CHALLENGES AND PRACTICES OF RESEARCH DATA MANAGEMENT AT KEPUSTAKAAN LIPI KAWASAN BANDUNG

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ABSTRACT

In the past 10 years, an international agenda around Research Data Management (RDM) emerged as a practice that can occur at various stages in the research cycle. RDM is a description of organizational activities, storage, preservation and sharing of data collected for research. This study aims to determine the challenges and practices of RDM at Kepustakaan LIPI Kawasan Bandung PDDI-LIPI in the management of video files as authentic research data from the results of research activities. The method used was a descriptive research method. From the research results, it was known that Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI as a multimedia library had compiled a research plan for the period 2019 to 2023, after joining the PDDI-LIPI, research planning was augmented with research data management (primary data). But in the planning, training activities that support the implementation of RDM had not been made. Research data collection had been done, there was research data in the form of video files total 4.517 titles stored on Network-Attached Storage, it was found photos and audio that had not been collected properly. Processing and analyzing research data had been done, but only research data was packaged in video files, while photos and audio had not been done. Publishing and sharing of research data had been done. Preservation of research data in the video file format was managed and stored in the Digital Asset Management application. Researchers who need research data in the video file, for re-using data, they could visit Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI. Considering that training is very important, it is advisable to make plans for employee participation in RDM training. It is recommended that all research data including photos and audio to be collected properly. Making a website as a means of publishing and sharing, also re-using research data is recommended to be made immediately.

Keywords: *Library; Information science; Database management*

ABSTRAK

Dalam 10 tahun terakhir, sebuah agenda internasional seputar *Research Data Management (RDM)* muncul sebagai praktik yang dapat terjadi pada berbagai tahap dalam siklus penelitian. RDM adalah gambaran kegiatan organisasi, penyimpanan, preservasi, dan berbagi data yang dikumpulkan untuk penelitian. Penelitian ini bertujuan untuk mengetahui tantangan dan praktek RDM di Kepustakaan LIPI Kawasan Bandung PDDI-LIPI dalam pengelolaan *file video* sebagai data penelitian otentik dari hasil kegiatan penelitian. Metode yang digunakan adalah metode penelitian deskriptif. Dari hasil penelitian diketahui bahwa Kepustakaan LIPI Kawasan Bandung PDDI-LIPI sebagai perpustakaan multimedia telah menyusun perencanaan penelitian periode tahun 2019 sampai 2023 dan setelah bergabung dengan PDDI-LIPI, perencanaan penelitian ditambah dengan manajemen data penelitian (data primer). Akan tetapi, dalam dokumen perencanaan penelitian tersebut, kegiatan pelatihan yang mendukung pelaksanaan RDM belum dibuat. Pengoleksian data penelitian telah dilakukan. Terdapat data penelitian berupa *file video* yang berjumlah 4.517 judul yang tersimpan pada *Network-Attached Storage*. Selain itu, ditemukan foto dan audio yang belum dikoleksi dengan baik. Memproses dan menganalisis data penelitian telah dilakukan, tetapi hanya data penelitian yang dikemas pada *file video* saja, sedangkan foto dan audio belum dilakukan. *Publishing dan sharing* data penelitian telah dilakukan. Preservasi data penelitian dalam format *file video* dikelola dan disimpan pada aplikasi *Digital Asset Management*. Peneliti yang memerlukan data penelitian dalam format *file video*, untuk *re-using* data penelitian, dapat berkunjung ke Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI untuk mencari, dengan cara melihat data penelitian. Mengingat pelatihan sangat penting, disarankan dibuat rencana keikutsertaan pegawai dalam pelatihan RDM. Disarankan semua data penelitian termasuk foto dan audio untuk dikoleksi dengan baik. Pembuatan *website* sebagai sarana *publishing* dan *sharing* serta *re-using* data penelitian disarankan untuk segera diselesaikan.

Kata kunci: Perpustakaan; Ilmu informasi; Manajemen pangkalan data

1. INTRODUCTION

Research data management (RDM) is not new to libraries. It refers to existing and developing organizational functions to improve data collection, access, use and preservation. Successful research data management services require the skills and knowledge found in library research links, collection experts, policy analysts, ICT experts, and archive experts. As a library, research data management is not single but multifaceted. This requires collaboration, technology and policy analysis skills, and project management (Steeleworth 2014).

The management and sharing of research data have become important because of its important and valuable role in improving science through the development of previous works by reusing data generated and obtained by other researchers. Research data includes every piece of data obtained and generated during the research process (Saeed and Ali, 2019). Research data management is useful for researchers and discipline progress in general. Although data management requires additional work at the beginning of a research project, it reduces difficulties and problems in the course of the project and ensures the availability of data after project completion (Payal 2019).

The library is well-positioned to provide centralized services for research data management. The researchers asked many questions about what they should do to research data management, indicating a significant degree of uncertainty. Some of these uncertainties stem from indications that donor requirements can immediately include activities such as sharing data or writing data management plans. Besides, participants highlighted data quality and data misuse as important issues (Perrier and Barnes 2018). RDM is ready to become an important library service (Fuhr 2019).

The role of librarians in data management varies depending on the needs and institutional support. While some libraries have collaborated in these fields and have integrated themselves into data management activities, other libraries are in the initial stages of assisting researchers with their data management challenges (Reed 2015). Managing research data is usually an integral part of the research process and extends throughout the data life cycle, from the point of creation to dissemination and archiving, and will usually continue long after the initial research project has concluded (Sanjeeva 2018).

Research data is available in various formats and collected using a variety of methodologies and can include text, spreadsheets, questionnaires, photographs, film/video files, test responses, laboratory notes, statistics, observations, slides, results from experiments, samples, scripts, algorithms, work flows, scripts, interview notes, and many other forms. Research data can be defined as authentic recorded material that is often received in the scientific community as needed to prove research findings; although most of the data is created in a digital format, all research data is entered regardless of the format that was created (Saeed and Ali 2019).

From the description above, this study aims to determine the challenges and practices of Research Data Management in managing raw material films/video files as authentic material from the results of research activities. While the problem raised is how to manage raw material films/video files at *Kepustakaan LIPI Kawasan Bandung, Pusat Data dan Dokumentasi Ilmiah, Lembaga Ilmu Pengetahuan Indonesia (LIPI Library of the Bandung Region – Centre for Scientific Data and Documentation - Indonesian Institute of Sciences)* in supporting the implementation of Research Data Management.

The results of previous research on data management research conducted by Mahdi (Mohammed and Ibrahim 2019) academic libraries played a fundamental role in managing research data, at universities

and research institutes. Academic libraries played an important role in maintaining and supporting authorities on data management matters. Recognizing the importance of proper research data and RDM, governments and funding organizations encourage researchers to properly store and share data. Proper data management was recommended as an important activity to present and verify the results of the research achieved by researchers and scholars to make it easier for other researchers to develop existing research. Therefore, librarians played an important role in assisting researchers in their practice and planning of research data because researchers did not realize the importance of preserving the research data set for future use. In today's digital era, research data in the form of film/video files of raw materials cannot be separated from other conventional research data.

Kepustakaan LIPI Kawasan Bandung as a multimedia library is obliged to answer the challenges in managing research data in the form of raw material films /video files, as research data conducted by LIPI researchers.

2. METHOD

The research method used in this research is descriptive qualitative research method. Manab (2008) said that qualitative research would look for and obtain natural data that depart from reality and photocopy as the fact, all the data elements were appointed.

Data resources in this study were obtained from the Kepustakaan LIPI Kawasan Bandung, PDDI LIPI. Data were collected from documents/reports, observations were made by paying attention to collections and library activities carried out, questionnaires were made to collect information so that attitudes, beliefs, behaviour and characteristics of librarians/library technical personnel could be studied, in-depth interviews were conducted by means of question and answer directly to the one manager and eight staffs, as well as ten researchers as users of the Kepustakaan LIPI Kawasan Bandung, PDII-LIPI in January - May 2020.

The activities of Kepustakaan LIPI Kawasan Bandung consist of planning, collecting data, processing and analyzing data, publishing and sharing data, and also preserving data and re-using data. All of this activity will be measured using the UK Data Archive's Research Data Management Lifecycle model. Data analysis in this research used the UK Data Archive's Research Data Management Lifecycle model (see figure. 1). According to Yuan, librarians have a history of collecting, organizing, describing, providing access to and preserving information. Since data is a type of information, it makes sense for librarians to be involved in similar work relevant to the data management lifecycle, so this analysis is a good to use (Li, Dressel, and Hersey 2019).

Figure 1. The UK data archive's Research Data Management lifecycle model
 (Source: <https://www.ukdataservice.ac.uk/manage-data/lifecycle.aspx>)
 accessed March 3rd, 2020

3. RESULTS AND DISCUSSION

Research Data Management (RDM) services refer to the storage, access and preservation of data generated in certain research investigations or projects (Chiwere and Mathe 2016). Research data are noted, factual material that is generally accepted in the scientific community as needed to validate research findings. There are various research data formats such as word documents (doc/docx), spreadsheets, lab notes, field notes, diaries, surveys, questionnaires, transcripts, codebooks, audio and video files, images, photos, artefacts, samples, models, algorithms, scripts, content analysis, focus group discussions and responses, interview notes, and so on. Data generated during research activities are valuable resources that if stored properly can be accessed, traced, consulted, used and built for future academic, research and scientific purposes. Researchers can add their point of view which can help in the generation of new knowledge (Payal 2019).

Research data in this study was the research data: raw material films/video files format. To facilitate the discussion, the discussion was divided into six parts, namely: a. planning research; b. collecting data; c. processing and analyzing data; d. publishing and sharing data; e. preserving data; and f. re-using data.

3.1 Planning research

It is important to establish an RDM plan to identify how to manage research data and who will be responsible for RDM. It is recommended to have a partnership between library staff and a researcher when developing an RDM plan. For example, the RDM plan needs to be required by institutions for grant recipients by following up on maintaining its specification updates annually. The plan is domain-specific that reflects best practice in the applicant's research field and must be consistent with the data that the project will produce. RDM activities and services are developed through collaboration between libraries and key stakeholders in the RDM landscape, especially the ICT service unit and research support offices (Mohammed and Ibrahim 2019).

Without a formal mechanism to assist researchers in data management problems, most of the information is spread throughout the institution. When identifying various data management and data-related activities, it is important to first understand the environment (Reed 2015). Many libraries are developing RDM services to assist their institute's research missions (Li, Dressel, and Hersey 2019).

Libraries can play an important role in offering support to academic researchers because they face challenges related to research data management. Increased knowledge about best practices is needed, and this can be provided through various offers (Perrier and Barnes 2018).

The key steps in formalizing RDM are creating, first, institutional RDM policies and then, appropriate RDM procedures. Procedures, a comprehensive document that sets out the steps that researchers must follow when managing their research data, must be inclusive, make provisions for all relevant disciplinary requirements and practices (Patterton, Bothma, and Deventer 2018). In the draft policy, researchers are required to provide a complete data management plan and store all research data in a recognized digital repository (Fuhr 2019).

Library research data management programs cannot sustain themselves without collaboration with their contact librarians, whose work in reference and research services makes it an important intermediary between library services and the research community. Liaison librarians often have domain-specific expertise and department-specific relationship networks that can spur the development of RDM programs by finding important data sets, and they provide support with their subject knowledge (Steeleworthy 2014). The Multimedia Library is one of the most visible and widely used institutional services (Sebillotte 2012).

Kepustakaan LIPI Kawasan Bandung as a multimedia library compiled research plans for the period 2019 to 2023, the plan was made in the form of a road map, as can be seen in figure 2. Plans for 2019-2020: Carrying out multimedia-based science and technology exhibitions, with the following objectives: The realization of multimedia-based science and technology exhibition infrastructure facilities; Implementation of acquisition and development of multimedia-based science and technology content (Virtual tour, augmented reality, etc.); Implementation of raw material films record management. The 2021-2022 plan was to become a multimedia-based Science and Technology Literacy Center, with the following objectives: Increasing the variety of multimedia-based science and technology content (hologram/holotour); Increasing the amount of multimedia raw material being managed. Whereas the plan for 2023 to become a National Reference for Multimedia-based Science and Technology, with the following objectives: To become a centre for multimedia-based Science and Technology starting from regional to national level; Realization of mobile-based science and technology VOD (Video on Demand) systems and applications.

Figure 2. Roadmap Scientific Multimedia Exhibition (SME)
(Source: Kepustakaan LIPI Kawasan Bandung, 2019)

After the joining of the *Kepustakaan LIPI Kawasan Bandung* with Centre for Scientific Data and Documentation-Indonesian Institute of Sciences (*Pusat Data dan Dokumentasi Ilmiah (PDDI)-Indonesian Institute of Sciences/Lembaga Ilmu Pengetahuan Indonesia/LIPI*), planning research increased, namely: research data management (primary data). The plan for 2019 was to acquire work unit research data at LIPI Bandung and increase data listings in the National Scientific Repository (*Repositori Ilmiah Nasional/RIN*). In 2020, data curation, data extraction and visualization of research data from RIN began. By continuing to improve data acquisition and listing. In 2021, *Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI* focused on managing research data to become healthy data and could be reused by other researchers both internal and external LIPI.

In the planning document for the Scientific Multimedia Exhibition (SME) roadmap, there was no training planned, while the RDM at *Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI* was the beginning of the activity, so the civitas (manager, librarians and employees) knowledge about RDM was still limited, besides the implementation of RDM at *Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI* was still a relatively new concept, so training was needed. The role of librarian data and other data professionals can be fulfilled by reskilled information professionals (F. Yu, Deuble, and Morgan, 2017).

It is indicated that libraries with well-developed research data services provide opportunities for their staff to develop the skills needed to provide different services (Mohammed and Ibrahim 2019). The next phase will require individuals to increase the capacity of other library staff to assist in operational activities around RDM. Also, emerging researchers have shown an interest in receiving training in many RDM activities (Patterton, Bothma, and Deventer 2018). Training initiatives will be beneficial because science information professionals increasingly provide several levels of data services (Fuhr, 2019).

3.2 Collecting data

All data is not Findable, Accessible, Interoperable, and Reusable (FAIR). Researchers face many data management challenges that result from the need to comply with data management and donor sharing requirements (Smith et al. 2019). Data management plans are considered as the most effective way to ask researchers to communicate their intention to store, use, maintain, and provide data generated from a project (Hudson-vitale and Moulaison-sandy 2019).

The topic of research data management, in a general sense, can refer to tasks and procedures in almost every step of the research process from finding and handling bibliographic references to printing or compiling final reports. It is very helpful here to break down the research process into several component steps (Gilchrist and Gilchrist 1986). There is a lot of literature discussing the challenges associated with the spread of this network, but somehow surprisingly, very few papers address the problem of collecting, storing, and analyzing large amounts of potentially large data that can be generated by (large scale) sensor networks (Ríos 2016). While Askers found no significant variations among different faculty members in the amount of research data they stored or their methods for storing and backing up data (for example, computer hard drives, external hard drives, instrument hard drives, instrument hard drives, university servers, internet-based storage, lab notebooks, disks/tapes) (Akers and Doty 2012).

The increasingly collaborative nature of research is an urgent argument for RDM services. Exchange of research data across various platforms originates from requests for effective storage, access and sharing of data securely in a multi-institutional research team. Data is quite real, shows the author, and qualifies to handle, store, describe, analyze, transform. Researchers and academics are important actors and research actors; their research data is first in their disposition, and these actors must be motivated and

have the competence needed to process their valuable research data, thus allowing data to be processed, shared and accessed correctly (Rudžionienė and Enwald 2018).

Because libraries have the primary responsibility for organizing, maintaining information in different formats, they are expected to expand RDM services as well. Research data services can range from creating and managing institutional data repositories, providing data mining and visualization tools, education and training to researchers on data management activities, writing data management plans, using metadata to describe data sets, making researchers sensitive to the importance of maintaining and share research data with others (Payal 2019).

The relationship of RDM with collection management is very important even if organizational considerations such as funding or availability of resources reduce the development of data collection at the local level. Conceptually, research data management requires an examination of the criteria used by researchers to determine what must be collected and what must be preserved. While collection and valuation methods are often aligned with specific disciplinary requirements, RDM librarians can benefit from the expertise of their collection librarians, who have experience managing resources in terms of cost, needs, consortium obligations, and long-term value. The RDM program, meanwhile, will benefit from developing data collection policies. This policy helps libraries develop collections through scoping criteria such as organizational priorities, researchers' needs, and administrative constraints (Steeleworth 2014). Research data generated or collected for further analysis and acceptance/confirmation of original scientific results is one important component of digital content. In this regard, RDM is recognized internationally as a key factor in the development of science (Redkina 2019).

From the research results, it was known that there were research data in the form of raw material films/video files available at Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI totalling 4.517 titles stored on Network-Attached Storage (NAS), besides being stored in the NAS, research data were also found in the form of video are packaged in MiniDV media and DVDs, photos and audio. Acquiring or collecting data was also done by providing direct technical guidance to researchers at the LIPI Bandung Campus on how to save, limit and publish research data at the National Scientific Repository (Repositori Ilmiah Nasional/RIN), so that the data included by the researchers themselves.

3.3 Processing and Analyzing

Successful data governance involves proper compliance with data standard metadata, proper documentation from data sources (Payal 2019). Librarians have information about data warehouses and data license templates and can recommend effective data processing methods; provide recommendations on tools that combine metadata with data production; suggest strategies for selecting data formats, data protection protocols, and relevant permanent identifiers; and answer other questions about data management. To effectively support researchers, librarians and data stewards must work with scientists. RDM services and infrastructure have been developed in academic institutions in many countries. Such infrastructure is usually built and maintained at the local, regional, or national level. Its creation requires coordination and cooperation of various RDM services (Redkina 2019).

Researchers need help with secure data storage and easy-to-use tools. Increased knowledge about best practices in RDM is needed and can be supported by libraries using several strategies. This finding helps the library identify and prioritize tools and services to allocate resources in support of RDM on campus (Perrier and Barnes 2018). New tools that allow the processing and storage of large amounts of data are

starting to emerge. This technology provides facilities to streamline the capture, processing, storage, transfer, search, publication, analysis, and visualization of large data sets. This paradigm allows exploiting parallel computing through functions and libraries that encapsulate and hide the complexities of scheduling, controlling, synchronizing, and communicating parallel tasks, fault tolerance and load balancing, among others. The main motivation behind this paradigm is that, in many cases, data cannot be completely stored before being processed due to hardware limitations; also there are many situations where a person must immediately react to changes or specific values in the data flow, and wait for data storage and then analysis to be unacceptable (Ríos 2016).

With the help of digitizing research, structured RDM is difficult to overestimate. But in practice, this requirement is only implemented unsatisfactorily, as agreed by various studies. This is more important than most easy-to-use tools (Vogl, Rudolph, and Thoring 2019).

Processing and analyzing research data in the form of raw material films/video file format at Kepustakaan LIPI Kawasan Bandung PDDI-LIPI was done by steps as below:

a. The process of cataloguing and classifying video files:

Determine research data in the form of raw material films/video file format, whether found on Network-Attached Storage (NAS), MiniDV packaging or DVD collections of films that have not been processed on a collection rack; record on Google Sheet cataloguing film collections at <http://bit.ly/FormKatalogisasiFilm>; Complete forms such as title, main and additional authors, place of publication, year of publication, illustrations, dimensions, type of content, subject, etc.; Determine the subject using the LCSH guide <http://id.loc.gov/authorities/subjects.html>; Determine classification numbers using Universal Decimal Classification; Specifically for research data in MiniDV and DVD format that had been processed, it was submitted to the labelling personnel.

b. Validation of processing and analyzing research data in video files format

The validation of processing and analyzing research data in the form of raw material films/video files format was done on the Google Sheet cataloguing the film collection at <http://bit.ly/FormKatalogisasiFilm>; Analyze the classification numbers and subjects that had been made before; Validate or correct if there were deficiencies or errors in class and subject numbering by providing information in the validation column.

c. Research data entry in video file format

Entries were made on the film's web database at <http://192.168.229.122/inlislite/backend>; Enter user (inlislite) and pass (inlislite=); Select the catalogue menu (RDA); Open the Google Sheet cataloguing films <http://bit.ly/FormKatalogisasiFilm>; Before entry select the type of material: video recording; Film entries were based on cataloguing that had been created and validated. When this research was conducted only video files that had been processed and analyzed, while photos and audio had not been done.

Processing and analyzing data were done by extracting research data at the National Scientific Repository (Repositori Ilmiah Nasional/RIN), such as disaster research data conducted at LIPI. Extraction was done by exporting data in RIN in the form of a CSV file, then tidying the data, and selecting the data. So, from the results of the analysis, we could find out the forecast or research trends at LIPI through data. Finally, the data were visualized from the results of the analysis using tools such as Tableau and D3.js.

3.4 Publishing and sharing data

Individual factors include how researchers understand the benefits, risks, and efforts involved in sharing data. Institutional factors are journal policies and funding institutions that mandate that research data must be available in the public domain. They have reported that there is no positive correlation between donor policy to share data and researchers' data sharing behaviour (Payal, 2019). Askers said that faculty ratings do not predict faculty members' willingness to share their research data with others (e.g. Researchers working on projects, outside project researchers, funders, instructors, the general public) or their methods of sharing research data (for example, e-mails on request, additional material linked to journal articles, data repositories, universities or personal websites) (Akers and Doty, 2012).

From a library perspective, the main requirement in RDM that must be addressed is education. Some faculty members reject the cultural changes proposed by RDM, while others mistakenly think that RDM means that their data must be accessible to anyone by the public. The truth is that limited data can be stored in a repository and that researchers can give permission for access and use of data based on needs (S. H. Yu, 2017).

Publishing and sharing of research data in the form of raw material films/video file format were planned through the website (name: *Thematic Data Visualization Web*), currently, this website was in the process. Meanwhile, researchers who were visiting Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI Library could request research data topics in the form of raw material films/video file format (see in figure 3).

Figure 3. Sharing data research at Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI

Through in-depth interviews conducted with researchers who use this service, the researchers want the website to be completed so that they can follow the development of research data available in the LIPI Library of the Bandung-PDII-LIPI Region.

3.5 Preserving data

It is said that research data management is not a simple task because of the prevalence of various challenges. For example, University repositories may not be able to carry out long-term data maintenance; data centres may not receive all data sent to them; More complex research data may be difficult to store and manage and some websites are temporary with little sustainability. The use of

different vocabulary hinders collaboration between librarians and researchers because of different cultures because researchers speak the language of research, not library language. Furthermore, challenges related to inconsistency and complexity in available data are common in many university libraries. Besides, many challenges in digital data management stem from the lack of good practice guidelines, inadequate human resources, technological obsolescence, and lack of evidence about the best infrastructure (Mohammed and Ibrahim 2019).

Data is not a natural type, but a property that is associated at a particular moment in history with a series of signs, traces, indexes. What is rarely discussed is the question of data materiality. The opening step is to ask, where does the data come from? From text and numbers carved into the rock to digital bits stored as electromagnetic charges on silicon chips, all data without exception have a material aspect (Strasser and Edwards 2017).

Many science librarians have been introduced to RDM through the laboratory and fieldwork of their researchers. At the same time, digital preservation, archivists, and developers have built platforms and developed policies that allow preservation and access to digitally born data to be possible. But when RDM emerges as an important part of a research company, academic libraries must remain aware of the fact that data management and data management touch all organizational functions and interacts with campus stakeholders. RDM's work refers to many functions and concerns in the library's organizational structure and is succeeded by the knowledge and expertise of librarians in this constituency (Steeleworthy 2014).

Long-term storage of scientific data is a consideration for RDM because this is how data will be stored and accessed. Digital repositories are one way to store, store and make research data accessible. This online platform hosts and provides access to research documents and data (Fuhr 2019). Studies of research data management services have emerged together with the development of research data management services in libraries and have mapped institutional and cross-institutional accounts (Perrier and Barnes 2018). Research data management emerges as a complex practice that can occur at various stages in the research cycle (Perrier and Barnes 2018).

Adequate infrastructure is needed to store data correctly. Long-term storage of scientific data is a consideration for RDM because this is how data will be stored and accessed. Digital repositories are one way to store, store and make research data accessible. This online platform host and provides access to research documents and data (Fuhr 2019).

It is important to develop research data repositories for each university or use research data repositories available today to ensure that data management standards are adhered to when conducting research. Furthermore, developing a research data repository is considered a vital RDM practice. The researchers stressed the need to decide on a particular platform to identify where data repositories will be held and run within the research institute. In this case, the librarian provides data storage facilities, tools for data analysis, and virtual community support. (Mohammed and Ibrahim 2019). With the increasing digitization of research, the importance of structured research data management can hardly be overestimated. But in practice, this requirement has so far only been implemented unsatisfactorily, as shown by various studies (Vogl, Rudolph, and Thoring 2019).

It was known that at Kepustakaan LIPI Kawasan Bandung-PDII-LIPI research data in the form of raw material films/video files format were managed and stored in the Digital Asset Management (DAM)

application. The DAM application was used because it was resource space software (www.resourcespace.com) which was open source-based software. With the management of raw material films/video files in the DAM could enable storage and share through online media. Installation was done by downloading the software installation file from <https://www.resourcespace.com/get>; Install the software using the guide <https://www.resourcespace.com/knowledge-base/systemadmin/>.

3.6 Re-using data

Integrated Research Data Management (RDM) support services throughout the research cycle can effectively help researchers meet the requirements of funding agencies and journal publishers. Research data stored with relevant metadata can verify the results of research and provide evidence to support claims made by researchers. This can potentially be reused to develop other research projects. The reused data, if cited correctly, will also increase the researcher's profile like the results of other studies (F. Yu, Deuble, and Morgan 2017). Libraries can play an important role by consistently auditing and verifying the quality of research data (Payal 2019).

RDM is a problem that concerns many institutions of higher education. Research data generated by publicly funded research are increasingly seen as public goods, which must be available for verification and reuse (Ball 2015). The concept of RDM has gained extraordinary importance (Payal 2019). Academic libraries are increasingly involved in data curation by providing infrastructure and services to support the management of research data on their campuses (Akers and Doty 2012). The problem of developing, managing, and using research data has received wide acclaim from academics and policymakers (Mohammed and Ibrahim 2019).

The fast pace in Information Communication Technology facilitates the collection, organization, description, analysis, storage, long-term preservation, and distribution of data sets to be shared and reused throughout the world (Payal 2019). Data is often the product of work processes, such as laboratory experiments or field studies, conducted by people employed by institutions. As a result, historically, scientists and even institutions have claimed at least metaphorical, and often literal, ownership of "their" data, whether DNA sequence or astronomical data (Strasser and Edwards 2017). Library fully supports data reuse through licensing/purchase data, provides workshops on legal and ethical considerations when reusing data, provides guidance on citing data, and supports campus workshops on producing reproducible data (Li, Dressel, and Hersey 2019).

From research, it was known that researchers who need research data in the form of raw material films/video file format could visit the Kepustakaan LIPI Kawasan Bandung-PDII-LIPI library to find and view film screenings in the Mini Theater at Kepustakaan LIPI Kawasan Bandung using Blu-Ray Disc (BD) player technology with an HDMI interface so that the picture quality was smoother with high resolution. Film packaging was available from MiniDV to Blu-ray Disc. It was planned that shortly a mobile film application will be developed, so users could choose the title and schedule for screening a science film at the Mini Theater, researchers who visit Mini Theater at Kepustakaan LIPI Kawasan Bandung should fill out an online guest book (<http://ebook3d.bit.lipi.go.id/bukutamu/>). Researcher's visit can be seen in figure 4. In 2021, Kepustakaan LIPI Kawasan Bandung focused on managing research data to become healthy data and can be reused by other researchers both internal and external LIPI.

Figure 4. Re-using research data at Mini theatre Kepustakaan LIPI Kawasan Bandung PDDI-LIPI

When this research was conducted, guidelines for re-using data (legal and ethical considerations when re-using data) were not made, whereas guidelines for re-using research data is important so that there are no legal problems from the owner of research data when the data is used/re-used by other parties.

From in-depth interviews with researchers as users of research data, they expect regulations made by Kepustakaan LIPI Kawasan Bandung PDDI-LIPI regarding regulations on the use of research data.

4. CONCLUSION

Kepustakaan LIPI Kawasan Bandung, PDII-LIPI as a multimedia library has compiled planning research for the period 2019 to 2023. However, in research planning, training activities that support the implementation of Research Data Management (RDM) have not been made, whereas training is very important. Apart from training, awareness and promotion are also important. Raising awareness and promoting good RDM practices in institutions is crucial for the success of the implementation plan (Patterton, Bothma, and Deventer 2018).

In terms of collecting data, there were research data in the form of raw material films/video files format available at Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI totalling 4.517 titles stored on Network-Attached Storage (NAS), besides being stored on NAS, research data also found in the form of the video were packaged in MiniDV and DVD media, research data was also found in the form of photos and audio, but photos and audio had not been collected properly. It is recommended that all research data included photos and audio be collected well.

Processing and analyzing research data had been done, but only research data that was packaged on video files that had been processed and analyzed, while photos and audio had not been done. Publishing and sharing data had been carried out. Preserving research data in the form of raw material films/video file format were managed and stored in the Digital Asset Management application.

In the case of researchers who want to use (re-use) research data in the form of raw material films/video files format, they wished to visit the Kepustakaan LIPI Kawasan Bandung-PDDI-LIPI to find and view film screenings in the Mini Theater.

Providing access to research data can involve storing data in general purposes or a special discipline warehouse so that other researchers can utilize it, and utilize other libraries and catalogues to describe the data so that it can be made discoverable by other researchers (Surkis and Read 2015).

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