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MEETING SUSTAINABLE GOALS THROUGH IMPROVED DIGITAL ACCESSIBILITY OF CONTENT: A LANDSCAPE REVIEW IN THE UNIVERSITY CONTEXT

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Abstract

The goal of this paper is to deepen the concepts and practice of digital accessibility to people with disabilities. In particular it builds on the wider concept of sustainability. It also addresses the impact on libraries, the relevant standards and processes and finally reports an overview of the state of the art in implementation through interviews with librarians.

Keywords

Digital accessibility, Sustainable goals, Sustainable development, Accessible formats, Artificial Intelligence, Accessible alternative texts. Web accessibility, Digital content

1. *Introduction*

Digital accessibility might be defined as the practice of ensuring that digital content and products are accessible to people with disabilities. This includes people with visual impairments, hearing impairments, mobility impairments, cognitive impairments, and other disabilities. The goal of this paper is to deepen the concepts and practice of accessibility and follows on from a paper by Merlo and Akeroyd (2022). In particular it builds on the wider concept of sustainability, as mentioned in the 2002 paper and as reflected the UN Agenda 2030; it also addresses the impact on libraries, the relevant standards and processes and finally reports an overview of the state of the art in implementation through interviews with librarians.

2. *The Context: Sustainability*

The world is more and more focused on digital information and e-learning, and this has resulted in a permanent commitment to inclusion and sustainability (Morriello, 2023).

Indeed, it is only through following the goals of sustainable development, using the concepts of environment, territory and common good that we can hope for a real change of direction. The 2030 Agenda for Sustainable Development[1] is an action programme for people, the planet and prosperity, signed in September 2015 by 193 countries UN members. It is shaped by the 17 specific goals for Sustainable Development[2]. The goals are related to essential questions as: poverty, climate change, hunger, accessibility, inclusivity, etc. Through the SDGs, countries of the world collectively pledged to eradicate poverty, find sustainable and inclusive development solutions, ensure everyone's human rights, and generally make sure that no one is left behind by 2030. The members are committed to reach all the goals within the year 2030.

Sustainable development and accessibility are also a core principle of the Treaty of the European Union and a priority objective for the EU's internal and external policies. The EU has thus made a positive and constructive contribution to the development of the 2030 Agenda; the members are encouraged to implement the SDGs in all their policies.[3]

[1] https://sdgs.un.org/2030agenda
[2] Sustainable Development Goals, SDGs http://www.un.org/sustainabledevelopment/

[3]https://international-partnerships.ec.europa.eu/policies_en

Indeed, all EU Member States should by now have transposed the European Accessibility Act[4] into national law and as of 28 June 2025, companies must ensure that newly marketed products and services covered by the Act are accessible.

The consequence of these global actions is what might be described as the concept of an integrated vision of sustainability - not only environmental sustainability, which is unquestionably important but also economic and social sustainability to fight inequalities.

Thus, whilst we must satisfy our present needs without compromising the capacity of future generations to satisfy their own needs, it is also very important to consider the concept of social sustainability, especially around libraries and information, of inclusive information and technology for education, and improving physical and digital accessibility - thus ensuring that the digital resources meet the needs of disabled users and staff.

We argue that we need to inspire and engage Universities to work on sustainability as according to the UN Agenda 2030 (par. 4) towards quality education and inclusivity for all.

Education, knowledge, and culture are all important components in an analysis of sustainable development in societies.

We also need to remember that libraries are the Institutions appointed to preserve the cultural heritage and thus the EU on September the 7th 2022 released the Report Strengthening cultural heritage resilience for climate change – Where the European Green Deal meets cultural heritage[5] .

A group of experts studied the impact of climate change on cultural heritageand identified numerous threats to all forms of cultural heritage, with the aim of ensuring its protection and reinforcing, in addition, its resilience.

Their report presents a set of key recommendations for policy makers. Among the latter, the expert group recognizes the importance of improving and aligning the public policy strategies of the different actors responsible for cultural heritage and climate change, and of the integration of culture into environmental sustainability policies at all levels.

So cultural heritage is central to the fulfilment of the *European Green Deal*[6] and the goals of *NetZero* by 2050. Universities, libraries and other participants in digital information are clearly very involved in implementing the policy in terms of the preservation of legacy of traditions.

Finally, accessibility is also one of the main goals for Libraries in helping to defeat a lack of education, to ensure quality in education and equitable access to knowledge and information.

Thus Libraries Can Drive Progress Across the Entire UN 2030 Agenda - IFLA[7] shows what some Italian libraries are doing in the context of accessibility, open science and open access publishing, including publishing and providing eBooks and eContent in order to ensure high levels of user accessibility.

3. Digital Accessibility Processes

We are here focussing mainly on one aspect of accessibility - content, and how it might be made accessible in the context of the visually impaired. Given any digital content, the processes towards digital accessibility can be summarised as primarily ensuring that it is in an appropriate format and with the requisite semantic richness to be able to be rendered by the available assistive technologies.

There are several actions that a content creator et al might need to undertake to meet digital accessibility needs. These include:

- Ensure that content is available in an accessible format.
- Provide alternative text for images, that is text which describes the content of an image.
- Use clear and concise language, which can also make digital content easier to read for everyone, as well as those with disabilities.
- Avoid the use of colour coding which can be helpful for some people but can also be a barrier for others.

[4] Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019

[5] European Commission, Directorate-General for Education, Youth, Sport and Culture, *Strengthening cultural heritage resilience for climate change – Where the European Green Deal meets cultural heritage*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2766/44688

[6] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

[7] https://www.ifla.org/wp-content/uploads/2019/05/assets/hq/topics/libraries-development/documents/ifla-poster-sdgs.pdf

There are in fact at least two more accessibility challenges which universities face but which we have not dwelt on.

Firstly, is the problem of the accessibility of the underlying software systems and platforms. Clearly unless these are inherently accessible, then, however well-structured the content that they deliver might be, there will always be issues for the disabled user. But platform accessibility is a specialist topic deserving of its own analysis and is not addressed here.

Similarly, much has been written about web accessibility as an issue in its own right (the W3C Web Accessibility Initiative[8] site offers information about web accessibility, including design and development resources, testing and evaluation templates, and teaching and advocacy resources) and thus we have not dwelt on that, though it should be noted that HTML files, and HTML5 especially, are inherently accessible friendly given the structuring that goes into them[9].

4. Content in the Academic Context

The extent of content available in the university content is probably no different to that available in many corporate organisations: that is, it includes the spectrum of information from highly structured data such as might be found in business systems right through to the poorly organised and relatively unstructured text developed, for example, by individual teachers to support their students.

It is important to note that, in this spectrum, that more structured content will be easier to make accessible whilst less structured content will need more management and attention.

Indeed, perhaps the biggest problem facing universities is that of ensuring that learning resources needed to support courses and eLearning can be made accessible to enable a rich learning experience on behalf of, for example, a visual impaired student.

Content can also be separated into that which is internally created (sometimes referred to as grey literature) and that which is licensed or bought in. Whilst the accessibility of the first is dependent on good internal policies and processes, the second is more likely to be dependent on the extent to which a supplier or publisher is aware of their accessibility responsibilities.

Fortunately, the latter seems increasingly to be the case, with many publishers adopting accessibility policies, or even employing accessibility experts, to ensure that the published content meets international standards.

Digital accessibility in eBooks and journal articles, which is crucial for making content available to users with impairments, is becoming more prevalent.

Cambridge University Press, for example, has engaged with various accessibility initiatives, such as: working with the RNIB Bookshare[10] by donating digital files to the collection which ensures that accessible content reaches print disabled learners as fast as possible; the ASPIRE project which aims to standardise accessibility statements so that readers know the benefits they can exploit or the barriers they need to work around when accessing texts in digital format and embedding accessibility in our development process[11]

4.1 Open Access Context

As well as the informally published content of elearning resources, many library systems of universities are increasingly involved in the promotion and management of Open Access journals and books, for free access, thus enabling knowledge sharing of practices, methodologies, and research data, and the consequent need for greater attention to formats, digital accessibility and sustainability, see for example, Valzano (2020), Ayris (2021) and Lippincott (2017).

This is especially true of Italian libraries where several factors (Valzano, 2020) have encouraged Universities to establish publishing enterprises in order to challenge the hegemony of established "traditional" journals.

This has been brought about by adopting new Open Access business models, including publishing so-called Gold and Diamond journals.

Thus, a special issue of SCIRES-IT on Open Science (Virginia, Cigola, & Gargiulo, 2020) notes that the Italian library systems were the first promoters of Open Access and Open Science and

[8] https://www.w3.org/WAI/
[9] https://developer.mozilla.org/en-US/docs/Learn/Accessibility/HTML
[10] https://www.rnibbookshare.org/cms/
[11] https://www.cambridge.org/accessibility

have joined, along with the CRUI[12], the Berlin Declaration.

Indeed *SCIRES-IT- SCIentific RESearch and Information Technology* itself emerged from the "*CASPUR-CIBER Publishing - Eco-sustainable publications*"[13] Publishing System, which in turn was established within the publishing project "*Eco-sustainable Open Access Publications*"[14] and was launched in 2009 in partnership with CASPUR[15] -CIBER[16], SIBA[17] and other structures of the University of Salento, with the aim of developing an open access electronic publishing platform for the consortium universities affiliated to CASPUR and CIBER.

SCIRES-IT thus itself, an excellent example of Diamond journal publishing, like many other Italian open access journals. And systems such as SINM[18] (National Information System for Mathematics) created back in the nineties by the Italian mathematical libraries and ESE[19] (Electronic Scientific Publishing) of the University of Salento are also good examples.

This universal drive towards libraries as publishers also creates another body of content for which the university holds the rights and puts the onus on them ensure that they are meeting the accessibility requirements of their user base and publishing in line with the international policies and state regulations noted in Section 2.

In summary, the key issue for universities is perhaps that of ensuring that content owned by the University and especially that supporting eLearning within learning platforms is accessible either at the outset or as it is being delivered. And there are now processes and tools which are available which can enable that and which we have summarised as audits, formats and tools.

5. *Audits*

A possible first stage in an accessibility programme for a university is that of undertaking an accessibility audit, whereby the current corpus of content – whether licensed or created - can be assessed against a given set of criteria for accessibility.

Audits are key to understanding the current position and making subsequent plans to remediate where there are obvious shortfalls.

To that end this can either be a matter of bringing in experts in accessibility or more likely and as well, deploying accessibility audit tools which can systematically check all content (at some speed) and provide guidance not only as to the extent to which content meets accessibility criteria but what needs to be done to overcome those.

This in turn can lead to a clear plan for systematic improvements to the content base, albeit it may be a matter of time and resource before that can be achieved so that some prioritisation may be needed.

Thus, the University of Michigan has identified an archival body of print publications which have been digitised, but which will only be addressed for improved accessibility over a period on an "as and when" needed basis given their low levels of usage (Merlo & Akeroyd, 2022).

Such pragmatic approaches are probably a necessary part of the accessibility plan.

There are tools which are available which can both audit content and make improvements -- if those are easy enough - such as make a change in file format, copying to a more accessible file format which will enable improvements in accessibility.

Three systems stand out in this regard: these are Blackboard Ally which is available as an extension of the Blackboard learning management system or as standalone system. An alternative is the Brickfield Education Labs software which provides a plugin for Moodle and can audit accessibility, generate accessible formats automatically and suggest improvements and apply bulk updates to fix unclear or missing text

[12] CRUI (Conferenza dei Rettori delle Università Italiane) - Conference of Italian University Rectors).

[13] CASPUR-CIBER Publishing - Eco-sustainable publications (CASPUR-CIBER Publishing - Pubblicazioni ecosostenibili): http://www.ceit-otranto.it/index.php/editoria-elettronica/18-caspur-ciber-publishing-info

[14] Eco-sustainable Open Access Publications (Pubblicazioni Open Aces ecosostenibili) see: http://www.ceit-otranto.it/index.php/editoria-elettronica/104-pubblicazioni-oa-info.

[15] CASPUR (Consorzio interuniversitario per le Applicazioni di Supercalcolo Per Università e Ricerca) – Interuniversity Consortium for Supercomputing for University and Research (1992-2013).

[16] CIBER (Comitato Interuniversitario Basi dati ed Editoria in Rete) is an Interuniversity Committee for Database and electronic-publishing, founded by CASPUR (1999-2013).

[17] Coordinamento SIBA (Servizi Informatici Bibliotecari d'Ateneo) coordinates the University Library IT services.

[18] SINM (Sistema Informativo Nazionale per la Matematica) - National Information System for Mathematics (1990-2010). See:http://www.ceit-otranto.it/index.php/progetti/317-quarto-seminario-sinm).

[19] ESE (Editoria Scientifica Elettronica) – Salento University Publishing. Retrieved from http://siba-ese.unisalento.it/

for links, add image descriptions and fix html tags. Both these systems are effectively positioned to improve content added to the institutional learning systems which has been internally authored for student consumption.

Thirdly is Siteimprove which is a tool that breaks down accessibility issues into manageable tasks, tracks progress toward compliance, and provides recommendations and guidance. Siteimprove is available as a Chrome extension.

6. Formats

As we have noted the digital transformation in publishing has enabled improved access particularly through the delivery of machine-readable content; thus, many learning resources, ebooks, journals and websites are now accessible through their initial creation.

Underlying these improvements has been the emergence of formats which are able to work with the screen readers necessary for a good user experience.

Some key digital accessibility formats used by screen readers include:

- HTML: HyperText Markup Language (HTML) is the standard language used to create websites and web content. Screen readers can interpret HTML elements, such as headings (H1, H2, etc.), lists (ordered and unordered), links, and image alt text, to help users navigate and understand the content.
- PDF Accessibility: Portable Document Format (PDF) is commonly used for sharing documents, but it can be challenging for screen readers to interpret. PDF accessibility involves structuring the document with tags, headings, alternative text for images, and other elements, making it more accessible to screen readers.
- EPUB: Electronic Publication (EPUB) and especially Epub3 is a digital eBook format that supports text reflow, making it easier for screen readers to adjust the text layout according to the user's preferences. EPUBs can include accessible features such as navigational landmarks and semantic structure.

In summary, three formats have emerged which could be considered standard or at least ubiquitous for documents. These are:

- PDF, or more specifically PDF UA (User Accessible)[20] which provides an optimal format for appropriate PDF readers;
- Epub or ePub3[21], where accessibility has been built in at the outset through the adoption of the long-standing Daisy standard;
- HTML which, given its inherently structured approach and its extraordinary widespread adoption, means that it has generated a suite of appropriate screen and web readers to enable its effective deployment.

PDF UA, it could be argued, has come about because there is so much PDF content available that it is almost a prerequisite that there is a way of reading it. But the fundamental problem with PDF is that it is essentially an image format designed to provide prints which simulate the original. To achieve greater accessibility implies that the PDF must be tagged and publishers have begun to tag original PDFs at the production stage or even earlier in the process. But there remains a lot of PDFs on campus which lack accessibility - see Lazar (2022).

EPub3 has been widely used as a generic ebook format and more recently has been used for journals and journal articles. It requires a level of tagging for its presentation and management and hence given its alignment with the DAISY format is a strong candidate for accessibility. It has been widely adopted for ebook dissemination and is recommended by, for example, the Accessible Books Consortium.[22]

There are also electronic braille formats. Electronic Braille formats are digital representations of braille text that can be read using refreshable braille displays. These formats allow blind and visually impaired individuals to access and interact with digital content through touch. Unlike traditional printed braille on paper, electronic braille is displayed dynamically on a

[20]https://www.adobe.com/uk/acrobat/resources/document-files/pdf-types/pdf-ua.html#:~:text=The%20PDF%2FUA%20standard%20%2D%20formally,that%20support%20people%20with%20disabilities.

[21] https://www.w3.org/TR/epub-overview-33/

[22]https://www.accessiblebooksconsortium.org/en/web/abc/publishing

braille display, where small pins or cells raise and lower to form braille characters, allowing users to read the content line by line.

Those commonly used, include:

1. BRF (Braille Refreshable File)[23]: BRF is a digital file format that contains braille characters in electronic form. It is specifically designed for use with refreshable braille displays. BRF files can be created from various sources, such as plain text, word processing documents, or electronic books, and they allow blind users to read and navigate through the content using their braille display.

2. BRL (Braille ASCII): BRL is a simple ASCII representation of braille characters. It uses a combination of dots and characters to represent each braille cell, making it possible to represent braille text in a standard text file. While BRL files can be read using screen readers or other text-based applications, their primary purpose is to provide braille content to braille embossers or braille displays.

7. Accessibility Challenges

Technologies have become available which ensure that accessible versions of documents can be made available as an output of the relevant production processes and a good percentage of published content will thus now be accessible at birth. But a parallel problem is that of dealing with content which is already published or has been published, without due attention to accessibility.

Such publications will need a process of transformation into an accessible format - a process commonly referred to as remediation. How easy or problematic that is probably depends on what is available as the initial file - whether that is machine readable or whether it's a consequence of OCR, which often results in poor quality original text. Remediation involves passing the file through a format tool which will point out problems that exist, and, if they are straightforward, then rectify them or in other cases leave it for a human operator so to do.

There are other cruder systems but which are becoming common place, such as accessibility tools built into Microsoft Word which ensures that any created document has a good level of accessibility at the outset. It can also apply to PowerPoints or similar content again, to a crude level. And a simple zoom facility might enable some users to make more of a document than otherwise and similarly, effective colour contrasts can help those with other site related disabilities.

Many universities have now deployed remediation systems to help with meeting statutory obligations. Remediation is often done on a one-off basis - the consequence of student requests and can be achieved if a source file can be made available. However, there is a clear benefit in working towards total accessibility, ensuring that the whole corpus of content delivered to students is made accessible. This is probably becoming the case where new material is acquired. But there continues to be considerable levels of content where that is simply not the case - particularly historical content and content which falls outside the “bought in” or “licenced in” through the acquisitions process. Thus, a lot of internal content developed by teachers and researchers for public consumption might reside on institutional repositories or the like and may well be without appropriate accessibility levels.

Thus, when creating digital content, it is crucial to adhere to accessibility guidelines and use accessible formats to ensure that screen readers can accurately convey the information to visually impaired users. This includes providing meaningful alternative text for images, using proper headings and lists, and structuring content in a logical and navigable manner.

It should be noted that this analysis is a probably an oversimplification of what is the interplay of a mixture of software and hardware functions.

So that software solutions might need to take account of different operating systems or network connectivity whilst hardware might need to address basic functionality such as buttons or tabs through to differing devices such as mobile phones, tablets, personal computers etc. In that sense making a document accessible might be an on-going process.

Thus, Botelho (2021) argues that accessibility is a process without an end point and will always need attention, despite the clear advance that digital technology has brought about., He identifies eight barriers to good accessibility which include, inter-alia, training, languages (in the sense of spoken languages), operating systems and the

[23] BRF stands for Braille Ready Format and is sometimes referred to as "Formatted Braille" https://www.braillists.org/wp-content/uploads/ho_x023.docx

technology itself. He argues that "it is most fruitful to think of and manage technology as a process rather than a state".

8. Tools

Digital accessibility tools are designed to ensure that individuals with disabilities can properly access and use websites and web applications.

These tools target specific steps in the digital accessibility process and often work in conjunction with other assistive technologies.

A summary includes:

- Screen readers: software programmes that read aloud the text on a screen. There are multiple screen readers available or different platforms but then most common are probably Jaws and NVDA which are maximised for the visually impaired though Adobe can also be used as a screen reader and there many other text to speech engines.
- Text-to-speech software is similar to screen readers but can be used with any type of digital content, not just ebooks.
- Zooming software: Zooming software allows users to magnify the text on a screen. This can be helpful for people with low vision or who have difficulty reading small print.
- Colour contrast tools: Colour contrast tools can be used to adjust the contrast between the text and background of a digital document. This can be helpful for people with colour blindness or who have difficulty reading text that is not well-contrasted.
- Braille displays: Braille displays are devices that translate text into Braille. This can be helpful for people who are blind or have low vision.

Universities may be reluctant to be specific on recommending any given tool as users will come with their own preferences and it is the requirement of the institution to support them in that regard – but nevertheless many if not most universities will provide guidance on, and maybe access to, the most common screen readers.

9. Artificial Intelligence

AI has the potential to revolutionise digital accessibility and make it easier for people with disabilities to access and use digital content.

As AI continues to develop, it is likely that we will see innovative ways to use AI to improve digital accessibility. It could be used to improve digital accessibility in several ways.

- To automate accessibility testing: AI can be used to scan websites and applications for potential accessibility barriers. This can help to identify and fix accessibility issues more quickly and easily.
- To generate alternative text: AI can be used to generate alternative text for images.
- To create accessible content: AI can be used to create accessible content, such as ebooks and videos.
- Personalize accessibility settings: AI can be used to personalize accessibility settings for individual users. This can help users to find the settings that work best for them.

Some specific examples of how AI is being used to improve digital accessibility include:

- Cloud Vision API[24]: The Google Cloud Vision API can be used to generate alternative text for images.
- Amazon Transcribe[25]: Amazon Transcribe is a service that can be used to create transcripts of audio and video files.
- Microsoft Azure Cognitive Services[26]: Microsoft Azure Cognitive Services offers AI services that can be used to improve digital accessibility. These services include text-to-speech, image recognition, and speech recognition.

10. The University Experience

The above provides both the technical and legal perspective surrounding digital accessibility but only touches upon the potential challenges of implementation. To address that we investigated, through interviews and desktop research, how universities generally, and Italian universities in particular, are setting about implementing good accessibility practices.

[24] https://cloud.google.com/vision
[25] https://docs.aws.amazon.com/transcribe/
[26] https://azure.microsoft.com/en-gb/products/ai-services/ai-vision/

Little has been reported on this topic though Lazar (2022) covers actions during the pandemic.

From our investigations it became clear that there are several key and common issues which need to, and are being, addressed. We have elaborated upon those below:

I **Policy concerns**. As a starting point, Universities have had to establish accessibility policies which both inform their legal position and ensure the right degree of compliance with the legal protocols which we have detailed above. In addition, such policies also act as an aid in the implementation of accessibility in that they provide a framework within which all parties are expected to operate. Indeed, one university disabilities champion made the point that his institution is so large and diverse it is almost impossible for any individual or even a team to adequately deal with all the issues that might arise within the University. Thus, policies represent both a legal approach in seeking to ensure that all individuals conform with accessibility guidelines but can also support an educative function for the majority of staff. That function might include providing seminars, guidance and support material as well as dealing with specific accessibility problems.

II **Tools and processes**. As we have noted, a mixture of software tools might be provided to help individual students or subscribed to at a more corporate level to support in the provision of accessible content. It seems that universities will commonly provide access to the most prominent software solutions including screen readers such as JAWS and NVDA. But beyond that, clearly many students will have individual preferences or experiences of using different software and these might be dealt with by helping support that provision rather than duplicate it. In the end it is almost impossible to deal with everything. It must also be acknowledged that most students will have to have a high degree of self-reliance given the need to attend lectures and self-learn.

One University told us about the provision of an accessibility hub; a physical space whereby all the software tools are made available within a secure environment - so that a visually impaired students did not have to compete with regular users for machine time or support.

Provision of emerging tools such as Microsoft Word accessibility checkers is also felt to be important in that it puts the onus back onto individual academics to ensure that their content is accessible and in effect points out deficiencies to them at the point of creation.

III **Staffing.** We know that most universities have now established disability units, albeit they may be on a shared basis, which seems to be common in France and perhaps elsewhere. But larger universities will most certainly provide a small team or even a considerable team, which is specifically charged with dealing with, and supporting students with disabilities. Staff will need both the experience and expertise in a range of accessibility solutions the skill is in recognising and having in place systems that can specifically identify those with disability needs and ensure that those needs are being met at all levels and all aspects of student life.

IV **Implementation**. What becomes clear from our discussions is that there is no endpoint whereby a university can be said to be wholly accessible. As systems improve and as accessibility improves, more challenges will emerge and more must be done. The idea of annual audits seems to have become prevalent and through those institutions can determine where they are in the cycle. Thus, more actions can be made in a subsequent period. An audit provides some kind of measure around the success or otherwise of investments. This clearly makes good sense.

Implementation is thus another dimension to the digital accessibility problem, but our view is that universities are making good strides, whether that is the consequence of national and local policies, whether it is a will to meet the needs of a body of students who are otherwise potentially excluded is probably a moot point.

11. Summary

In conclusion, we have sought in this paper to describe the drivers which are moving us towards improved digital accessibility through international, European, and local policies.

We have addressed the issue of sustainability - that is a need to ensure not only that immediate problems are dealt with, but that there are in place

systems and people to ensure long term improvements in accessibility.

We have also described some of the tools and formats which are available, and which are important in ensuring widespread utilisation of digital content.

Finally, we have looked at how universities and libraries are attempting to implement accessibility policies.

Our view is that we can be positive about much of what is happening, but we must also be aware of new issues that might emerge or are emerging particularly challenges around artificial intelligence and more advanced technologies which will present their own problems.

REFERENCES

Ayris, P. (2014). Research libraries – new approaches for library-based publishing. Presented at: *Conference on Open Access Scholarly Publishing (COASP) 2014,* UNESCO, Paris, France.

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003). Retrieved from https://openaccess.mpg.de/Berlin-Declaration

Botelho, F. H. F. (2021) Accessibility to digital technology: Virtual barriers, real opportunities, Assistive *Technology*, *33*:sup1, 27-34, DOI: 10.1080/10400435.2021.1945705.

Directive (EU) 2019/882 of the European Parliament and of the Council of 17 April 2019 on the accessibility requirements for products and services (Text with EEA relevance). PE/81/2018/REV/1 OJ L 151, 7.6.2019, p. 70–115

Lazar, J. (2022) Managing digital accessibility at universities during the COVID-19 pandemic. *Universal Access in the Information Society*, Vol 21, 749–765. https://doi.org/10.1007/s10209-021-00792-5.

Lippincott, Sarah K. (2017). *Library as Publisher: New Models of Scholarly Communication for a New Era.* ATG LLC (Media). Series: Charleston Briefings: Trending Topics for Information Professionals, edited by Matthew Ismail. DOI: http://dx.doi.org/10.3998/mpub.9944345.

Merlo, A., & Akeroyd, J. (2022) Meeting Sustainable Goals Through Improved Accessibility: A Call to Action. In *87th IFLA World Library and Information Congress (WLIC); Satellite Meeting: Environment, Sustainability and Libraries (ENSULIB), Management and Marketing, Preservation and Conservation Sections*. 9-Sep-2022 International Federation of Library Associations and Institutions (IFLA). Retrieved from https://repository.ifla.org/handle/123456789/2063

Morriello, R. (2023) Biblioteche, conoscenza, bene comune e lo stretto legame con lo sviluppo sostenibile. *Biblioteche Oggi, 41*(2), 5-14. DOI: http://dx.doi.org/10.3302/0392-8586-202302-005-1

Valzano, V (2020) Open Science: new models of scientific communication and research evaluation. *SCIRES-IT - SCIentific RESearch and Information Technology*, *10*(Special issue), 5-12. DOI: http://dx.doi.org/10.2423/i22394303v10Sp5

Virginia, V., Cigola, M., & Gargiulo, P. (2020) Editorial. A Special Issue of SCIRES-IT on the "Open Science: new models of scientific communication and research evaluation". *SCIRES-IT - SCIentific RESearch and Information Technology*, *10*(Special issue), I-IV. DOI 10.2423/i22394303v10SpI