Assessing Research Data Output Management at the Managerial Levels at Partner PS HEIs

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Research Output Management through
Open Access Institutional Repositories in
Palestinian Higher Education Institutions

The Islamic University - Gaza

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1. Introduction

This report presents the findings of a needs assessment survey that was carried out with research managers in four Palestinian Higher Education Institutions (PS HEIs) between December 2016 and February 2017. The four participating institutions include:

- The Islamic University of Gaza (IUG)
- Al-Quds Open University (QOU)
- Birzeit University (BZU)
- Palestine Technical University-Kadoori (KAD)

2. Objectives

The survey data will be used to:

- Identify the size, formats and scopes of research volumes and digital holdings for which each partner PS HEI assumes preservation responsibility.
- Review the current RDM practices and activities adopted at the institutional level.
- Review the current situation in PS HEIs as regards IRs, open access publishing and institutional support for RDM.
- Determine the current shortcomings and future priorities in RDM from the institution's perspective.

3. Target Groups

In general, this survey targeted the administration and management staff who were responsible for, or directly involved, in RDM in the four partner PS HEIs. Since partner PS Universities might have different organizational structures and administrative departments, the selection process of participants from each university could not be the same. Project coordinators at partner PS Universities were asked to choose eligible persons based on the university's structure and pertinent administrative positions. They were urged to select participants from department/units/centres that were in charge of RDM activities such as scientific research, University library, IT unit, etc.

4. Methodology

To investigate the objectives of this survey, a questionnaire consisting of 29 questions was prepared. The questionnaire was inspired from similar studies from the literature, and was subject to a thorough revision by the BU team. Questions were divided into six categories as the following:

- Demographic Information (5 questions)
- Digitized Research Outputs (5 questions)
- Availability and Accessibility of Research Outputs (7 questions)
- Institutional Policies (3 questions)

- Research Data Management (3 questions)
- Institutional Repositories (6 questions)

Both paper and electronic based versions of the questionnaire were prepared. The links to the paper-based versions in the ROMOR Zenodo Collection are:

English - http://doi.org/10.5281/zenodo.801775

Arabic - http://doi.org/10.5281/zenodo.801790

It is worth noticing here that the questionnaire was designed to cover multiple areas that refer to distinct job responsibilities. For example, RDM is often a shared responsibility of several units/departments in the institution, each of which handles specific tasks. Therefore, it is unlikely that a single participant would be able to answer all questions, but would only be able to contribute to particular areas. In addition, we opted not to split the questionnaire based on the area of expertise because partner PS Universities are organized differently, a thing that made it difficult to decide who could answer what.

In order to gain a profound understanding of the situation on the ground, project coordinators at the four partner PS Universities were instructed to make face-to-face interviews with selected members of the managerial and administrative staff. During the interviews, interviewees were asked to fill in the questionnaire and to give explanations on their answers where appropriate.

Tables 1-4 list the persons selected to participate in the study, along with their positions, from each partner PS University:

	Name	Position	Department/unit	E-mail
1	Dr. Mohammed Al-Hanjouri	Assistant Vice President for IT Affairs	IT Affairs – Administration	mhanjouri@iugaza.edu.ps
2	Dr. Wisam Ashour	Assistant Vice President for Research and Graduate Affairs	Research and Graduate Affairs	wkashour@iugaza.edu.ps
3	Moneer Al-Masri	Head of programming unit	IT Affairs– Programming Unit	mmassry@iugaza.edu.ps
4	Belal Al-Nabris	Head of e-learning unit - He operates the learning content management system (Moodle), and the content management system for Master theses.	IT Affairs – E-learning Unit	bnabris@iugaza.edu.ps

5	Mohammed Saleh	Secretary- He operates the content management system for IUG journals	Research and Graduate Affairs	msaleh@iugaza.edu.ps
6	Mahmoud Hammad	Secretary - He is responsible for archiving the Master's theses	Research and Graduate Affairs	mmhammad@iugaza.edu.ps
7	Ahmed El-Abed	Web Developer - He developed and currently maintains the website and the electronic services of University Library	IT Affairs – Programming Unit	aelabed@iugaza.edu.ps
8	Ameera Al-Haddad	Programmer - She participated in the development and deployment of a repository for master theses	IT Affairs – Programming Unit	ahadad@iugaza.edu.ps
9	Dr. Iyad Al-Shami	Assistant Professor – He was involved in the management of library services and the training of library staff.	University Library	eshami@iugaza.edu.ps

Table 1: Participants from IUG

	Name	Position	Department/unit	E-mail
1	Prof. Dr. Husni Awad	Dean of Scientific Research	Deanship of Scientific Research	hawad@qou.edu
2	Mr. Baha Thabit	Head of Open Learning Center (OLC)	OLC Center	bthabet@qou.edu
3	Mrs. Rajaa AbuAlia	Head	Central Library West Bank	centrallibrary@qou.edu
4	Mr. Salameh Ali Qarariyyeh	Employee	Central Library Nablus	sqarariyyeh@qou.edu

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5	Mr. Ahmad Thabit	Head	Central Library Gaza	ahthabit@qou.edu
6	Mr. Jad Fraij	Head of eLearning Unit	eLearning Unit/ICT center	jfreij@qou.edu
7	Eng. Mohammad Khdair	Employee	Department of the Curricula and Textbooks	mkhdair@qou.edu

Table 2: Participants from QOU

	Name	Position	Department/unit	E-mail
1	Dr. Saed Mallak	Vice President for Academic Affairs	Vice President	s.mallak@ptuk.edu.ps
2	Dr. Rana Samara (Qubbaj)	Dean of Graduate Studies and Scientific Research	Graduate Studies and Sci. Research	r.samara@ptuk.edu.ps
3	Eng. Fadi Ismail	The Director of the Computer Center	Computer Center	fadi@ptuk.edu.ps
4	Dr. Awni Sous	The Director of the Library and E-Library	Library	a.sous@ptuk.edu.ps
5	Ahmad Rabayaa + Hadi Khaleeliye	The Director of the E-learning Center	E- Learning Center	a.rabaya@ptuk.edu.ps, h.khalila@ptuk.edu.ps
6	Mays Abu Taqa	The Director of the Multimedia and Educational Resources	Multimedia and Edu. Resources Center	m.taqa@ptuk.edu.ps
7	Dr. Mutamed Alkhatib	Dean of Faculty of Engineering and Technology	Faculty of Engineering and Technology	M.Alkhatib@ptuk.edu.ps

BIRZEIT UNIVERSITY   TU WIEN

8	Dr. Ehab Qubbaj	Dean of Faculty of Business and Economics	Faculty of Business and Economics	l.Alqubaj@ptuk.edu.ps

Table 3: Participants from KAD

Position
Vice President for Academic Affairs, current and former
Dean of graduate Studies
Chair of the University Research Committee
Heads of the Masters programs
The head of the single PhD program at the University
Deans of faculties
Heads of institutes, a major source of research output at BZU
Librarian and some Library People
ICT Staff with direct involvement in research management software
Department Chairs
Research active faculty members, beyond the above

Table 4: Participants from BZU

5. Analysis and Results

When analyzing the results of the survey, we decided to review the responses to the questionnaire as well as the subjective comments and discussions from the interviews. We opted not to carry out quantitative analysis of the questionnaire results due to the following reasons:

1. Number of participants per institution was small. In addition, treating the whole participants as a single sample and generalizing the results to the population would not be possible due the vast differences between institutions regarding the RDM infrastructure and procedures.

2. Questionnaires were partially filled in: Each participant could only provide answers to questions that were part of his/her area of expertise. Out-of-scope questions were left unanswered.

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In what follows, the results are discussed from the following perspectives: digital materials, data management, RDM policies, institutional repositories, copyright issues, metadata, library staff, and priorities for future development. Afterwards, a general comparison is made between the four PS Universities.

5.1. Digital Materials

Digital Materials at IUG:

IUG is responsible for managing and preserving only the digital materials shown in Table 5. These digital materials are stored in local servers operated by the IT staff. Table 5 also shows which unit is in charge of the management process, and the estimated size of each material where possible.

Digital Material	Responsible department/unit	Digital types	Estimated size (in GB)	Other details
Master theses	Research and Graduate Affairs Central Library	PDF DOC	24	Roughly annual increase: 2-3 GBs
Publications of IUG Journals	Research and Graduate Affairs	PDF	3	IUG publishes 6 journals that are issued either quarterly or semi-annually, and are all open-access.
Unpublished and Technical Reports related to scientific research	Research and Graduate Affairs	PDF DOC XSL Image formats	2	Primarily consist of administrative reports such as guidelines, policies, templates, forms, news articles and procedures.
Learning Content	IT Affairs – E-learning Unit	Diverse	72	10 GB annual increase
Video Lectures	IT Affairs – E-learning Unit	MPEG 4	445	Video and audio recorded lectures for

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				about 150 courses

Table 5: Digital materials in IUG

Digital Materials at QOU:

In QOU much of the following materials (scholarly articles, presentations, research data, technical reports, manuscripts, books, websites, emails, papers, photographs, audio files, and videos, etc.) are being created in digital formats and they are vital to future researchers.

To ensure that the digital materials remain reliable and available for users (researcher, student, staff, etc.) for as long as is deemed necessary, QOU is responsible for creating, managing, storing, and preserving these digital materials. Table 6 shows more information about these materials. These digital materials are stored in local servers operated by the ICT Center. Table 6 also shows which unit is in charge of the management process, and the estimated size of each material where possible.

Digital Material	Responsible department/unit	Digital types	Estimated size (in GB)	Other details
Graduation projects	Deanship Scientific Research and Deanship of Student Affairs Central Library	PDF DOC	2GB	Roughly annual increase: 2-3 GBs
Publications of 7 Journals	Deanship of Scientific Research	PDF DOC Excel	3GB	QOU publishes 7 journals that are issued either Quarterly or Monthly, and are all open-access.
Unpublished and Technical Reports related to scientific research and OLC Center	Deanship Scientific Research, OLC Center, ICT Center, and Faculties	PDF DOC Excel Image formats	5GB	Primarily consist of administrative reports such as reports, news articles and technical reports.
General Reports	Deanship Scientific Research, Deanship of Student Affairs, Deanships of Registration and exams, Public Relation, OLC Center, ICT Center,	Excel, Doc, PDF, and ppt	5GB	Primarily consist of administrative reports such as guidelines, policies, templates, forms, News articles and procedures.

	Continuous Education, Quality Department, Department for Curricula and Textbooks and Faculties			
Learning Content	ICT Center, OLC, MPC, Department for Curricula and Textbooks and Faculties	Web pages, Flash , Books, Videos, eLearning materials, ppt,	83.62 GB + 15GBs Books	15-20 GB annual increase
Video Lectures	ICT Center, OLC and MPC	MP4	69.21 GB	Video COURSES

Table 6: Digital materials in QOU

Digital Materials at KAD:

Although KAD is a young university, it is rapidly growing. From the beginning, the university emphasized the importance of research and supported it morally and financially. It created several research centers and postgraduate departments. Despite this substantial support, the research outputs and number of research publications is not as it should be and below the university ambitions. The university continually assesses and modifies its policies in order to further improve the research outputs. Table 7 shows the elements relevant to the research outputs in KAD.

Digital Material	Responsible department/unit	Digital types	Estimated size (in GB)	Other details
Master theses	Research and Graduate Affairs Central Library	PDF DOC	0	No Masters graduates Yet. Our first Graduate program is 1 year old
Publications of KAD (KAD) Journal and	Research and Graduate Affairs and the	PDF	1	KAD publishes 1 journals that is issued semi-annually, and it is openly

Conference proc.	Computer Center			accessible. Through the university website. Every year KAD organizes 3-4 conferences. Some of the Proc. Are for open access.
Learning Content	Computer Center and E-learning Center	.doc, .ppt, .PDF, .xls, …	30	Annual Growth 5 GB
Video Lectures and other Educational Videos	Computer Center and Multimedia Resources Center	MPEG 4	1000	Video lectures, seminars. Annual growth 200 GB

Table 7: Digital materials in KAD

Digital Materials at BZU:

The questionnaire/interviews indicate that the main data format being used is the usual for documents (pdf, doc*, txt, sheets, slides) plus occasional use of Audio and Video/pictures and xml data. This is probably due to the fact that the material being stored is mostly research papers and teaching materials. Variations occur when the individual concerned is versed/needs that particular type of data. One would expect that University wide there is quite some room for more diverse formats than is currently being used. We ascertained this information during our contacts with the law institute and their work on the legal repository: AlMuqtafi.

In addition to the usual storage mechanisms: hard disk, Flash Drives, many reported resorting to the cloud for data storage, and less so to the drives at the institution. This sounds interesting and in need of study. It may be the case that the managers are not sure about the availability of the data on these drives, something that should be factored into any future effort.

Very few could give an estimate of the size of the material they work to archive. This is understandable since they may not have knowledge of the size of digitally-stored material, knowledge which can be obtained from the people responsible for the archiving effort. Table 8 lists the available numbers of research items stored by BZU and their estimated size.

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Type	Items
Scientific Publications	1360
Books	329
Book Chapters	6
Master Theses	670
Technical Reports	175
Other (brochures, Studies,…)	500
Total Items:	3040
Space Used	20GB

Table 8: Summary of Stored material

About half of the material is from 2009 and later. All academic units are well represented in the archived material. There are variations in the size of output for individual units.

The estimation is that the size may triple in the next 5 years.

One can notice the absence of Multimedia material, teaching material, archival data on topics like cultural heritage and museum holding and so on. One reason is that many of these are being archived in separate systems as mentioned above (Ritaj and moodle for teaching material, Awraq for cultural heritage). There is an effort to enter the museum artifacts collection but that is still in the planning stage.

5.2. Data Management

Data Management at IUG:

The following subsections describe how each type of digital material is handled and managed at the institutional level. Shortcomings within the management process are also illustrated where possible.

Master Theses:

Master theses form the primary research output for which the university assumes responsibility. The number of master theses that have been produced since the opening of the first master program 15 years ago is estimated at 3600 theses. On average, 500 theses are produced annually, all of which are stored on local servers and are made openly accessible to the public through the

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website of the central library. The total volume of master theses is roughly 24 GB. The procedure followed to store and manage accessibility to the master theses is as the following:

The Masters student should hand in a soft copy of the thesis on a CD or flash drive to the Research and Graduate Affairs. The soft copy should be in PDF and MS-word formats. Any data used in the thesis, such as datasets, statistics, source code, sheets, is not required to be handed in, and thus is not preserved. The thesis files are archived by the Research and Graduate Affairs, and are then sent to the central library.

The library staff upload the thesis file to the library's website, and adds short descriptions, i.e. metadata. These descriptions include: thesis title, abstract, author, and supervisor's name. No specific standard is used for metadata. Once uploaded, the thesis file instantly becomes openly accessible and available to download by the public through the library's webpage. A search service, with several search options, is also provided and supported by the aforementioned metadata.

The following problems have been reported by the Research and Graduate Affairs and the Library staff while handling the master theses:

1. *Duplicated copies uploaded to the servers:* the same thesis may be uploaded twice or more. This duplication is attributed to the poor coordination between the Research Affairs and the Library staff, and the recruitment of less-trained volunteers to undertake the data entry process. This duplication can result in inconsistent search results and wasted storage space. It also causes disruption to the indexing and abstracting bodies which repeatedly sent complains of duplicated references to theses files.

2. *Lack of metadata standards*: No metadata standard is currently used for describing master theses.

3. *Stalled development of the library's electronic services:* the library's webpage and electronic services have been developed, and are currently maintained, by the programming unit at IUG. Since the launch of the website, little progress has been made to improve and customize the website, despite the several requests sent by the Research and Graduate affairs unit and the IUG staff. This delay is explained by the intensive work that the programming unit is undertaking across the whole university. In general, software solutions that are locally-developed at IUG often evolve at a slow pace.

4. *Limited number of supported formats:* only text files, in PDF and MS Word formats, are currently archived. Other research data, such as datasets, developed software, CAD files, sheets, designs etc, are neither stored nor requested to be delivered. It is the responsibility of the author to make such supplementary materials available and accessible through, for example, his/her personal webpage.

Due to the above limitations, the Research and Graduate Affairs unit indicated that they are currently planning to create an alternative archive for master theses that will be solely administered by the Research and Graduate Affairs unit. An open source content management system will be used to overcome the limitations of the locally-developed solutions. The staff at the Research and Graduate Affairs unit will take over responsibility for uploading, archiving and describing the master theses.

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Besides the above limitations, it may worth mentioning that the user interface of the library's web page is written in Arabic, and there is no English version of the interface at the time of writing this report. In addition, metadata are added using the same language used in writing the thesis, except the abstract, which is added in both English and Arabic. This means that the thesis can be only retrieved by using the same language used for writing it.

Publications of University Journals:

The IUG currently publishes 6 journals that are issued either quarterly or semi-annually, and are all open-access. These journals can be accessed online through the following link: http://journals.iugaza.edu.ps/. Submissions to these journals are processed by the staff at the Graduate and Research Affairs unit who arrange for the peer-review process, and perform the entire editing. The total size of publications in IUG journals is roughly 2 GBs. Open Access Journal (OAJ) is a management and publishing software that is currently used by the Research and Graduate Affairs to manage the publishing, reviewing and indexing processes. Similar to the situation with the master theses, a lot of effort was devoted in the past by the programming unit at IUG to develop a web-based management system for IUG journals. This system, which took over 6 months to develop, has been abandoned and replaced by OAJ due to the low level of coordination between the programming unit and the Graduate and Research Staff.

Unpublished and Technical Reports related to scientific research:

The Research and Graduate Affairs at IUG publishes policies, regulations, news, templates, technical reports and forms that pertain to scientific research. The estimated size of these documents is about 2GB, and are stored in a local server. Some documents such as general policies and regulations, are made openly accessible through the university website. Note that published policies provide guidelines for academic promotions, and terms and regulations for funded projects. At the time of writing this report, there are no policies for research data management.

Learning Materials:

The learning content includes all the learning and teaching materials that are used by academic courses. The University uses MOODLE as a learning content management system. Using MOODLE for teaching is not mandatory for academic staff, though recommended, according to IUG policies. The E-learning center, which falls under the IT Affairs, is responsible for operating MOODLE and maintaining its content. Students are given access upon the request of the lecturer, who is then become responsible for managing course activities and uploading the course content to MOODLE.

The estimated size of the MOODLE's content is about 72 GBs. This number includes not only the course contents, but also files and assignments uploaded by students. This size has increased from 25 GB in 2011 to 72 GBs in 2017, indicating the vast increase in adopting MOODLE for learning and teaching. The content of MOODLE is stored in local servers at IUG.

Video Lectures:

At IUG, special rooms with recording facilities are available for staff to record their lectures. All recordings are processed by the staff at the E-learning center, and are made freely accessible through the university website. The size of recordings is currently 445 GBs, and are stored in a local server in MPEG4 format.

Other Digital Materials:

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The digital materials discussed above are the only materials that are exclusively managed and stored at the institutional level. Other digital materials, such as publications of staff members, technical reports, graduation project reports, datasets, manuals, etc, are the intellectual properties of the owners or authors. Some faculties and departments at IUG can make these materials accessible through their webpages. Members of academic staff can also make these materials available online through their personal webpages.

Data Management at QOU:

The following subsections describe how each digital material is handled and managed at the institutional level. Shortcomings within the management process are also illustrated where possible.

Graduation Projects and Journals:

The total annual size of graduation projects at QOU is about 3GBs. Most of these reports are in Arabic Language.

The following problems have been reported by the Deanship of Scientific Research and the Library staff while handling the Digital Materials:

1. There is no coordination between the Deanship of scientific Research and the Library staff specially in indexing the research articles and graduation projects.

2. The staff at the Library Department are responsible for uploading, archiving and describing the graduation projects as well as other digital or hard copies in the library. Indexing and metadata are added using the same language used in writing the graduation projects (Mostly Arabic language), except the abstract which is added in English and Arabic.

3. Lack of metadata standards:

    ● No metadata standard is currently used for describing the Graduation projects.

    ● No metadata standard is currently used for indexing articles in the QOU journals

4. Electronic Library and the library's electronic services: the library's webpage and electronic services were developed and are currently maintained by the ICT Center at QOU. The Central Library Automatic Index in the website of Libraries Department allows users to search through the field or group of fields, and a word or any number of words in the same field. The website is available in Arabic and English Language.

Publications of University Journals:

The QOU currently publishes 7 journals that are issued either quarterly or monthly, and are all open-access and hard copy version. These journals can be accessed online through the following link: http://www.qou.edu/english/index.jsp?pageId=226.

The Deanship of Scientific Research is responsible for all RDM activities and there are written procedures and policies for research data management prepared in cooperation with the Quality Department at QOU.

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Submissions to these journals are processed by the staff at the Deanship of Scientific Research who arrange for the peer-review process and perform the entire editing and publishing online and printed version of the journals.

The total size of publications in QOU journals is currently about 3GBs.

The Deanship of Scientific Research uses in-house and open source software to manage and publish, review and index Open Access Journals (OAJ). ICT plays an important role in implementing and maintaining the software for management of QOU journals.

The Deanship of Scientific Research uses open source Journal Management system to manage content, submission, archiving, publishing, access, and preservation the Palestinian Journal of Technology and Applied Sciences (PJTAS). The system offers the staff at the Deanship of Scientific Research with the tools to manage the whole life cycle of article management, reviewing, uploading, archiving and publishing the scientific articles in this journal. Other journals are still managed with in-house tools developed by the ICT Center.

Unpublished and Technical Reports related to scientific research:

The Deanship Scientific Research, OLC Center, ICT Center, and Faculties at QOU publish news, technical reports and forms that pertain to scientific research. The estimated size of these documents is about 5 GBs, and are stored locally in each department/Center and in a local server in ICT center.

General Reports:

Deanship Scientific Research, Deanship of Student Affairs, Deanships of Registration and Exams, Public Relations, OLC Center, ICT Center, Continuous Education, Quality Department, Department for Curricula and Textbooks and Faculties at QOU publish policies, regulations, news, templates, technical reports and forms that pertain to scientific research. The estimate size of these documents is about 5 GBs, and are stored locally in each department/Center and in a local server. Some documents such as general statistical information, policies and regulations, are made openly accessible through the university website. Other documents have restricted access to authorized users only. Quality Department and Scientific Research published policies provide guidelines for academic promotions, and terms and regulations for funded projects.

Learning Materials:

The learning content includes all the learning and teaching materials that are used for academic courses. The University uses different Digital Learning Contents and the Academic portal as a learning content management system. Figure 1 summarize these models.
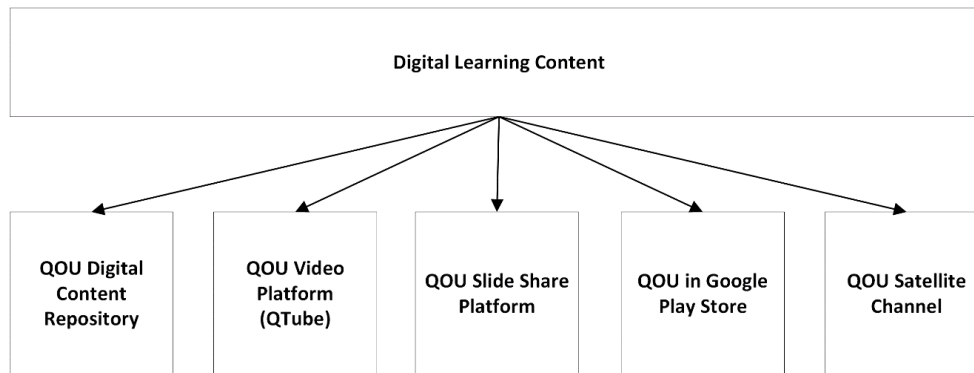
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Figure 1: Different Digital Learning Contents at QOU

QOU Digital Content Repository (QOU DCR) is an open access repository operated by the Dublin Core metadata standards, and used for storing, retrieving, and indexing the digital content to re-use it independently in various contexts and in different platforms. QOU DCR contains many formats of the digital learning content such as learning objects, self-Learning Open Online Courses (sLOOC), graphs, infographics and others.

QOU SlideShare Platform (QOU SlideShare) is an open access and interactive platform to view, share, and download learning slides and documents that prepared by the instructors. QOU SlideShare also enables learners to make comments and collaborate with other learners and with instructors.

eCourse (Moodle) in QOU Learning Management System (LMS), provides QOU students with different services for each course such as Course Plan, File exchange, Virtual Classes, Forums and others. QOU designed and developed 2 MOOCs with Edraak MOOCs Provider (A Queen Rania Foundation for Education and development and the Arabic version of Edx MOOCs) in Math and Statistics. Table 9 summarizes the total size of these digital learning contents.

Content	Database	Data file	No of files
Qtube	(82 MB)	(69.21 GB)	2380 video
Dspace	(1.1 MB)	(51.32 GB)	
SlideShare	(7.5 MB)	(176.7 MB)	158 file
eCourse	(6994.1 MB)	(83.62 GB)	528 items

Table 9: Digital learning contents in QOU

Figure 2 shows the eLearning components structure in QOU and the relationships between them.

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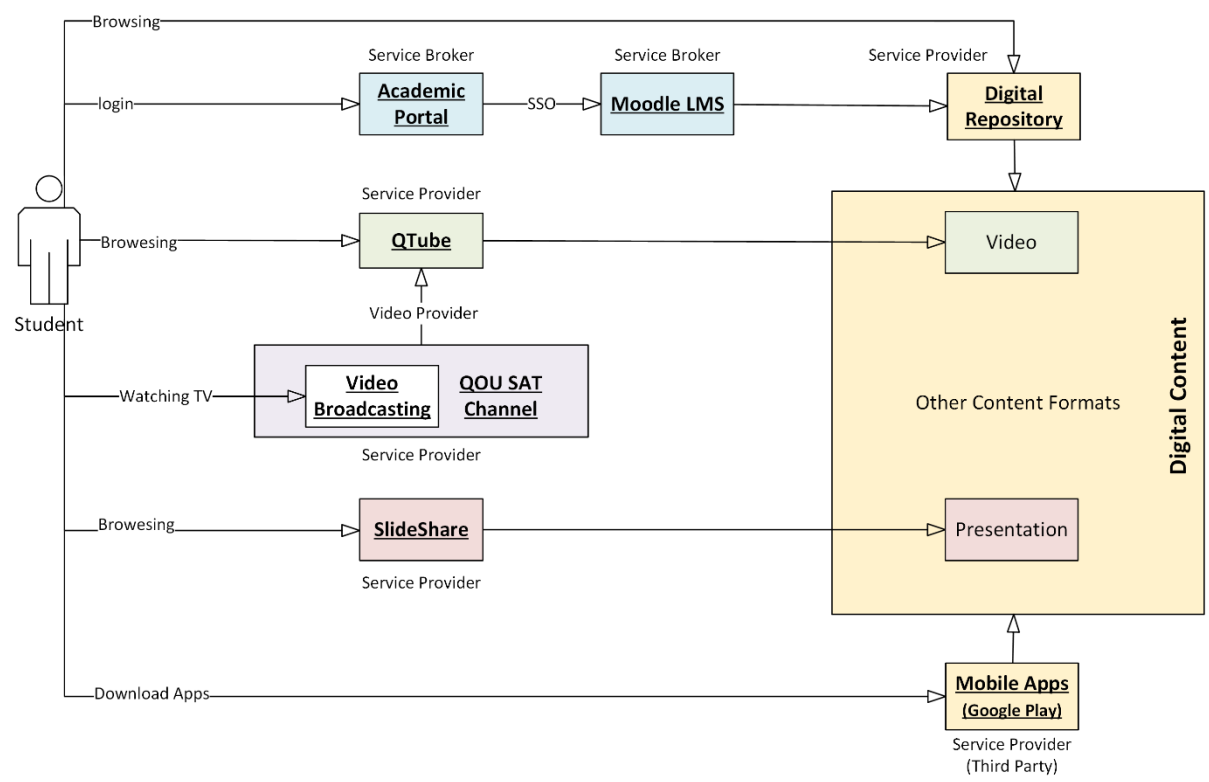Co-funded by the
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Figure 2: eLearning components structure in QOU

The ICT center, is responsible for operating and maintaining the MOODLE as well as the other eLearning materials. Online courses are opened, and students can access them as they enrolled in these courses. Academic staff can manage course activities and upload content to MOODLE like ppts, summaries, quizzes and exams, etc. OLC is responsible of system management, content creation, and maintenance.

The estimated size of the learning materials is about 380 GBs. The Learning materials is stored in local servers at QOU in the ICT center.

OLC center provides the following standards:

● Instructional and Pedagogical Standards

● Design and Layout Standards

● Technical Standard

● Publishing Standards

   o License and Publishing

   o Dublin Core Metadata Standards

Video Lectures:

QOU Satellite Channel (QSC) is an open access educational satellite broadcasting service that produce all educational video lectures that broadcasted on TVs, published on QOU Video Platform

(QTube), and used in developing the self-Learning Open Online Courses (sLOOC). All recordings are processed by the staff at the Multimedia Production Center (MPC), and are made freely accessible through the university website and QTube .

Other Digital Materials:

The digital materials discussed above are the only materials that are exclusively managed and stored at the institutional level. Other digital materials, such as publications of staff members, technical reports, graduation project reports, datasets, manuals, etc, are the intellectual properties of the owner or the author. Some faculties and departments at QOU make these materials accessible through their webpages Facebook, LinkedIn and ResearchGate or academic portal.

Data Management at KAD:

The following subsections describe how each digital material is handled and managed at the institutional level. Shortcomings within the management process are also illustrated where possible.

Master Theses:

 KAD has only one Master degree program which in Agricultural biotechnology. It started last year, so, KAD does not have any graduates from this program yet. The deanship of graduate studies put on their plans to publish for open access all graduate student theses and all publications (Journal, Conference, Technical Reports) through the university website with the assistance of the E-Library and Computer center staff.

Publications of KAD Journals:

 KAD publishes only one peer-reviewed Journal (KAD Research Journal) which is published both Hardcopy and softcopy and available for open access through the university website. KAD journal is published regularly at most three times a year. The university journal can be accessed through the following link: http://KAD.edu.ps/KAD_journal/. Online submission is available through the same link and all submissions and handled by the editorial committee. Besides the university, Journal KAD organizes 3-4 scientific conferences in the disciplines of Engineering, Business, Agriculture, Vocational Education. The proceedings of these conference and printed and some of them are available online for open access.

Multimedia Resource and Video Lectures:

KAD has a center for multimedia resource which is well-equipped to make video recording of 160-200 lecture meetings every semester. This results in about growth of about 200 GB of storage needed every year. The recording, editing and management of video-recorded material is carried out by the Multimedia and Computer Center.

E-learning Content:

The E-learning center at KAD uses MOODLE as the E-learning platform. The amount educational material available through MOODLE is about 30 GB with a growth of about 5 GB every year. The E-learning content is managed by the E-learning Center and Computer Center staff

Data Management at BZU:

As to the ways the institution makes material available, there seems to be familiarity with the more traditional ways (Institution/unit web site, researcher site,..) but less so about the Institutional Repository, probably due to its novelty.

There is a difference of opinion as to the type of access being/should be granted to potential customers, with strong preference to granting access to those allowed to have it. The dominant type of access seems to be keyword/author search. The custodian of the system, the Library, are for open access and are trying to be as open as possible and to limit access only in cases when open access conflicts with laws/regulations. This does not apply to the University archival data which is accessible only by authorized individuals.

Birzeit University has been trying hard to preserve many aspects of Palestinian heritage. Back in the 80s the University had a center for Documentation which was tasked with documenting Palestinian political and economic life. In the early 90s a drive to preserve the Palestinian legal heritage resulted in a Computerized System: AlMuqtafi dedicated to storing Palestinian laws and regulations over the years and making them accessible to potential users. It is also an official digital legal repository for the Palestinian Legal System. In 2010 the University started the Palestine Archive (Awraq: Papers) dedicated to preserving Palestinian Cultural Heritage through digitization. http://awraq.birzeit.edu/. In the same year a major effort was directed at granting access to University Scientific output and a Publications system full with approval and access protocols was added to the University portal: https://ritaj.birzeit.edu/instructor/publications/

5.3. Research Data Management Policies

Research Data Management Policies at IUG:

IUG has no written policies for RDM. There are also no guidelines or regulations for handling digitized materials (storage, migration, refreshing, and publishing). The Research and Graduate Affairs is the entity that plans for RDM activities, and they often use ad-hoc procedures. These procedures are often subject to change when the administration board is changed. For example, the new administration board of the Research and Graduate Affairs plans to take over responsibility for the processing and management of master theses from the University Library.

All entities involved in this study (IT Affairs, Research and Graduate Affairs and Central Library) stressed the importance of having written guidelines and policies for research data management, and that these policies are extremely important to resolve the conflict in rights and duties, improve efficiency and avoid redundant efforts.

Research Data Management Policies at QOU:

QOU has written procedures for research publishing in Deanship of Scientific Research. There are guidelines or regulations for handling digitized materials (storage, migration, refreshing, and publishing) in OLC center. The Deanship of Scientific Research with the cooperation with Quality Department is the entity that plans for research data management. There are no clear procedures for the management of research output on Digital repositories especially for indexing and preservation process in the life cycle of the digital documents.

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All members of managerial and administrative staff participated in this study (ITC Center, Deanship of Scientific Research and Central Library, OLC) stressed the importance of having written guidelines and policies for research data management. These policies are extremely important to manage, store, and preserve research output in order to maximize the initial investment and ensure that objects and information remains reliable and available for users for as long as is deemed necessary.

Research Data Management Policies at KAD:

Since KAD is a young university, there are no mature policies and regulations for research output management. Currently, we can say, that ad-hoc policies are followed that may vary by time. Due the importance of having guidelines and policies for research output management, the Vice President for Academic Affairs and the Dean of graduate studies and Scientific research are appointed by the university administration to work on establishing institutional policies for Research output management. After KAD became a partner in this Project (ROMOR), the institutional polices will be created to meet to outcomes of this project.

Research Data Management Policies at BZU:

There seems a good degree of awareness regarding the existing written policies for digital assets management. This may be due to the multiple announcements on the subject distributed several times a year, and the fact that these policies are published in Arabic and are translated into English https://fada.birzeit.edu/policies/ .

5.4. Institutional Repositories

Institutional Repositories at IUG:

IUG does not currently operate an institutional repository to store the entire research outputs of its academic and research staff. Apart from master theses and IUG journals, which are stored and managed by using a locally-developed web application and a content management system respectively, the preservation of all research assets is the responsibility of the owning researcher or research group. Researchers can make their research assets accessible through their personal, departmental, or faculty webpages if they own the copyrights, but IUG is not responsible for any content published on personal webpages linked to from IUG website, unless that content violates its policies.

Furthermore, there is no policy that requests the academic staff and researchers to deposit or report on their research outputs. As a result, the Research and Graduate Affairs cannot provide clear figures or statistics on the institution's research outputs (e.g. numbers and details of publications). Although staff members are requested, but not obliged, to submit an annual report in which publications and activities should be listed and described in detail, no useful information or statistics are extracted from these reports, besides the fact that a considerable number of staff members used to show little commitment towards providing the complete details of their research results and activities.

All participants pointed out that the development of an institutional repository is a top priority. They all think that a single repository that encompasses, structures and provides accessibility to

the entire research holdings of the institution will be the effective remedy for the use of multiple content management systems and locally-developed solutions to manage the different types of outputs. Currently used solutions are often incompatible, hardly customizable and difficult to integrate as compared to the provisioned institutional repository, as indicated by most interviewees.

Institutional Repositories at QOU:

QOU Digital Content Repository (QOU DCR) is an open access repository operated by the Dublin Core metadata standards, and is used for storing, retrieving, and indexing the digital learning material. QOU does not currently operate an institutional repository to store the entire research outputs of its academic and research staff.

The Deanship of Scientific Research does not use QOU Digital Content Repository to store and manage QOU journals. QOU journals are stored and managed by using in-house web application and a content management system developed by the ICT center and open source journal management software, the preservation of all research materials is the responsibility of the Deanship of Scientific Research and the owning researcher/s.

Researchers share their researches online through their personal, departmental, or faculty webpages if they own the copyrights. They are responsible for publish their research and promoting wider access to research data, and other materials that support publications. Researchers are also responsible for any content published on personal webpages linked to from QOU website.

At the end of each academic year, the Deanship of Scientific research requests the academic staff and researchers to deposit or report on their research outputs. As a result, the Deanship of Scientific Research can provide clear figures or statistics on the institution's research outputs (e.g. numbers and details of publications).

In spite of, all Staff members are requested to submit an annual report in which his/her publications and activities should be listed and described in detail for the annual academic evaluating, no useful information or statistics are extracted from these reports.

All survey participants mentioned that institutional repositories are a top priority and very vital in QOU. Currently QOU DCR is operated only for eLearning materials and all the survey participants looking to integrate their digital material into QOU DCR.

Institutional Repositories at KAD:

KAD does not have institutional repository to store any data of any kind including research outputs. KAD currently has only one master degree program with no graduates yet. The preservation of all research outputs is currently carried out by the Computer Center through web applications developed locally under the supervision of the dean of graduate studies and scientific research. Researchers, in very limited numbers, make their publications available through their own webpages or department webpages. Furthermore the university does not have policy that compels academic staff to deposit their publications making it difficult for the university to give accurate data about research output size. The administration at KAD are keen to develop such repository making faculty research accessible to others thus encouraging and enhancing research at this new academic institution.

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Institutional Repositories at BZU:

In 2016 the University released the first version of its repository (Fada: Space) https://fada.birzeit.edu/ as an attempt to archive the University material and that is still work in progress. The University regulations have been calling for preserving digital copies of all theses produced at the University and many departments require electronic copies of graduation projects for preservation and the University portal is frequently used to store students submissions, though not necessarily for the longer term.

The approval system is handled by the library and this sometimes results in some delays.

The people most involved in the Research management effort are the Library and the IT services. The data entry is performed by individuals and/or their designated representatives then go into an approval process.

Among the issues worth mentioning is the noticeable reluctance of many to add their material to the repository or its predecessor. This may be due to the perceived difficult of dealing with the system and the lack of understanding of its utility and returns to the individual concerned. To overcome that several approaches are being tested, with some success: integrating the repository with the evaluation system and requests for conference attendance support. On the cards are using the data in the repository for tenure and promotion document delivery. This is already announced as being contemplated, but is not implemented yet.

5.5.   Copyrights

Copyrights at IUG:

According to the Research and Graduate Affairs, IUG owns the copyrights of the articles published in IUG journals. Copyrights of master theses and video lectures are owned by authors. However, there are no written policies addressing copyright issues.

Copyrights at QOU:
According to the Deanship of Scientific Research, QOU owns the copyrights of the articles published in QOU journals.

According to the department of the Curricula and Textbooks QOU owns the copyrights of textbooks. All digital learning content is published as open access for reusable and educational purposes. Creative Commons licensing (CC) is used as: Reusable, Non-Commercial and No derivatives. However, there are written policies addressing copyright issues.

Copyrights at KAD:

KAD owns the copyrights of all articles published in KAD journal or conference proceedings and Master theses. Research outputs of KAD academic staff that are published in other institutions are under the publisher's rules and regulations.

Copyrights at BZU:
There seems a good degree of disagreement as to the Institutional Policies (IP) rights ownership for the different research output elements. This may be a reflection of the large variety of support

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schemes for research and the resulting confusion regarding IP ownership. Also this may call for a clearer policy as to who owns what in terms of IP rights.

5.6.   Metadata

Metadata at IUG:

No metadata standards are used to describe any digital material preserved at the institutional level. Only very limited descriptions of master theses and the publications of IUG journals are provided. These descriptions are not accessible by the public, and are only used to support search services (search by author, year, supervisor, topic, etc..). Although the administration board of Research and Graduated Affairs has put the standardization of metadata as a top priority for the next five years, they indicated that they have neither the knowledge nor the expertise to perform the standardization process.

Metadata at QOU:

Metadata is used to describe records in repositories, and requires skills in defining schemas, standards, and interoperability protocols. In the deanship of the Scientific research there is no metadata standards used to describe the management of the digital material. The Deanship of Scientific Research with the help of the Quality Department are planning to put the standardization of metadata as a top priority for the coming years. The way in which it will be tackled can vary significantly and may be affected by many factors including knowledge and the expertise to perform the standardization process. The Deanship of scientific research is using an open source journal management system to manage PJTAS journal, the system provides archiving toolkit to support management, acquisition, collection management, storage, maintenance and access.

Metadata at KAD:

KAD does not have any metadata standards to describe any digital material for which it assumes responsibility.

Metadata at BZU:

There seems to be lack of knowledge about the Metadata Standards adoption at the institution. Metadata is handled by the library people with an eye on moving that to individuals later on after sufficient training. The metadata standards used are Dublin Core plus some others.

5.7.   Library Staff

Library Staff at IUG:

The library staff does not perform any activities related to research outputs management, except the upload of master theses to the local servers. They often follow routinely procedures by simply copying files from CDs or flash drives to a specific drive on the server. They also input, through the library's website, a short description of the thesis to enable end-users to perform advanced search. These descriptions included: the thesis title, author, supervisor, category, year and faculty. In the past, some volunteers were recruited to perform the data entry. Several mistakes in data entry and duplicate uploads were reported as explained earlier in this report.

Library Staff at QOU:

The library staff does not perform any activities related to research outputs management, except the upload of graduation projects, books, journals and master thesis to the local servers. They also manage the process on entering and updating the data related to these resources. They input, through the library's website, a short description, indexing metadata of these resources to enable end-users to perform advanced search. These descriptions included the title, author, category, year and other related information.

Library Staff at KAD:

In KAD Library staff does not perform any activities related to research output management.

Library Staff at BZU:
The library staff is responsible for the management of the institutional repository, and they handle its digital contents. They also handle the entry of metadata, but there are plans to move that to individuals after sufficient training.

5.8. Priorities for Future Development

Priorities for Future Development at IUG:

From the perspective of the stakeholders' vision for future development, the following areas were assigned the highest priorities:

- More network bandwidth and storage capacity
- Data security
- Ease of use and access
- Open access support
- Better guidelines or policies for dealing with research data
- Interoperability with other platforms
- Standardization of metadata
- More RDM training and support

In contrast, the following areas were assigned the lowest priorities:

- Better IT support: They think that the current IT support staff is sufficient.
- Digital Preservation: Necessary, but not urgent and demanding.
- Collaborative working space: This area is not highly demanded by the staff.
- Local RDM solutions: There has been a stronger orientation towards open access and off-the-shelf software solutions.

Priorities for Future Development at QOU:
The data from the interview could be used to facilitate staff development and training. There is clearly a need for more and varied training opportunities for repository professionals. Repository work requires a specific set of skills that can be difficult to find, and institutions will benefit from investing in training and ongoing development opportunities for repository staff.

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It is understandable therefore, that our HEIs particularly libraries, archives , research centres, and eLearning and open learning centre face increasing demands for digital services from users who routinely use or depend upon digital information in life.

The objectives should identifying how best to prepare, and support, the repository staff who will be vital to the success of repository services as they continue to evolve and mature.

There is a need to review and enhance the QOU Digital Content Repository (QOU DCR) to better serve the University community.

It is clear from the responses that technical skills, in general, are vitally important. The majority of survey participants held managerial or administrative positions, and technical support for repositories was provided by those in their teams.

The interview identified a specific set of technical, skills and knowledge required to work on a digital repository, these may be summarized as:

Technical Issues:

- Network bandwidth, storage requirements, and backup of primary storage
- Design of a Storage Architecture
- Data access security controls rights and levels to view, access and modify Repository Objects
- Ease of use and access
- Interoperability with other platforms

Knowledge of:

- Specific repository software
- Copyright legislation
- Open access issues

Technical skills:

- Communicate with IT support staff
- Communicate technical issues to management and team members

Collection management skills:

- Identify and manage copyright issues
- Monitor metadata quality; use metadata sets
- Coordinate with clients, researcher, etc.

Management skills:

- manage staff
- Plan and develop the repository collection
- Assess and evaluate repository performance

- Engage in strategic planning

Priorities for Future Development at KAD:

From the interviewed parties, the following areas were given the highest priority (top-down):

- Training on RDM

- Open access support

- Guidelines and Policies for Research output management

- More network bandwidth and storage capacity

- Security issues

- Training to ensure Better IT support

- Redundant sources to ensure availability

Priorities for Future Development at BZU:

There seems to be strong interest in continuing and expanding the current effort. There is a desire to bring in more document types, to transfer some of the tasks to individuals and their units after the necessary training and to make the data entry process easier and user friendly. There is a need to account for the multiplicity of languages that may be used in the system and how to best handle queries that may involve multiple languages. Back-up issues are not seen as a current problem but there is a desire to make sure that the material is accessible all the time and from different platforms.

The results of the questionnaire/interviews point the need for raising awareness on the issues relevant to research management especially for individual researchers and research managers. We didn't include non-Academics in the interviews (aside from IT people). One would think that their involvement will be necessary especially for any effort directed at preserving university materials generated at these units like audit reports, building plans, policies on issue like parking, safety, emergency evacuation, and many others. One may include non-academics in any training effort on the matter.

5.9. Comparison between Partner PS University with respect to RDM

Table 10 summarizes the main differences between partner PS Universities.

	IUG	QOU	KAD	BZU
Digital Materials preserved at the Institutional Level	Master theses, Publications of 6 IUG Journals, Unpublished and Technical Reports, Learning Content, Video Lectures	Graduation Projects, Publications of 7 QOU Local Journals, Unpublished and Technical Reports, General Reports,	Publications of KAD Journal, Learning Content, Video Lectures, Educational Videos	Palestinian Digitized Cultural Heritage, Palestinian Law and Regulations, University

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		Learning Content, Video Lectures		Scientific Output, Theses and Graduation Projects, Technical Reports, Books and Book Chapters
Preservation of Research Data and Outputs (Not published in local journals)	- Responsibility of researcher or research group. - IUG provides storage space upon request	- Responsibility of researcher or research group. - QOU provides storage space upon request.	- Responsibility of researcher or research group.	- Stored in university archival systems. Materials are made available through the researcher / institution website.
Entities in charge of RDM	- Graduate and Research Affairs (Planning, execution, policies) - University Library (uploading theses) - IT Affairs (provides storage spaces and develop local RDM solutions)	- Scientific Research (Planning, execution) - Quality Department (co-planning for RDM) - Library (uploading and indexing projects and theses) - ICT Center (provides storage spaces, develop and operate websites) - OLC (Open Learning Center)	- Graduate Studies (planning) - E-Library - Computer Center - Center for Multimedia Resources (manages video recordings of lectures) - E-learning Center (manages learning content)	- Library and IT Staff

			(maintains learning content)		
RDM Software Solutions	- Open Access Journals Software (OAJ) for IUG Journals - Locally-developed repository of master theses (currently in the process of migrating to open source solution) - Online Library Website with indexing and search services. - MOODLE (for learning content)	- Open Access Journals Software (OAJ) for managing QOU Journals -	- Open Access Journals Software (OAJ) for QOU Local Journals - MOODLE (for QOU e-Courses) - DSPACE (for a digital repository of course materials and graduation reports) - CLIPBUCKET (open source video broadcasting solution) for QOU Video Platforms - SLIDESHARE (open source platform for sharing slides and documents) - E-library website, developed locally with indexing and search services.	- DSPACE (for fada institutional repository). - A web based system (Awraq) for archiving Palestinian cultural heritage. - A web based system (AlMuqtafi) for storing Palestinian laws and regulations. - Scientific publications of staff members are accessible through the university web-based portal. - Ritaj (University portal) and MOODLE (for learning material)	
RDM Policies	Ad-hoc policies. Not written.	- Written procedures for research publishing (planned by Scientific Research and Quality Department).	Ad-hoc policies. Not written.	Written policies for digital assets management and for Birzeit Institutional Repository (fada).	

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		- Written guidelines or regulations for handling digitized materials (storage, migration, refreshing, and publishing) (planned by OLC center). - No written procedures for the management of research outputs on Digital repositories especially for indexing and preservation.		Policies are published in Arabic and English.
Institutional Repositories for research outputs	None. Only repositories for certain research outputs (i.e. Master theses)	- None. QOU operates an open access digital repository exclusively for learning materials. DPSACE and Dublin Core Metadata Standard are used for implementation.	None	
Copyrights	- IUG owns the copyrights of the articles published in IUG journals. - Copyrights of master theses, publications, and video lectures are	- QOU owns the copyrights of the articles published in QOU journals. - QOU owns the copyrights of textbooks developed for its courses.	- KAD owns the copyrights of all articles published in KAD journal or conference proceedings and master theses.	Authors own copyrights of their own scientific output.

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	owned by authors.	- Copyrights of master theses , video lectures and publications are owned by authors.		
Metadata Standards	None. Local peer-reviewed publications and master theses are associated with metadata that does not adhere to a standard.	- DSPACE digital repository uses Dublin Core Metadata Standard. - No standard is used for describing other digital materials.	None.	DSPACE digital repository uses Dublin Core Metadata Standard.

Table 10: Comparison between partner PS Universities with respect to RDM

6. Conclusions

It is evident that the four PS Universities have many similarities regarding RDM capacity and activities. However, it seems that BZU has made the furthest progress through its official institutional repository named FADA. BZU also operates two other repositories to preserve the Palestinian cultural heritage and the Palestinian laws and regulations. QOU, IUG and KAD has also set up a variety of online systems and repositories, but mainly to manage and publish learning materials, video lectures and theses. However, faculty publications and research data has gained, by far, little attention as they have been deposited in very fewer amounts.

Looking at the institutional support for digital preservation, it can be concluded that most of the institutional support is targeted towards the preservation of digital materials associated with academic studies as against to faculty publications. The materials associated with academic studies include learning material, video lectures, theses and graduation projects. Institutions may indirectly support the faculty's research by offering help-desk support and storage spaces, but without holding direct responsibility over the preservation, accessibility and visibility of research outputs. The survey has also shown that activities related to RDM are mostly carried out on an individual basis, with the researcher, or research group, being fully responsible for preserving, publishing and providing accessibility to their research holdings.

The above results also indicate that PS Universities allocate more resources to act as teaching institutions than to act as research-oriented institutions. Members of academic staff have supported this claim when they demanded for more institutional support for handling research data. It addition, the survey reveals that RDM activities has not been included in job responsibilities, and that library staff in PS Universities have limited experience in RDM.

Furthermore, results prove that PS Universities have made a little effort to increase the visibility of PS research output. This was evident by the lack of adopted metadata standards, lack of RDM policies, the changing strategies, and the fluctuation between open source and custom-developed

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RDM solutions. The institution's behavior in this regard is consistent with the actions of academic staff who used to show little interest in describing their research data.

When it comes to open access, the staff's attitudes seem to be largely in accordance with the institution's attitudes as both sides agree on making the research outputs freely accessible. It is necessary to build upon this harmony by increasing the institutional support for RDM and promoting for the potential benefits of OAIRs among the faculty members.