

## **Access to Open Educational Resources during the Pandemic: The Case of the OER Community in the Portuguese Open University Repository**

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**Abstract:** The COVID-19 pandemic that affected the world in 2020 and 2021, imposed important changes in teaching and learning processes in many institutions, notably in Higher Education. During this period teachers and students had to access online quality resources which increased the importance of Open Educational Resources (OER).

Universidade Aberta (Portuguese Open University) is the only university, in the Portuguese higher education context, that includes in its institutional repository an autonomous OER community. It was considered of particular interest to analyse access to resources made available in the OER community during the pandemic, verifying whether this scenario had an influence on access and download numbers.

Results show that the number of OER archived in the repositories has been growing, but the most relevant difference is between years 2018 and 2019. During the analyzed two years of the pandemic (2020 and 2021) the number of new deposits had remain stable, but the number of these resources' downloads is very significant showing an increase during the pandemic period.

We conclude that this increase in use should be considered a valid argument to justify more internal actions to support the strengthening of the OER collection at the UAb, especially in the scientific areas with fewer deposits.

**Keywords:** OER, COVID-19, UAb, Institutional Repository, Portugal



## 1. Introduction

The pandemic that the world faced in 2020 and 2021, and the subsequent lockdown periods in various countries caused important changes in the teaching and learning processes in many institutions, notably in Higher Education (HE). These institutions were compelled to switch rapidly to emergency remote teaching (Hodges *et al.*, 2020), and 2020 was a year of change as there have never been so many students and staff exposed to online learning and teaching in Europe (EUA, 2020), but this movement happened all over the world. These specific circumstances and demands, both for teachers and students, made the need to gain access to online quality resources more pressing and increased the importance of Open Educational Resources (OER).

In fact, in recent decades, the Open Educational Resources movement has assumed, in the educational scenario all over the world, a significant importance and a prominent role in new contexts related to Open Education. In a situation in which it is necessary to expand access to learning and knowledge at reduced costs, there has been a growing awareness of the teaching community for the incorporation of OER in their educational practices, as well as for the availability of their productions for reuse. And the Covid-19 pandemic has accelerated change in this field. One example is leading to a rapid expansion in the digital offer (EUA, 2021: 5) and it is expected this will have a long-lasting impact in the future. The study developed by the Library Journal (2020) concerning Open Access and OER usage, suggests that because of teaching and learning constraints caused by the Covid-19 pandemic, faculty members are more receptive to access to open resources now and that many academic libraries have increased efforts to discover them.

In Europe, the survey taken by the Association of European Research Libraries showed that digitization and access to open resources are the main concerns for academic libraries, and the pandemic accentuated these needs (LIBER, 2020). And the report about digitally enhanced learning and teaching (Gaebel *et al.*, 2021: 33) states that “although open library access is available in 90% of the respondents’ institutions, 65% affirmed that they enhanced it as a result of Covid-19”.

In Portugal, Universidade Aberta (UAb), the Portuguese Open University, is the only university, in the national panorama, that includes in its institutional repository (IR) an autonomous OER community, which has been increasing its role in promoting open education. All documents comply with OER requirements as defined by UNESCO and the Commonwealth of Learning – COL (2015). With the pandemic and considering the above-mentioned changes and developments, we believe that it is of particular interest to analyze access to resources during these times, made available in the OER community, verifying whether it influenced download levels.

## 2. Literature Review and Background

Considering the definitions that have been proposed for OER, we can see that the concept itself has expanded, referring to a greater variety of resources. In 2007, the OECD defined open resources as “digitized materials freely and

openly offered to educators, students and self-learners to use and reuse for teaching, learning and research” (p. 10). The Commonwealth of Learning (COL, UNESCO, 2011, 2015) updated its first definition (2011), and now considers OER as educational resources that include curricula, teaching materials, digital manuals, videos, multimedia applications, podcasts, and other materials designed for teaching and learning, and which are openly made available for use by teachers and students without the need for payment (p. 5).

UNESCO coined the term “Open Educational Resources” in the 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries and since then has been paying particular attention to OER, trying to overcome the limited awareness of the role of Open Access in education and its potential benefits. In 2012, the Paris OER declaration (UNESCO, 2012), as a result of the I World Open Educational Resources Congress, recommended, for example, to “Reinforce the development of strategies and policies on OER”, to “Encourage the development and adaptation of OER in a variety of languages and cultural contexts” and “Facilitate finding, retrieving and sharing of OER”. In 2017, through the Ljubljana OER Action Plan, UNESCO defined five specific challenges for a wider promotion of OER, with examples of concrete actions, emphasizing the importance of facilitating access to quality resources and pointing out again the language and cultural issues, stating that OER should be available in diverse languages. Finally, the recommendation on OER adopted by the UNESCO General Conference in 2019 reaffirms the importance of OER for the achievement of Sustainable Development Goal 4 (SDG 4), which calls for the international community to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all and in the building of inclusive knowledge societies.

Considering the role of academic libraries in this open movement, we can see that OER in IR is not yet generalized and many libraries are unaware of the conditions under which the open-access service is made available (LIBER, 2020; Library Journal, 2020). In the case of Universidade Aberta, the IR is structured around the principles of Open Access. Supported by an Institutional Open Access Policy, the Repository is organized into thematic communities and made available in open access — electronic format and full text — the scientific production of authors (teaching and research staff and other collaborators), the academic production of students, and pedagogical resources, the latter gathered in the Open Educational Resources community, created at the end of 2015. With the creation of this specific collection, it is possible to gather usage statistics specifically for OER content.

The OER collection is made up of contents of the most varied types, published under an evaluation process, based on objective quality and relevance criteria, properly described and indexed to facilitate information retrieval, interoperability, and free use by a wide range of users. The assessment of the quality of OER resources is carried out in three dimensions: 1 - Relevance of information | Relevance and educational value of the content; 2 - Publication | Peer review; 3 - Use | Interoperability.

The documents available are versions of documents from the UAb Audiovisual Archive (videos and podcasts that are produced as complementary materials for the teaching of courses offered by the university) and other OER deposited by the respective authors (textbooks and other documents to support students learning). The search and retrieval of information, as well as access to the contents of the files housed in the Repository, are promoted from different access points, open access networks, and infrastructures, like RCAAP (Portal of Open Access Scientific Repositories of Portugal), OpenAIRE, eduCAPES (Brazil), UNESP (Brazil), Campus Virtual de Saúde Pública (Virtual Campus of Public Health, Brazil), B-on, and Europeana.

The management of the Repository is based on curation processes that involve several activities to facilitate the discovery, access, archiving, and dissemination of resources. As mentioned by Kim, Warga & Moen (2013), digital curation implies traditional and new skills, for example, technological competencies and particular attention to metadata. Metadata makes learning objects more accessible. To ensure interoperability with other information systems, the information retrieval, the access, and (re)use of contents, the management of the OER community in the IR is based on international criteria and standards, in terms of metadata. Its use is critical to maintaining the availability, identity, persistence, renderability, understandability, and authenticity of digital objects over long periods. These aspects have a special relevance to OER, as one of the reasons given for its still not very comprehensive use lies precisely in the difficulties in researching OER: “materials are difficult to locate, retrieve and sometimes impossible to download to be adapted, translated or updated” (Atenas *et al.*, 2014: 30).

The success in searching and locating a document or a set of documents, relevant to a given user, is highly dependent on the quality and consistency of the descriptive information available to search. The metadata system used is Dublin Core and OpenAIRE guidelines (2015). Each OER document in the Repository has an associated metadata sheet, with a set of core elements (Author, Title, Date, Language, Creative Commons License) but also some complementary data. It is important that OER users can have information regarding, for example, the pedagogical settings in which the document was or is used, or the learning objectives associated with the resource. In the case of Universidade Aberta, according to the initiatives developed concerning the creation of an ecosystem of OER and OE practices (Bastos & Carvalho, 2019), there are several recommendations concerning the description of the educational resources in terms of its pedagogical use and these fields are part of the metadata sheet. This type of information especially facilitates others to adopt OER and adapt them to their teaching and learning.

The commitment to quality as a strategic vector is essential for the Repository's sustainability. Its normative documents — Regulation and Preservation Policy — are in line with the general guidelines of the Universidade Aberta's policies, and strategies for safeguarding, disseminating, and continuing access to scientific production, and guaranteeing the preservation and availability of access to content. There is an institutional effort to guarantee future access to

digital documents and the existence of this formalized policy is a key instrument to guide digital preservation practices (Digital Preservation Coalition, 2015). As Bernardette Houghton (2016) says, “preserving digital materials is not just a matter of preserving files”, and it is important to ensure that all stages of the resource lifecycle are considered, safeguarding future access.

Ensuring consistency between the deposited document and its description is essential. As defined in the UAb Quality Management System, each community has a scientific coordinator, legitimized by the Scientific Council of the University, who validates the contents submitted by the authors. The guarantee that the resource is correctly described is provided by the author, validated by the scientific coordinator of the community, and by the administration of the Open Repository. The validation of the degree of conformity of the Repository, regarding the quality of the metadata and technical interoperability, is carried out by the administration of the Repository.

Copyright is another key issue when we talk about OER. The importance given to intellectual protection becomes greater in the case of digital materials, mainly due to the ease with which they can change in terms of design, presentation, or interaction in the publication format. For the contents to be (re)used, it is essential to ensure that information regarding the legal way of proceeding in this regard is made available in a transparent manner. All OER resources are available with open licenses that allow access, copying, distribution, and reuse in new productions.

We believe that, as mentioned by Carvalho & Lopes (2018), the potential of repositories when interconnected is high. The Repository's interoperability with other systems is ensured by using the OpenAIRE guidelines and enables the establishment of partnerships with other OER repositories, as mentioned before. The validation processes, implemented systematically, ensure the harmonization of the Repository within the scope of the Scientific Repositories of Open Access of Portugal (RCAAP) portal, and promote integration, compatibility, and interoperability, also with the European repository infrastructure.

### **3. Objectives**

This study aims to examine how the Covid pandemic, especially considering the emergency remote teaching, affected the interest in OER, specifically the OER community at the Universidade Aberta's IR. The study also focuses on the contribution of OER to the globalization of science and knowledge, perceived by the usage statistics of the OER collection made available by UAb. Open access allows expansion of the social responsibility of the university.

### **4. Methods**

Data collection took place at the beginning of 2022 (February). Usage statistics related to the number of downloads of the OER collection (made through the repository) and the home countries of these accesses were gathered. A descriptive analysis was performed based on a comparative approach between two years before the Covid pandemic (2018, 2019), and the years 2020 and 2021. The first two years illustrate the usage statistics before the Covid

pandemic and provide a comparison with the two years affected by the constraints caused by the pandemic, namely the closing of HE institutions that started with emergency remote teaching (Hodges *et al.*, 2020).

### 5. Analysis of the Results

At the end of 2021, a total of 2457 OER were available at UAb's IR (table 1). In the period under examination (2018-2021), a total of 1253 OER were archived in the IR, and these 4 years correspond to 51% of all OER deposits since 2015.

The community of OER corresponds to 22% of all the documents available at the UAb's IR (at the end of 2021). The IR integrates several communities and different types of documents in OA and the most represented are the scientific production of faculty staff – articles (26%), conference objects (13,5%), book chapters (9,9%) -, master dissertations (19%), e-books (5,4%) and Ph.D. thesis (4,5%). The percentage of OER demonstrates the relevance of this specific community to the overall open resources archived in the repository. This is the result of its Regulation and Preservation Policy (2018), according to which all multimedia resources that support the courses (mainly videos and audio) are made available as OER. As a distance university, UAb has produced over the years a significant number of multimedia resources to support the learning of its students and it is part of the university's mission to make these documents available at the IR, for download and (re)use by a wider audience.

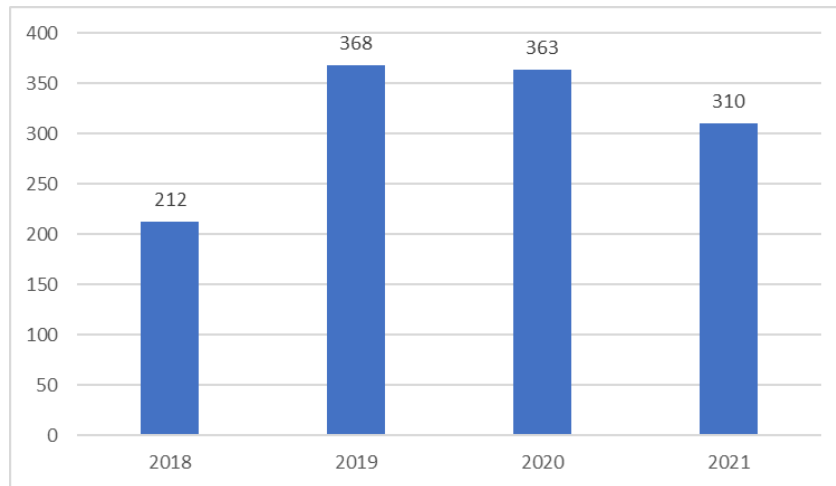
Concerning the scientific areas of the OER, table 1 shows the most represented topics. It is necessary to clarify that the courses offered by UAb cover only a few scientific areas, mainly related to social sciences, management, languages and literature, education, environment, mathematics, and computing.

Table 1. Main scientific areas represented in UAb's IR.

Scientific Areas	No of OER
Languages, Literature, and Cultures	407
History, Archeology, and Heritage	342
Life Sciences, Environment, and Sustainability	245
Education sciences	204
Art	184
Science and technology	106
Management and Economics	88
Mathematics and Statistics	64
Sociology	47
Information Sciences / DSD	35
Linguistics	20
Law and Political Science	15

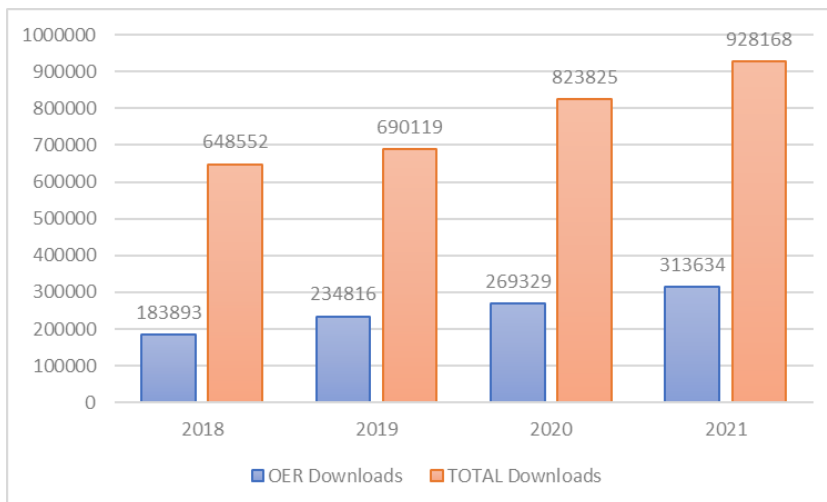
Looking at the number of deposits during the four years under analysis, we see an increase in the number of publications deposited in the repository between 2018 and 2019 (Graphic 1). During the two years affected by the pandemic, a

slight drop occurred. This can be explained by the lockdown periods, during which library staff was unable to work regularly.



Graphic 1. OER: Deposits per year (2018-2021).

Despite this decrease in the number of new deposits, when we analyze downloads, we see that the forward movement continued in 2020 and 2021, with even a slight acceleration in the number of downloads in 2021 (graphic 2). We can say that the interest of the educational community in the OER available at UAb's IR grows faster compared with the number of new OER made available in the same period.



## Graphic 2. Downloads per year: total downloads and OER community.

A hypothesis that may justify this occurrence is related to greater dissemination of the IR and consequently the OER community, through participation in several networks. Participation in inter-institutional networks has proved to be a scaling factor in the dissemination of UAb's open resources (Carvalho, 2018). We can add to this situation the fact that the closure of face-to-face activities forced teachers and students to look for and try to find more online resources to support teaching and learning activities, as mentioned in the literature, and OER repositories are ways to overcome some of the constraints felt.

We also decided to look at the total number of downloads carried out in the same period (graphic 2), and we found that there was also a considerable increase in the number of downloads of all documents available in open access on the IR (including the OER). However, considering the relative weight that OER has maintained in the IR (about 20%), it can be concluded that the importance of the OER community considerably increases, since its downloads have a higher percentage: 28.35% of the total downloads in 2018, 34.02% in 2019, 32.69% in 2020 and 33.79% in 2021. This “pandemic effect” underlines the importance of making OER available, and thus allowing broad access to validated educational resources.

It is also important to consider the countries of origin of the searches, to understand the scope and reach out of the dissemination of this collection of OER. In the analyses were identified 159 countries or regions were as places of origin of downloads. The top 3 is made up of Portugal, Brazil, and Angola and these 3 countries represent more than 70% of all the downloads.

Table 3. OER – Top 15 downloads by country (2018-2021)

	<b>Country</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Total</b>
1	Portugal	53.914	72.975	103.310	115.450	345649
2	Brazil	70.688	73.545	80.940	74.389	299562
3	Angola	19.762	34.012	23.428	43.321	120523
4	Mozambique	16.956	27.452	21.558	30.502	96468
5	United States	5.268	6.203	10.018	14.511	36000
6	Cape Verde	1.109	1.222	1.547	1.828	5706
7	United Kingdom	580	471	505	1.098	2654
8	Germany	537	399	459	612	2007
9	France	452	390	492	531	1865
10	East Timor	571	644	225	289	1729



Data demonstrate the influence of the language of the documents deposited, represented here by the Portuguese language and by countries that speak the same language. For example, Angola and Mozambique doubled the number of downloads from 2018 to 2021. Other countries with Portuguese as an official language that are in the top 10 are Cape Verde and East Timor.

A curious note that the data reveals is the change in the top place of the top 10 between Brazil and Portugal, comparing the years before the pandemic (2018-2019) and the two years of the pandemic with the closure of face-to-face activities at universities during large periods (2020-2021). In the two years of the pandemic, Brazil, although the number of downloads had increased, is significantly overtaken by Portugal. This can be explained considering the Portuguese circumstances, as UAb is known for its strong open access policy, as a distance and open university, and most likely with the lockdown due to Covid-19, there was a greater demand and an increase in access to OER in Portuguese to help in the emergency remote teaching.

Regarding this language issue, we recall the different UNESCO guidelines already mentioned (UNESCO, 2012, 2017, 2019), which always focus on the importance of OER being available in different languages and representing a variety of cultural environments. We are aware of the hegemony of the English language, as an important language of communication, but we agree that it is essential to make room for resources in other languages, which makes it possible for those who do not speak English to continue to have access to quality educational resources. The UAb institutional repository assumes part of this responsibility by making accessible documents for educational use in Portuguese: 95% of the OER are in Portuguese, 4,6% in English, 0,8% in French, and 0,17% in Spanish.

We also want to emphasize the importance of metadata for OER. As educational resources include a very broad range of diverse materials in a variety of formats, such as audio, video, interactive content, 3D representations or other types of materials intended for teaching and learning, their description (cataloging, indexing, and keywords) and organization must ensure that retrieval of required documents is efficient and effective. Due to the nonlinear nature of OER, the organization of data in its content level is very much required. In this scenario, metadata plays a vital role. Only metadata has the potential to deal with each element of data for retrieving resources efficiently.

In their study, Atenas & Havemann (2013) evaluated qualitatively 80 international repositories and found that 93.75% of these used keywords for resource description. Very often it is the author or the uploader of the resource that creates keywords, which means that they use natural rather than controlled vocabulary. Natural language cannot be interoperated between repositories, so keywords are often seen as an imprecise and inconsistent method of describing resources although being a simple and cost-effective method. On the other hand, and according to the referred authors, metadata can provide “highly accurate, consistent information to searchers [but] only 38.75% of the repositories include the use of standardized metadata such as either Dublin Core or Learning Object Metadata (Dublin Core - IEEE LOM - OAI-PMH) which is recommended for

the design of repositories as it captures relevant information which can be transferred across repositories (Atenas & Havemann, 2013: 29). The authors conclude that metadata is probably not regarded to be cost-effective by most of the repository operators, as its usage always needs constant support from librarians. In the case of UAb, as mentioned before, quality assurance is a key aspect, and several procedures taken by the library staff ensure this dimension.

## **6. Final Remarks**

We can assert that openness is becoming a more important category in education, with words like open access, open resources, or open science present in almost all international documents focusing on HE strategies for the future. Several studies also reveal the importance of open access IR in the visibility of collections, namely OER, over time, and the potential impact on the national and international scientific and educational community. Additionally, OER collections and repositories need special attention regarding digital curation, which has assumed increasing importance for libraries as institutions responsible for the preservation of digital objects (Beagrie, 2006; Kunda & Anderson-Wilk, 2011).

Results show us that the number of OER archived in the UAb's IR has been growing. During the 2 years of the pandemic (2020 and 2021), the number of new deposits remains stable. But the use of these resources (downloads) is very significant, and we confirmed an increase in downloads during the pandemic period. This increased use, demonstrated by the statistical data, should be considered a valid argument to justify more internal actions to support the strengthening of the OER collection at the UAb, especially in the scientific areas with fewer deposits. As the university is committed to the Open Educational Movement and the ODS and looking at the main scientific areas that are developed at UAb, we identified some weaknesses, for example in topics that relate to some core areas of courses offered by UAb. Taking into consideration the effective interest and appeal reached by this OER collection, we can anticipate that its educational and social impact could be greater. Especially when we confirm that most users are from Portuguese-speaking countries and we know that in those countries, students and teachers have problems accessing free educational resources with quality assurance. We recall UNESCO's recommendations over the years on the need for linguistic and cultural variety in OER.

Studies like this one are useful to verify the scientific and pedagogical activity carried out in the institutions as well as their impact at national and international levels. It is also possible to obtain some indications and suggestions to improve future actions, monitoring the evolution resulting from possible interventions at the institutional level. The institution, in particular the faculty, can benefit from the dissemination of its work in the repository, and the community in general gathers tangible benefits from access to the knowledge produced. It is not possible to discover the effective use of the OER, at the individual (for self-learning, for example) or institutional level, but as Tuomi discusses, OER are,

with no doubt, an important part of the transformation of education and learning in the knowledge society (Tuomi, 2013).

The relevance of this study is based on the need to value and encourage OER in the country and the world, through a more sustained knowledge of institutional repositories and OER collections. By democratizing the processes through which educational materials are designed and delivered it is possible, as Farrow (2017) also points out, to increase the potential of open education with more people having access to better educational resources.

In this process, institutional repositories play a pivotal role, because they have the responsibility to ensure the treatment and long-term preservation of information. OER collections in institutional repositories are a reliable and solid way to make these educational resources available, complying with quality rules. These are now fundamental tasks for IR and, as mentioned by Lynch (2017: 130), can also be “a core part of the scholarly communications agenda”.

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