# SUSTAINABILITY OF DIGITAL RESOURCES FRAMEWORK (SDRF)

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## Contents

# 1. Purpose

As part of the activities undertaken by the AHRC-funded Living Legacies 1914-18 Engagement Centre, Information Studies at the University of Glasgow has developed a framework and methodology for evaluating the digital sustainability of community-generated content for the FWW centenary, and beyond. The Sustainability of Digital Resources Framework (SDRF) forms part of a larger study undertaken by Information Studies at the University of Glasgow. The study seeks to promote a better understanding of the digital legacy produced by projects on the First World War (FWW).

This report documents the aims and objectives, scope, methodology and outputs relating to the development and deliverables of the SDRF, as well as guidance on how to use the framework to evaluate the sustainability of digital resources.

# 2. Aims and Objectives

The primary aims of the SDRF is to inform policy recommendations and interventions in key digital sustainability issues; and identify existing and emerging digital sustainability 'pathways' in order to understand and address the specific sustainability challenges of community-generated digital content. In doing so, the SDRF aims to contribute to a preliminary understanding around the cultural value of digital investment in First World War materials.

The objectives of the SDRF have been identified as follows:

- To review extant frameworks and methods for assessing digital sustainability, and synthesise – where possible – knowledge, assessment criteria and outputs that derive from existing projects in this space.
- To evaluate the suitability of different research methods and analytics tools that can facilitate collection of data and extraction of information necessary for digital sustainability assessment, providing recommendations for automated collection of quantitative data where possible.
- To develop a rubric of criteria, indicators and metrics for evaluating the extent to which digital resources are sustainable.

# 3. Methodology

The SDRF methodology is based on a broad definition of digital sustainability, whereby the latter is perceived "as encompassing the wide range of issues and concerns that contribute to the longevity of digital information […] and provides the context for digital preservation by considering the overall life cycle, technical, and socio-technical issues associated with the creation and management of [a] digital item."[1] In defining the methodology for the SDRF, the digital outputs of FWW commemoration activities have been considered as part of digital ecosystems, which involve "not only the technical components, but also social elements" – such as individuals and organisations – that in turn hold "know-how and experience related to the creation and use of a digital artifact"[2]. This is particularly pertinent for community-generated content and its digital legacy, which has been identified as "challenging to secure"[3] and critically endangered because "there are no agencies responsible for them or those agencies are unwilling or unable to meet preservation needs."[4]

Hence, our approach to designing the framework was guided by three principles:

- **Contextualisation** – the SDRF should assess dimensions across the information lifecycle; and complement, facilitate and contextualise digital preservation activities.
- **Encompassment** – the SDRF should incorporate evaluation methods, criteria and metrics that cover both technical and social aspects of digital sustainability.
- **Adaptability** – the SDRF should allow for flexible implementation so that communities and agencies responsible for the production of digital content can adapt the framework to suit their needs.

In order to incorporate these principles into the development of the SDRF, we made three key decisions:

- To review existing tools and frameworks for digital sustainability, some of which are already familiar to communities and agencies, and agglomerate otherwise disparate digital sustainability criteria across multiple sources into one resource. Where necessary, new and adapted criteria that are tailored to the needs of community-generated content should be introduced.

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[1] Bradley, K. (2007). Defining Digital Sustainability. *Library Trends*, *56*(1), 148-163. Retrieved from Project MUSE database, https://muse.jhu.edu/article/223247

[2] Stuermer, M., Abu-Tayeh, G., and Myrach, T. (2017). Digital sustainability: basic conditions for sustainable digital artifacts and their ecosystems. *Sustainability Science*, *12*(2), 247-262.

[3] Brookfield, K. (2018). The People's Centenary: a perspective from the Heritage Lottery Fund. *Cultural Trends*, *27*(2), 119-124. DOI: 10.1080/09548963.2018.1453455

[4] Digital Preservation Coalition. (2018). The 'Bit List' of Digitally Endangered Species. Revision 2. Retrieved from https://dpconline.org/docs/miscellaneous/advocacy/1932-bitlist2018-final/

- To consider digital preservation as one aspect of the SDRF that – alongside its own criteria – is framed by social and socio-technical elements and actions that contribute to the overall sustainability of digital outputs.

- To structure the framework as a hierarchy consisting of major digital sustainability dimensions, each of which being further stratified into criteria, indicators and metrics so that flexibility and adaptability can be facilitated.

# 4. Review and contribution of existing work

The framework synthesises and builds on eight extant works, which provide tools and methods for digital sustainability. Each of these works reviewed represents a different facet of digital sustainability, and has contributed to the framework with criteria, metrics, research methods, insights on structure, or a combination of the above. Specifically, the SDFR builds on the following works:

### TIDSR: Toolkit for the Impact of Digitised Scholarly Resources[5]
The toolkit has been developed by the Oxford Internet Institute "in order to present a framework and best practices in measuring usage and impact of digitised scholarly resources." However, the recommendations and practices that it provides are applicable to both digitised and born-digital materials. Impact assessment of community-generated content is pertinent in the context of the SDRF, as – alongside uncertainty over its sustainability - there is documented lack of evidence on the impact that this content actually has on user communities.[6] TISDR has contributed to the SDRF with research methods and analysis tools that can be used to automate or semi-automate the collection of evidence required for sustainability criteria and metrics.

### Sustainability of Digital Outputs from AHRC Resource Enhancement Projects[7]
The Arts & Humanities Research Council published in 2007 a report and methodology, originally developed to assess the digital sustainability of "resources funded through the AHRC's Resource Enhancement Scheme from November 2000 until May 2006." The report highlights issues around technical sustainability, but also includes criteria relating to content availability, evidence of value, institutional support, publicity and promotion – which have been incorporated into the SDRF.

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[5] https://www.oii.ox.ac.uk/research/projects/tidsr/?blog

[6] For instance, Ian Anderson has noted that "one recommendation for funders would be to require applicants to provide more detail on expected impacts, especially regarding usage levels, type of engagement, and success criteria" – see: Anderson, I.G. (2018). Understanding the digital legacy of the World War I: Cymru1914. *Cultural Trends, 27(2)*, 99-118. DOI: 10.1080/09548963.2018.1453443

[7] http://www.ahrcict.rdg.ac.uk/activities/review/sustainability08.pdf

## Sustaining Our Digital Future: Institutional Strategies for Digital Content[8]

The study was conducted in 2013 by ITHAKA S+R – part of a not-for-profit organization helping the academic community use digital technologies to preserve the scholarly record and to advance research and teaching in sustainable ways – with funding from the Jisc-led Strategic Content Alliance. The deriving report provides insights on support necessary to sustain digital content beyond the end of a grant; as well as how institutions think about and plan for sustaining and enhancing the value of their digital collections. The report also includes the "Sustainability Health Check Tool for Digital Content Projects" which has contributed several criteria and metrics to the SDRF.

## Guidelines for sustainable online resources[9]

The study, conducted in 2013, provides sustainability principles for ESRC-funded online resources and is "specifically concerned with how to maximise the value of online resources […] by making explicit the consideration of sustainability from the very outset of each project." A report on the study has been published by the ReStore team at National Centre for Research Methods (NCRM), University of Southampton, which covers many dimensions of sustainability, including content quality, Intellectual Property Rights (IPR), as well as technical guiding principles for sustainable web resources.

## Sustainable Web Design: Resources for building a cleaner, greener internet[10]

The web resource has been developed by MightyBytes – a Chicago-based digital marketing agency – and provides information and sustainability principles so that online resources are user-friendly and energy-efficient. The accompanying Ecograder tool11 evaluates online resources against these principles, using four key areas that underpin sustainable digital ecosystems – namely Findability, Performance optimisation, Design & User experience, and Green hosting. This perspective aligns with the methodological approach for developing the SDRF, and provides a dimension of sustainability that has not been considered in any of the previous works reviewed.

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[8] https://sr.ithaka.org/wp-content/uploads/2015/08/Sustaining_Our_Digital_Future.pdf

[9] http://www.restore.ac.uk/guidance/downloads/documents/Guidance-Release_V1.4.pdf

[10] https://sustainablewebdesign.org/

[11] https://ecograder.com

## 5. Development

A preliminary list of 26 assessment areas and 73 criteria were collated from the sources above. The list can be found in Appendix B, with demarcation of the sources that each area and criterion originate. The preliminary list collates the recommendations found in the extant works reviewed, which formed the basis for identifying assessment areas and criteria to be considered for the SDRF. As such, the list includes duplicate entries and overlapping areas, which have been synthesised into the Sustainability Assessment Rubric (Appendix A). Following deduplication, the assessment rubric consists of a set of 55 metrics, organised in a hierarchy of indicators, criteria and sustainability dimensions (see Section 6 for more details on the SDRF structure).

The SDRF hierarchy has been adapted from framework developed by Hasan and Abuelrub[12] (Figure 1) for assessing the quality of websites. Although the scope of the SDRF is much broader than Hasan and Abuelrub's framework, the structure and rationalisation of the latter is pertinent to digital sustainability and therefore suited the purposed of the SDRF well.
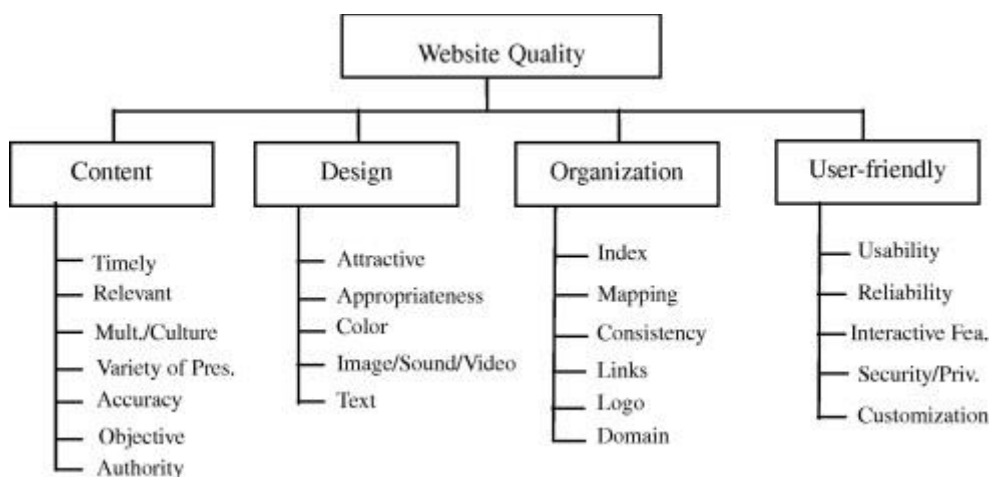


*Figure 1. Hierarchy of the framework proposed by Hasan and Abuelrub[12] for assessing the quality of websites.*

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[12] Hasan, L., & Abuelrub, E. (2011). Assessing the quality of web sites. *Applied Computing and Informatics, 9*(1), 11-29. doi: https://doi.org/10.1016/j.aci.2009.03.001

# 6. Structure

The SDRF has been formulated as a hierarchy of Sustainability Dimensions (Figure 2), which are further stratified into Criteria, Indicators and Metrics:

- Digital sustainability *Dimensions* are the highest-level entities in the SDRF hierarchy. They represent the four main areas against which digital resources are evaluated for sustainability.

- *Criteria* describe the factors that affect (directly or indirectly) the sustainability of a Dimension; and describe the major principles by which each Dimension is evaluated.

- Each criterion comprises of one or more *Indicators*, which provide succinct and specific measures of digital sustainability.

- Each indicator features one or more *Metrics*, which represent evidence-based measurements or observations of digital sustainability qualities. All metrics consist of two parts: possible values and suggested research methods.
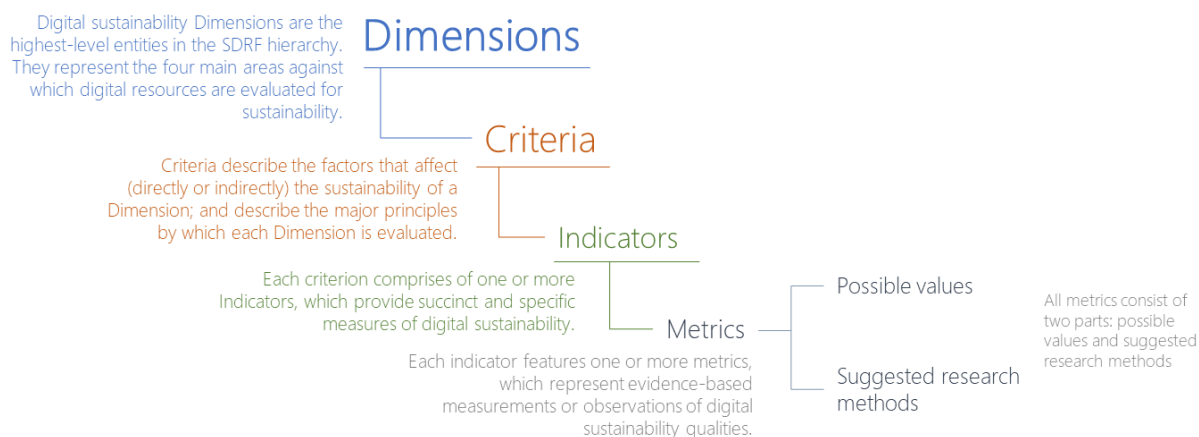


*Figure 2. The SDRF hierarchy explained.*

Combining the recommendations from the review of extant work with the SDRF objectives and guiding principles (see Section 3), four sustainability Dimensions are identified in the framework:

- **Content**: evaluates the extent to which the digital content produced by community projects is sustainable, through giving or maintaining *currency* to the information provided by members[13]; through its *relevance* for user and business needs; the perceived *value* of the content – i.e. its relative worth, utility, or importance; and by assessing its *authority* – the "credibility or the level of user confidence"[14] of the content identified by the existence of such information as Organisation details, Ownership etc.

- **Technology:** evaluates the to which the technology used to produce, store, present and disseminate the content aligns with technical sustainability criteria.

- **Digital Preservation:** evaluates the extent to which the digital preservation principles and practices have been considered and/or implemented. The criteria, indicators and metrics for this Dimension draw substantially from the Digital Preservation Handbook published by the Digital Preservation Coalition[15].

- **Promotion:** evaluates the extent to which activities to promote the content to user communities have been undertaken as a means to facilitate sustainability through communication and/or sharing of the content via events, public documents, popular and social media.

Figure 3 offers a summary view of the sustainability assessment rubric, while Appendix A provides a full view.



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[13] Rajagopalan, R., & Sarkar, R. (2008). A digital ecosystem approach to using ICT for sustainable development in communities. Paper presented at the 2nd IEEE International Conference on Digital Ecosystems and Technologies. doi:10.1109/DEST.2008.4635172

[14] Hasan & Abuelrub, *ibid*.

[15] https://www.dpconline.org/handbook

# 7. Research methods

A selection of research methods drawn from TISDR have been used to collect data as part of the SDRF implementation. These include:

- Content analysis
  *Content analysis refers to a general set of techniques useful for analysing and understanding collections of text.  There is considerable work done in this area, which predates Internet research by decades.  In the context of understanding the impact of digitised collections and websites, one particularly relevant type of content analysis is the analysis of news articles.  These news articles may be about the collection, or they may be about the type of resource in general.*[16]

- Interviews
  Interviews can be defined as a qualitative research technique which involves "conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation."[17]

- Referrer analysis
  *Referrer analysis is a process by which you can determine more specifically how a digital resource is being used. You can find out, for example, if a collection or site is being used in a taught course or if a resource recommended by an academic library. Referrer analysis makes use of several webometric methods, including web log analysis and link analysis.*[18]

- Direct observation
  *Direct observation, also known as observational study, is "a method of collecting evaluative information in which the evaluator watches the subject in his or her usual environment without altering that environment. Direct observation is used when other data collection procedures, such as surveys, questionnaires, etc., are not effective; when the goal is to evaluate an ongoing behavior process, event, or situation; or when there are physical outcomes that can be readily seen."*[19]

- Webometrics
  *Webometrics is (a) a set of quantitative techniques for tracking and evaluating the impact of web sites and online ideas and (b) the information science research field that developed these ideas. Webometric techniques include link analysis, web mention analysis, blog analysis and search engine evaluation, but from the perspective of digital library evaluation the main method is link analysis.*[20]

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[16] http://microsites.oii.ox.ac.uk/tidsr/kb/content-analysis

[17] Boyce, C. & Neale, P. (2006) "Conducting in-depth Interviews: A Guide for Designing and Conducting In-Depth Interviews", Pathfinder International Tool Series

[18] http://microsites.oii.ox.ac.uk/tidsr/kb/referrer-analysis

[19] Holmes A. (2013) Direct Observation. In: Volkmar F.R. (eds) Encyclopedia of Autism Spectrum Disorders. Springer, New York, NY.

[20] http://microsites.oii.ox.ac.uk/tidsr/kb/webometrics

# 8. Implementation and Use case

The SDRF has been designed as a flexible, adaptable framework that allows for tailored implementation to fit the specific purpose of a project wishing to evaluate the sustainability of its digital outputs; or of agencies wishing to assess the sustainability of digital outputs they manage/fund.

Table 1 provides an overview of the SDRF elements that are mandatory and optional, as well as cardinality – i.e. the number of elements that are required as a minimum.

*Table 1. Requirements and cardinality of SDRF elements*

| SDRF ELEMENT | REQUIREMENT | CARDINALITY |
|---|---|---|
| *Dimensions* | Mandatory | All 4 dimensions need to be assessed |
| *Criteria* | Mandatory | All criteria need to be assessed. In cases where a criterion is not applicable to a specific project or context, a note should be made, and a justification provided. |
| *Indicators* | Optional | At least one indicator per criterion should be assessed. Indicators not relevant to a specific project or context can be omitted, ideally with a note made and a justification provided. |
| *Metrics* | Optional | At least one metric per indicator should be assessed. Metrics not relevant to a specific project or context can be omitted, ideally with a note made and a justification provided. |

A use case of adapting and implementing the SDRF as a questionnaire administered to community projects that generate digital content can be found in Appendix C. The questionnaire was used in the Living Legacies Phase 2 project in order to collect data from agencies that create or manage community-generated digital content relating to commemoration activities of the First World War centenary. Some indicators and metrics have been omitted and the wording has been adapted to the needs of the project.

## Appendix A: Sustainability Assessment Rubric

| DIMENSION | Criteria | Indicators | Metrics | Possible Values | Description | Suggested Research method(s) |
|---|---|---|---|---|---|---|
| CONTENT | Currency | Updates | Last update date | Date | The date the resource was last updated, as identified on the web pages. | DIRECT OBSERVATION |
| | | | Current status | Active | The resource is currently being maintained and updated. | DIRECT OBSERVATION |
| | | | | Archived | The resource has been archived, or is accessible online but no longer updated. | DIRECT OBSERVATION |
| | Relevance | Project objectives | Objectives specified | Yes/No | Does the resource clearly state the objectives, which it was developed to address? | DIRECT OBSERVATION |
| | | Project history | History described | Yes | Does the resource clearly describe the context within which it was developed? | DIRECT OBSERVATION |

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|---|---|---|---|---|---|
| | Audience | Audience identified | Yes/No | Does the resource specify the user base / designated community / audience for which it has been developed? | DIRECT OBSERVATION |
| | Value | Value to audience identified | Yes/No | Does the resource provide information on the perceived value to its user base / designated community / audience? | DIRECT OBSERVATION |
| Authority | Organisation details | Details provided | Yes/No | Does the resource provide details of the organisation responsible for its development? | DIRECT OBSERVATION |
| | Ownership | Ownership specified | Yes/No | Does the resource specify the owner of the digital materials of which it comprises? | DIRECT OBSERVATION |
| | Partners | External partners specified | Yes/No | Does the resource specify external stakeholders and partners that have been involved in its development and maintenance? | DIRECT OBSERVATION |
| | | Funding body details provided | Yes/No | Does the resource provide details of the source/body that funded its development? | DIRECT OBSERVATION |
| | Agreements | Funding agreement specified | Yes/No | Does the resource specify or provide details of the agreement(s) under which it was funded? | DIRECT OBSERVATION |

| | | Collaboration/partnership agreement specified | Yes/No/NA | If external partners involved, does the resource specify or provide details of the agreement(s) under which the partnership operated? | DIRECT OBSERVATION |
|---|---|---|---|---|---|
| | | Development/ maintenance agreement specified | Yes/No | Does the resource provide details of agreement(s) that its development/maintenance should abide by? | DIRECT OBSERVATION |
| | Ongoing support | Contacts provided | Yes/No | Does the resource provide contact details for someone to respond to user queries? | DIRECT OBSERVATION |
| Quality | Availability and location | Content available | Yes, entirely | The resource is available at the expected URL; all pages are accessible; and any digital artefacts documented are available to the user community | DIRECT OBSERVATION |
| | | | Partly, with 404 errors (missing pages) | The resource is available at the expected URL, but there are missing pages producing 404 errors when accessed | CONTENT ANALYSIS |
| | | | Partly, with artefacts missing | The resource is available at the expected URL, but there are digital artefacts documented that are not available to the user community | CONTENT ANALYSIS |
| | | | No | The resource is not available at the expected URL | CONTENT ANALYSIS |

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|---|---|---|---|---|
| Impact | Impact metrics collected | Yes/No/Unknown | An indication of whether impact metrics as indicated below are being / have been collected | INTERVIEWS |
| | Analytics produced | Yes/No/Unknown | Whether analytics are / have been produced, with an indication of metrics such as number of contact accesses; total audience reached; user loyalty and engagement | INTERVIEWS |
| | Referrals | Link analysis results | Link analysis "is a process by which you can determine more specifically how a digital resource is being used. You can find out, for example, if a collection or site is being used in a taught course or if a resource recommended by an academic library. Referrer analysis makes use of several webometric methods, including web log analysis and link analysis." (Source: TIDSR) | REFERRER ANALYSIS |

| | | | | | |
|---|---|---|---|---|---|
| | | Usage in research, teaching and other contexts | Webometrics analysis | Webometrics is (a) a set of quantitative techniques for tracking and evaluating the impact of web sites and online ideas and (b) the information science research field that developed these ideas. Webometric techniques include link analysis, web mention analysis, blog analysis and search engine evaluation (Source: TIDSR) | WEBOMETRICS |
| | | Awards won | Yes/No/NA | Does the resource specify any awards won for its content, performance, innovation etc. | DIRECT OBSERVATION |
| TECHNOLOGY | Implementation and Development | **Type** | Type of resource development | Static | The resource been developed as a set of static HTML pages | CONTENT ANALYSIS |
| | | | | Dynamic | The resource has been developed using server-side scripting | |
| | | **Platform** | Implementation platform used | Plain HTML | Plain HTML | CONTENT ANALYSIS |
| | | | | Scripting | The resource has been implemented as a set of server-side scripts | |
| | | | | CMS | The resource has been implemented using a Content Management System | |

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| | | | Repository | The resource forms part of a repository's collections | |
| | | Implementation platform ownership | Open source | The source-code of the implementation platform is free and openly available to everyone | DIRECT OBSERVATION |
| | | | Proprietary | The implementation platform legally remains the property of the organisation, group, or individual who created it. | |
| | | | Free | The implementation platform is licensed at no cost, but it is closed source. | |
| Maintenance | Responsibility | Type of organisation responsible | Public body | The responsibility for maintaining the resource belongs to a public organisation. | CONTENT ANALYSIS |
| | | | Academic institution | The responsibility for maintaining the resource belongs to an academic institution. | |
| | | | Commercial company | The responsibility for maintaining the resource belongs to a commercial company. | |

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|---|---|---|---|---|---|
| | | | Repository | The responsibility for maintaining the resource belongs to a repository. | |
| | | | Individual | The responsibility for maintaining the resource belongs to an individual person. | |
| | Planning | Maintenance plan created | Yes/No | Whether a maintenance plan has been generated for sustaining the web resource | INTERVIEWS |
| Usability | Design | Design consistent across pages | Yes/No | The resource consists of web pages that follow the same design consistently throughout. | DIRECT OBSERVATION |
| | | User-driven navigation | Yes/No | The structure encompasses the formation and placement of link vocabulary (link titles, names, phrases, etc); availability of core links on every page to facilitate easy navigation; visibility of each navigational entity in individual pages and across the entire site, and flexibility to accommodate future changes. | DIRECT OBSERVATION |
| | | Accessibility features | Results of Web accessibility evaluation tool | Evaluates whether the resource meets accessibility guidelines for use by disabled people | CONTENT ANALYSIS |
| | | Friendly error pages | Yes/No | Evaluates whether user-friendly 404 pages error pages have been created, or if the (non user-friendly) default 404 server message is displayed. | CONTENT ANALYSIS |

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|---|---|---|---|---|---|
| | | Use of single CSS | Yes/No/No CSS used | See RESTORE guidelines p. 30 for details. It is recommended to use a single CSS file to control the look, feel and style of the entire web site. | CONTENT ANALYSIS |
| | Browsing | Memorable URLs | Yes/No | The URL of a web resource should not be longer than 78 characters | DIRECT OBSERVATION |
| | | Web browser compatibility | Compatibility analysis results | In order to be confident that a web page will be displayed correctly on a user's web browser, browser compatibility tests must be carried out | CONTENT ANALYSIS |
| | | Character encoding | Yes/No | See RESTORE guidelines p. 29 for details. Indicator measures whether CE is declared or rendering web resources. | CONTENT ANALYSIS |
| Findability & Optimisation | Searching | Content search available | Yes/No | Whether the resource provides functionality to search through its contents | DIRECT OBSERVATION |
| | | Keyword optimisation and SEO | Yes/No | Evaluates whether Search Engine Optimisation has been used | CONTENT ANALYSIS |
| | Green | Optimised for Green browsing | Yes/No | Evaluates whether sustainable, green optimisation for digital resources has been used. | CONTENT ANALYSIS |

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|---|---|---|---|---|---|
| **PRESERVATION** | Ongoing support | Funding | Support post-funding specified | Yes/No | Evaluates whether financial support has been identified for ongoing maintenance of the resource after end of project | INTERVIEWS CONTENT ANALYSIS |
| | | Staff | Support staff identified | Yes/No | Evaluates whether staff resources have been allocated for ongoing support (either external funded or as art of organisation's operational budget) | INTERVIEWS |
| | Best practice | Documentation | Metadata standards used | Yes/No/NA | evaluates whether any records or artefacts in the resource are documented using metadata standards | DIRECT OBSERVATION |
| | | File formats | Open formats used | Yes/No/NA | Evaluates whether any artefacts as part of the resource are stored in open formats | DIRECT OBSERVATION INTERVIEWS |
| | | Persistent identifiers | Persistent identifiers used | Yes/No/NA | Evaluates whether persistent identifiers are minted for any artefacts as part of the resource are stored in open formats | DIRECT OBSERVATION |
| | | Web harvesting and archiving | Resource harvested and/or archived digitally | Yes/No | Evaluates whether the resource is harvested and archived by a digital archive, such as the Internet Archive | DIRECT OBSERVATION |

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|---|---|---|---|---|---|
| **IPR** | | Copyright | Copyright identified | Yes/No | The resource provides copyright specifications for content and digital artefacts | DIRECT OBSERVATION |
| | | Trademarks | Trademarks identified | Yes/No/NA | The resource provides details of any trademarks applicable to content or artefacts | DIRECT OBSERVATION |
| | | Disclaimer | Disclaimer / Terms and Conditions specified | Yes/No | The resource specifies the terms and conditions for use of its content and artefacts | DIRECT OBSERVATION |
| **PROMOTION** | Channels | Events | Direct promotion at relevant events | Yes/No | Whether evidence exists that the resource has been promoted at events, such as conferences, meetings, workshops etc. | DIRECT OBSERVATION INTERVIEWS |
| | | Documents | Inclusion of the site URL in print media and promotional materials | Yes/No | Whether the resource has been included in print media or promotional materials | DIRECT OBSERVATION CONTENT ANALYSIS INTERVIEWS |
| | | | Project reports available | Yes/No | Whether reports generated by the project are publicly available | DIRECT OBSERVATION CONTENT ANALYSIS INTERVIEWS |

| | | Documented in journal/conference papers | Yes/No | Whether the resource and the project have been documented in academic publications | DIRECT OBSERVATION CONTENT ANALYSIS INTERVIEWS |
|---|---|---|---|---|---|
| | Social media | Advertised on social media and weblogs | Yes/No | Whether the resource is advertised on social media. Evaluated with results from automated analysis. | CONTENT ANALYSIS |
| | | Dedicated social media presence | Yes/No | Whether the resource/project have a dedicated presence on social media. | CONTENT ANALYSIS |
| | Web | Placement of links on cognate websites | Yes/No | Whether links to the resource are present in other resources | REFERRER ANALYSIS |
| | | Ability to share/embed resource content via different means | Yes/No | Whether the resource provides functionality to embed and/or share its content(s) on other resources | CONTENT ANALYSIS |
| | | Placement in search engine results | Yes/No | Whether the resource is indexed by search engines and appears in search results | DIRECT OBSERVATION |
| | Public media | Coverage in other public media | Yes/No | Whether the resource has featured in other public media, such as newspapers articles; television programmes; radio shows | CONTENT ANALYSIS |

# Appendix B: Preliminary list of assessment areas and criteria

| SOURCE | ASSESSMENT AREA | CRITERIA |
|---|---|---|
| Sustainability of Digital Outputs from AHRC Resource Enhancement Projects (AHRC) | PURPOSE | Suitability and relevance of content |
| | | Contextualisation |
| | AVAILABILITY AND MAINTENANCE | Location of resources |
| | | Maintenance plan and responsibility |
| | | Availability issues identified |
| | TECHNICAL SUSTAINABILITY | Long-term maintenance of functionality |
| | | Technical issues identified |
| | UPDATING AND CURRENCY | Content maintenance |
| | | Content updates |
| | | Issues identified |
| | VALUE | Value to audience identified |
| | USAGE STATISTICS | Collection |
| | | Findings |
| | INSTITUTIONAL SUPPORT | Provision post-funding |

| | | |
|---|---|---|
| | PUBLICITY & PROMOTION | Methods |
| | | Outcomes |
| Sustaining Our Digital Future: Institutional Strategies for Digital Content (ITHAKA S+R) | CURRENT OWNER | Collection/resource owner identified |
| | EXTERNAL PARTNERS | External partners named |
| | | Involvement in management |
| | | Agreements |
| | ONGOING SUPPORT | Staff identified |
| | | Funding/funder identified |
| | UPDATES | Frequency of content updates |
| | | Frequency of interface updates |
| | PRESERVATION | Metadata used |
| | | Preservation formats used |
| | | IPR issues defined |
| | IMPACT | Impact metrics |
| Guidelines for sustainable online resources (ReStore, National Centre for Research Methods) | TECHNICAL CHARACTERISTICS | Resource type |
| | MAINTENANCE | Type of organisation responsible |
| | PRESERVATION | Web harvesting and archiving |

| | | |
|---|---|---|
| | | Indexed by search engines |
| | QUALITY | Referrers |
| | | Content quality |
| | | Consistency of quality |
| | | Audience identified (user base) |
| | | Descriptive metadata |
| | | Superfluous material |
| | | Quality of external links |
| | | Content typography |
| | | Frequency of content updates |
| | USAGE STATISTICS | Web resource usage statistics collected |
| | PROMOTION | Direct promotion at relevant events |
| | | Inclusion of the site URL in print media and promotional materials |
| | | Placement of links on cognate websites |
| | | Advertising on social media and weblogs |
| | | Ability to share/embed resource content via different means |
| | | Dedicated social media preserce |

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|---|---|---|
| | **IPR** | Copyright for artefacts identified |
| | | Trademarks identified |
| | | Terms and conditions available |
| | **TECHNICAL ISSUES** | Type of development platform used |
| | | Search Engine Optimisation |
| | **ACCESSIBILITY** | Reliable fault-free access |
| | | Disability |
| | **USABILITY STANDARDS** | Design consistency |
| | | User-driven navigation |
| | | Memorable layout |
| | | Memorable URLs |
| | | Web browser compatibility |
| | | Character encoding |
| | | Use of CSS |
| | | Modularisation |
| | | File naming |
| | | Descriptive hyperlinks |

| Sustainable Web Design: Resources for building a cleaner, greener internet (MightyBytes) | FINDABILITY | Content search available |
| | | Keyword optimisation and SEO |
| | | Customer Friendly 404 Error |
| | | Broken links |
| | | 301 permanent redirects |
| | PERFORMANCE OPTIMISATION | Google Page Speed Insights |
| | | HTTP Requests |
| | | Shared Resources |

## Appendix C: SDRF-based questionnaire

# Digital Sustainability Evaluation Survey

**About your project**

Please provide us with information about your project. We will not share these details with third parties, and your responses will be anonymised in all reports and publications.



Which Living Legacies community project are your responses in this survey associated with?

Your answer

What is the status of this project?

○ Completed and closed, no more work is being carried out

○ Completed, but some work is still being carried out

○ Active, the project is still running

## Digital Content Sustainability

In this section, you will be responding to criteria related to the DIGITAL CONTENT that the project has produced or is still producing. The criteria aim to assess whether the digital resources created by the project meet good practice for sustainability.
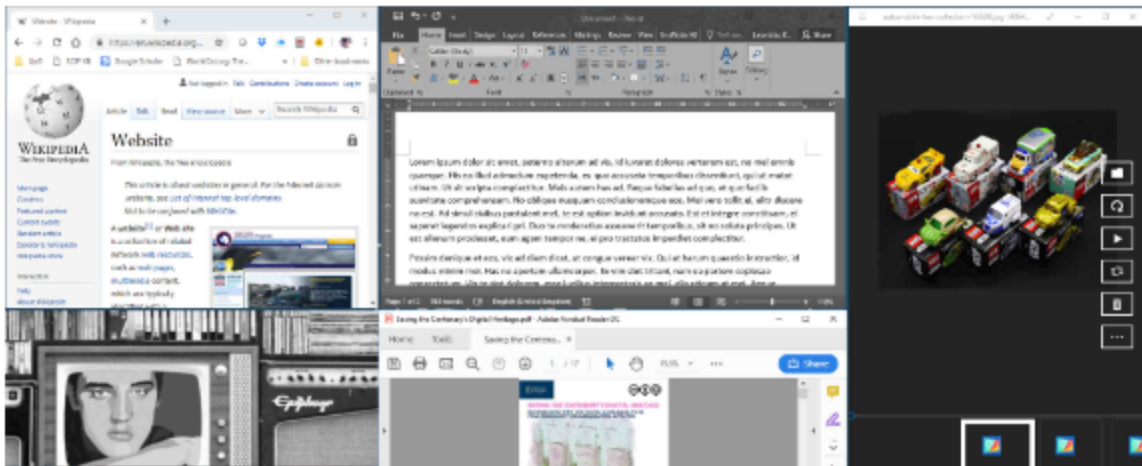


In the table below, tick the boxes to indicate the types of digital content that the project has produced, and the current status for each type. (Choose all that apply)

| | Produced by the project | Active: currently maintained and updated | Archived: no longer updated but maintained in computer storage (e.g. on external hard drive) | Publicly available (e.g.user community can access this type via a website) |
| --- | --- | --- | --- | --- |
| Documents (e.g. text, spreadsheets, PowerPoint presentations) | ☐ | ☐ | ☐ | ☐ |
| Images and Photographs (including graphics and logos) | ☐ | ☐ | ☐ | ☐ |
| Audio and video materials | ☐ | ☐ | ☐ | ☐ |
| 3D objects and models | ☐ | ☐ | ☐ | ☐ |
| Website / Web pages | ☐ | ☐ | ☐ | ☐ |

## Thinking about the project's digital content as a whole, is any of the following information available to the user community? (Choose all that apply)

| | Yes, this information is available on a website | Yes, this information is available by visiting a physical location (e.g. in brochures distributed at your organisation) | No, this information is not available to the community but the project has recorded it (e.g. in reports that are not public) | No, this information is neither available to the community nor documented by the project |
|---|---|---|---|---|
| The objectives, which the digital content has been developed to address (e.g. the project digitised photographs for online publication, which the community would not be able to easily access otherwise) | ○ | ○ | ○ | ○ |
| The context within which the digital content has been created (e.g. information about the project's background, the gaps that it is meant to fill) | ○ | ○ | ○ | ○ |
| The audience for which the digital content has been developed (e.g. for researchers, the public, family of soldiers) | ○ | ○ | ○ | ○ |
| The value that the digital content aims to provide to the community (e.g. online access to rare photographs, opportunities for research) | ○ | ○ | ○ | ○ |

## Thinking about the team responsible for the project's digital content, is any of the following information available to the user community? (Choose all that apply)

| | Yes, this information is available on a website | Yes, this information is available by visiting a physical location (e.g. in brochures distributed at your organisation) | No, this information is not available to the community but the project has recorded it (e.g. in reports that are not public) | No, this information is neither available to the community nor documented by the project | Not applicable |
|---|---|---|---|---|---|
| Details of the organisation responsible for its development | ○ | ○ | ○ | ○ | ○ |
| Information about the ownership of the digital content | ○ | ○ | ○ | ○ | ○ |
| Any external stakeholders and partners that have been involved in its development and maintenance | ○ | ○ | ○ | ○ | ○ |
| Details of the source/body that has funded its development | ○ | ○ | ○ | ○ | ○ |
| Ongoing support for community members requiring assistance with the digital content (e.g. Contact details for someone to respond to user queries) | ○ | ○ | ○ | ○ | ○ |

## Is the digital content produced by the project accessible to the community? (Choose one)

○ Yes, through a dedicated project website

○ Yes, via a digital repository or digital archive

○ Yes, but not online (e.g. community members need to visit a physical location to access the digital content)

○ No, but the project is planning to make digital content available to the community before its closure

○ No, and there are no plans to make the digital content available to the community

○ Other: _____

## Technical Sustainability

In this section, you will be responding to criteria related to the TECHNOLOGY that the project has used to develop digital content. The criteria aim to assess whether the technology used by the project meets requirements for sustainability. If you don't know the answer to some of these questions, you can leave them blank and - if possible - provide a name for a contact person who is familiar with the project's technology use at the end of this survey.

What kind(s) of digital storage media does the project currently use to store its digital content? (Choose all that apply)

☐ Removable storage media (e.g. DVDs, Blue-Ray disks, USB memory sticks)

☐ Portable storage media (e.g. laptops, smartphones and tablets, external hard disk drives)

☐ Stand-alone computers (e.g. Desktop PCs and Apple Macs)

☐ Don't know

☐ Other: _____

Does the project keep backups of the storage media where digital content is stored?

○ Yes

○ No

○ Don't know

○ Other: _____

Who is responsible for maintaining the technology used by the project for storing digital content? (Choose one)

○ A public organisation

○ An academic institution

○ A commercial company

○ A repository or digital archive

○ An individual person

○ No responsibility has been assigned

○ Other: _____

Has a plan been developed for ensuring ongoing maintenance for the project's technology? This can include backup schedules; checks for storage integrity and virus protection; access management for authorised users; protection against physical damage and environmental hazards. (Choose one)

○ Yes

○ No

○ Don't know

○ Other: _____

## Digital Preservation

In this section, you will be responding to criteria related to the actions undertaken by the project for maintaining its digital content for the long-term. The criteria aim to assess whether digital preservation requirements and practice have been considered and/or established. If you don't know the answer to some of these questions, you can leave them blank and - if possible - provide a name for a contact person who is familiar with the project's digital preservation planning and action at the end of this survey.



## Has the project identified and/or secured financial support for the ongoing maintenance of digital content post end-of-project?

○ Yes

○ No

○ Don't know

○ Other: _____

Has the project identified and/or secured financial support for the ongoing maintenance of digital content post end-of-project?

○ Yes

○ No

○ Don't know

○ Other: _____

Has the project identified and/or secured staff resources for ongoing support with digital content? (Either externally funded or as part of an organisation's operational budget)

○ Yes

○ No

○ Don't know

○ Other: _____

Does the project provide metadata or other descriptive information for its digital content, so that the user community can understand, interpret and discover the content?

○ Yes

○ No

○ Don't know

○ Other: _____

## Sustainable file formats

For digital content to remain accessible in the long term, sustainable file formats should be used. The table below provides sustainable file formats for common digital content types.

To answer the next question, consult the table first then specify if the project uses sustainable file formats for the digital content it has developed.

| Digital content type | Sustainable file formats |
|---|---|
| Text documents | • Open document Text Format (ODT)<br>• Portable Document Format/Archival (PDF/A-2) |
| Photographs and graphics | • Portable Network Graphics (PNG)<br>• Tagged Image File Format (TIFF)<br>• JPEG 2000 (JP2) |
| Vector graphics and illustrations | • Scalable Vector Graphics (SVG) |
| Audio files | • Audio Interchange (AIFF)<br>• WAVeform Audio (WAV) |
| Video files | • Motion JPEG 2000 (MJP2 or MJ2)<br>• MPEG-4 |
| Presentations and slides | • OpenDocument Presentation Format (ODP)<br>• Portable Document Format/Archival (PDF/A-2) |

## Looking at the table above, please specify below if the project uses any sustainable file formats for storing different digital content types.

| | Yes: the project stores this content type in a sustainable file format | Partly: the project stores some of this content type in a sustainable file format | No: the project doesn't use this file format for this content type | Not applicable: the project hasn't produced files of this content type | Don't know |
|---|---|---|---|---|---|
| Text documents | ○ | ○ | ○ | ○ | ○ |
| Photographs and images | ○ | ○ | ○ | ○ | ○ |
| Graphics and illustrations | ○ | ○ | ○ | ○ | ○ |
| Audio | ○ | ○ | ○ | ○ | ○ |
| Video | ○ | ○ | ○ | ○ | ○ |
| Presentations and slides | ○ | ○ | ○ | ○ | ○ |

Is the project's digital content harvested and archived by a public web archive (e.g. the Internet Archive)?

○ Yes

○ No

○ Don't know

○ Other: _____

Are there legal, legislative, contractual and/or financial reasons to keep the project's digital outputs for the long-term? (Choose all that apply)

☐ Compliance with legal responsibilities, e.g. Freedom of Information

☐ Contractual terms and conditions of funding that require digital outputs to be maintained for a specified period of time or indefinitely

☐ Digital outputs of commercial value, or that are named in current projects or forthcoming project proposals

☐ Don't know

☐ Other: _____

Does the project provide its user community with the terms and conditions (including copyright and licensing) that apply to access and use of the digital content?

○ Yes

○ No

○ Don't know

○ Other:

## Promotion of Digital Content

In this last section, you will be responding to criteria related to activities that the project has undertaken to promote the digital content. The criteria are based on digital sustainability theories, which postulate that promotion activities raise community engagement with digital content and contribute to its sustainability through community-led initiatives.



Thinking of the project's promotional and audience engagement activities, please indicate if any of the following channels have been used.

| | Yes | No | Not yet, but it is planned to use this channel | Don't know |
|---|---|---|---|---|
| Events: the project and its digital content have been promoted at conferences, meetings, workshops etc. | ○ | ○ | ○ | ○ |
| Public media: the project and its digital content have been publicised in public media, such as newspapers articles; television programmes; radio shows | ○ | ○ | ○ | ○ |
| Academic press: the project and its digital content have been documented in academic publications, such as journals and conference papers/posters | ○ | ○ | ○ | ○ |
| Social media: the project has a dedicated presence on social media, through which it promotes its activities and digital content | ○ | ○ | ○ | ○ |