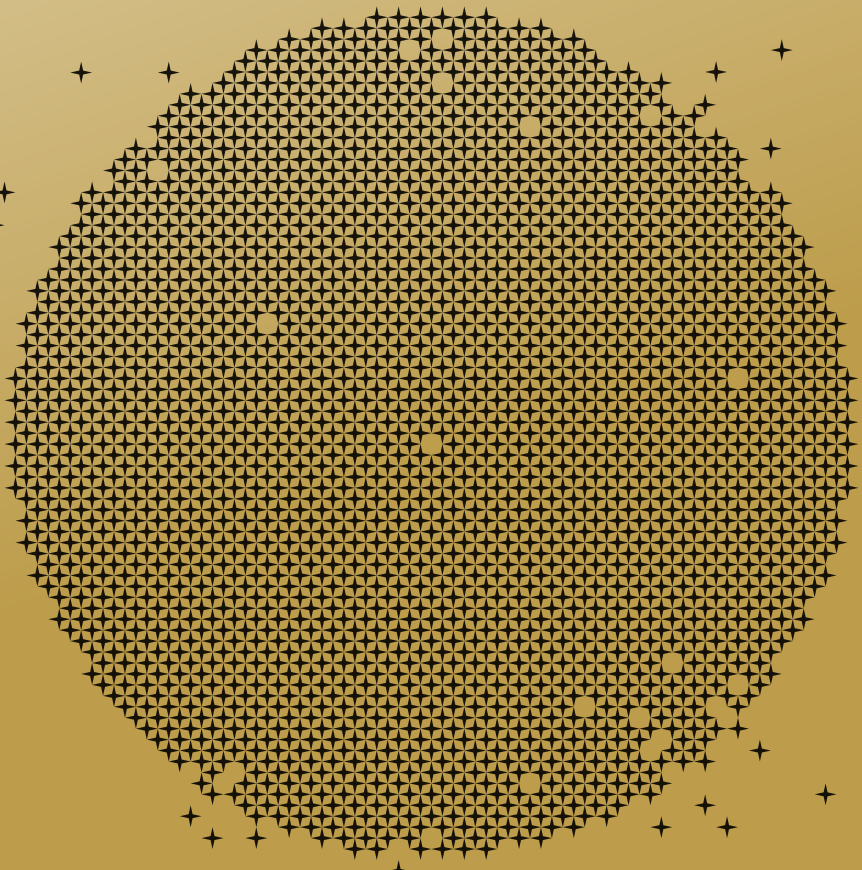
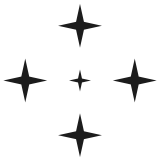
DISEGNO

VII/01
journal of design culture
_Designing Digital Humanities





Disegno

Journal of Design Culture
Double-blind peer-reviewed, open access scholarly journal

Editorial Board: *Victor Margolin, Professor Emeritus: University of Illinois (1941–2019)*
Roy Brand, Associate Professor: Bezalel Academy of Arts and Design, Jerusalem
Loredana Di Lucchio, Professor: Sapienza University of Rome
Jessica Hemmings, Professor: University of Gothenburg
Lorenzo Imbesi, Professor: Sapienzia University of Rome
Ágnes Kapitány, Professor Emerita: MOME Budapest
Gábor Kapitány, Honorary Professor: MOME Budapest
Viktor Malakuczi, Research Fellow: Sapienza University of Rome
György Endre Szőnyi, Professor: University of Szeged; Visiting Professor: CEU

Editors: *Zsolt Gyenge, Olivér Horváth (Managing Editor), Szilvia Maróthy, Márton Szentpéteri, Péter Wunderlich (Project Manager). Founding Editor: Heni Fiáth*

Graphic Design: *Borka Skrapits*
Copy Editing: *William Potter*

Aims and Scope

Disegno publishes original research papers, essays, and reviews on all aspects of design cultures. We understand the notion of design culture as resolutely broad: our aim is to freely discuss the designed environment as mutually intertwined strands of sociocultural products, practices, and discourses. This attitude traverses the disciplinary boundaries between art, design, and visual culture and is therefore open to all themes related to sociocultural creativity and innovation. Our post-disciplinary endeavour welcomes intellectual contributions from all members of different design cultures. Besides providing a lively platform for debating issues of design culture, our specific aim is to consolidate and enhance the emerging field of design culture studies in the Central European academia by providing criticism of fundamental biases and misleading cultural imprinting with respect to the field of design.

All research papers published in Disegno undergo a rigorous double-blind peer review process.
This journal does not charge APCs or submission charges.

Contact: *Moholy-Nagy University of Art and Design*
H-1121 Budapest, Zugligeti út 9–25.
disegno@mome.hu

The full content of Disegno can be accessed online: ***disegno.mome.hu***

Published by: *József Fülöp*
Publisher: Moholy-Nagy University of Art and Design, 1121 Budapest, Zugligeti út 9-25.

ISSN: *2064-7778 (print)* ***ISSN:*** *2416-156X (online)*

Creative Commons License
This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

MOHOLY-NAGY
művészeti egyetem
university of art and
design budapest

DISEGNO_VII/01_DESIGNING DIGITAL HUMANITIES

Contents

introduction

004 *Szilvia Maróthy and Márton Szentpéteri: Designing Digital Humanities*

research papers

008 *Ágnes Anna Sebestyén: Designing the International Network of* Tér és Forma*, 1928–1939. A Hungarian Architectural Journal's Data-Driven Analysis*

026 *Dinara Gagarina: Data and Knowledge Modelling as the Methodological Foundation of the Digital Humanities*

046 *Dorottya Kun: Design Culture's Perspective on Institutional Repositories: Challenges and Opportunities*

066 *Merve Pekdemir Başeğmez and Burak Asiliskender: Smart Factories: New Production Spaces in Digital Transition*

essays

082 *Iacopo Neri, Darío Negueruela del Castillo, Pepe Ballesteros Zapata, Valentine Bernasconi, and Ludovica Schaerf: Cityscapes Transformed: Immersive Exploration at the Intersection of Culture, Computation, and Curatorial Practices*

094 *Stefano Corbo: The Dodecahedron and the Basket of Fruit: Architecture in the Age of Artificial Intelligence*

106 *Zsolt Almási: AI? Predictive Media. Art*

interview

118 *Szilvia Maróthy and Márton Szentpéteri: A Distant Reader: An Interview with Iván Horváth*

128 ***about the authors***

DESIGN CULTURE'S PERSPECTIVE ON INSTITUTIONAL REPOSITORIES

CHALLENGES AND OPPORTUNITIES

Dorottya Kun

ABSTRACT

This paper aims to identify and summarise the challenges of preserving the outputs of design universities in institutional repositories (IRs) and share the developments and lessons learned from similar fields' successful projects. For traditional academic disciplines, metadata models and standards are well-developed for publication and preservation practices. Research in this area is presently underrepresented in academia; furthermore, the collections tend to be scattered or hidden. In the last fifteen years, preserving works in repositories has become one of the central issues in design institutions. This study examines the problems and other collections' responses to these challenges — observations which can be utilised in the field of design where it is difficult to make visible and present the values created in design.

#design institution, #institutional repository, #metadata model, #metadata standard, #knowledge management

https://doi.org/10.21096/disegno_2023_1dk

PURPOSE AND STRUCTURE OF THE PUBLICATION

The first section of this paper will examine the key knowledge management terms and concepts and the potential applications of essential data standards and models. The second part of the paper aims to identify and summarise the challenges of preserving the outputs of art and design (a&d) universities in institutional repositories (IRs) and share the developments and lessons learned from similar fields' successful projects. The study examines the difficulties and other collections' responses to these challenges—observations which can be utilised in the field of design where it is difficult to make the value of design visible. This paper focuses mainly on the resources related to a&d, performing art, and other creative repositories in the literature of nearly twenty years.

1. INTRODUCTION

Now that the web has been part of our lives for almost three decades, preserving, describing, managing, and making the outcomes from the field of design accessible online has become one of the central issues for art and design institutions, such as universities, museums, and galleries. The creative results emerging in this field, as compared to the primarily text-based publications in other disciplines, take a wide variety of forms, from vehicles, buildings, information systems, user interfaces, objects of use, or even services, and in many cases, these are the outcome of experiments with new technologies and materials. They are complex works that can incorporate various artistic expressions and technological innovations. These can in turn take different forms, including exhibitions, fashion shows, dance, music, and performance. Archiving all this presents many challenges for institutions, both in terms of technology and concepts. However, the endeavour to preserve and facilitate access to the outputs of design is undertaken by only a limited number of institutional repositories. Research in this area is presently underrepresented in academia; furthermore, the collections tend to be scattered or hidden. Design studies is a relatively new discipline, and the archival practices still need to be well-established based on the characteristics and unique needs of the field.

Galleries, libraries, archives, and museums (GLAM) practices can help cover this diverse field through established methods of describing works of art and other types of museum objects. It is essential to examine the descriptive practices that have emerged in this field, such as the VRA Core data model developed by the Library of Congress and the Visual Resources Association, Categories for the Description of Works of Art (CDWA), a set of guidelines for describing works of art, architecture and other cultural works provided by Getty Institute, as their metadata models for publishing visual culture outputs are already widespread. Likewise, the museum (CIDOC CRM) and library (Dublin Core, MARC) systems of practice can be used as a starting point for future research. .

2. KNOWLEDGE ORGANISATION ACROSS UNIVERSITIES AND THE GLAM SECTOR—INSTITUTIONAL REPOSITORIES, METADATA STANDARDS, AND MODELS

An institutional repository (IR) is an archive that collects, preserves, and disseminates digital copies of the intellectual output of an institution, particularly a research institute. The collection managers originally envisioned the IRs as the tool that facilitates access to traditional text-based research outputs, especially peer-reviewed research articles. However, they later recognised that IRs offer universities and other institutions the opportunity to independently manage and preserve their own scientific outputs, research data, and other relevant information. IR is one of the most effective knowledge management platforms because it documents in a standardised and authoritative way the results produced in an institution through the work and supervision of archiving experts. (Callicott, Burton B., David Scherer, and Andrew Wesole 2015; Clobridge 2010; Lynch 2003)

Design institutions create mainly non-text-based research outputs and may include objects such as everyday objects, animated films, exhibitions, designs, performances, material experiments, glass art, and installations. IRs are primarily designed to preserve bibliographic references of text-based research; non-text-based research results do not necessarily fit within the framework of the descriptive practices used so far, and the solution to this problem is crucial to the issue of archiving and making accessible design works.

To fulfil its intended role of collecting, preserving, and disseminating digital copies of intellectual output, an IR requires access to data models and sources because information on works must be recorded in a standardised and interoperable format. Efforts towards structured description and standardization enable information storage and accurate management. Sharing this information is vital to making it accessible and usable by others, helping to promote the visibility of design work in the academic community.

The works preserved in the repository are described, identified, and made accessible by using metadata. By definition, metadata is 'data about data' and provides a structured reference that helps to sort and identify attributes of the information it describes. A set of descriptive data and content information that characterises a work, helps to identify, retrieve, and legally define it. It includes data stored by bibliographic records in library catalogues, such as author, title, subject headings, and publication details, including author name, genre, style direction, or material. Metadata, specifically descriptive metadata, is vital for ensuring the effective discoverability of digital objects in IRs and outside IRs. In essence, as with traditional academic publication, "the metadata that is created for each object ensures proper understanding of what the work is and allows it to be discovered and cited." (Nadim and Randall, 17)

Galleries, libraries, archives, and museums (GLAM) practices use different metadata models, usually based on document type and subject area characteristics. . The acronym LAM (libraries, archives and museums) was coined by Zorich in 2008 (Zorich, Waibel, and Erway 2008, 5), and later added galleries to it. GLAM means cultural heritage institutions, libraries, archives, and museums share the "common goals to acquire, preserve, and make accessible artifacts and evidences of the world's social, intellectual, artistic, even spiritual achievements." (Dupont 2007, 13) The MARC and DublinCore (DC) models represent widely adopted standards in the library domain, while EAD and METS are commonly utilised in archival contexts. Museums predominantly employ the CIDOC and LIDO models for documentation and metadata management practices. The following part provides an overview of the characteristics of standards and models that can be used to describe design works.

The DC mentioned above is one of the most universal and commonly used metadata standards due to its flexibility, and the set of elements can be easily refined according to the needs of a discipline. However, it is criticised that metadata based on simple DC is often not sufficient for describing scientific work, art or design works. (Allinson 2008; Arvidsson 2009, Baca 2016; Řezník et al. 2022) While complex and advanced schemas exist for describing artistic and cultural objects, IRS can adhere to different documentation standards than archives and museum collections. Due to limited resources and the strictness of archiving standards, recommended to prioritise metadata that ensures end-user understanding, enabling users to have a clear understanding of the content what it is that they are looking at. (Nadim and Randall, 12). The core set for all items should include title, creators, contributors, abstract/description/synopsis, date, location, and keywords. Including additional metadata, like format, technique, duration, dimensions, media, genre, and copyright is recommended.

However, the Academy of Performing Arts in Prague (AMU) has taken advantage of the possibility provided by DC to link multiple records. In their repository, AMU apply the DC model to describe the theses created at the university. AMU specialises in music, dance, drama, film, television, and multimedia, and these can take various formats: texts, audio recordings, videos, photos, and scores. The collaborative nature commonly involves multiple roles, such as a film shared by a director, screenwriter, producer, or sound artist. Thus, several types and genres of documents are linked to a single performance and need to show these connections in the IR, indicating the relationship of subordination and superordination between parts of the work. The "superior" metadata record represents the textual work, while the "subordinated" metadata records represent the non-text works. Metadata records of textual works are designated as the main "superior" records, while the non-text records are considered "subordinated" records. Each superior record includes a link to the subordinated records, and vice versa. This approach involves describing each part of the work with a separate metadata record and then connecting them using the relations element. Although uncommon, this method is highly effective in supporting the discovery of the objects, as it allows for easy and clear recognition of all necessary and relevant details in the descriptions. Importantly, it ensures the accurate recognition of relationships between works and records.

The Moholy-Nagy University of Art and Design (MOME) Repository (MOME-R) relies on HUNMARC, but we developed the metadata model with a slightly different approach. In addition to processing and preservation, the IR also helps to manage the graduation process, as it was the first in the country to introduce the uploading of diploma works to the IR for students in 2013. Also, the IR enabled other participants in the process to access and evaluate diplomas and theses. (Kun 2016, 60) Students across all academic levels at MOME must create various final qualifying works. A written thesis is always required, complemented by documentation of a&d works with specific topics, consultants, and examiners. The preservation, exploration, and accessibility of these works are necessary, just as is the case with traditional written works. As a first step in the workflow, we created forms for every graduating student, one for each type of document (thesis, presentation, portfolio for BA, master project in addition to the previous for MA, thesis, and masterwork for DLA/PhD). Students log in with their student ID, give a detailed description of the work, and upload works within the deadline. After that, only specific groups can access the uploaded documents to verify and evaluate the work. The IR is also the platform where the opponents can upload their reviews, and the diploma committee can examine the graduates' work. As there are many participants in the workflow, both MOME and external, the access system had to be

adapted accordingly: we developed user groups and strict access levels. Based on preliminary surveys, the data model was tailored to the needs of each department, and the library's joint catalogue provided a single interface for searching and filtering theses alongside the library's printed and electronic books and other special collections. Thus, the repository has been equipped with functionalities that are not typical, but this proves that IRs can support the work in the institution from another perspective.

A more specific data standard than the DC is the Library of Congress and Visual Resources Association VRA Core Categories (VRA Core) standard, which is similar to the principles and structure of the DC model but is designed specifically for describing visual objects. It is a widely recognised and applied standard used by the Getty Research Institute, Stanford University, and Central European University, among others. VRA CORE considers the visual works created by human culture and their associated image objects as its subject matter and thus considers multiple representations of a given work. This data standard includes three primary entities: collection, work, and image, in addition to which it can record the agents, cultural context, date, description, inscription, location, material, dimensions, relationships, rights of use, source, condition, edition, style, subject, technique, title and type of work. The primary focus is on the record of the work, which can be associated with one or more images via the relation element. (Mandal 2018, 3) Likewise, a single image may be associated with one or more works, in which case the collection record can be used to aggregate multiple work or image records. The schema can be used to record the data of an original image (painting or photograph) according to the parameters of a given format, along with the printed reproduction or a digital version. Understanding the complexity of the data model and the relationship between the many pre-defined fields and relations can take time and effort for the collection manager.

The Getty Institute has developed two data standards for describing art and other man-made objects. One of the standards is the Categories for the Description of Works of Arts (CDWA), which provides a detailed and comprehensive data model for describing works of art. The standard includes extensive data fields and categories, allowing for a precise and rich description. The other one is the Categories for the Description of Works of Art Lite (CDWA Lite), which is a simplified profile of CDWA for smaller collections and institutions—mainly used by museums and galleries, including The Metropolitan Museum of Art, Museum of Modern Art, and Tate.The model primarily employed for cataloguing museum artifacts is the CIDOC Conceptual Reference Model (CRM), which covers a much broader range of domains than the data standards discussed above; its flexibility and extensibility make it suitable for other cultural works. This data model exhibits a higher

complexity level than the previous ones, owing to its ontological structure comprehensively depicting rich and precise information, including objects, events, places, and people. It facilitates modelling relations and events between objects, achieving a detailed description and representation of relationships and events between objects. It enriches data with ontologies, concepts, and relations, which enables more complex description and interpretation. "The primary role of the CIDOC CRM is to serve as a basis for mediation of cultural heritage information and thereby provide the semantic 'glue' needed to transform today's disparate, localised information sources into a coherent and valuable global resource." (Short Intro: CIDOC CRM)

Ensuring the accurate and comprehensive association of controlled vocabularies with digital objects is essential for optimizing the description. Applying vocabularies enhances the accessibility and exploration of digital collections, improving the user experience and enabling more meaningful discovery of relevant content. By providing standardised terms and unique identifiers, these tools ensure unambiguous identification of entities and concepts. This clarity enhances precision and consistency in data representation, facilitating effective information retrieval and sharing within the scientific community. The clarity of this data is ensured by standardised lists and authority files that offer a controlled choice to describe some aspect of a given work. The credibility of these lists is underpinned by the fact that the development and maintenance of these lists is carried out with the contribution of libraries, archives, and museums in the relevant discipline. Standardised lists organise the specific representations of a language category into a simple list according to some kind of structure. This allows names (personal, geographical, or proper nouns) to be clearly identified. Whereas these lists are built on semantic relationships, they also allow the exploration of the relationship between persons, places, works of art, and other related concepts. Beyond its information richness, its usefulness as a research tool lies in its ability to place objects in context, thereby highlighting relationships other searches would not discover.

One type of authority file is the namespace. Artist names can be disambiguated using the Union List of Artist Names (ULAN) provided by the Getty Institute. ULAN is a structured vocabulary containing artist names and other information about people and corporate bodies related to art, architecture, and other cultural visual works, which includes given names, pseudonyms, variant spellings, names in multiple languages and the default preferred name for the record. It includes names, relationships, and biographical information required for documentation, collection, and discovery. Furthermore, it captures various associations between mentors, colleagues, or personal affiliations. ULAN can provide a richer context for design history researchers and

although it is currently focused on visual arts creators, it could also better represent designers.

Thesauri have a more complex nature than the previously mentioned controlled vocabularies as they encompass not only a compilation of accepted concepts and terms but also significant conceptual relationships, antonyms, synonyms, and hierarchical relationships. The Art and Architecture Thesaurus (AAT, Getty Institute) enables more accurate and standardised descriptions of artistic and architectural works, improving their discoverability and facilitating cross-referencing between related objects. One of its limitations is inadequate coverage in other fields, such as design, digital art, or new technologies. New and alternative art forms, media, and concepts are only sometimes found in AAT, and their expansion and maintenance require expertise and time.

The interconnection of repositories and data sources is facilitated by OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting), which allows content harvesting services to collect, query, and disseminate metadata information about digital content on the internet in a structured way. With OAI-PMH, repositories can easily and efficiently share metadata associated with their content with aggregator services and other repositories, facilitating search and interoperability across different data sources. It means an institution can share its metadata via an OAI-PMH server to enable it to be harvested by other organisations or search engines - regardless of the platform and software used by the institution. The digital content of the archive is not duplicated during the data provisioning process; it remains in the repository and continues to be held by the IR.

The Europeana portal embodies this approach, providing a platform for the unified presentation of Europe's cultural heritage via OAI-PMH. They have developed the Europeana Data Model (EDM) to enhance data connections in Europe's cultural heritage, allowing partners to link information about persons, places, subjects, etc. This interconnectivity enables the sharing and enrichment of content across various initiatives and institutions, surpassing domain-specific metadata standards. EDM accommodates diverse standards like LIDO, EAD, DC, MARC and METS.

3. THE MODERN WUNDERKAMMER

IRs offer various benefits to support curatorial activities, including preserving, discovering, controlling, managing, reusing, and repurposing institutional intellectual content. The academic acceptance of the design discipline partially depends on the visibility and accessibility of design works, innovations, or collaborations, while the values created in the field of design are often trapped within its (online or offline) walls of institutions or remain in the ephemeral world of designers'

websites. The provision of sharing content across institutions broadens the horizons of design theory research, as previously hidden contexts and new research are revealed for designers and researchers while breathing new life into the works.

Representing the history and biographies of design works is essential for recognizing social history, cultural change, values, sustainability, and creativity. Knowing the history of objects helps us better understand our world and the meaning of the objects around us. "In connecting disparate and relatively small yet invaluable archives and collections, they represent design histories that are inevitably more representative." (Moriarty 2016, 62) The IRs support the design process by preserving the achievements of the past, knowledge of which is essential to designing better products, services, and practices. IRs act as a living history, keeping the design works in a state of continuous motion, and due to their properties and characteristics, they create a network between creators, institutions, events, and collaborations.

4. LITERATURE REVIEW

This section presents the unconventional solutions and issues related to design institutions and design works in IRs. Jacqueline Cooke (2007) was the first to summarise the problematic adapting of the terms of the academic world into the language of art and design, and the difficulties of applying tools typical of scientific databases in art. Cooke mentions the key aspects that distinguish visual arts from traditional disciplines: the wide range of genres, formats, and work types. Her work highlights the difficulties of describing exhibitions and performance artworks and copyright problems. It addresses all the concepts that shape the flow of academic knowledge—publication, citation and quotation, peer-review, and evaluation—and examines whether these can be understood in the context of art and artistic research. Cooke's insights have been the starting point for a lot of research, but many of the questions remain unanswered.

The next section focuses on universities, associations, and research institutions with a similar profile to the fields of visual arts, performing arts, and music. By examining the related literature in the co-fields, several problem areas emerged, from which the paper addresses the following: the difficulties of describing and categorizing design works, terminological conflict and contextual change, and the possible role of IRs in evaluation, which is a much debated and controversial topic in the a&d world.

4.1 The objects and escape from the category of 'Other'

IRs can include not only peer-reviewed academic publications but also other work types related to the institution in question, which can be

considered important sources of research on design culture, such as invitations, laudations, pamphlets, exhibition catalogues, book reviews, translations, grey literature and magazine articles, blogs, and other online publications. The Defiant Objects project, supported by SHERPA-LEAP and conducted at Goldsmiths, University of London, examined the challenges associated with depositing certain objects in IRs. The project aimed to simplify the deposit process for these defiant objects by providing a decision-making guide. Additionally, it led to the re-categorisation of research types in their IR. There are issues with the limited definition of research output in non-text-based research. In the academic context, the deposit of documents is mainly limited to a narrow range of document types. This approach ignores the relevant content that may not be considered scientific. (Nadim and Randall 2013, 8) IR managers recommended focusing on material that is outside the formal publishing realm because "there is so much happening at all of our institutions that would be valuable to share. The institutional repository is a fabulous vehicle for doing that."(Plutchak and Moore 2017, 31)

The National Irish Visual Arts Library's (NIVAL) IR and the physical collection provide information about Irish artists, designers, galleries, arts organisations and institutions, critics, and other related subjects. The unique feature of NIVAL is that it preserves a wide range of *Defiant Objects*. NIVAL collects documents that cover a wide range of ephemeral literature and may be helpful for further research: statements, price lists, images, floor plans, project proposals, catalogues, and material culture collections. In many cases, the artists themselves donate their material to NIVAL, often accompanied by information-rich documentation. "These works help to broaden and diversify the resources available to other researchers to access. They provide evidence of the regenerative potential of the library to both receive and give back to the arts community it serves." (Romano 2018, 15)

In the case of complex works, it is advised to give the depositor the freedom to choose the item type that best represents most of the work. Nadim and Randall provide the example of a sound installation: if it consists of devices and projections, the item type Sound and Music might be chosen. However, at the same time, the abstract should include descriptions of the other elements involved. They hypothesise that a specific element within the overall work can stand as a research output on its own. In that case, it can be deposited separately as a distinct item with the appropriate work type. In the abstract, the relationship between this separate element and the main work can be described. "For example, an algorithm that transforms weather data into music could be deposited as a separate digital object." (Nadim and Randall 2013, 15)

Evans and colleagues (University of Westminster) reached a similar conclusion when they discussed with the researchers what a practice research output would ideally look like. They learned that each research output could be a publication, research dataset, or non-text results. "These outputs then needed to be connected together into a collection (portfolio), and the underlying research methods needed to be documented by a narrative." (Evans, Watts, Mudd, and Reiner 2022, 5) In these instances, the researcher is typically left to decide what to deposit. However, the deposition of "process materials" is actively encouraged, as it enriches the understanding of research.

The concept of authorship also necessitates flexibility, primarily when works result from complex collaborations, which should also be represented in IRs. "Confusion remains where the depositor is not actually the (sole) 'creator' of the work deposited, such as with artist researchers depositing exhibition catalogues that feature their work but were not written/edited by them."(Nadim and Randall 2013, 7)

The output of the design discipline can often only be placed in the traditional academic category of "Other", and researchers of Defiant Objects' expected that the problematic works would be found there. On the one hand, using the term "supplementary" or "additional" media creates the misconception that the textual document represents the whole work, forgetting the importance of the accompanying material. Labelling these components as "supplementary" or "additional" reinforces their secondary nature, affecting the preservation of and access to these media. (Rodríguez 2019, 11.)

4.2 Terminology and context

Science aims to discover and share new knowledge with the wider community through diverse disciplinary approaches. The natural and social sciences, as well as the humanities have developed publication conventions, standards, and terminology. There can be marked differences between apparently related disciplines in these respects. One of the challenges involves seamlessly integrating the term *institutional repository* into the workflow of designers and researchers. Instead of strictly relying on library and scientific terminology, exploring alternative names for concepts is advisable. "Terms like 'curated exhibition' and 'documenting the process/journey' are more suitable than using 'repository-speak' language. It emphasises the need to consider the vocabulary and understanding of designers. The goal is to simplify and streamline the deposit process, minimizing data entry time and avoiding redundant work." (Gramstadt 2012, 2)

A different approach is taken in The Journal for Artistic Research (JAR) Research Catalogue, where the repository is envisioned as a tool that allows artists to create their own environment for their work by providing flexible and visual online space in the IR instead of the in-

flexible traditional journal article format. They suggest that instead of depositing peer-reviewed final outputs, artists should begin by depositing objects into the IR. "These objects can then be set in an individually designed context as they choose to 'expose' their work as research, designing 'expositions' which can then be peer-reviewed and published. This approach is designed to display artistic practice in a manner that 'respects artists' modes of presentation." (Gramstadt 2012, 3) By doing this, the Research Catalogue "represents a shift from object-centred repositories to a research-centred repository, which includes the peer-review process of the editorial board." Another perspective was presented by the visual artist Ruth MacLennan during the Kultivate Archiving and Curation workshop in 2011, where she presented an archive of her work using a workshop as a new context and as a new performance for her art. (Gramstadt 2012, 2)

Arguably the most cited barrier to depositing design works is their being of out-of-context in the IR. Cooke remarks that "context and presentation are often considered as part of the work by artists, and work is conceived for a particular context." (Cooke 2007, 4) Design works are placed in a different context when they become database records, where their content is reduced to the level of data, somewhat deprived of their original intentions, environment, and use. These works inevitably lose some of their original meaning and context when they are converted into digital documents.

Like the issue with completing the description, many aspects of design cannot be fully captured. We cannot experience what it is like to sit on a chair if we only rely on the 3D model; just as it is difficult to get a sense of the texture of a material experiment without touching it. "They are an essential part of what artefacts have to offer the historian and can be experienced with our senses - sight, touch, balance, hearing and smell. Such sensory engagements are also intellectual ones, and can provide vital information for our work." (Harvey 2009, 130)

Some digital content can be understood in a specific technological and use context. When displayed on other scientific platforms, they can be placed in contexts that would not otherwise be revealed under different circumstances. However, "what is understood through a publication may experientially be poorer but epistemically enriched in a way that a 'real' but discursively limited encounter may not be able to deliver." (Assis and Errico 2019, 35) Price translates the question of the IR context to the world of architectural models. For a long time we have been fascinated by architectural models: captivating micro representations of the real world. "The model presents a microcosm of structural elements and formal composition that permits one to imagine a building fully. The translation from two-dimensional plan, section, and elevation starts to take shape in the scale model, allowing one to fathom something that in full scale can rarely be taken in at

one glance. The model itself can take on sculptural qualities, adding to visual comprehension and delight." (Price 2020, 94)

4.3 Peer review and evaluation

The emergence of the art and design sector in the academic context inevitably implies the need for quality assessment and evaluation. Deposit of research results in IR ensures research ethics and funders' expectations are met. (Rieger 2007) "Institutional repositories can provide institutional stakeholders with valuable quantitative evidence for the reach and impact of research." (Meece, Robinson, and Gramstadt 2017, 23) According to Walhström, it is needed to demonstrate statistics, international interest, and good visibility in Google's search engine results. Another motivation for registering in an institutional repository is enhanced statistical visibility. (Wahlström 2021, 17)

In traditional academic fields, researchers' performance is most often assessed by the number and quality of their scientific publications and the number of citations they receive. Both journal ranking and bibliometric methods have evolved, as has the framework for the peer review process. Assessing quality is complicated, and the role and practices of peer review in the field of a&d are not established. As with artistic research, defining the framework is complicated. The researchers articulate their ideas through conventional academic publications and artistic mediums. It becomes imperative for academic infrastructures to accord these expressions the same level of respect and validity as they would to any other scientific discipline. There is debate whether art has a place in science at all; among the harshest critics are academics who consider artistic methods and procedures to be "obscure" and unscientific. Other critics are the artists themselves, who fear the academicisation of art and that only those artists who cannot succeed in the market will turn to academic research. (Lilja 2012, 6)

However, the Bologna reforms in higher education have inevitably affected art universities across Europe. They were also expected to adapt to their research funding systems as they entered academia. The allocation of resources for research is increasingly performance-based and often depends in part on the bibliometric indicators of faculty publications recorded in databases and repositories. For the outputs of a&d research and practice, the challenge remains how exactly to record outputs and set up a quality assessment model.

In Hungary, the Hungarian Science Bibliography (Magyar Tudományos Művek Tára, MTMT) has served as the comprehensive national bibliographic database of scientific publications and citations for academic publications since 2009. It is mandated by law to include publications that arise from public funding. The key operational principles of MTMT encompass the self-registration of publications by

authors and research-performing organisations. It enhances transparency by presenting statistical data on scientific output and facilitating access to articles hosted by publishers or institutional repositories.

MTMT was used to record data on traditional written works, but with the accession of art universities, the possibility of describing the results of the discipline became necessary. The Creation Working Group was established in 2009 with the participation of librarians from the major Hungarian art universities as part of the MTMT Bibliographic Committee. The group led by Klára Lévai (MOME) developed the Creation data type, which includes objects, images, space, music, literature, theatre, and performance art. This data type can be used to record publication data for works of artistic merit or significant technical works (e.g., exhibitions, concerts, and designs entered into competitions). Describing a specific image or object as a separate record is only necessary if the work is included in a permanent collection of recorded art.

The primary focus during development was to ensure that the broadest possible range of Hungarian art universities could use it. For this reason, the forms often allow for a free-text entry, giving users freedom to describe their work, and the Working Group decided not to provide predefined categories. The original concept was to develop it further by summarising the free-text entries and developing an extended a&d thesaurus based on the Getty AAT. Nevertheless, with this flexible approach, there is a potential risk of inadequate search precision, relevance, and system efficiency, and although it is not suitable for quality assessment right now, the development of the a&d thesaurus can solve these problems. The Creation datatype needs to be updated and refined, requiring closer joint professional work—despite the lack of art repository-dedicated expertise resources and funding. However, there have been several criticisms of MTMT's operation in the recent years, especially in terms of the user interface design: it is not user-friendly, difficult to use, and not visually appealing, which can be a deterrent to uploading in the field of a&d. (Duca, 2017)

The University of Gothenburg practice answered some of the abovementioned problems by identifying artistic works of peer review status for quality assessment. On the one hand, their evaluation system was extended to include publication types relevant to the creative arts, and, on the other hand, a committee determined which publications could be of peer review status. The University of Gothenburg formulated a bibliometric indicator to assess both scientific publications and artistic works. (Lundén and Sundén 2015, 27. "Bibliometric Analyses at Gothenburg University Library.") The model ranks faculty publications, including artistic works, based on established traditions within humanities, social sciences, and arts. The progressive nature of the indicator allows for fund redistribution based on the faculty's

bibliometric system development over a four-year period. The artistic works can qualify fpr two quality levels: refereed and non-refereed. The focus here is on the reviewers' criteria, and questions regarding interoperability and standards were not considered a priority in this context. They required metadata to give full and rich descriptions of the works and to capture their context. The key indicators are the question or problem underlying the work, its relation to other relevant works of art, the exhibition's context or place, documentation of the work and exhibition (including different pieces and environment), as well as documentation of reactions and responses such as reviews and debates.

This solution is still uncommon, especially for smaller disciplines and their institutions. As Walhström has noted regarding artistic research: in a new field, "it might take some years for a critical mass of experts to accumulate, and for reaching a paradigmatic consensus regarding what is quality." (Wahlström 2021, 14) However, quality is typically assessed by curators, art theorists, gallerists, producers, and critics, not by fellow artists. According to Lilja's proposal, higher education institutions would conclude cooperation agreements with artist-run or commercial forums for the public presentation of artistic research (art galleries, stages, concert halls, various media forums, forums, etc.) The agreements would regulate and guarantee the appointment of expert panels for the selection and presentation processes. Once the artwork has passed the peer review process, the presentation would be considered as a bibliometric representation. (Lilja 2012, 18) It is important for developing the field that institutions establish their quality assessment criteria, indicators, and procedures. (ibid.). This development has been the focus of a&d institutions for a few years now but is typically still rinconsistently applied (Wahlström 2021, 17)

5. FURTHER CHALLENGES

In addition to the issues presented and detailed in this paper, several questions still need to be answered, that are as essential to the successful operation of IR as those discussed earlier. However, these can only be briefly addressed here.

Nadim and Randall discuss the issue of versions that arise in the case of born-digital objects, such as software, a website, an application, or a computer game. When documenting digital objects, it is important to consider the potential for significant changes between versions. If a work is continuously updated and developed, it is something that is "likely to remain in perpetual beta state" (Nadim and Randall 2013, 15), which should be noted in the abstract. Regarding software versions or game platforms, including this information in the title is recommended. For complex digital objects like computer games created by a large

team, specifying roles in the abstract is advisable if it cannot be done in the creator field.

Copyright and intellectual property issues are closely intertwined with the highly collaborative nature of artistic and design research, involving multiple rights holders and diverse contributors (Sliger Krause 2018, 21; White, Wendy, and Clare Hemmings 2010). If the a&d sector considers IRs a platform to promote their research outcomes, this undoubtedly lead to discussions about intellectual property and access issues. (Garcia, 2019, 70; Lambaria, 2020, 15; Burgess 2021, 37)

IRs serve as showcases and personal archives for artists and designers, allowing others to explore research, collaborate, and access works. However, the visual display of files in repositories can be improved (Shelley, 2020, 5). Customizing repository software, like DSpace, enables a visually appealing interface that aligns with the institution's identity (Horová and Chvála 2010, 236). This flexibility enhances the user experience, promotes discoverability, and ensures accessibility compliance. Ultimately, these efforts aim to create a better showcase for artistic and multimedia research outputs.

6. CONCLUSION

For fields within the creative arts that do not rely heavily on journal articles as their primary means of communication and often lack formal digital publication of research outputs, the IR becomes crucial in achieving open access to research. However, the successful implementation of IR as a viable alternative relies on overcoming technological and conceptual challenges. Encouragingly, the last few years have seen a significant increase in the literature on the use of IRs in artistic research, while studies covering the field of design are still limited.

The projects discussed in this study face similar challenges, and they provided uniques solutions. In many cases, the projects remain isolated; cross-national cooperation and standard practices have not yet developed in the co-domains. Institutions that have not yet built a repository are in a more difficult position because, although practices are multiplying, there is no explicitly recommended "off-the-shelf" solution to fall back on.

The projects discussed here typically focus on revealing and highlighting connections between artists, works, or institutions, describing creations as richly as possible, and showing how the phenomenon that the developments focus on addresses the needs of creators and end users rather than meeting a standard. However, unconventional disciplines need unconventional solutions to present the values and results created in design.

REFERENCES

Allinson, Julie. 2008. "Describing Scholarly Works with Dublin Core: A Functional Approach." *Library Trends* 57, no. 2.: 221–43. https://doi.org/10.1353/lib.0.0034

Arvidsson, Sofia. 2009. "Modell för att hantera komplexa digitala objekt i öppna arkiv – med utgångspunkt i konst och design. Slutrapport." http://hb.diva-portal.org/smash/get/diva2:883795/FULLTEXT01.pdf

Assis, Paulo de, and Lucia D'Errico. 2019. "Artistic Research: Charting a Field in Expansion". https://www.academia.edu/41272368/Artistic_Research_Charting_a_Field_in_Expansion

Baca, Murtha. 2016. "Introduction to Metadata." Los Angeles: Getty Research Institute. http://www.getty.edu/publications/intrometadata

"Bibliometric Analyses at Gothenburg University Library." https://www.ub.gu.se/en/services-and-support/bibliometric-analyses

Burgess, Robin. 2021. "Getting to Grips with NTROs (Visual Arts Data): The Role of Repositories and Libraries in Their Management." *Against the Grain* 31, no. 5. https://doi.org/10.7771/2380-176X.8428

Callicott, Burton B., David Scherer, and Andrew Wesolek. 2015. *Making Institutional Repositories Work*. West Lafayette: Purdue University Press. https://doi.org/10.26530/oapen_626981

Clobridge, Abby. 2010. *Building a Digital Repository Program with Limited Resources*. Oxford, UK: Chandos Publishing.

Cooke, Jacqueline. 2007. "A Visual Arts Perspective on Open Access Institutional Repositories." https://research.gold.ac.uk/id/eprint/140/3/LIB-Cooke2007b_GRO.pdf

Duca, Daniela. 2017. "Does My Data Look Good in This?" *Research Infrastructure and Data*. https://researchdata.jiscinvolve.org/wp/2017/02/06/data-look-good/

Dupont, Christian. 2007. "Libraries, Archives, and Museums in the Twenty-First Century: Intersecting Missions, Converging Futures?" *RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage* 8, no. 1: 25. https://doi.org/10.5860/rbm.8.1.271

Evans, Jenny. 2020. "Taking a Holistic Approach to Practice-Based Arts Research." https://westminsterresearch.westminster.ac.uk/item/v050x/taking-a-holistic-approach-to-practice-based-arts-research-our-experiences-successes-and-challenges-at-the-university-of-westminster

Evans, Jenny, Nina Watts, Taylor Mudd, and Tom Renner. 2022. "From Legacy to next Generation: A Story of Collaboration to Push the Boundaries of the Open Source Haplo Repository from Cayuse" 35: 14. https://doi.org/10.1629/uksg.582

Garcia, Larissa. 2019. "Art, Rights, and Repositories: Contextualizing Information Literacy with the Institutional Repository." *Art Documentation: Journal of the Art Libraries Society of North America* 38, no. 1: 70–77. https://doi.org/10.1086/702892

Gramstadt, Marie-Therese. 2012. "Kultivating Kultur: Increasing Arts Research Deposit." *Ariadne*, no. 68. http://www.ariadne.ac.uk/issue/68/gramstadt/

Harvey, Karen (ed.) 2009. *History and Material Culture*. London: Routledge.

Horová, Iva, and Radim Chvála. 2010. "Non-Text Theses as an Integrated Part of the University Repository: A Case Study of the Academy of Performing Arts in Prague." *LIBER Quarterly: The Journal of the Association of European Research Libraries* 20, no. 2: 226–41. https://doi.org/10.18352/lq.7990.

Kun, Dorottya. "Újszerű Megoldások a MOME Repozitóriumában." 2016. In: *Könyvtárak a tudomány és a felsőoktatás szolgálatában: Tanulmányok* Kiss, Gábor (ed.) 60–65. Kaposvár: Kaposvári Egyetem.

Lambaria, Kate. "Considering Creative Activity in Institutional Repositories: An Exploration of Faculty Perceptions." 2020. *Journal of Librarianship and Scholarly Communication* 8, no. 1. https://doi.org/10.7710/2162-3309.2312

Lilja, Efva. 2012. "Konstnären som forskare. Om kvalitetssäkring av konstnärlig forskning och forskarutbildning." https://suhf.se/app/uploads/2019/07/Expertgruppen-f%C3%B6r-kvalitetsfr%C3%A5gor-2012-2013-bilaga-7-Konstn%C3%A4ren-som-forskare.-Om-kvalitetss%C3%A4kring-av-konstn%C3%A4rlig-forskning-och-forskarutbild.pdf

Lundén, Tomas, and Karin Sundén. 2015. "Art as Academic Output: Quality Assessment and Open Access Publishing of Artistic Works at the University of Gothenburg." *Art Libraries Journal* 40 (4): 26–32. https://doi.org/10.1017/S0307472200020496

Lynch, Clifford A. 2003. "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age." *ARL Bimonthly Report* 226. https://www.cni.org/wp-content/uploads/2003/02/arl-br-226-Lynch-IRs-2003.pdf

Mandal, Sukumar. 2018. "Development of an Integrated VRA Core Framework for Libraries." *Library Philosophy and Practice*. https://digitalcommons.unl.edu/libphilprac/1890

Meece, Stephanie, Amy Robinson, and Marie-Therese Gramstadt. 2017. "Engaging Researchers with the World's First Scholarly Arts Repositories: Ten Years After the UK's Kultur Project." *New Review of Academic Librarianship* 23 (2–3): 209–32. https://doi.org/10.1080/13614533.2017.1320767

Moriarty, Catherine. 2016. "Monographs, Archives, and Networks: Representing Designer Relationships." *Design Issues* 32 (4): 52–63. https://doi.org/10.1162/DESI_a_00416

Nadim, Tahani, and Rebecca Randall. 2013. "Defiant Objects Project Report." Report. London: Goldsmiths, University of London. https://research.gold.ac.uk/id/eprint/8731/

Plutchak, T. Scott, and Kate B. Moore. 2017. "Dialectic: The Aims of Institutional Repositories." *The Serials Librarian* 72 (1–4): 27–35. https://doi.org/10.1080/0361526X.2017.1320868

Price, Rebecca. 2020. "A Square Peg in a Round Hole? The MARCH Thesis and the Institutional Repository." *Art Documentation: Journal of the Art Libraries Society of North America* 39 (1): 93–100. https://doi.org/10.1086/709661

"Research Catalogue - an International Database for Artistic Research." https://www.researchcatalogue.net/profile/show-work?work=790463

Řezník, Tomáš, Lieven Raes, Andrew Stott, Bart De Lathouwer, Andrea Perego, Karel Charvát, and Štěpán Kafka. 2022. "Improving the Documentation and Findability of Data Services and Repositories: A Review of (Meta)Data Management Approaches." *Computers & Geosciences* 169. https://doi.org/10.1016/j.cageo.2022.105194

Rieger, Oya Y. 2007. "Select for Success: Key Principles in Assessing Repository Models." *D-Lib Magazine* 13, no. 7/8. https://doi.org/10.1045/july2007-rieger

Rodríguez, Cristina Fontánez. 2019. "Archiving Art and Design Theses: Report on Institutional Repositories." https://assets.mica.edu/files/resources/ndsr_art_mica_fontanez_rodriguez_2019.pdf

Romano, Donna. 2018. "In the Service of Artists – Symbiosis and Creative Engagement in Collection Development Strategy at NIVAL: National Irish Visual Arts Library." *Art Libraries Journal* 43 (3): 127–36. https://doi.org/10.1017/alj.2018.17

Shelley, Anne. 2020. "It Takes a Village: Populating the Institutional Repository with Performing Arts Content." *Music Reference Services Quarterly* 23 (3–4): 130–41. https://doi.org/10.1080/10588167.2020.1786308

"Short Intro: CIDOC CRM." https://cidoc-crm.org/node/202

Sliger Krause, Rose, Andrea Langhurst Eickholt, and Justin L. Otto. 2018. "Creative Collaboration: Student Creative Works in the Institutional Repository." *Digital Library Perspectives* 34 (1): 20–31. https://doi.org/10.1108/DLP-03-2017-0010

Wahlström, Annika. 2021. "When Outputs of Artistic Research Meet Academic Infrastructures." https://urn.kb.se/resolve?urn=urn:nbn:se:hb:diva-26460

White, Wendy, and Clare Hemmings. 2010. "KULTUR: Showcasing Art through Institutional Repositories." *Art Libraries Journal* 35 (3): 30–34. https://doi.org/10.1017/S0307472200016515

Zorich, Diane, Günter Waibel, and Ricky Erway. 2008. "Beyond the Silos of the LAMs: Collaboration Among Libraries, Archives and Museums." OCLC Research. https://doi.org/10.25333/X187-3W53