the staff members responsible.
3. There is no programme of review for the policies and procedures to ensure that they are up to date, and remain efficient and effective.
4. There is no formal succession plan in place. This is discussed in the business case for the repository, but has not been formalised. This is particularly important in the current economic climate, with cuts in spending on higher education. In addition the coming general election could mean changes in higher education priorities and/or budgets.
5. The level of budget is not currently known.
6. There is no contingency fund for the repository.
7. Staff development reviews are not linked directly to training needs or business objectives. This may be addressed by the new staff development review procedure being introduced by SOAS in 2010.
8. A user needs assessment was carried out before the repository was set up, but there are no procedures in place for regular review of user needs or requirements.

9. There has been no review of SOAS Research Online since it was launched, to evaluate its success.

4.1.2 Technical Infrastructure and Security

The functional class technical infrastructure and security relates to the hardware, software, core utilities and hardware environment of the repository. The audit identified twelve risks that relate to technical infrastructure and security (risks R24-R35 in the Risk Register at Appendix III). The main issues identified were:

1. Security procedures are not documented in detail.
2. Users are not compelled to change passwords frequently
3. There is currently no disaster management policy. SOAS has however recently engaged a consultant to develop one.
4. No time is specifically allocated to monitoring ongoing suitability of software and hardware for the repository.
5. No review of the success of the repository's hardware or software has taken place since SOAS Research Online was launched in 2008.

4.1.3 Acquisition and Ingest

The functional class acquisition and ingest relates to those activities which are involved in the deposit of materials to the repository. The audit identified three risks that relate to acquisition and ingest (risks R39-R49 in the Risk Register at Appendix III). The main issues identified were:

1. There is no documented policy or procedure in place to determine whether packages that are not in a suitable format are disposed of, returned or ingested
2. There is no policy or procedure in place to ensure that sole, complete physical and intellectual control is obtained over received material.
3. The acquisition and ingest policies and procedures have not been reviewed since SOAS Research Online was launched in 2008.

4.1.4 Preservation and Storage

The functional class preservation and storage relates to the long-term preservation of digital objects. The audit identified eleven risks related to preservation and storage (risks R39 –R49 in the Risk Register at Appendix III). The main issues identified were:

1. No service level has been defined with regards to availability of the repository.
2. There are no documented policies and procedures regarding preserving authenticity and integrity of information, nor of recording transactions over the lifecycle of the digital packages, what will be preserved, or what is an acceptable level of loss. Finally, the procedures regarding back-ups are not documented in detail.
3. There is no regular recording and comparison of checksums to confirm the integrity of information.
4. The eprints software should be upgraded to ensure it is capable of recording of provenance information and detailing interactions over the lifecycle of digital packages.
5. The policies and procedures relating to preservation and storage have not been reviewed since SOAS Research Online was launched in 2008.

4.1.5 Metadata Management

The functional class metadata management relates to the recording of data about the preserved digital objects. The audit identified five risks related to metadata management (risks R50 –R54 in the Risk Register at Appendix III). The main issues identified were:

1. There are no documented policies and procedures describing metadata schema and means by which metadata are associated with corresponding information objects.

2. As for Section 4.1.4 above, the eprints software should be upgraded to ensure it is capable of recording of provenance information and detailing interactions over the lifecycle of digital packages.
3. The user community has not been consulted about the appropriateness of the metadata schema, understandability definitions, or discovery mechanisms.
4. The policies and procedures relating to metadata management have not been reviewed since SOAS Research Online was launched in 2008.

4.1.6 Access and Dissemination

The functional class access and dissemination relates to the delivery of information. The audit identified two risks related to metadata management (risks R55 –R56 in the Risk Register at Appendix III). The main issues identified were:

1. There are no documented policies describing the available information delivery services.
2. The information delivery services have not been reviewed since the launch of SOAS Research online in 2008.

4.1.7 Summary

There are several recurring themes in the issues identified for each of the functional classes. These are the lack of a complete set of clearly defined policies and procedures, a lack of consultation with the user community, and the lack of a system of regular review of policies and procedures.

This project addresses two of these issues. Firstly, the risk management framework produced by this research project can be used as a tool for the regular review of SOAS Research Online's policies and procedures. Secondly, the risk register documents the areas for which SOAS Research Online needs to design and document detailed policies and procedures.

4.2 Questionnaire

There was a low response to the questionnaire with only 18% of all SOAS academics replying. There are several possible reasons for this which are discussed in Section 3.4 above.

Of those who did reply to the questionnaire, it is clear that most SOAS academics are aware of SOAS Research online, with 90% replying that they know that SOAS has an online research repository. This is a large increase on the proportion of academics who knew of the repository in 2007, when only 36% of respondents stated that they knew SOAS had a research repository. This can be attributed to two factors:

- The publicity surrounding the official launch of SOAS Research Online and consequent advocacy carried out by repository staff
- The fact that SOAS Research Online is now being used as the main publications database of the School, and as such is embedded in the School's infrastructure.

However, it is clear that there is a need for continued advocacy and marketing of the service. 10% of respondents were not aware of the repository, and responses to the questions 'do you have any further comments to make about SOAS Research Online' included:

- 'Didn't know about it until now!'
- 'I would submit material if the purpose of the repository was re-explained to me'
- 'I am not really familiar with it'.

Although SOAS academics do, in the main, seem to be aware of the repository, only 44% of the respondents had used the repository to deposit their research in full text.

One of the main reasons given for not adding materials to the repository (see Figure 4.2.1) is that adding materials to the repository is extra work (34%) and time consuming (25%) One respondent claimed that 'I don't have the time to organise this kind of show-casing.'

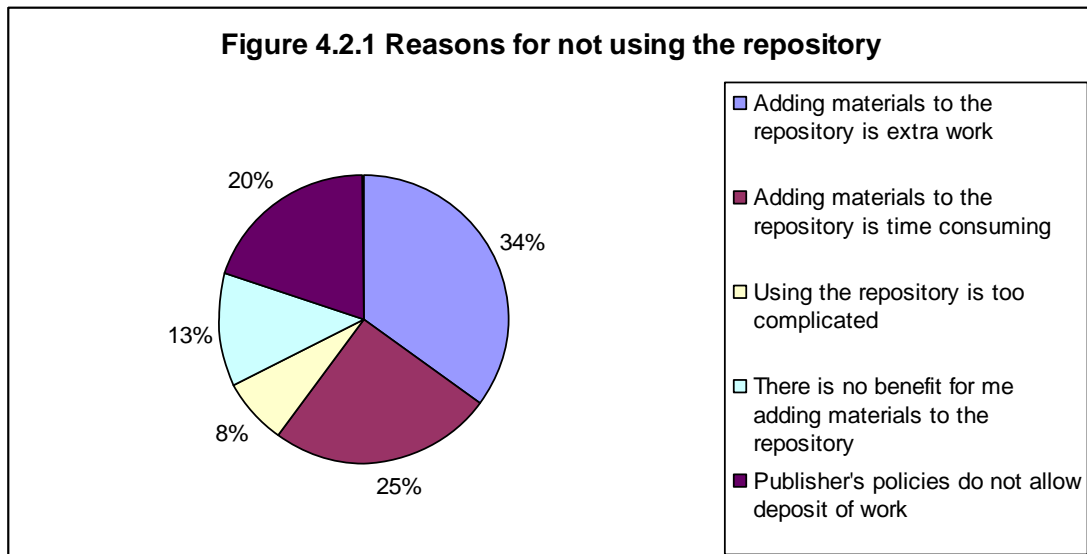
25% of respondents stated that the reason they had never used the repository to deposit full text materials was that publishers' policies do not allow deposit of work. In further comments, several academics commented that they were not sure about publisher's policies relating to deposit of full-text articles in repositories. One academic stated 'I am not sure about the copyright implications of depositing published material in the repository', while another noted that it is 'not easy to determine the rights questions affecting access on online full text.' One academic commented 'when I know I have copyright for my papers, then it is straightforward. But I am unsure whether it is appropriate to share articles that I upload for 'restricted access' with those who request them via research online.' Finally, one respondent pointed out that 'it is very time-consuming to find out publishers' policies by myself. If somebody at the library could check them and put the materials online if possible, that would encourage me to deposit full-text materials.'

This would suggest that the academics are not aware of the Sherpa Romeo website which can be used to check publishers' policies. This is mentioned in the deposit instructions on SOAS Research Online, but not prominently. The findings suggest that this website should be actively promoted to academics. Alternatively, the repository staff could check copyright policies on behalf of the academics.

Ultimately, these results also suggest that, for the repository to increase the deposit of full-text articles, they may have to consider mediated deposit, rather than relying on self-archiving by the SOAS academics.

Further, 13% of respondents felt that there was no benefit to them in adding materials to the repository. If SOAS Research Online is to encourage academics to

deposit full text material, efforts need to be concentrated on advocacy, stressing the benefits to academics of open access, such as increased citation.



Of those who had used the repository and commented on their experiences, while most responded that they had found it very simple to use, several had had difficulties with various aspects of it:

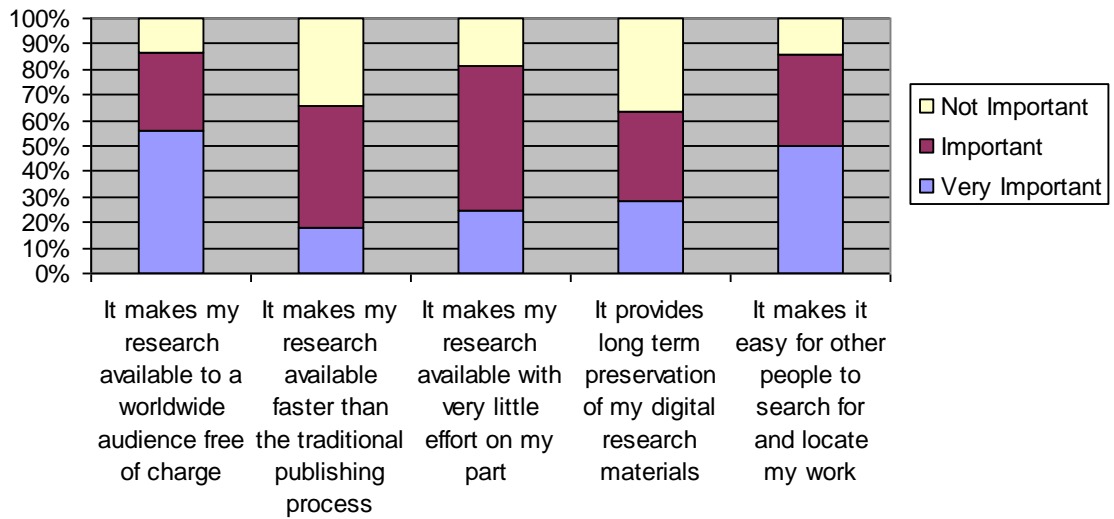
- 'Not very good. I found it difficult to delete entries. Also I have forgotten how to get access again and cannot find explanation of the procedures easily.'
- 'The system works fine, but once research has been deposited, it is hard to correct any mistakes that might have been made. Sometimes I feel like there are a few too many optional fields, and it is difficult to know what is important to fill out and what isn't.'
- 'OK once you get used to it. The updating of amended material is slightly challenging but primarily because of only doing it occasionally with less familiarity and memory.'

- 'It's fine for standard academic outputs. Needs to be developed so web-based articles and commentary can also be included and more easily uploaded. Long live the intellectual bloggerati!'
- 'I have tried but am not sure I've done it correctly.'
- 'I found it difficult to edit my submission information, and I am hesitant to submit my work until I know the information is final.'
- 'Why bother? I have maintained my own web page for over 10 years which presents my work the way that I want, not the way that eprints does (which tends to show things incorrectly, and seems to be impossible to fix).'

This suggests that there is a need to deliver more training in the use of the repository, or to provide more detailed deposit instructions. Several respondents reported problems with amending and updating deposits, which reiterates the need for a clear policy and procedure in this area (see section 4.1).

The results of the questionnaire indicate that there is strong support for the philosophy of open access with SOAS, with 56% of respondents indicating that making their research available to a worldwide audience free of charge is 'very important' to them and 30.8% rating it 'important' (see Figure 4.2.2).

Figure 4.2.2 How important to you are the following statements about the benefits offered by SOAS Research online?

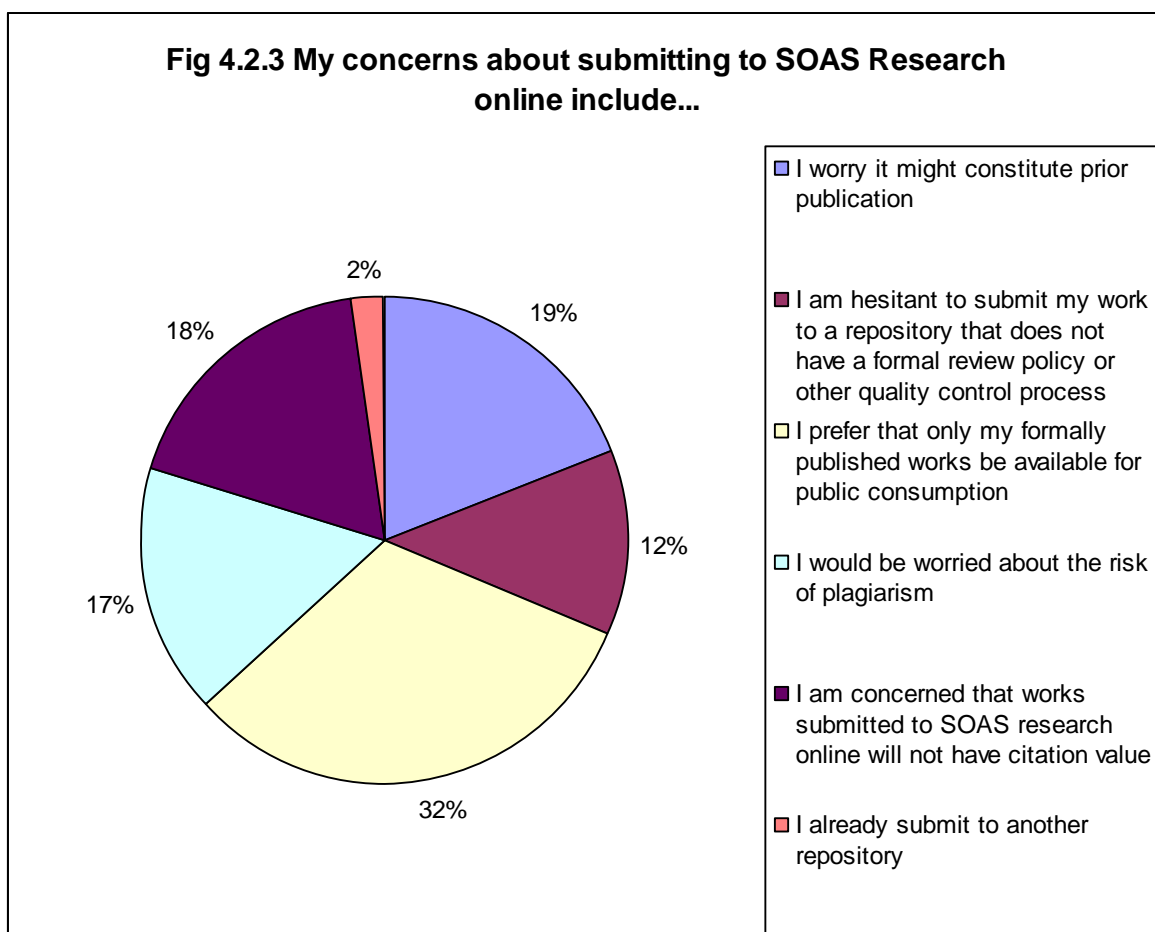


These figures are encouraging as it shows that SOAS has a culture that would support a successful institutional repository. However, 37% of respondents believe that long term preservation of digital materials is 'not important'. It would seem that SOAS academics are more concerned with the dissemination of their research than the preservation. This suggests that the repository should concentrate more of their effort on access and dissemination than focusing simply on the archiving of information. This highlights the need for further research in this area such as link analysis to identify where the users are coming from, and surveys of the users to establish what their needs are in terms of understandability and discovery mechanisms.

When asked about concerns about submitting to SOAS Research Online, (see Figure 4.2.3 below) 32% of academics stated that they preferred only formally published works to be available for public consumption and 19% said that they were worried it would constitute prior publication. Comments included 'I only submit pieces that were published already in traditional means of publication (i.e. journals, edited volumes etc.) My main concern is copyright infringement', 'I only submit my published work to SOAS research online. I do not even submit my 'in

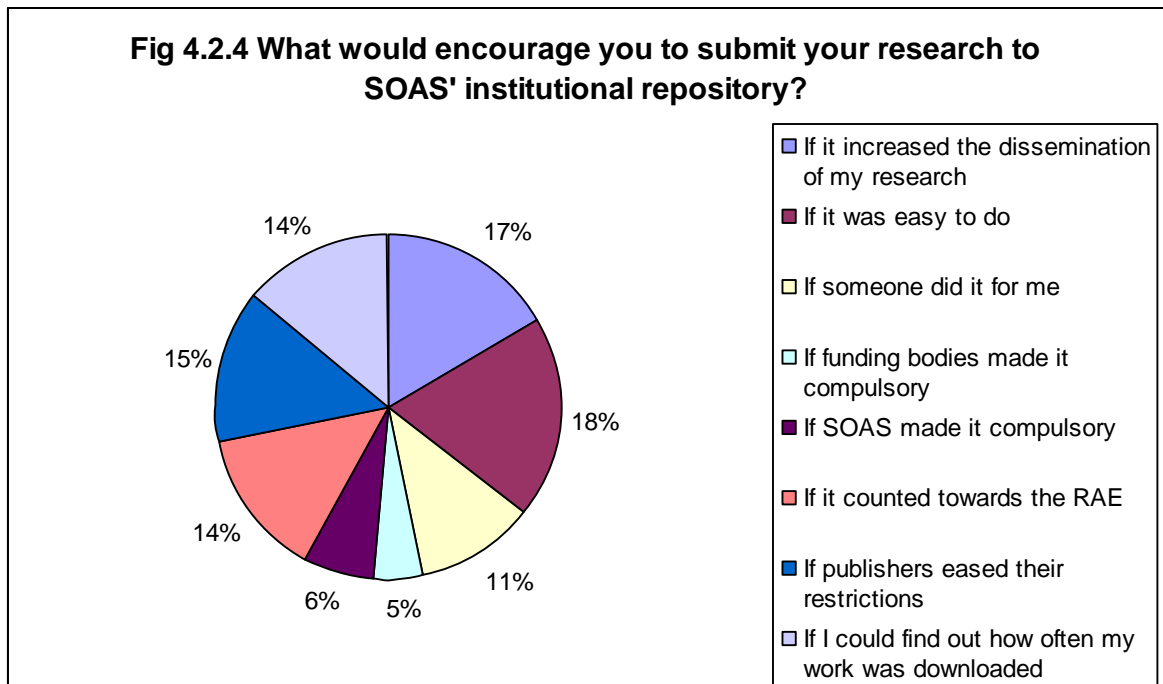
press' work' and 'I have so far hesitated to submit the actual text of my publications because I am not sure about copyright issues. I fear that submitting the text may prevent people from buying the hard copy publication.' Again, this indicates the need for training sessions and advice on publishing and copyright issues.

Academics were also concerned about plagiarism (17%), although this is also an issue with articles in published journals. 18% of respondents were concerned that works submitted to SOAS Research online would not have citation value and will not count towards formal assessment. This suggests that it is necessary to investigate the possibilities of generating download and access statistics using the repository software, and the need for further advocacy stressing the benefit of increased visibility and citation impact as identified by Bailey (2008).



When asked what would encourage submission to SOAS Research Online, there was a wide range of responses (see figure 4.2.4 below). Eighteen per cent of

respondents noted that they would submit their research if it was easy to do, while 11% said they would submit research if someone did it for them. Again, this suggests the need to consider mediated deposit, rather than relying on self-archiving in order to achieve a higher numbers of full text deposit. These results also show that enabling statistics in the repository would be useful – 14% of respondents stated that they would be more likely to submit work if it counted towards the Research Assessment Exercise (RAE), while a further 14% stated that they would be encouraged to submit research if they could find out how often it was downloaded. The fact that 12% of respondents stated that they were hesitant to submit work to a repository without a formal review policy or quality control procedures again supports the case for looking into providing mediated ingest of materials. It also adds weight to the findings from the audit regarding the need for formally documented policies and instigating regular review of the repository’s policies and procedures. Finally, the research shows that making submission compulsory would have little effect, as only 5% of respondents would be more likely to submit research if funding bodies made it compulsory, with 6% saying they would be encouraged by SOAS making submission compulsory.



To summarise, the key areas that have been highlighted by the questionnaire results are:

- There is a need to provide further training to academics relating to copyright issues and repositories, with particular reference to the SHERPA ROMEO website
- SOAS should consider providing a mediated deposit service, subject to available resources
- The possibility of providing statistics relating to download and impact figures should be investigated
- There is a need for further training in the use of the repository
- There is a need for clearer guidelines when it comes to deposit and editing submissions in particular
- SOAS should consider undertaking further research into who is using and accessing the information in the repository, possibly using link analysis
- SOAS should consider surveying the users of the repository to ascertain their understandability and discovery needs
- Although advocacy efforts have had some impact, these efforts should be continued and results reviewed on a regular basis.

5. Conclusion

5.1 Evaluation of SOAS Research Online

The audit and questionnaire results, discussed in detail in Section 4 above, showed that certain areas of SOAS Research Online are susceptible to risk and could be improved. The following recommendations have been made after careful consideration of these results.

Firstly, although objectives for SOAS Research Online were defined in the original business case, there is no formal mandate or mission statement for the repository and policies are incomplete, not detailed and not referenced to corresponding fundamental objectives. In addition, there are no formally documented procedures, or the day to day activities of the repository, other than the instructions for deposit. Activities, policies and procedures should be defined with strict reference to corresponding fundamental objectives. These should be comprehensive and include, but not be limited to: security and back up procedures, a policy on what happens to packages that are received but are not in a suitable format, a policy stating that the repository has sole complete and intellectual control over received packages, policies on how authenticity, integrity and provenance of information are maintained, details on how transactions are recorded over a digital packages lifecycle, acceptable levels of loss, metadata schema and details of how metadata is associated with corresponding objects, information delivery services, policies to acknowledge and react to community feedback, and procedures for updating and amending records.

Mechanisms for the regular review of policies and procedures should be established. Fully documented policies and procedures that are efficient and effective, help guard against the risk of management failure and loss of trust or reputation, and provide assurance to users that the repository is trustworthy. Policies and procedures should be saved on a shared drive or in a wiki, to ensure that knowledge of policies and procedures is not limited to one or two members of

staff. This means that if key members of staff leave, or are absent for a prolonged period of time, it is still possible to achieve business objectives.

In addition, to determine the efficiency and appropriateness with respect to organisational goals, external accreditation of policies and procedures should be sought – for example, by seeking the opinion of user communities, or external auditors.

The repository should also establish a succession plan and exit strategy. This is documented briefly in the business case, but needs to be set out in detail and formally approved. In the current economic climate, and with a general election approaching which could significantly affect higher education funding, there risk of enforced cessation of repository operations is high. This puts the long-term preservation of digital information within the repository at risk, and contingency plans should be made.

Repository management should make every effort to ascertain the budget for the repository. Even by the time the research for this project finished in December 2009, the budget for the academic year 2009/10 was still unknown. It should be ensured that there is a contingency fund in the budget for unforeseen expenses, such as replacement of faulty hardware, or increase in software maintenance costs. This will mitigate the risk of the finances being insufficient to meet repository commitments.

The only mechanism currently available for community feedback is an email address under contact details on the e-prints website. Consideration should be given to expanding this to include a telephone helpdesk, mail address and web forms, to encourage feedback from users who prefer other methods of communication. In addition, feedback should be actively solicited, with a proportion of staff time allocation to community engagement. This should include not only SOAS academics, but the community who are accessing the information held within SOAS Research online. A link analysis study should yield this information, and indicate where communication efforts should be targeted.

Increased community feedback would ensure that community needs regarding level of service, understandability, metadata suitability, and discovery methods are met.

Repository management should endeavour to ensure that the disaster management policy, currently being drawn up for SOAS by consultants, includes consideration of the repository. There should be plans for continuation of the service in the event of disaster such as fire or terrorism.

Time should be allocated to the regular review of software and hardware to ensure that they remain suitable for the needs of the repository. These reviews should be documented. In particular, the eprints software should be investigated to ensure that it is capable of recording sufficient detail regarding provenance information and transactions undertaken over a digital object's lifecycle.

SOAS IT department should implement a policy enforcing the regular changing of passwords by staff. This is a basic security measure that is not in place at SOAS. As discussed above, the documentation of policies and procedures should include detailed security (software and physical) and back-up policies in relation to the repository and these should be reviewed regularly to ensure they remain effective.

SOAS Repository staff should regularly record and compare checksums to provide assurance over the integrity of the data. Checksums of back-up copies should also be regularly checked to ensure that copies of data are consistent.

Repository management should define realistic service levels with regard to the repository, and delivery of information – for example, the website will be available 90% of the time - and implement policies and procedures for their review and adjustment. The ability of the repository to meet service levels is then measurable, and success at meeting targets can be demonstrated to user groups to gain their trust in the repository.

To encourage more full text deposit to the repository, offering mediated deposit should be considered. If necessary, additional funding should be sought to support this.

The questionnaire showed that there remains a great deal of uncertainty with regard to copyright issues and concern about publishers' policies and IPR infringement among SOAS academics. The SHERPA RoMEO website should be more widely publicised, and a programme of training/awareness designed for academics (in collaboration with SOAS' new information compliance officer).

Although advocacy efforts have paid off, and the majority of SOAS staff are aware of the repository, some staff have never heard of it or are unsure of what it is or how to use it. Staff time should continue to be allocated to marketing activities, and regular training sessions in the use of the repository should be offered, either as group or one to one sessions.

The deposit instructions should be reviewed with representatives of the user community to ensure that they are clear and easy to understand and follow. Several academics reported problems with depositing articles, in particular with regard to updating or editing submissions. This has had an effect on their willingness to submit full text articles, so review of the instructions could improve the rate of full-text deposit.

The possibility of enabling statistics in SOAS Research online should be investigated. Implementation of statistics would go some way to demonstrating the benefits of the repository to academics, in terms of dissemination of their work, and increased citation, and could encourage increased deposit of full text articles. As discussed above, research into the people who are using the information in the repository could also help in this regard.

In summary, it is recommended that the repository:

- Create a mission statement and comprehensive policies and procedures and that these are made widely available, reviewed regularly, and subject to external accreditation
- Establish a formal succession plan and exit strategy
- Ascertain the budget and ensure that it includes a contingency fund
- Solicit regular feedback from the user community and devise a policy to acknowledge and respond to this feedback
- Ensure that the disaster management plan gives due consideration to the repository
- Allocate time to the regular review of software and hardware for suitability, and document these reviews
- Enforce regular changes of passwords
- Regularly record and compare checksums, including those of back-up copies
- Define realistic service levels
- Consider offering mediated service, and obtaining additional funding for this if necessary
- Publicise the SHERPA/RoMEO website more widely, and develop a training programme in relation to copyright issues and the repository
- Continue advocacy and marketing efforts, and set up a regular training programme for academics in the use of the repository
- Review the deposit instructions with representatives of the user community to ensure that they are understandable and easy to follow
- Investigating implementing statistics in SOAS Research Online as a way of demonstrating the benefits of the repository to academics.

Finally, if all the steps above are taken, the risks identified in the risk register will be satisfactorily managed. The risk register should be adopted as a management tool, and the audit of the repository should be repeated regularly to ensure that the risk register remains up to date and relevant.

5.2 Have the success factors been met?

One of the objectives of this research project was to determine if Kalmar's (2007) success factors and lessons to be learned have been applied at SOAS. As a reminder, these were:

Success factors were identified as:

1. A place in the normal working practices of the university
2. Integration within the technical infrastructure
3. Regular pattern of self-archiving by academics. (Kalmar, 2007)

Lessons learned which could be applied at SOAS were identified as:

1. The importance of advocacy.
2. Project management for planning and implementation including identification of objectives, risks and benefits.
3. Clear policies on preservation and types of content accepted as deposits in the institutional repository. (Kalmar, 2007)

To take the success factors one by one:

1. A place in the normal working practices of the university – SOAS Research Online has been adopted as the publications database of the university. This has had a great deal of success in encouraging staff to enter bibliographical records into the repository, but as yet there is a lower rate of full-text deposits.

2. Integration within the technical infrastructure – In order for publications to appear on their staff pages, the details have to be entered into SOAS Research online. This then feeds through to the staff pages on SOAS' website. As noted above, this has led to some success in gathering bibliographic records, but deposit of full-text articles has been slow.

3. Regular pattern of self-archiving by academics. Again, self-archiving of bibliographic records has grown rapidly, but there has been some reluctance to deposit full-text articles, as described in detail in Sections 4.2 and 5.1 above.

As for the lessons to be learned:

1. The importance of advocacy – significant efforts were undertaken in this area when the repository was launched, and it has paid off with 90% of respondents to the questionnaire for this project saying that they were aware of SOAS Research Online. However, a significant minority of respondents had not heard of it, and several commented that they were not sure what benefits it would give them, or that they were unsure how to use it. As discussed in detail in section 5.1, advocacy and training efforts should be continued, and staff time allocated to this activity on a regular basis.

2. Project management for planning and implementation including identification of objectives, risks and benefits – prior to the establishment of an in-house repository in 2007, a business case was prepared that identified objectives, risks and benefits to SOAS. However, a mandate or mission statement for the repository has not been formally documented, and the policies and procedures have not been explicitly linked to the objectives set out in the business case. As discussed in detail in section 5.1 above, policies and procedures are not comprehensive, or reviewed regularly. This project has produced a risk register for the repository. This should be used as a basis on which to establish risk management and regular reviews of risk within the repository.

3. Clear policies on preservation and types of content accepted as deposits in the institutional repository. SOAS Research Online details the types of content it accepts, but the preservation policies are not comprehensive or detailed. This is discussed further in section 5.1 above.

In conclusion, while most of the success factors and lessons to be learnt have been achieved, there is room for improvement in the self-archiving of full-text

articles, the comprehensive documentation of policies and procedures, and the monitoring and management of risks.

5.3 Limitations

There are several flaws to this research. One of the most obvious is the use of only the DRAMBORA toolkit to evaluate the repository. Using the TRAC or nestor checklists, or a combination of the two, alongside the DRAMBORA audit would have provided assurance that the risk analysis was complete, and a useful comparison of the results from the two methods. A lack of available time meant that this was not possible. However, the use of DRAMBORA alone still yielded valuable results which highlighted areas of the repository which were vulnerable to risk.

A second limitation to the research is that follow-up interviews were not carried out with willing questionnaire participants. This would have given more detailed reasons for lack of full-text deposit and user needs. It is recommended that the repository actively solicits feedback from the user community, and this is something that could be considered for future research (discussed in section 5.4 below).

In addition, it would have been useful to compare the results of the risk analysis with repositories comparable to SOAS Research Online in terms of scope and scale. DRAMBORA are currently developing a tool that will make it possible to do this using DRAMBORA Interactive. Further, SOAS Research Online's policies and procedures were not compared with similar organisations. This would have been a useful benchmarking exercise, and provided an insight into how other repositories manage their risks. Again, this is something that could be considered for future research.

Finally, no account was taken of the views of the users of SOAS Research Online. The views of the user community would have provided information on how well SOAS Research Online's search and retrieval functions work, and how useful the

metadata used is for the user community. This is another area that could be considered for future research.

5.4 Future application and research

The results of this research have a wider applicability. Other similar repositories can use the risk register and recommendations for SOAS Research Online to manage the risk in their repositories. The results have also established some reasons for the barriers to academics in depositing full-text articles in institutional repositories. The suggestions for overcoming this at SOAS can also be applied to other repositories. Finally, the results have shown that advocacy and integration into the organisation do work in terms of making people aware of the repository and using it for deposit of bibliographic details. Other organisations can learn from the experiences of SOAS when setting up and devising policies for their own repositories.

The implementation of the recommendations in this report, affect not only the repository but other areas of the organisation such as IT, Human Resources and the SOAS Directorate. This has implications for the entire organisation. The possibility of applying the DRAMBORA approach to risk management across the whole organisation could be investigated.

This research has highlighted the need for further research in several areas. Firstly, a comparative study of the various methods that are currently available for assessment of repositories would establish which were most useful and appropriate for repositories at different stages in their development. Secondly, if full-text deposit is to be regarded as the measure of success of repositories, there is a need for more detailed investigation into the reasons academics are reluctant to do so. Finally, a study of who the users of SOAS Research Online are, and what they are accessing and downloading, would provide valuable information regarding the needs of the user community and how best the repository can meet their needs.

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7. APPENDICES

7.1 Appendix I - Dissertation Proposal

A risk-based evaluation of SOAS Research Online, the institutional repository of the School of Oriental and African Studies

Introduction

An Institutional Repository (IR) is defined to be a web-based database (repository) of scholarly material which is institutionally defined (as opposed to a subject-based repository); cumulative and perpetual (a collection of record); open and interoperable (e.g. using OAI-compliant software); and thus collects, stores and disseminates (is part of the process of scholarly communication). In addition, most would include long-term preservation of digital materials as a key function of IRs. (Ware, 2006).

Commonly cited benefits of Institutional Repositories are:

- To increase the visibility and citation impact of the institution's scholarship
- To provide unified access to the institution's scholarship
- To provide open access to the institution's scholarship
- To preserve the institution's scholarship (Bailey, 2008)

SOAS Research Online is a free, publicly accessible repository of the research outputs of the School of Oriental and African Studies. (SOAS, 2009) The repository contains both full text papers and metadata only (descriptive) records of research carried out by SOAS staff members. SOAS Research Online was set up in 2007, following a pilot as part of the SHERPA project, hosted at UCL. It was formally launched in 2008, and currently holds 7,048 records. Since its launch in 2008 use has grown rapidly. However, the SOAS Research Online has never been evaluated to ensure that its objectives and methods are robust, and meet industry standards, and that intrinsic and extrinsic risks are managed.

Project Overview

Summary of Research Problem

SOAS Research Online was set up in 2007, and launched in 2008. A previous Masters dissertation (Kalmar, 2007) carried out an evaluation of best practice for implementing and populating Institutional Repositories with the objectives of identifying the 'success factors' for IRs and identifying the lessons that can be learned and applied at SOAS. Alongside this, a survey was carried out to identify what users (SOAS academic staff) wanted from an Institutional Repository. SOAS Research Online has not been formally evaluated since its launch to find out whether it has met any of the success factors, or applied any of the lessons learnt from that research. As this remains a relatively immature field, evaluation methods are new and still being developed. However, as McHugh et al (2008) write, 'as repositories of various shapes and sizes continue to appear across the digital preservation landscape, means are urgently required to facilitate their evaluation'.

Aims and Objectives

The purpose of this research is to evaluate SOAS Research Online. The objectives are to:

1. Produce a comprehensive registry of risks for SOAS Research Online
2. Identify strengths and weaknesses in SOAS Research Online, and produce a report detailing how weaknesses can be addressed.
3. Identify whether the lessons to be learnt identified by Kalmar (2007) and the SOAS survey in 2007 have been successfully applied at SOAS.

Research Approach

Several methods have been developed for evaluating Institutional Repositories including TRAC (Trustworthy Repositories Audit and Certification Checklist), NESTOR (Institutional Repository Certification in Germany) and DRAMBORA (The Digital Repository Audit Method Based on Risk Assessment). DRAMBORA

provides a self-audit methodology and online tool, facilitating the validation objectives and methods, and the management of intrinsic and extrinsic threats. (McHugh et al, 2008). This study will use the DRAMBORA toolkit to fulfill objectives one and two above – namely, to produce a register of risks, and to identify which risks are being managed, and which are not. In addition, a checklist will be produced based on the research by Kalmar, and the TRAC and NESTOR checklists, to identify whether the lessons learnt have been applied, and whether the SOAS repository meets international standards for repositories. Finally, a questionnaire will be sent to SOAS academics, to identify whether their needs, as identified by the 2007 staff survey, have been met.

Aims and Objectives

The research has both an academic and a practical, applied purpose. It is being undertaken to fulfill the MA dissertation requirements but also to provide information on which policy and action at SOAS can be based.

As noted above, my aim is to evaluate SOAS Research Online. SOAS would like the IR to be audited so that policy and practice can be developed to ensure that they are providing a solid grounding for research archiving and access.

As McHugh et al (2008) note 'Digital repositories are a manifestation of complex organisational, financial, legal, technological, procedural and political interrelationships.' Accompanying each of these are innate uncertainties, exacerbated by the relative immaturity of understanding prevalent within the digital preservation domain. Management, staff, information creators, depositors, consumers, and financiers must all be assured that these uncertainties, or risks, are being managed.

In recent years considerable work has been undertaken to develop audit checklists and toolkits to evaluate repositories. Ten general principles of repositories have been conceived by the developers of TRAC, nestor and DRAMBORA, the three

principle methods of evaluation, encapsulating all organisational components that could be subject to assessment (CRL/OCLC/NESTOR/DCC/DPE, 2007):

- Mandate and commitment to Digital Object Maintenance
- Organisational Fitness
- Legal and Regulatory Legitimacy
- Efficient and Effective Policies
- Adequate Technical Infrastructure
- Acquisition & Digest
- Preservation of Digital Object Integrity, Authenticity & Usability
- Metadata Management & Audit Trails
- Dissemination
- Preservation Planning & Action.

This research will evaluate these 10 principles within SOAS Research online, with the objective of:

1. Producing a comprehensive registry of risks for SOAS Research Online
2. Identifying strengths and weaknesses in SOAS Research Online, and produce a report detailing how weaknesses can be addressed.
3. Identifying whether the lessons to be learnt identified by Kalmar (2007) and the SOAS survey in 2007 have been successfully applied at SOAS.

The research questions which underpin the aims and objectives are:

1. What is the metric for defining success of an IR?
2. What risks impede the activities of Institutional Repositories?
3. How can these risks be managed and/or mitigated?
4. Which approaches are appropriate for evaluating IRs?

Scope and definition

The literature search will aim to be comprehensive, but restricted access to primary literature, for example due to the remote location of material sought, will exclude consideration of some sources.

The evaluation will focus on SOAS Research online, the Institutional Repository of the School of Oriental and African Studies. The evaluation will be carried out using the DRAMBORA toolkit, and a checklist based on the TRAC and nestor criteria for evaluating institutional repositories and the results of a previous MA dissertation carried out for the SOAS repository - 'An evaluation of best practice for implementing and populating institutional repositories', Kalmar, 2007.

The collection of primary data will be based on a questionnaire sent to all SOAS academics.

Research Context/ Literature Review

A previous Masters dissertation evaluating best practice for implementing and populating Institutional Repositories was undertaken at this time as part of a placement at SOAS. The aims of this research were to

1. Identify the 'success factors' by exploring political, cultural, and technological aspects affecting the setting up of an institutional repository and encouraging its use.
2. Identify the lessons that can be learned and applied at SOAS to encourage use of their institutional repository. (Kalmar, 2007).

The purpose of my research will be to follow up this previous research, to evaluate the success of SOAS Institutional Repository to date, and identify areas where it could be improved.

An accepted understanding of what digital repositories actually are is a necessary precursor to any work that seeks to determine their effectiveness. The background to this research project is the growth of institutional repositories (IRs) as part of the wider Open Access (OA) movement. OA is summarised in the Budapest Open Access Initiative (2002) and sees the output of research as a public good which should be freely available. OA can be divided into the two main strands – OA journals, and repositories. In turn, repositories may be subject-specific or institutional. Institutional repositories are being promoted by governments worldwide, and in the UK context there are projects being funded nationally by the Joint Information Systems Committee (JISC) – the Repositories and Preservation Programme. European projects include SciX and DRIVER, and developments in the USA include the DSpace free repository software at Massachusetts Institute of Technology (MIT). In the developing world, particularly relevant to the research carried out at SOAS, IRs are considered of great economic benefit and projects are being funded worldwide (www.openDOAR.org provides a list of IRs by geographical region). A statement from the Joint Information Systems Committee (JISC), Research Councils UK (RCUK), Council for the Central Laboratory of the Research Councils (CCLRC) and the Research Libraries Network (RLN) states:

‘Our four organisations believe that, as a matter of principle, the outputs of publicly funded research should be made available as widely and rapidly as possible. Hence we are taking steps to encourage free online access to research results. To stimulate these changes, we are encouraging researchers to place their papers in digital repositories.’ (JISC, 2006b, p2)

A JISC briefing paper defines what open access is, and is not:

‘There are various misunderstandings about open access. It is not self-publishing, nor a way to bypass peer-review and publication, nor is it a second-class, cut-price publishing route. It is simply a means to make research results freely available online to the whole research community.’ (JISC, 2006a)

Institutional repositories (IRs) are electronic databases, publicly and freely accessible via the internet using search engines, where universities can hold bibliographic records and full text of the institution's research papers and other research output, and administrative and teaching and learning materials.

Clifford Lynch provides a frequently cited definition:

'In my view, a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution.' (Lynch, 2003)

Kalmar carried out a MA dissertation 'An evaluation of best practice for implementing and populating Institutional Repositories' in 2007. One objective was to identify the success factors for an IR and what lessons SOAS could learn and implement as they set up SOAS Research Online. The research found that the attempt to reach a definition of a successful repository is hampered by the relatively short life of most. However, success indicators which should be the objectives of a successful implementation identified were:

- A place in the normal working practices of the university
- Integration within the technical infrastructure
- Regular pattern of deposit by academics (Kalmar, 2007)

This research will follow up the previous research and investigate whether SOAS has achieved these success factors. Since this research was undertaken, several projects have been undertaken to identify the success factors for repositories. At a meeting hosted by Center for Research Libraries (CRL) in January 2007, ten principles for a trusted digital repository were defined. These are documented in the Aims and Objectives section above. As McHugh, Innocenti, Ross and Ruusalepp (2008) note, '[there is an] ongoing international effort to conceive

criteria, means and methodologies for audit and certification of trustworthy digital repositories’.

The three principle methods are:

- The Trustworthy Repositories Audit and Certification (TRAC) criteria and check-list was developed by the US National Archives and Records Administration (NARA) and the Research Libraries Group (RLG) in 2007. TRAC describes approximately 90 characteristics that apply to a trustworthy repository.
- The nestor Catalogue of Criteria for Trusted Digital Repositories (nestor working group, 2006) was developed in Germany by the Network of expertise in Digital long-term preservation (nestor). This provides examples that are more representative of a German context.
- The Digital Repository Audit Method based on Risk Assessment (DRAMBORA) was developed by the Digital Curation Centre and DigitalPreservationEurope in 2007. DRAMBORA is a process that encourages repositories to consider and document their mission, objectives, constraints and activities, before planning to address the challenges that threaten overall success. (McHugh et al, 2008).

This research will use a combination of these methods to evaluate the SOAS IR, SOAS Research online. As McHugh et al (2008) note:

‘For DRAMBORA, the objective metrics presented within the TRAC checklist and nestor’s Catalogue of Criteria are pervasive influences, presenting structured insights into the kinds of issues that may correspond to risks, shortcomings and perceived points of failure...when combined with DRAMBORA such tools offer a flexible methodology that supports an organisation or auditor in determining conformance to objective and rigorously defined metrics’.

This research will benefit SOAS by evaluating SOAS Research online, and assessing whether it is a successful and trustworthy repository. Risks that impede

their activities and threaten their assets will be identified, assessed and recommendations for risk management made. Understanding of the successes and shortcomings of the organisation will be enhanced.

Methodology

There will be four stages to the research:

1. Literature search and review. Due to the nature of my research and the emerging status of the evaluation of Institutional Repositories, there is not much widely available information in textbooks. Therefore my research will mainly be based on bibliographic databases and Internet search engines and directories.

Useful resources include:

- LISA (Library and Information Science Abstracts)
- The International Journal of Digital Curation
- D-Lib Magazine
- <http://www.eprints.org/>
- <http://www.repositoryaudit.eu/>
- <http://www.data-audit.eu/>
- Journal of Information Science
- ASLIB proceedings
- Ariadne
- <http://jisc.ac.uk/publications>
- JISC-REPOSITORIES@JISCMAIL.AC.UK

Sources accessed and retrieved will be used to write the literature review.

2. Evaluation

SOAS Research Online will be evaluated using the DRAMBORA Interactive toolkit, and a checklist devised from the TRAC and nestor checklists, together with the success factors identified in the research carried out at SOAS by Kalmar in 2007 and the desired criteria of SOAS academics identified in the SOAS survey in 2007.

3. Data collection. A largely qualitative methodology will be adopted for primary data collection. A survey conducted by email questionnaire will be the main tool, sent to all SOAS academics, to examine whether SOAS Research Online is perceived to have met the desired criteria of SOAS Academics as surveyed in 2007.

4. Data analysis. The Data collected from the questionnaire and the evaluations will be analysed to identify the strengths and weaknesses of SOAS Research Online and come up with recommendations for improvement.

The DRAMBORA method is being used in combination with the checklist based on TRAC and nestor as they have been developed specifically for this purpose by professional research groups. The DRAMBORA toolkit has been developed following a period of pilot audits undertaken by DigitalPreservationEurope (DPE), the Digital Curation Centre (DCC) and the DELOS Digital Preservation Cluster, aimed at evaluating DRAMBORA. Research showed that there were a number of criticisms, in particular that the potential for repositories to improve may be limited by their own horizons. Self-‘assessment alone can only indicate problems within the bounds of what repositories believe that they should be doing. Problems arise when organisations are oblivious to their shortcomings, or unaware of the potential benefits available to them and which they might usefully seize.’ (McHugh et al). For this reason, the DRAMBORA toolkit is being used in conjunction with the checklist derived from the TRAC and nestor criteria. The fundamental problem of using only the checklist is associated with the generalisation of optimal repository characteristics. As McHugh et al note ‘to do so equates to an assumption that all repositories share a singularity of purpose, and that their priorities are uniform, irrespective of where or why they exist.’ This problem should be overcome by customising the checklists for SOAS, and combining the checklist and risk-based assessment approaches.

A questionnaire is being used as this is a follow-up to a 2007 survey, and a like for like comparison can be made. In addition, the population is too large to interview a representative sample in the time available.

There may be problems in obtaining some of the documentation necessary for the audit, such as financial policies and procedures, and in achieving a sufficiently high response rate to the questionnaire. These problems should be overcome by obtaining high-level permission (from the Director of Information and Learning Support) for the audit, and by including the questionnaire in the annual SOAS Library Evaluation questionnaire sent to all staff.

Work Plan

Task	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10
						HOLIDAY			
Literature Search and Review						HOLIDAY			
Writing literature review & research methodology chapters						HOLIDAY			
DRAMBORA audit						HOLIDAY			
Checklist Audit						HOLIDAY			
Questionnaire						HOLIDAY			
Analysis of Findings						HOLIDAY			
Re-Writing Literature Review and Method Chapters						HOLIDAY			
Writing up Data Chapter, Interpretation Chapter and Conclusions/ Recommendations						HOLIDAY			
Checking, Finalisation, Printing						HOLIDAY			

Resources

Computing and library facilities at the School of Oriental and African Studies and City University will be used extensively in support of the project. No specialist resources will be required.

Ethics

There are no significant ethical constraints on the work, apart from confidentiality and the need for anonymity where requested. The reason for, and the nature of the research will be explained to all participants (Denscombe, 2006, p52).

Confidentiality

Anonymity will be granted where requested, and any reference to survey respondents will not be personal but based on role. Approval will be requested for direct quotes.

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McHugh, A., Ross, S., Innocenti, P., Ruusalepp R., Hofman H., 2008, Bringing Self-assessment home: Repository Profiling and Key Lines of Enquiry within DRAMBORA, *The International Journal of Digital Curation*, 2 (3), 131-142
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7.2 APPENDIX II - Reflection

My task in this project was to evaluate SOAS Research Online, the Institutional Repository of the School of Oriental and African Studies (SOAS). This was suggested as a project by the repository administrator, as the repository had not been assessed since its launch in 2008. I approached this task from both an academic and practical angle. My aim was that the research should produce some tangible benefit to SOAS, and practical recommendations that could be implemented within the repository. The project appealed to me as I was able to apply my experience from ten years of working as an auditor, as well as learn about an area of information management I am not familiar with, but am interested in.

My plan is documented in the research proposal at Appendix I and consisted of first carrying out a literature review to familiarise myself with the subject, and then apply the knowledge gained in the assessment of the repository. I planned to assess the repository using both of the tools available, a checklist devised from the TRAC and nestor checklists and adapted for SOAS, and the DRAMBORA Interactive toolkit, which takes the auditor through a step by step risk management exercise. In parallel, I planned to survey SOAS academics in order to understand the point of view of the users of the repository. I would then analyse the results and prepare recommendations for SOAS Research Online based on these. I prepared a detailed timetable to enable me to achieve all of this in the time available.

However, the literature available on the subject proved to be more extensive than I had foreseen, and this took longer than I had allowed to complete. In addition, I encountered several technical problems with both my repository management software (endnote web) and the DRAMBORA interactive toolkit. This meant I had to recreate both my bibliography and risk register manually. I had not included any time for contingencies in my timetable, and found it difficult to make up the time. As I work full time and commute a long-distance, the only time available for me to work on my project was weekends and holidays. I therefore decided that I would

have to forego compiling a checklist and assessing the repository against this. This does mean that there are some limitations to the research, and these have been fully documented in the main body of the text. The results I gained from the DRAMBORA assessment were, however, still sufficient to produce some useful recommendations for SOAS Research Online.

I faced several challenges in this project. One relates to time constraints, as discussed above. The second is also discussed above and relates to technological failures. Another challenge was obtaining sufficient information to enable me to complete the audit. The culture of SOAS is quite closed, in that individual staff members do not like sharing information with each other. There is also a suspicion of audit activity, particularly at the moment as the Directorate of Library and Information Services is in the process of restructuring. This was compounded by my relatively junior position as a subject librarian, which meant that staff, particularly those from other departments, were reluctant to share information with me. I did not have the authority an external auditor would. Nevertheless, I gained the support of the Director of Library and Information Services and he prevailed upon staff members to provide me with the information I needed. Finally, although I am an experienced auditor, repositories are an entirely new area to me. I found auditing the organisational aspects relatively straightforward, but understanding the particular risks associated with preservation of digital objects was more challenging.

This project has taught me that it is vital to include contingencies in planning for any large project. It has also taught me not to underestimate the challenges that will be involved in a project, even if I think I am relatively familiar with the processes involved. I also learnt to accept advice and constructive criticism from others, and that it can be helpful in informing your own opinions.

Overall, this project has been extremely useful to me as a subject librarian to carry out my own piece of independent research as I am better able to understand the needs of the students and researchers who come to me for advice on planning research strategies.

7.3

APPENDIX III – RISK REGISTER

Risk Identifier:	R01	
Risk Name:	Management Failure	
Risk Description:	One or more aspects of organisational management are unsuccessful.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Policies do not evolve to reflect changes in requirements and practice 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	↔ R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Create a mission statement for the repository that reflects a commitment to the long-term retention of, management of, and access to digital information • Conceive and create comprehensive management policies and procedures for the repository. • Establish mechanisms for regular review of policies and procedures • Establish benchmarks to determine effectiveness of management policies and procedures. • Create a formal succession plan, to include the identification of trusted inheritors in the event of a loss of funding or staffing. 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R02	
Risk Name:	Loss of trust or reputation	
Risk Description:	One or more stakeholder communities have doubts about the repository's ability to achieve its business objectives.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • A public statement announcing a cut in funding raises concerns that the repository will have insufficient resources to operate effectively • An irrecoverable loss of digital objects provokes concerns about the repository's competence 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	↔ R01	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Seek all available and relevant certifications to publicly demonstrate the repository's operational effectiveness • Establish outreach mechanisms to reflect where possible expectations of user communities 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R03	
Risk Name:	Business objectives not met	
Risk Description:	One or more integral business outcomes are not achieved, or are achieved inadequately	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to adequately preserve identified significant properties of ingested materials 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Define repository activities, policies and procedures with reference to corresponding objectives Establish mechanisms to regularly review, and if necessary, adjust, policies and procedures in order to ensure objectives are realised 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R04	
Risk Name:	Repository loses mandate	
Risk Description:	Basis for repository's existence is withdrawn or substantially altered, rendering it incompatible with business activities	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Scope of repository responsibility is changed by legislative amendment 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R07	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Seek all available and relevant certifications to publicly demonstrate the repository's operational effectiveness • Create a formal succession plan, to include the identification of trusted inheritors in the event of a loss of funding or staffing. 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R05	
Risk Name:	Community requirements change substantially	
Risk Description:	Community expectations or requirements are substantially altered, and no longer correspond to business activities.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • User community adopts new software system which provide no support for legacy data formats that were previously dominant • Community becomes increasingly unfamiliar with the semantics of a previously well-known and widely employed mark-up language. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R10 → R48 → R52	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish mechanisms to monitor requirements, expectations and knowledge base of user community • Document and review definition of understandability for each distinct user community 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R06	
Risk Name:	Community requirements misunderstood or miscommunicated	
Risk Description:	Repository is incapable of determining the expectations of its stakeholder communities and therefore unable to tailor business activities appropriately	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to identify that its user communities require the data to be delivered encoded as <i>abc</i> files in order for them to be usable 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R10 → R48 → R52	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish mechanisms to monitor requirements, expectations and knowledge base of user community Document and review definition of understandability for each distinct user community 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R07	
Risk Name:	Enforced cessation of repository operations	
Risk Description:	Repository is forced to cease its business activities	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository's responsibilities are withdrawn by legislative amendment • Repository is no longer financially sustainable 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Seek all available and relevant certifications to demonstrate publicly the repository's operational effectiveness • Create a formal succession plan, to include the identification of trusted inheritors in the event of a loss of funding or staffing. 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R08	
Risk Name:	Community feedback not received	
Risk Description:	Repository fails to solicit responses from the community regarding its level of service, or fails to provide mechanisms for this	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to identify that its user communities are increasingly incapable of using data encoded within the repository's chosen formats with the software that they principally employ 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R09	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Maintain appropriate mechanisms for the community to provide feedback, such as email, web-forms, telephone helpdesk and mail address Actively solicit feedback, allocating a proportion of staff time to community engagement 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R09	
Risk Name:	Community feedback not acted upon	
Risk Description:	Although feedback is received, it has no influence over repository's business activities	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to react to the fact that its user communities are increasingly incapable of using data encoded within the repository's chosen formats with the software that they principally employ 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R10 → R48 → R52	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish documented policies to acknowledge and react to community feedback 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R10	
Risk Name:	Business fails to preserve essential characteristics of digital information	
Risk Description:	Repository's preservation activities are insufficient to maintain the properties of its digital holdings that are of greatest significance to its user communities	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository aims to preserve images but chosen resolution is insufficient to display the level of detail required by user community 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R03 → R48 → R52	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Document significant properties of digital objects that will be maintained, based on community expectations and requirements 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R11	
Risk Name:	Business policies and procedures are unknown	
Risk Description:	Fundamentals of why and how repository's business activities are conducted are undocumented and unknown, or known only by specific individuals.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Procedures are known only to the individuals responsible • Policies and procedures are documented in MS Word files but stored only on an unshared partition of a workstation hard disk. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R03 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Conceive and create comprehensive management policies and procedures • Circulate documentation among repository staff and save to a shared drive or wiki. Circulate details of documentation locations. 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R12	
Risk Name:	Business policies and procedures are inefficient	
Risk Description:	Rationale and/or practical approach adopted for repository fail to demonstrate optimal efficiency.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository makes objects available one hour after dissemination request, but comparable organisations providing similar content are capable of doing so in 30 minutes. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Expose policies and procedures to regular review to determine their efficiency and appropriateness with respect to organisational goals Document the review process and findings Seek all available and relevant certifications to demonstrate publicly the repository's operational effectiveness Actively solicit feedback, allocating a proportion of staff time to community engagement 	
Risk Probability	Medium	
Risk Impact	Medium	

Risk Identifier:	R13	
Risk Name:	Business policies and procedures are inconsistent or contradictory	
Risk Description:	Rationale and/or practical approach adopted for particular objectives introduce obstacles to the successful completion of other objectives	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository requires staff to undertake quality assurance procedures for each object ingested, which takes on average 10 minutes, although an additional policy states that ingest should be completed in 10 minutes. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Expose policies and procedures to regular review to determine their consistency Document the review process and findings Seek all available and relevant certifications to demonstrate publicly the repository's operational effectiveness Actively solicit feedback, allocating a proportion of staff time to community engagement 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier:	R14	
Risk Name:	Legal liability for IPR infringement	
Risk Description:	Repository is legally accountable for a breach of copyright as a direct result of its business activities	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> An institutional repository disseminates e-journal content, and in doing so is guilty of copyright breach 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Information Compliance Manager/ Electronic Services Manager	
Risk Relationships:	→ R01 → R02 → R03	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Assess preserved materials to determine those to which intellectual property restrictions may apply Establish policies and procedures to follow in the event of IPR challenge 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R15	
Risk Name:	Liability for regulatory non-compliance	
Risk Description:	Repository is liable for failure to conduct its activities in accordance with industrial, business oriented or global regulation	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to conform to appropriate jurisdictional health and safety guidelines for employees 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	SOAS Directorate	
Risk Relationships:	→ R01 → R02 → R03	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Monitor regulatory framework and ensure policies and procedures correspond to their requirements and prohibitions 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R16	
Risk Name:	Inability to evaluate repository's successfulness	
Risk Description:	Repository is incapable of effectively determining the extent to which it has successfully achieved the business objectives.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository cannot demonstrate that submitted information has been ingested correctly and transformed into a complete and correct archival package • Repository has no way of demonstrating that the integrity and authenticity of its archived materials have been maintained 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Seek relevant external certification in order to demonstrate competence • Establish internal means of assessment including risk management 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R17	
Risk Name:	False perception of the extent of the repository's success	
Risk Description:	Repository assessments of success are flawed and indicate a level of performance inconsistent with reality	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Based on flawed end-user survey evidence solicited from just a small subsection of its user community, the repository is satisfied that its efforts are successful, although mechanism in place are actually insufficient to maintain the understandability, integrity and authenticity of archived information 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Seek relevant external certification in order to demonstrate competence Establish internal means of assessment including risk management 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R18	
Risk Name:	Loss of key members of staff	
Risk Description:	Individuals with roles, responsibilities or aptitudes vital to the achievement of objectives, part company with the repository, rendering the achievement of those objectives less straight forward.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository Support Officer, the sole individual with knowledge of the repository procedures, leaves to work within an alternative industry. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	HR/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R11	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Offer favourable terms and conditions Promote sharing of organisational responsibilities and duplication of skills in order to limit the impact of losing individual members of staff Ensure policies and procedures are widely circulated and not known only to selected individuals 	
Risk Probability	High	
Risk Impact	Medium	

Risk Identifier:	R19	
Risk Name:	Staff skills become obsolete	
Risk Description:	Staff members skills stagnate and are no longer current	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Staff are only capable of employing dated preservation strategies and are not trained in or exposed to emerging techniques or technologies. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	HR/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish means for staff skills refreshment, and for staff to employ skills of limited frequent use in test environment Carry out staff performance reviews to regularly determine skill levels and training requirements 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier:	R20	
Risk Name:	Inability to evaluate staff effectiveness or suitability	
Risk Description:	Repository is incapable of effectively determining the extent to which staff are capable of achieving business objectives	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository has no record of performance levels of individuals within its staff or means to effectively identify training requirements. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	HR/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish internal means of assessment including risk assessment Seek relevant external certification in order to demonstrate staff competence Undertake regular staff development reviews 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier:	R21	
Risk Name:	Budgetary reduction	
Risk Description:	Recession provokes budgetary reduction of government financed repository	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Unanticipated enforced expenditure, such as replacement of non-functioning server. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Finance/ Electronic Resources Manager	
Risk Relationships:	→ R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Develop self-sustainability with charged-for services • Seek assurances of level of budget • Solicit additional funding to enable achievement of objectives • Revise objectives if funding stream is insufficiently flexible • Maintain contingency fund where possible to meet shortfalls 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R22	
Risk Name:	Misallocation of finances	
Risk Description:	Repository allocates resources ill-advisedly, representing a poor investment, with benefits not proportional to expenditure	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Management invest heavily in software that offers functionality far in excess of operational requirements, when cheaper alternatives with limited, but adequate features are available 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Finance/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R21	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish policies and budgetary authorisation infrastructure to ensure appropriate use of repository funding 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R23	
Risk Name:	Financial shortfalls or income restrictions	
Risk Description:	Atypical operational circumstances result in budgetary shortfall or gap	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Unanticipated enforced expenditure, such as replacement of non-functioning server. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	Finance/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R21	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Manage budgetary allocations, bearing in mind commitments that are less than annual • Maintain contingency fund where possible to meet shortfalls 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R24	
Risk Name:	Hardware failure or incompatibility	
Risk Description:	System hardware is rendered incapable of facilitating current business objectives	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Server's power supply burns out, rendering hardware unusable. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R26	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Allocate a proportion of staff time to monitoring the ongoing suitability of repository hardware and assessing the potential value of emerging technologies 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R25	
Risk Name:	Software failure or incompatibility	
Risk Description:	System software is rendered incapable of facilitating current business objectives	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Software update breaks dependencies of other core software services 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R26 → R28 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Allocate a proportion of staff time to monitoring the ongoing suitability of repository software and assessing the potential value of emerging technologies 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R26	
Risk Name:	Hardware or software incapable of supporting emerging repository aims	
Risk Description:	Technical infrastructure, while adequate for meeting current needs, is incapable of meeting new requirements resulting from organisation's natural evolution	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Technical infrastructure is insufficiently scalable to handle an anticipated escalation in number of objects or requests 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Allocate a proportion of staff time to monitoring the scalability and compatibility of repository technologies with respect to emerging organisational aims. 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R27	
Risk Name:	Obsolescence of hardware or software	
Risk Description:	Core technology is no longer current or is incongruent with that of most comparable organisations	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Operating system is no longer supported by vendor, and therefore security updates are no longer made available 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Allocate a proportion of staff time to monitoring the ongoing availability of repository technologies and assessing the potential value of emerging technologies Pre-empt technological obsolescence with anticipatory investment 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R28	
Risk Name:	Exploitation of security vulnerability	
Risk Description:	Shortcoming in repository's security provisions is identified and used to gain unauthorised access	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Unpatched software security loophole hack • Intruder gains physical access to repository through a security door that is wedged open 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R31 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Document in detail and regularly evaluate policies and procedures for physical and software security in accordance with relevant standards, including back-ups • Compel users to change passwords frequently 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier:	R29	
Risk Name:	Accidental system disruption	
Risk Description:	Business activities are adversely affected by non-deliberate intervention, or intervention that was not intended to result in these outcomes.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Content is inadvertently deleted during ingest 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager/ IT	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Develop systems to limit extent to which non-valid interactions, or those that contradict policy can physically occur Ensure staff are well trained in the use of the systems Document procedures and circulate to all staff 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier:	R30	
Risk Name:	Deliberate system sabotage	
Risk Description:	Business activities are adversely affected by measures intended to have these effects	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • E-Terrorism or physical terrorism • Disaffected staff members maliciously vandalise systems 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Maintain, test and revise physical and software security in accordance with relevant standards • Monitor for suspicious activity that appears unusual • Remove staff members or ex-staff members that are likely to be disaffected are immediately revoke system privileges • Ensure as far as possible that all system interactions are reversible • Ensure availability of back ups at remote geographical location 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R31	
Risk Name:	Destruction or non-availability of repository site	
Risk Description:	Repository's physical premises are destroyed or rendered permanently or temporarily unusable	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Fire damage • Asbestos found within building 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	
Owner:	SOAS Directorate/ IT	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Maintain, test and revise physical and software security in accordance with relevant standards • Conceive and create disaster management policy • Establish alternative facilities capable of becoming operational base 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R32	
Risk Name:	Non-availability of core utilities	
Risk Description:	Key third party, externally originating services suffer from temporary disruption, and are not available.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Temporary disruption to repository's electrical supplies 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Estates / Purchasing	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish service level agreements or service commitments with utility provider • Establish internal means to nullify disruption wherever possible, such as installing a petrol electricity generator. 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R33	
Risk Name:	Non-availability of other third-party services	
Risk Description:	Other third-party services that the repository relies upon suffer disruption	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> The company supplying the repository's maintenance and support goes out of business 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish service level agreements or service commitments with third-party provider Establish internal means to nullify disruption wherever possible. 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier:	R34	
Risk Name:	Change of terms within third-party service contracts	
Risk Description:	Conditions with which third-party services are delivered change substantially.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Prices escalate 	
Nature of Risk:	Physical environment	X
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish lasting service level agreements with third-party provider with minimal scope for their subsequent renegotiation • Implement policy to seek alternative service providers capable of offering more favourable terms. 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R35	
Risk Name:	Inability to evaluate effectiveness of technical infrastructure and security	
Risk Description:	Repository is incapable of effectively determining the extent to which its technical infrastructure and security provisions are capable of facilitating business objectives.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository has no mechanisms to test security provisions or to evaluate the effectiveness of technological infrastructure 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	
	Hardware, software or communications equipment and facilities	X
Owner:	IT/ Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish internal means of assessment including risk management Seek relevant external certification in order to demonstrate competence 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R36	
Risk Name:	Structural non-validity or malformedness of received packages	
Risk Description:	Received packages fail to correspond to what repository expects or is capable of preserving	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Deposited content is encoded in a format that is unsupported by the repository 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R37	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish list of acceptable formats for submission • Communicate definition to depositors and producers • Maintain policy and procedure to determine whether package is disposed of, returned or ingested. 	
Risk Probability	Low	
Risk Impact	Low	

Risk Identifier:	R37	
Risk Name:	Incompleteness of submitted packages	
Risk Description:	Received packages do not contain information that is necessary to facilitate their preservation	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Submitted package lacks metadata information 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Establish list of acceptable formats for submission Communicate definition to depositors and producers Enforce completion of key fields during submission process Maintain policy and procedure to determine whether package is disposed of, returned or ingested. 	
Risk Probability	Low	
Risk Impact	Low	

Risk Identifier:	R38	
Risk Name:	Externally motivated changes or maintenance to information during ingest	
Risk Description:	Between the points of receipt and the creation of an archivable object the received package is subjected to changes that are not sanctioned or implemented by the repository.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> An intrinsic part of a submitted object is not included within the deposited package and instead is remotely referenced. During the process of ingest this remote object is subject to alteration by external actors. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40- R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Ensure that sole, complete physical and intellectual control is obtained over received material. Maintain policy and procedure to determine whether package is disposed of, returned or ingested. 	
Risk Probability	Medium	
Risk Impact	Low	

Risk Identifier:	R39	
Risk Name:	Loss of availability of information and/or service	
Risk Description:	Repository is unable to provide a comprehensive range of services or access to all of its information holdings for which access ought to be available.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository's servers fail, rendering a proportion of the collections inaccessible. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Ensure policies and procedures are conceived with due consideration of any service levels that the repository has committed to. Ensure software and hardware systems and preservation strategies are capable of meeting service levels. 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier:	R40	
Risk Name:	Loss of authenticity of information	
Risk Description:	Repository is incapable of demonstrating that information objects are what they purport to be	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository is unable to demonstrate the authenticity of preserved records that purport to be the work of a leading academic. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Ensure policies and procedures are conceived with due consideration of authenticity requirements Maintain and review policies and procedures to ensure adequate recording of provenance information to demonstrate that archived material represents authentic representation of what was initially deposited or received. Ensure software and hardware systems and preservation strategies are capable of preserving authenticity. 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier:	R41	
Risk Name:	Loss of integrity of information	
Risk Description:	Repository is incapable of demonstrating that the integrity of information has been maintained since its receipt, and that what is stored corresponds exactly with what was originally received.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Records documenting research data have been subjected to unauthorised or unanticipated changes, rendering them no longer representative of originally deposited content. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Ensure policies and procedures are conceived with due consideration of authenticity requirements Maintain and review policies and procedures to ensure adequate recording and comparison of checksums to demonstrate that archived information has suffered no loss of integrity since its deposit or receipt. Ensure software and hardware systems and preservation strategies are capable of preserving information integrity. 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R42	
Risk Name:	Loss of information provenance	
Risk Description:	Repository is incapable of demonstrating the provenance of its information holdings, and their traceability from receipt and through each interaction that they have been subject to	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository fails to document the preservation processes undertaken to convert a received Microsoft Word file into a plain text preservation document 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Ensure policies and procedures are conceived with due consideration of provenance requirements • Maintain and review policies and procedures to record the origins and lifecycle of archived packages and any transactions or interactions that they have been subject to • Ensure software and hardware and preservation strategies are capable of maintaining and recording provenance information 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R43	
Risk Name:	Loss or non-suitability of backups	
Risk Description:	Repository is unable to retrieve content or system state information from backup mechanism.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Faced with the loss of primary archival information, the repository discovers that it is unable to restore content because backup tapes are irreparably corrupted 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	IT	
Risk Relationships:	→ R01 → R02 → R40 – R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Maintain multiple copies of backups Store backed-up content in remote locations Undertake regular tests to determine whether systems and data can be restored from back up 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier	R44	
Risk Name:	Extent of what is within the archival package is unclear	
Risk Description:	Repository is incapable of determining the parts of the archival object that will be subject to ongoing preservation.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository fails to adequately define its archival package format 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R11	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Conceive definition for archival package 	
Risk Probability	Medium	
Risk Impact	Medium	

Risk Identifier	R45	
Risk Name:	Inability to validate the effectiveness of the ingest process	
Risk Description:	Repository is incapable of asserting that integrity and authentication were maintained during the process of ingesting digital information	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository fails to adequately define its archival package format 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish internal means of assessment including risk management • Seek relevant external certification in order to demonstrate effectiveness of ingest process 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier	R46	
Risk Name:	Preservation plans cannot be implemented	
Risk Description:	Repository is incapable of executing in practice the preservation planning it has undertaken	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository's planned emulation strategy requires technological expertise to implement that is unavailable within the staff, and insufficient resource exists to contract with third-party developers to undertake the work. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R48	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Aim to reflect the extent of technological, financial and human resources available within the repository as well as its organisational objectives when conceiving preservation plans Seek additional resources to facilitate plans 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier	R47	
Risk Name:	Preservation strategies result in information loss	
Risk Description:	Exposure of an archived object to preservation plans results in loss or damage to one or more of its significant characteristics	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository's proposed migration strategy results in loss of look and feel of archived documents, regarded as essential properties by user community 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40-56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Evaluate preservation strategies in testbed environment prior to execution Ensure procedures are reversible in event of unexpected or inappropriate results Define policies to describe the acceptable levels of loss tolerated by the repository 	
Risk Probability	Low	
Risk Impact	High	

Risk Identifier	R48	
Risk Name:	Inability to validate the effectiveness of preservation	
Risk Description:	Repository is incapable of effectively determining the extent to which its preservation activities are successful in terms of its business objectives.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository lacks means to demonstrate continued preservation, including understandability to the appropriate user communities. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish internal means of assessment including risk management • Seek relevant external certification in order to demonstrate competence 	
Risk Probability	High	
Risk Impact	High	

Risk Identifier	R49	
Risk Name:	Non-traceability of received, archived or disseminated package	
Risk Description:	Packages cannot be traced to corresponding packages or groups of packages from an earlier point within the repository's information lifecycle	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to maintain appropriate documentation describing the origins and lifecycle of an archived package and any transactions or interactions to which it has been subject 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Record appropriate provenance information, detailing interactions undertaken during receipt, ingest, preservation and dissemination processes Define policy to determine whether package should be disposed of, returned or retained 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R50	
Risk Name:	Metadata to information referential integrity is compromised	
Risk Description:	Associations between information packages and corresponding metadata are broken, and can no longer be traversed.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Documentation describing the repository's directory structure, which represents relationships between metadata and corresponding objects, is irretrievably lost. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R40 – R56	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Define, document and review policies and procedures describing the means by which metadata are associated with corresponding information packages and communicate the information widely within the organisation Define and review policies and procedures describing the metadata schema that will be used within the repository's activities 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R51	
Risk Name:	Documented change history incomplete or incorrect	
Risk Description:	Metadata recording interactions, implemented preservation strategies or procedures undertaken with respect to information packages are undocumented, or only partially documented.	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository fails to maintain appropriate documentation describing the origins and lifecycle of an archived package and any transactions or interactions that it has been subject to. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R43	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Ensure policies and procedures are conceived with due consideration of provenance requirements Maintain and review policies and procedures to record the origins and lifecycle of archived packages and any transactions or interactions that it has been subject to Ensure software and hardware systems are capable of maintaining and recording provenance information 	
Risk Probability	Low	
Risk Impact	Low	

Risk Identifier	R52	
Risk Name:	Non-discoverability of information objects	
Risk Description:	Metadata supporting information package discovery are insufficient	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository records discovery metadata to facilitate searching only by name of data set, but researchers within the community wish to search based on the physical location where the data was acquired. 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Determine extent of discovery mechanisms and searchable fields in consultation with designated community Communicate full range of available information discovery mechanisms to community Introduce alternative means for information discovery based on perceived shortcomings 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R53	
Risk Name:	Ambiguity of understandability definition	
Risk Description:	Repository is unable to describe what understandability means with reference to their stakeholder communities' expectations or requirements	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> Repository preserves information and associated metadata based on a perception of what is required by user communities that is not necessarily representative 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> Define and regularly review the concept of understandability with respect to community expectations, requirements and knowledge base Make understandability definition available to community and solicit their feedback 	
Risk Probability	Medium	
Risk Impact	High	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier	R54	
Risk Name:	Shortcomings of semantic or technical understandability of information	
Risk Description:	Repository fails to maintain appropriately complete representation information to facilitate information understandability	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Repository preserving social science data documents information about the SPSS format within which much of the content is encoded but fails to record the meaning of the acronyms used as field headings throughout these files 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Record or refer to appropriate representation information such as file format information, taking into account community understandability requirements • Solicit community feedback as to the extent to which preserved information remains understandable 	
Risk Probability	Low	
Risk Impact	Medium	

Risk Identifier	R55	
Risk Name:	Non-availability of information delivery services	
Risk Description:	Repository is unable to provide access to information packages	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Web server relied upon for dissemination of materials is off-line due to network services failure 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager/IT	
Risk Relationships:	→ R01 → R02	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Define policies describing available information delivery services and communicate these to the user community • Implement appropriate systems to meet delivery policy requirements • Establish sufficiently robust technical infrastructure to satisfy demands of proposed delivery service 	
Risk Probability	Medium	
Risk Impact	High	

Risk Identifier	R56	
Risk Name:	Inability to validate effectiveness of dissemination mechanism	
Risk Description:	Repository is incapable of effectively determining the extent to which its dissemination mechanisms are successful in terms of its overall business objectives	
Example Risk Manifestation(s):	<ul style="list-style-type: none"> • Web server relied upon for dissemination of materials is off-line due to network services failure 	
Nature of Risk:	Physical environment	
	Personnel, management and administration procedures	X
	Operations and service delivery	X
	Hardware, software or communications equipment and facilities	X
Owner:	Electronic Resources Manager	
Risk Relationships:	→ R01 → R02 → R16	
Risk Management Strategy(ies):	<ul style="list-style-type: none"> • Establish internal means of assessment including risk management • Seek relevant external certification in order to demonstrate effectiveness of dissemination 	
Risk Probability	High	
Risk Impact	High	

7.4 APPENDIX IV- Questionnaire

This is a short survey to evaluate SOAS Research Online (SOAS' research repository) - and to consult staff on how this service could be improved.

*

1. Did you know that SOAS had an online research repository?

- Yes, please go to question 2
- No, please go to the end of the survey

2. Have you used the repository to deposit your research in full text?

- Yes, please go to question 3
- No, please go to question 4

3. If you have used the repository, please comment on your experience (include any enhancements you would like to see)

4. If you have never used the repository, please specify your reasons for not using it

- Adding materials to the Repository is extra work
- Adding materials to the Repository is time consuming
- Using the Repository is too complicated
- There is no benefit for me adding materials to the Repository
- Publishers' policies do not allow deposit of work
- Other (please specify

5. How important to you are the following statements about the benefits offered by SOAS Research online?

	Very important	Important	Not important
It makes my research available to a worldwide audience free of charge	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Not important
It makes my research available faster than the traditional	<input type="radio"/> Very important	<input type="radio"/> Important	<input type="radio"/> Not important

publishing process
 It makes available types of materials that have not been made available through the traditional publishing process e.g. large datasets, rich media formats such as audio, video and graphic images
 It makes my research available with very little effort on my part and without having to maintain a website of my own
 It makes my research available to SOAS students
 It provides long-term preservation of my digital research materials
 It makes it easy for other people to search for and locate my work e.g. via Google
 It preserves the research of

Very important

Important

Not important

Very important

Important

Not important

Very important

Important

Not important

Very important

Important

Not important

Very important

Important

Not important

Very important

Important

Not important

**the institution
in a
convenient,
central place.
It provides a
showcase of
SOAS'
research
output**

Very important



Important



Not important

6. My concerns about submitting to SOAS Research online include...

- I worry it might constitute prior publication and prevent me from submitting my work to journals
 - I am hesitant to submit my work to a repository that does not have a formal review policy or other quality control process
 - I prefer that only my formally published works be available for public consumption
 - I would be worried about the risk of plagiarism
 - I am concerned that works submitted to SOAS Research online will not have citation value and will not count towards formal assessment
 - I already submit to another repository e.g. a subject one
- Other

7. Do you have any other comments to make about SOAS Research Online?