

Linking faculty research output and activities to sustainable development goals: opportunities for metadata specialists

Linking
faculty
research
output

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Abstract

Purpose – Although universities have extensive research and initiatives in place that align with the United Nations' Sustainable Development Goals (SDGs), there is still a significant gap in documenting and assessing these efforts. This paper aims to discuss how academic libraries can apply their information management skills and open-access platforms, to facilitate the discoverability and retrieval of evidence on SDGs.

Design/methodology/approach – Introduced by a brief literature review on the role of libraries in contributing to the SDGs in general, the authors draw on their personal experiences as metadata specialists, participating in a project aimed at linking their university's research output to the SDGs. A case study, from the University of Pretoria's Veterinary Science Library, is used as an example to demonstrate the benefits of resourceful metadata in organising, communicating and raising awareness about the SDGs in the field of veterinary science.

Findings – Through practical examples and recommended workflows, this paper illustrates that metadata specialists are perfectly positioned to apply their information management skills and library platforms to facilitate the discoverability and retrieval of evidence on SDGs.

Originality/value – Although there are increasing reports on the contributions of libraries to support the successful implementation of the SDGs, limited information exists on the role of metadata specialists, as well as those with a practical focus.

Keywords Sustainable Development Goals (SDGs), Academic libraries, Open-access platforms, Institutional repositories (IRs), Metadata, Metadata specialists

Paper type Technical paper

1. Introduction

Universities are crucial in achieving global Sustainable Development Goals (SDGs). Apart from traditional academia, they also shape societal values, foster innovation and drive



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impactful research (Yeh *et al.*, 2022). With their ability to shape future leaders, universities have the power to equip the next generation with the necessary skills, knowledge and perspectives to address sustainability challenges (Chankseliani and Mccowan, 2021; Ferguson and Rooft, 2020; Mori Junior *et al.*, 2019; Žalėnienė and Pereira, 2021). Through scholarly inquiry and innovation, universities not only advance a collective understanding of sustainable development but also lead the way in creating practical solutions to global challenges (Fia *et al.*, 2022). In addition, universities can use their expertise and leadership to influence various stakeholders to adopt sustainable policies and practices, thereby magnifying the impact of their contribution to the SDGs (Cabrera and Cutright, 2023).

Apart from all these opportunities, universities also face challenges. According to Serafini *et al.* (2022), finding collaborators who share the same goals is a major obstacle, while Žalėnienė and Pereira (2021) found the alignment of university strategies with SDG frameworks and adapting organisational cultures to accommodate sustainability difficult. Other challenges include an absence of strong leadership, a complex socio-political context and securing sustainable funding mechanisms (Fia *et al.*, 2022; Leal Filho *et al.*, 2021). Nonetheless, the main hurdle that universities confront revolves around transparently communicating and documenting their SDG-related research and activities (Chankseliani and Mccowan, 2021).

With academic libraries mandated to support the core business of the higher education system, they have to congruently explore opportunities to support the strategies of their parent institutions, including those difficulties related to SDGs. Essentially, librarians are perfectly positioned to apply their information management skills, information organising tools and information communication infrastructure knowledge to facilitate the discoverability and retrieval of evidence on SDGs. To use this, librarians from the University of Pretoria investigated an initiative to create comprehensive metadata for the research output of their institution. The main aim was to enable better measurement and evaluation of research aligned with the SDGs and to facilitate the dissemination and impact assessment of the university's scholarly contributions.

In this paper, a project, aimed at linking the university's research output to the SDGs, will be discussed. The discussion will start with a brief overview of the role of libraries in contributing to the SDGs. The focus will then move to the role of metadata specialists (traditionally known as cataloguers) in grouping the items in the institutional repository, using unique tags in the metadata records of the articles, theses and faculty activities, to enable the linking of these items to the SDGs. The Jotello F. Soga Library, from the University of Pretoria's Veterinary Science Faculty, will be used as an example to demonstrate the benefits of these efforts in the field of veterinary science.

2. Contribution of libraries to the Sustainable Development Goals

Libraries play a vital role in education, knowledge dissemination and community engagement. They are therefore considered important contributors in achieving the SDGs. Specifically, their functions related to providing access to information, promoting literacy and supporting lifelong learning are connected to SDG targets, such as education, gender equality, poverty reduction and access to information (Bangani, 2023).

The literature outlines various ways in which libraries support the achievement of the SDGs. Here are some examples with a focus on initiatives from South Africa and the University of Pretoria.

2.1 Eliminating poverty and ending hunger (SDGs 1 and 2)

The first SDG aims to eradicate poverty, which is closely linked to SDG 2, which focuses on eliminating hunger. Libraries are already recognised as crucial players in community

engagement and can significantly contribute to ensuring that more individuals, particularly the poor and vulnerable, have equal access to economic resources. As part of their mandate, libraries are actively involved in enhancing the literacy levels of their communities. Literacy is a fundamental skill that empowers individuals, enriches education and contributes to social and economic development. Many authors have reported on various literacy programmes presented by libraries to empower their communities (Omona, 2020; Bangani, 2023; Strand and Britz, 2018).

Despite three decades of democracy, South Africa still faces several challenges, such as poverty, social inequality and illiteracy, as a result of its history of apartheid (Strand and Britz, 2018). Libraries, deeply connected to their communities, possess a keen understanding of these struggles. According to a study by Bangani and Dube (2023), most academic libraries in South Africa are actively involved in community engagement. The University of Pretoria libraries have, for example, even included a community outreach responsibility as a strategic goal. They act as collection hubs where non-perishable foods and second-hand clothing are collected and distributed to needy students, mirroring similar initiatives in other libraries.

Libraries, aligning with broader sustainability goals, are also adopting eco-conscious practices such as energy-efficient designs and waste reduction. The concept of a “Green Library” or “Sustainable Library” prioritises environmental considerations. The University of Pretoria Libraries, in collaboration with the Goethe Institute, linked their green library initiative with a community engagement project at their Mamelodi Campus. This initiative included the development of a sensory garden featuring diverse plants, aiming to educate early childhood education (ECD) teachers about the benefits of outdoor reading and sensory learning. A reading nook made from natural materials is part of this garden, supporting reading initiatives for ECD communities in Pretoria through the library’s community engagement focus area. This initiative involves alignment with several sustainable development goals, including no poverty, zero hunger, good health and well-being and quality education. The sensory garden serves as a community-oriented space, offering standard library services and serving as a versatile venue for ECD workshops and collaborative projects.

2.2 Promoting lifelong learning (SDG 4)

SDG 4 aims to provide quality education for all, promoting lifelong learning opportunities while ensuring inclusivity and equity. It is important to note that quality education cannot be achieved by ignoring vulnerable members of society, including those who are poor. Addressing their needs is crucial for the development of society as a whole (Nilsson *et al.*, 2016).

Libraries offer a wide range of educational resources, including books, periodicals, digital resources and multimedia items, to enrich the learning experience. They provide a peaceful and comfortable environment to promote research and study, fostering a culture of learning. By offering various educational programmes, workshops and events for people of all ages, libraries encourage lifelong learning and support the development of skills and continuous education (Nhamo and Malan, 2021; Strand and Britz, 2018).

2.3 Facilitating digital inclusion (SDG 9)

SDG 9 emphasises the development of industry, innovation and infrastructure. Libraries play a crucial role in bridging the digital divide by offering access to computers, the internet and digital literacy programmes, enabling people to acquire the necessary skills and resources to participate in the digital age. Academic and public libraries are the primary sources of technology for their users. Computers and the internet offer limitless

opportunities for people to access information, enhance their educational and employment prospects, communicate with others and enjoy online entertainment (Modiba and Bopape, 2017).

Adedokun and Zulu (2022) report on several initiatives in South Africa, aimed at promoting digital inclusion among its citizens. One such initiative is the “Ulwazi Sharing Indigenous Knowledge” programme, which is being implemented in KwaZulu-Natal province. The programme is integrated into local library services and provides an online repository for preserving indigenous knowledge. The programme originated in Durban and addresses the challenges of limited access to information and communication technology and the lack of documentation of South Africa’s cultural heritage. By enabling access to and creation of resources, this library-led initiative not only enhances digital inclusion but also empowers society by preserving indigenous knowledge through online platforms.

2.4 Strengthening cultural preservation (SDG 11.4)

Focused on sustainable cities and communities, SDG 11, with target 11.4, aims to strengthen efforts to protect and safeguard the world’s cultural and natural heritage. Libraries play a crucial role in cultural heritage preservation by gathering, conserving and making historical texts, books and artefacts accessible. To ensure that historical records, artefacts and customs are not lost over time, libraries are adopting digital archives and placing greater emphasis on digitising their collections. Several authors have reported on the involvement of libraries in various preservation projects (Diko, 2023; Sundani, 2023; Moseti, 2016; Masenya, 2021).

The University of Pretoria’s libraries house a vast collection of historical materials, including photographs, documents and audio-visual content. They have been digitising various heritage resources since 2006, using their institutional repository, UP Space (see section 4.1.3). This digitisation effort spans diverse disciplines and content, serving as a testament to the advantages of open access digital repositories. Furthermore, these collections not only underscore the benefits of accessibility but also actively promote collaboration within communities, while underscoring the pivotal role of metadata in enhancing accessibility (Breytenbach *et al.*, 2013; Groenewald and Breytenbach, 2011).

2.5 Supporting global cooperation (SDG 17)

Libraries have a key role to play in supporting SDG 17, which focuses on strengthening partnerships to achieve the goals. Acting as hubs for local and international collaboration, they bring together community members, organisations and government agencies to work collectively towards achieving the SDGs. Services provided by libraries in collaboration with different local organisations are essential to fostering sustainable development in the areas they serve (Mathiasson and Jochumsen, 2022; Nhamo and Malan, 2021).

In addition, libraries could create more virtual spaces with online resources, virtual reality experiences and interactive learning platforms, as a result of technological advancements to further support SDG 17. Libraries can also establish makerspaces and innovation hubs that support entrepreneurship, creativity and long-term innovation in their respective communities (Kruger and Steyn, 2020). An example of such spaces is the Makerspace Centre at the University of Pretoria Library. During the COVID-19 pandemic, they, for example, assisted community health workers by manufacturing facial shields.

Libraries worldwide are participating in diverse and innovative initiatives to align with the SDGs. In the preceding section, a few examples, ranging from community engagement programmes to technological advancements in information dissemination, were discussed. These multifaceted initiatives underscore the fundamental role of libraries in addressing

global challenges. Amidst these efforts, contributions of metadata specialists emerge as another opportunity in amplifying the impact of libraries on the SDGs.

3. Role of metadata specialists in contributing to the Sustainable Development Goals

In recent years, academic and research libraries have seen an increase in the number of metadata librarian roles. This growth in job opportunities has happened alongside the expansion of digital resources and their description and accessibility. However, the significance and potential impact of this constantly evolving position, on the successful implementation of the SDGs in higher education institutions, have not yet been fully explored.

In the next section, the role of metadata specialists will be discussed to support our argument that metadata specialists are perfectly positioned to apply their information management skills, information organising tools and information communication infrastructure knowledge to facilitate the discoverability and retrieval of evidence on SDGs. We will introduce the section by briefly discussing institutional repositories, which are considered as valuable tools in the scholarly communications landscape.

3.1 Institutional repositories

Over the past few decades, most higher education institutions started to store the scholarly outputs and intellectual work, created by members of their institutions, on institutional repositories. Institutional repositories serve as tools for collecting, storing and sharing scholarly works both within and beyond the institution. These digital repositories are institutionally defined, scholarly, cumulative, perpetual, open and interoperable. Institutional repositories focus on managing scholarly research outputs, encompassing various sources like journal articles (pre-published or post-published), conference papers, books, theses, research reports, case studies, surveys and raw data. They form an integral part of knowledge management, specifically focusing on institutional scholarly output, and may stand as benchmarks for digital scholarship, due to their scholarly nature (Jain, 2011).

Metadata serves as the backbone of an institutional repository, enabling efficient organisation, discovery, access and preservation of scholarly resources while ensuring their relevance and usability for researchers, educators and the wider community. Metadata is structured data, used to describe other data, and has various applications in research areas, including identifying, classifying, retrieving and validating data sets (Liu *et al.*, 2023; Gartner, 2016). In the context of SDGs, metadata plays a crucial role in mapping and categorising information resources that are linked to specific goals, targets and indicators.

3.2 Metadata and its role in connecting research and Sustainable Development Goals

Metadata linking facilitates the establishment of connections between different metadata elements, allowing libraries to efficiently link information about authors, publishers, subjects, keywords, controlled vocabularies and identifiers (Alemu and Stevens, 2015). Linking within content metadata simplifies connections to related resources, promoting cross-referencing and enhancing the discoverability of interconnected content.

This approach minimises redundant efforts by reusing metadata enabling the linkage of individual elements like keywords or names. The effectiveness of metadata linking is closely tied to the underlying structure of the metadata, ensuring seamless integration and avoiding unnecessary duplication of information.

To connect metadata to the SDGs, we used the skills of metadata specialists along with various library platforms and tools. This allowed us to easily link the research output of the

University of Pretoria to the SDGs, making it easy to access and navigate. Our project was conducted as a pilot study within the Faculty of Veterinary Science, and therefore, this discussion will be limited to this faculty. For context and a better understanding of the value of the project, a brief background of the faculty and the importance of animal health in the South African context will introduce the discussion.

4. Case study: the Jotello F. Soga Veterinary Science Library

In 2020, the Jotello F. Soga Veterinary Science Library's information specialists were asked by the dean's office to create a list of all the faculty's research output related to the SDGs. They discovered that databases, like Scopus, support SDG-related keyword searches. However, these results were not entirely comprehensive, and some records were excluded, particularly in the area of animal health. They were also aware of the South African SDG Hub (<https://sasdghub.up.ac.za/home/>), an artificial intelligence-driven tool that connects research articles to the SDGs. The machine learning algorithm scans a PDF document and suggests relevant articles from a database, allowing articles linked to a specific SDG to be grouped. However, this option was not appropriate for their assignment at that time, as it could not cater to faculty-specific results, lacked faculty activity inclusion and lacked a simplified dashboard for a comprehensive overview.

They realised that there was a significant gap in collecting and reporting evidence on the SDGs, as well as in creating awareness among researchers about them. To address this issue, they sought guidance from their library's metadata specialist on how to effectively use the faculty's research output, which was already on the institutional repository, for SDG-related reporting. Since the SDGs were established by the United Nations General Assembly in 2015 to be achieved by 2030, it was decided to retrospectively include all faculty research output published from 2015. SDG-related metadata will then be assigned to new items when they are submitted to the institutional repository.

In the following section, this process will be explained, starting with a brief background on the Faculty of Veterinary Science and the Jotello F. Soga Library.

4.1 Brief background of the Faculty of Veterinary Science and the Jotello F. Soga Library

The University of Pretoria is considered to be one of the top universities in Africa and is also the largest contact university in South Africa. The university is spread over seven different campuses and comprises of nine highly respected faculties. The university is also home to South Africa's only Faculty of Veterinary Science, which is located at Onderstepoort, north of Pretoria.

The university boasts of 11 world-class libraries that provide an extensive collection of physical and digital resources. These include a highly useful institutional repository (UPSpace).

4.1.1 Faculty of Veterinary Science. The Faculty of Veterinary Science is the only veterinary faculty that offers professional training to veterinarians and veterinary nurses in South Africa. Apart from specialised undergraduate degree programmes, the faculty also presents various postgraduate programmes, including specialist veterinary training. Renowned for top-tier education, research, services and community involvement, it aims to enhance the lives of all South Africans through improved nutrition and the growth of the country's agricultural economy ([University of Pretoria, 2023](#)).

The Onderstepoort Veterinary Academic Hospital with specialist clinics for various species, provides fully integrated student training and diagnostic laboratories.

4.1.2 Jotello F. Soga Library. The Jotello F. Soga Library, named after the first South African to qualify as a veterinary surgeon, supports the information needs of the faculty, by

delivering essential services such as research support, information access, interlibrary loans and outreach. They also provide essential information support for veterinary practitioners. It grants access to a diverse collection of printed and digital material. Alongside two information specialists, a dedicated metadata specialist ensures efficient cataloguing and metadata services, supporting the management, preservation and accessibility of veterinary resources and digital content.

4.1.3 Institutional repository of the University of Pretoria. The institutional repository, UPSpace (<https://repository.up.ac.za/>), serves as a centralised hub for storing and disseminating the intellectual contributions of the University of Pretoria's academic community, supporting research, education and knowledge sharing both within the institution and globally. It is built on DSpace, an open-source digital repository software, and uses Dublin Core as metadata schema.

The repository is managed by the Scholarly Communications unit of the library, and the metadata specialists assist with the provision of specialised metadata. Figure 1 provides an overview of the layout of UPSpace to indicate the veterinary science collections.

As indicated in Figure 1, UPSpace consists of three main groups of collections, namely, faculty research collections, archival and special collections, and collections of research support divisions. Each collection has several sub-collections. For example, the faculty research collections include the different faculties of the university (e.g. veterinary science). Each faculty has its sub-communities, of which those of veterinary science are listed in Figure 1. In this illustration, the departments and activities of the faculty (events and history) were divided. Each department has sub-communities, including departmental research articles, and theses and dissertations, as well as other collections relevant to the specific department (e.g. multimedia and open education resources). In the history collection, are sub-collections, such as memorial lectures, community engagement newsletters, faculty day posters and programmes and newsletters. These collections are good sources reflecting and reporting on the faculty-related activities.

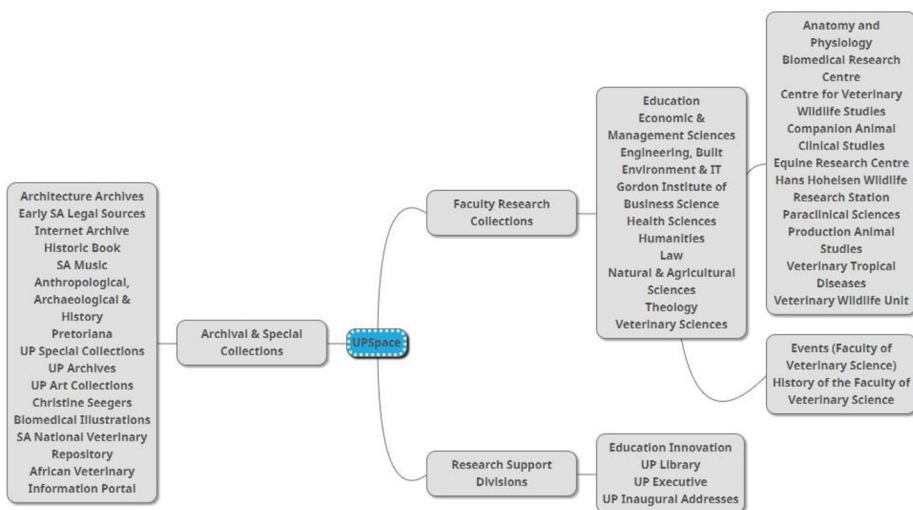


Figure 1.
Veterinary Science
collections on
UPSpace (the
institutional
repository of the
University of
Pretoria)

Source: Authors' own work

4.2 Relevance of veterinary science and animal welfare to Sustainable Development Goals

Animal health and wellbeing are important for humans, the economy and society as a whole. Veterinary research in South Africa is essential in addressing the complex needs of the various sectors of society that need veterinary input (Swan and Kriek, 2009, p. 113). Many of the SDGs have direct or indirect connections with animal welfare. Animals, both domestic and wild, contribute significantly to sustainable human development and their welfare supports human well-being in all its forms. Most of the SDGs rely on animal welfare and wildlife conservation, although few of the goals mention animals directly. To be able to allocate veterinary research and activities to the different SDGs, the descriptions, facts and figures from the literature as well as a working paper developed by the Animal Production and Health Division of FAO were used (FAO-AGAL Livestock Information, 2016). From the published reports it is clear that the veterinary profession is uniquely placed at the human–animal–environment interface to address the SDGs. The SDGs cannot be fully achieved without incorporating animal welfare and conservation into these strategies.

4.3 Linking faculty-related research output to the Sustainable Development Goals

Driven by the metadata specialist at the Jotello F. Soga Library, a pilot project to develop metadata elements to tag the SDGs in the research output of the Faculty of Veterinary Science (theses and dissertations, and research articles) as well as faculty activities (events and history), in the institutional repository (UPSpace) (see Section 4.1.3 and Figure 1) was launched in 2021. A subject guide (using Springshare's LibGuides) was developed to serve as a hosting platform for the links, including sharing additional information to promote awareness of the SDGs related to veterinary science. The workflow followed by the metadata specialist is summarised in Figure 2. Each step will be discussed more in detail in the following section.

4.3.1 Make sense of the subject. To ensure accuracy, the metadata specialist has to understand the subject as well as how it links to a specific SDG. To achieve this, it was necessary to approach the literature. Information resources, such as Wikipedia, online information from the United Nations Department of Economic and Social Affairs and other sources on animal health related to SDGs (e.g. FAO) were used. These sources enabled the metadata specialist to compile lists of keywords for each SDG. Other existing lists of keywords (e.g. Scopus keywords and lists for SDG mapping compiled by Australian universities) were also consulted.

4.3.2 Construct the workflows. To work efficiently, it is important to establish a personal workflow before one starts. This is done by first reviewing all the content at one's disposal.

Most research output (research articles as well as theses and dissertations) of all University of Pretoria faculties, of at least the last 15 years, are available on the institutional repository (UPSpace). Each faculty's items are sorted according to the faculty departments, as well as other units (see Figure 1), and each department's collection includes articles and theses, as well as other content. Because the work was done retrospectively on articles and theses from 2015, the metadata specialist had to work out a systematic flow to ensure all



Figure 2.
Workflow followed
by the metadata
specialist

Source: Authors' own work

collections and years were covered. Excel lists were created to assist in keeping track of the progress.

Once the articles and theses of all departments from 2015 to 2022 were completed, the same process was followed to tag and link faculty activities (see Section 4.1.3).

4.3.3 Create the metadata. Metadata tagging is the process of attaching descriptive keywords or labels to digital content, making it easier to organise, search and categorise information (Zeng and Qin, 2016, p. 391). Because the work was done retrospectively, the items already had metadata, and the metadata specialist only had to add additional metadata to each item to link it to a specific SDG. As part of this process, the keywords were also enriched. It was important to be consistent with the terminology, as any spelling errors or differences in punctuation could exclude items. Therefore, lists of tags were compiled before the work started. Specific tags were used to be able to link the different communities according to the faculty together (e.g. Veterinary science activities SDG-07, Veterinary science articles SDG-03 or Veterinary science theses SDG-02). To be able to link it in general and also be able to link all UP-related research to a specific SDG, more general tags for each SDG (e.g. SDG-04: Quality education) were also created. The “dc. subject. Other” field was used.

It is further important to notice that not all items necessarily relate to a SDG. It is also not always easy to determine the alignment of an item to a specific SDG. To identify which SDG an item pertains to, the metadata specialist had to carefully examine the abstract or, in some cases, the entire text. Pre-compiled keywords were also helpful, but in certain situations, the author or other sources had to be consulted.

4.3.4 Publish the links. A LibGuide (<https://library.up.ac.za/c.php?g=1210451>) was created to serve as a platform to host the links to the different items in UPSpace, as they relate to a specific SDG. The first page (homepage) introduces the Libguide by providing sustainable related information and links to relevant SDG information resources, such as the SDG in Action App, an RSS News Feed from the UN Web page and relevant podcasts to help users stay updated with SDG-related developments. In addition, it also provides lists of books on SDGs from the library, in print and full-text electronic format, allowing users to broaden their knowledge of sustainable development. The second page provides an overview of SDG-related research at the University of Pretoria, in general. The next page hosts the links to SDG-related veterinary science research and links to veterinary science articles, theses and activities, associated with each of the SDGs.

To get the links for the Libguide, the items first needed to be tagged and keywords updated. A search was then done in the subject file on UPSpace, to result in lists related to a specific tag. Separate searches for all the different tags were done, and the links of each search, in the top bar of the browser, were copied and pasted on the Libguide. This enables visitors to the LibGuide to click on the link, which then directly navigates to the list of items associated with a specific SDG, on UPSpace.

4.3.5 Update new items. All research articles, theses and activities for the Faculty of Veterinary Science, from 2015 to 2022, were tagged and their keywords updated. Tags are now created and good sustainability-related keywords are assigned when new items are submitted.

4.4 Evaluation of the project and the way forward

After completion of the pilot project, it was presented to the faculty, and the response was overwhelmingly positive. Members of the faculty indicated that they found the SDG LibGuide to be very powerful, with the potential to enhance the discoverability and visibility of SDG-related research at the university. This now assists the faculty with the

measurement and reporting of the university's contributions to the SDGs. Moreover, it can aid in identifying gaps in research and areas where limited SDG-related research exists, providing opportunities for new research.

As a result, it was decided to implement the project across other faculties. To make the guide more applicable, a page for each faculty will be added, and the content will be expanded to cover various disciplines and interests, providing researchers and visitors with more comprehensive information.

5. Conclusion

Libraries play an essential role in promoting sustainable development. They are, for example, known for providing information, supporting research, fostering collaboration and partnerships, raising awareness, engaging local communities and preserving knowledge. In this paper, it was argued that librarians can leverage their expertise in managing information, their knowledge of information infrastructure and metadata, and their access to library tools and platforms to do even more. A pilot project was presented, where metadata tags were developed, and the links were published on a LibGuide. This guide helps academia and society gain actionable SDG knowledge and provides a dashboard for reporting of SDG-related faculty research. By reflecting on the invaluable role of libraries and metadata specialists, it is clear that their contributions go beyond preserving knowledge. They act as catalysts, driving society towards a more sustainable and equitable future.

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