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**The Role of Institutional Repositories in Advancing Open Scholarship: A Case Study
from the United Arab Emirates University**

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Abstract

The digitization of theses and dissertations at the United Arab Emirates University (UAEU) began five years ago with the Digital Commons institutional repository (IR) platform, Scholarworks, employed for the purpose. The project, initiated by the University Library, exemplifies how academic libraries can take the lead in advocating for digital preservation and open access publishing of institutional research materials. This case study describes how the library's Electronic Theses and Dissertations (ETD) initiative has provided an excellent model to the UAEU for it to start disseminating its research output and how the library's copyright and open access policies have been crucial for the project's success. We summarize the UAEU's IR objectives, including future expansion of publication types beyond the current ETD and journal collections. We identified opportunities for improvements to the repository, such as enhanced workflows, librarians' capabilities, system performance, and increased discoverability and metadata. Our study highlights the successes and technical challenges of developing the UAEU IR and its central role in supporting open scholarship at the university.

Keywords: Institutional Repository, Open Scholarship, Open Access, United Arab Emirates, ETDs, Electronic Theses and Dissertations

The Role of Institutional Repositories in Advancing Open Scholarship: A Case Study from the United Arab Emirates University

The United Arab Emirates University (UAEU), founded in 1976 by the late Sheikh Zayed bin Sultan Al Nahyan, is a recently instituted university in global terms but the oldest in the United Arab Emirates (UAE). The university is proud to be part of the global open scholarship movement, which encompasses open access, open science, and open data. In 2017, UAEU Library received the Chancellor's Award for Institutional Excellence in implementing an institutional repository (IR) for Electronic Theses and Dissertations (ETD).

UAEU Library initiated its first ETD system in 2015 as Scholarworks@UAEU employing the Digital Commons IR platform from bepress as its base infrastructure. In addition, the PURE Research Information Management System (RIMS), initiated in 2018, has been updated for relaunching in 2020 to streamline and capture UAEU scholars' comprehensive research and publishing activities and their impact. Establishing the ETD IR systems at UAEU addressed the necessity to have a platform for collecting and supporting the publishing process for ETDs and other types of scholarly contributions and to have systems compliant with open access policies and guidelines.

UAEU has striven to provide leadership in the UAE, in the Gulf Cooperation Council region, and on a global scale, has recently been moving toward becoming the "University of the Future" and a research-intensive university. UAEU Library has supported this work by reviewing existing practices and formulating guidelines to ensure that scholarly output such as ETDs and those in UAEU open access e-Journals are deposited in the IR wherever

possible and are in compliance with the Findable, Accessible, Interoperable, Reusable Alliance (FAIR, 2020).

The Open Scholarship Framework at UAEU

The Open Scholarship Framework initiated by UAEU Library was formulated to address the needs of the research community at UAEU and create a sustainable and evolving open scholarship environment that fosters the growth of scholarship alongside public access to that knowledge.

A summary of the primary purposes of this policy is provided below.

1. Encourage as much comprehensive access to scholarly and academic works as possible
2. Ensure good faith and appropriate use of copyright material
3. Clarify the rights of authors and others under the law
4. Enhance the university's leadership role concerning the open scholarship agenda at both national and international levels

(United Arab Emirates University, Libraries Deanship, n.d.).

The policy also states, "The procedures of the Open Access policy will facilitate the university community learning more about the details of Creative Commons licenses and their updates" (United Arab Emirates University, Libraries Deanship, n.d.). UAEU Library is currently developing new procedures and workflows to include details surrounding the terms of licenses, agreements, and types of Creative Commons that designate the use and reuse of content. In the book *Techniques for Electronic Resource Management*, Emery et al. (2020)

recommend workflows to administer e-resource collections that also cover open access in library systems and IRs (Emery et al., 2020).

The UAEU Open Scholarship Policy Framework, including policies for copyright use, copyright ownership, and open access, will promote open and broad dissemination of scholarship to share researchers' products of intellectual endeavors as widely as possible (United Arab Emirates University, Libraries Deanship, n.d.). Within this framework, the UAEU open access policy identifies two versions of open access that are relevant to the university's institutional repository (IR): Green Open Access and Gold Open Access. This policy supports the objective of promoting and increasing the visibility of scholarly work at the university.

The policies included in the framework have yet to be approved by the university's Policy Committee.

IR System and Open Access

UAEU Library advocates and supports open access and will continuously review practices and guidelines to ensure the capture and use of open access publications in accordance with relevant licensing agreements and in keeping with the FAIR principles (Fair Open Access Alliance, 2020).

Further work is required in order to build guidelines that ensure the straightforwardness of publishing, copyright, and open access practices for users and staff, ultimately allowing and encouraging self-submission activities by faculty and students of their open access articles and works in Scholarworks@UAEU.

Institutional repositories play an instrumental role in increasing global visibility and ameliorating the marketing of scholarly content and improved institutional rankings (Corrall et al., 2013; Hazelkorn, 2014). Therefore, the UAEU Libraries Open Scholarship Framework,

including the implementation of Scholarworks@UAEU, is aligned with the university's ranking strategy as supported by Wong (2020) among others. Implementing an IR supports UAEU's profile and reputation as a research-intensive institution that aspires to higher global rankings.

Advantages of research visibility both locally and globally and support for enhanced institutional ranking are also highlighted as significant selling points, where faculty get concrete evidence with statistics on their research in an IR (Giesecke, 2011).

Objectives for the Institutional Repository Scholarworks@UAEU

The main objectives of the university's open access IR are as follows:

- • To promote and increase the visibility of UAEU's scholarly work internally, regionally, and internationally
- • To digitally preserve UAEU's academic work
- • To centralize and streamline research data processes across all of UAEU faculties.

The current establishment for collections in Scholarworks@UAEU includes the following:

- Books and Book Chapters
- Conferences and Symposia
- ETDs
- Newsletters
- UAEU e-Journals

- Patents and Intellectual Property
- Research Datasets

However, not all types of these collections have published content. The majority of the UAEU repository content currently comprises ETDs, open access published articles, and UAEU open access e-journals that are published regularly.

Implementation and Ongoing Work with the IR System at UAEU

The UAEU Digital Commons IR, Scholarworks@UAEU, is an ongoing project that continues to grow and change as identified and described in the sections below.

UAEU ETDs: Capturing and Indexing Electronic Theses and Dissertations (ETDs)

After adopting Scholarworks at UAEU Library, in the early stages, the primary focus was capturing print and digital theses and dissertations and utilizing the tools available at Scholarworks. The system now holds 1,143 ETDs, which, to date, have generated over 600,000 downloads from around the world, with more than half of these effected in the past 12 months (figures from November 2020).

Until recently, most university theses and dissertations at UAEU were submitted in printed, hardbound format. Theses and dissertations were sent to the libraries for scanning and uploading into the IR on the Digital Commons platform only after accepting the examining faculty. A review to enhance the workflow that enables digital submission is on

the anvil along with only print-on-demand hard copies for review, examination, and dissemination.

UAEU E-Journals: Capturing and Indexing E-Journals

UAEU open access journals are hosted on the Scholarworks platform and respective faculty webpages linked to Scholarworks. The university journal names mentioned below are classified as open access and are hosted or on the agenda for hosting on the IR. Thus far, 186 articles have been posted on the system.

1. Emirates Journal for Engineering Research Open Access
2. International Journal for Research in Education Open Access
3. Journal of Sharia and Law *prospect in progress*
4. Journal of Food and Agriculture *prospect in progress*

Other journals are viewable after a registration process and hosted on faculty webpages or managed by commercial publishing entities. More engagement with faculty is needed in order to highlight the importance of submitting content to the IR system for not only visibility but also preservation purposes. UAEU open access journals are currently under review to ensure that metadata, such as ISSNs and DOIs, are applied consistently to meet the registration requirements for the Directory of Open Access Journals, and that archival issues are stored and preserved. The collection also includes Arabic-language content that requires careful translation of content, abstracts, and metadata descriptions.

Adding Collections, Preprint, and Post-Print University Publications, and Special Collections, Redefining the Purpose of Scholarworks@UAEU

UAEU Library has a vital role in encouraging and promoting services to faculty and students, hosting preprint and post-print publications as licenses permit on the

Scholarworks@UAEU repository, and, looking at expanding the IR collection to include content at both undergraduate and graduate levels.

There are opportunities for future projects to include special and rare library collections that are invisible to the community as of now. Work is in progress to identify these valuable collections currently stored or warehoused offsite and onsite and not recorded in the digital IR system.

A paradigm shift is required in order to create a more inclusive IR system for formal and informal work produced by students, faculty, and staff to share and disseminate their work openly. Conducting IR pilots with faculty and students is a good approach at UAEU that will aid IR library staff to define specific pathways for the university repository. Bjork et al. has described experiences illustrating the methods and outcomes of IR pilots at Portland State University and Kansas State University in an interesting article.

Each pilot project was aimed at determining feasibility and providing an assessment of the long-term impact on the repository's mission statement (Bjork et al., 2019). At UAEU Library, we have both a Research Information System as well as an IR to capture output and track research and scholarly publishing workflows, thereby rendering us among those fortunate in this line of research. The aim is to streamline the work needed in both systems, capture the process at the beginning of the research lifecycle, and nurture the repository into a trusted and reliable source for the university's scholarly output.

Integration and Interoperability

UAEU Library is reviewing and exploring more opportunities to extend the capabilities of the Scholarworks@UAEU repository by way of data synchronization. Examples include the use of APIs and mapping data from internal and external sources. Some strategies that need to be developed include using human resources and RIMS and including

Persistent Identity Documents (PID), such as open researcher and contributor ID (ORCID) and Digital Object Identifiers (DOIs), among new metadata elements to be added. These identifiers promise to support authors with their publishing processes and streamline workflows for IR staff, thereby ensuring consistent and accurate data. Mapping and scaling the systems are on the agenda to avoid duplication and redundant functions.

Improving Discoverability and Metadata

According to Emery et al. (2020) descriptive metadata is critical for the discovery and retrieval landscape and a challenging area for our library. PIDs and in particular DOIs are key metadata elements integral to retrieval in IRs. Further metadata descriptors and PIDs are still underutilized in the Scholarworks@UAEU system. DOIs could be applied to various items, such as blog posts, newsletters, tables, and graphs. Another PID under review is ORCID IDs that help librarians easily capture local scholars' outputs that highlight and promote authors. UAEU is now also an institutional member of ORCID and most UAEU researchers have an ORCID ID; triggered by the implementation of PURE (RIM) in 2020. UAEU researchers can now manage their Scholarly IDs and disambiguate names in the RIMS system. More applications are under exploration even as we plan and review to improve data management and access in this space. We recommend the following six PIDs considered essential for discovery and the utility of scholarship throughout the research lifecycle:

1. Digital Object Identifier (DOIs)
2. Journal Article Tag Suite (JATS)
3. ORCID IDs
4. Funder RegistryRef from CrossRef
5. International Standard Name Identifier (ISNI)

6. Research Organization Registry

(Emery et al., 2020)

Furthermore, in a study on the role of metadata in institutional repositories, Mering (2019) describes how ORCID IDs added into the Dublin Core metadata elements are utilized for the IR at the University of Nebraska–Lincoln University to disambiguate author entries and increase their IR's visibility.

The feasibility of synchronizing metadata between the UAEU RIM System and Scholarworks@UAEU is under exploration with Elsevier (bepress). Work is still ongoing at both system as well as metadata-linking levels in order to achieve the desired outcomes, mainly to ensure content findability and retrievability for all academic resources and to capture all scholarly outputs in Scholarworks@UAEU. Arabic indexed resources are of high importance in the UAEU and in the region as a whole. To ensure discoverability of content, reviewing the quality of metadata used for these resources is also required. The scale of Arabic content and scholarly outputs is significant; these records are not easily discoverable.

Preservation Strategies and Plans

Scholarworks is used as a tool to discover digitally preserved content. There is a requirement to review current practice, introduce preservation strategies, and identify the appropriate methods and solutions to serve this critical function. UAEU Library currently lacks these preservation policies and technical staff with specialized knowledge of archiving. In his article, Horstmann (2018) mentions the main issues facing scholarly communication units in academic libraries as acquiring staff with the right skillsets in a rapidly changing technology environment. This situation is a significant hindrance to progress at UAEU, where specific skillsets are required to carry out highly technical functions. While not strictly IT-

related, these functions require knowledge and expertise across the fields of database management, metadata, digitization, archiving, and scholarly publishing.

Redefining Workflows for the Digitization of ETDs and Other Works

For some time, UAEU Library has discussed with the University Deans Group and the College of Graduate Studies a plan to revise the policy and processes associated with submitting hardbound print theses and dissertations at UAEU. Introducing a print-on-demand model will help with cutting back on redundant processes. At this stage, it will require an investment to acquire the equipment (e.g., Espresso Book Machine, EBM, and other rapid- or instant-printing equipment) and a complete revision of the university policy on thesis and dissertation submission. This change in workflow and process would better support the management of embargoed content (for planned patent and commercial publication options). We are looking at various universities that have a paperback publication of research in the form of theses and dissertations collated with allied papers as articles and conference proceedings. Discussions are underway toward evaluating these new methods of disseminating published work, reviewing ways in which to hold digital ETDs, and complementing this service with a print-on-demand model.

The aim is to eliminate paper workflows for theses and dissertations, where advisors can submit, track revisions, and approve through an online interface with automatic notifications. These e-printing support services are an extension of IR digital services that Nemati-Anaraki and Tavassoli-Farahi (2018) state will ensure a lasting and successful outcome for the life of the institutional repository and services.

Customized tools allow administrators from different graduate programs or departments to manage ETDs instantly through Scholarworks@UAEU jointly.

Currently, embargoed content is maintained manually outside of the IR system because of IR staff concerns regarding the possibility of human error occurring during the embargoed item's lifecycle. Appropriate embargo workflows need to be reviewed and

flagged in the system and reviewed by staff at both the faculty as well as library IR service levels.

Measuring Success to Date

UAEU Library anticipates a continued upward trend in downloads and visibility of research outputs as we continuously apply improvements and introduce system enhancements.

The exponential growth of downloads until now indicates the success of the University Library's IR in promoting the university's scholarly outputs to the world, as a driver toward continuing to improve faculty engagement and introduce new methods to increase the visibility of content in Scholarworks@UAEU. Despite the humble beginnings with small collections, the download usage statistics are quite impressive.

Discovery Analytics

The seamless discovery features in the Scholarworks@UAEU system and the collaborative benefits of Digital Commons are leading factors contributing to the visibility of content on Google Scholar. The metadata of ETD in Scholarworks is recognized as scholarly and indexed in Google Scholar.

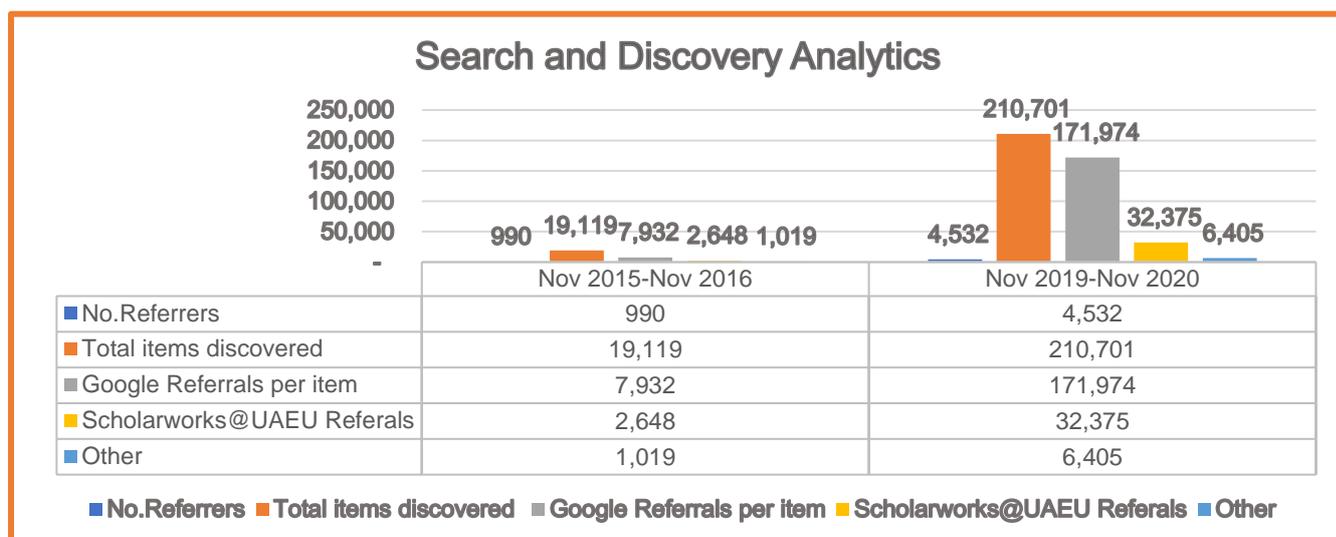


Figure 1. Search and discovery analytics (2015-2020)

Several factors have influenced search and discovery analytics (figure 1), which are as follows:

1. Consistency in uploading content
2. Content type, such as in the case of ETDs, which are classified as Scholarly by Google, thereby increasing the chances of discovery
3. Age of the repository

Download Statistics Since November 2015 to November 2020

- 1,366 total works posted until now and uploaded on Scholarworks@UAEU since 2015
- 651,485 downloads globally, more than 344,000 in the past 12 months, 2019–2020 (figure 2)
- 213 countries globally

- 11,000 institutions, commercial, government, and education have visited Scholarworks@UAEU

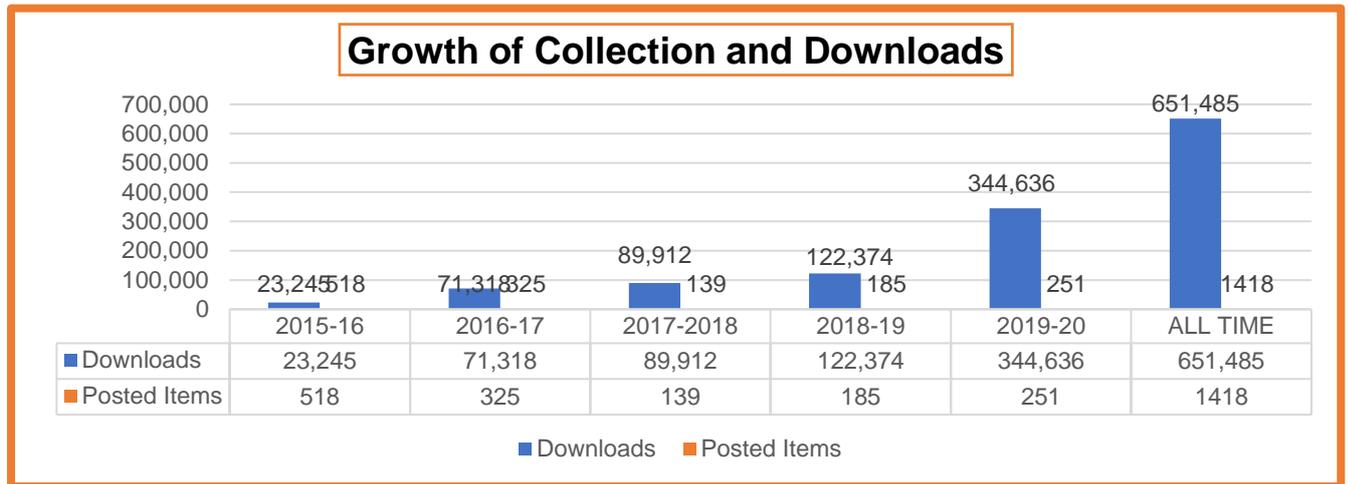


Figure 2. Growth of collection and downloads (2015-2020)

Challenges and Opportunities for Improvement

Academic libraries share common issues during the journey of implementing IR services. The need for library and research support staff with qualifications in skillsets to identify and implement the best approaches toward the evolving RIM ecosystem is a challenge at UAEU. Our approach has been to recruit expertise, albeit at a relatively slow pace, and promote best practice as a clear goal for the university to retain and preserve scholars’ intellectual outputs.

Implementing appropriate systems to support this endeavor has also been a challenge as the availability of RIM and IR systems and the vendors’ commercial arrangements change over time.

Gewissler and Do (2017) have listed the most common challenges of establishing institutional repositories in academic libraries. These include changing workflows, lack of

understanding of intellectual property, confusion with copyright, faculty's fear of open access, and lengthy embargoes (Gewissler & Do, 2017). Horstmann (2017) discusses the relationships among, and the impact of, open access, research data management, data analytics in libraries, and the constant need for rapid skillset development on scholarly communication units that have become more complex.

Lessons learned from other libraries at similar-sized universities abroad have provided valuable insights for UAEU Librarians involved in IR and Research support at the undergraduate and graduate levels. Exline (2016) from the library at the University of New Hampshire has talked about common problems with standardizing and adding customized fields, errors in metadata in IRs, and promoting open access among students. The author of the aforementioned study has also explicated the importance of improving user experience through usability testing, ameliorating the user interface of systems, and addressing the benefits and challenges of collecting student research.

The present paper concludes with an important message for libraries in that more engagement with students is required from specialized library staff directly to instruct on scholarly issues such as open access publishing, intellectual property, and simplifying the research and scholarly publishing user journey (Exline, 2016).

Conclusion

UAEU, through its libraries, aims to support open scholarship and research through advocacy and promotion of its research productivity and output. It achieves this by capturing and increasing the visibility of preprint, post-print, and published works on its IR, Scholarworks@UAEU. Efforts to introduce updated workflows, with revised new policies, integration with RIM and discovery systems, and participation in globally recognized PID

systems being chief among them, will improve and streamline the production of scholarly works and provide bridges to global collaboration. UAEU Library is committed to supporting the open access trends in scholarly communication at the university, which is a positive step toward a transparent framework for open scholarship. The further development of Scholarworks@UAEU will present excellent opportunities for open access leadership in the region and support the UAEU's goal of becoming a research-intensive university of the future.

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