University Library Support to the eScience: Integration and Optimization of Information Resources for Scientific Progress

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ABSTRACT: The information system eScience is a publicly available system for monitoring the scientific work of researchers and institutions in the Republic of Serbia. The University Library "Svetozar Marković" helped in the process of unification of data for the eScience from different information systems and offered help to scientific research organizations in the Republic of Serbia (NIO) in achieving the highest and more representative metadata quality of researchers' scientific results.This paper will presenta package of services that the University Library created for NIOs that didn't have the personnel and technical capabilities to use the eScience system independently.

KEYWORDS: eScience, University Library "Svetozar Marković", COBISS.SR, PHAIDRA, processing library materials, metadata

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1 Introduction

The information system eScience[1] is a publicly available system for monitoring the scientific work of researchers and institutions in the Republic of Serbia. It shows current information and data about scientific research organizations in the Republic of Serbia (NIO), affiliated researchers, and their research results. The system was implemented with the idea of being "an aggregator which will draw on all existing information resources and

1. eScience

obtain information from existing systems and platforms" (Милновић 2023) and "aligned with international standards and practices to establish interoperability for data transfer" (Косановић 2023). Since libraries in Serbia have developed and maintained resources that store the results of scientific research activities, it was determined that libraries are key organizations in the eScience system realization and data unification. Thus, the two most important steps in the entire process were realized in cooperation with the two biggest libraries in the country, the National Library of Serbia[2] and the University Library "Svetozar Marković"[3]. The systems immediately identified as the most important resources or pillars that can respond to the eScience project needs were COBISS.SR[4], E-CRIS[5], and PHAIDRA[6], developed and maintained in the previously mentioned libraries.

Although the eScience portal officially started in May 2023, organizational, technical, and other preparations began much earlier, and University Library "Svetozar Marković" started to participate in those activities in the spring of 2022.Librarians from several departments in the University Library were involved in the work process and they received additional tasks besides their regular work. This required reorganization of their daily work activities and additional engagement, in order to prepare adequate data and objects for harvesting into the eScience system. Scientific research organizations had a choice either to prepare necessary data by themselves or to turn to the University Library for help (Столић, Милошевић, and Жикић 2023). For NIOs that did not have the personnel and technical capabilities to use the eScience system by themselves, the University Library created a package of services that included the processing of scientific research material submitted via the already mentioned available library systems (COBISS.SR, E-CRIS.SR and PHAIDRA). The paper by (Тртовац and Стијеповић 2023) presents the importance of the COBISS.SR and E-CRIS.SR systems for eScience, while the paper (Столић, Милошевић, and Жикић 2023) outlines the importance of the PHAIDRA repository for eScience. This paper will present the processing of submitted scientific research material in the system COBISS.SR and digital objects storage in the digital repository PHAIDRA, as well as their metadata structure.

2. National Library of Serbia
3. University Library "Svetozar Marković"
4. COBISS.SR
5. E-CRIS.SR
6. PHAIDRA

2 Processing of scientific research material in the COBISS system

In the digital repository PHAIDRA, NIOs created 25 digital collections out of which three were created within the University Library services package. The University Library was asked for help by three NIOs: Mining and Metallurgy Institute, Institute for Serbian Culture Priština – Leposavić and Institute for Cardiovascular Diseases "Dedinje". The three Institutes, in cooperation with their researchers, prepared bibliographies and full texts of research materials, which they submitted to the University Library. The first step of processing of research materials involved librarians from the Cataloguing Department,who performed bibliography cataloging and classification of delivered material in the COBISS system, while librarians who maintain the digital repository PHAIDRA stored the digital objects in this repository. Bibliography cataloging and classification involved, on the one hand, a redaction of existing bibliography records in the COBISS.SR system, and,on the other hand, the creation of new ones when necessary. In addition to regular metadata such as title, author name(s), collation, year of publication, subject i.e. keywords, UDC classification, as well as metadata describing an integral part of a publication (article in journal and proceedings, monograph chapter, etc.) such as volume and number of the journal, link to the journal, proceeding/monograph, encyclopedia/lexicon/dictionary, etc. it was extremely important to enter material typology, and then link the bibliographic record with an appropriate record in the authority database CONOR, as well as to enter the code of research institution where the researcher is employed.

In the COBISS system metadata "material typology" is inserted in the field **001** subfield **t** (Example 1) from the offered code list,according to the COMARC/B format (IZUM 2023a, 001/1–001/8)(Figure 1). The code list enables different material typology: article in journal (original scientific paper, review scientific paper, other scientific paper, professional paper, popular paper), preface, afterword, introductory article, article review, paper in proceeding, chapter in monograph, bibliography, register, encyclopedia/lexicon/dictionary, encyclopedia/lexicon/dictionary units, proceedings (from a conference), monograph (scientific and professional), catalog, patent, etc. A code defining material typology was assigned to submitted scientific material in the COBISS records according to the proposed categorization. There were no major problems in the process of assigning typology during the bibliographic processing of scientific material from the Institute for Ser-

bian Culture Pristina – Leposavic. However, while processing the material from the Mining and Metallurgy Institute and the Institute for Cardiovascular Diseases "Dedinje" some specific issues appeared, and categorization that was originally assigned to some papers could hardly be fitted into the existing COBISS typology code list. More precisely, librarians from the Cataloguing Department had to find a compromise when entering typology codes to ensure that the submitted material had appropriate typology assigned in the COBISS records, as mandatory metadata. In the next sections, specific material categorization and typology solutions in COBISS.SR records will be explained in detail.

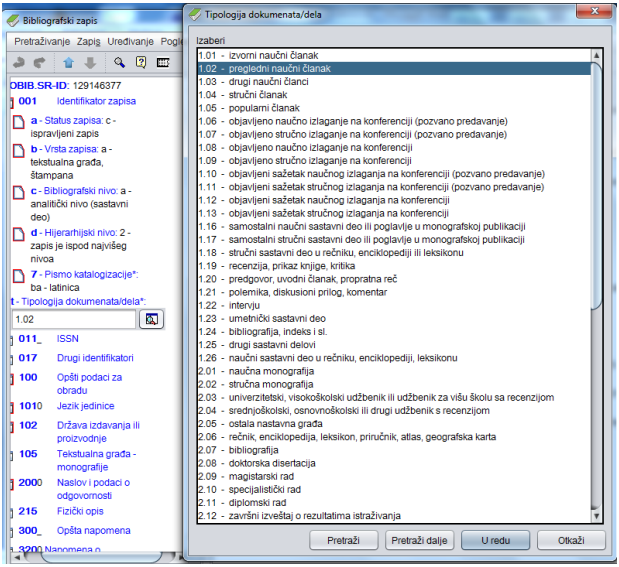

Figure 1. Typology code list in COBISS.SR system

Another specificity in material processing was intellectual responsibility. According to the cataloging rules, all authors and co-authors who signed a paper need to be entered in a bibliographic record and linked with the appropriate authority record in the CONOR database (Savic 2017; Trtovac and Dakić 2020). Before the bibliographic processing of researchers' scientific material, librarians had an obligation to check if there was a CONOR record

for each specific researcher. If a record for a specific researcher didn't exist, a new one had to be created with accurate and precise metadata. On the other hand, if a record for a specific researcher existed, librarians had to check the correctness and completeness of the metadata, and then, if necessary, enter additional metadata. The most common case when metadata were supplemented was related to a researcher's name on the submitted material that has to be in the proper form for the mandatory metadata in the authority record, which is also important for the harvesting process in the eScience system.

In the delivered material some specific forms of a researcher's name needed to be entered in the appropriate CONOR record. The first was the Serbian author's name without diacritics.[7] Such cases appeared most frequently in the material from the Institute for Cardiovascular Diseases "Dedinje" because researchers from this NIO publish a lot in foreign journals (mostly in English). The second example was a researcher's name in Russian, which appeared in materials from the Institute for Serbian Culture Priština – Leposavić because they were published in Russian publications. Also, a frequent name form was with a middle letter,which is a mandatory form of the author's name in some journals, both domestic and foreign. All mentioned forms of a researcher's name, if they didn't exist, were added in the authority record as mandatory metadata in field **400**, while the bibliographic unit in which the researcher was signed with a specific name form was added in field **810** (Example 2) (IZUM 2023b, 400–480). Completed CONOR records were linked with the bibliographic record using subfield **3** in the fields **700**, **701**, and **702**(Example 1).

The next very important metadata for eScience is the researcher's ORCID[8] identification.This is the internationally accepted researcher's identification,which became necessary for paper submission in international journals (lately more often also in Serbian journals), but also for applying to project calls(e.g. European Commission calls). This metadata is also essential because researchers use ORCID ID to log into the eScience system.Thus, librarians entered this metadata within the CONOR record in the field **017**, subfields **a** (ORCID ID) and **2** (ID definition) (Example 2). During the work the problem of two or more ORCID profiles of the same researcher appeared. In this situation librarians used the E-CRIS database and the eScience sys-

7. Authors usually sign without diacritical marks when publishing in foreign journals.

8. Open Researcher and Contributor ID Orcid: Connecting research and researchers

tem to check the validity of the researcher's ORCID profiles. If ORCID IDs in these two systems were also different, the ORCID ID assigned in eScience system was taken as relevant.

The third important metadata about a researcher was the research organization code. It is entered within the bibliographic record in the fields **700**, **701** and **702**, subfield **8** (Example 1). Institutional code is chosen from the offered code list, in the same way as typology (Figure 2), and these codes for the three aforementioned NIOs are: the Mining and Metallurgy Institute – *SR11-059*, the Institute for Serbian Culture Pristina – Leposavic – *SR31-001*, and the Institute for Cardiovascular Diseases "Dedinje"– *SR13-01.08.36.20*. There were also some specific issues when adding the organization code, which will be explained in the following sections.

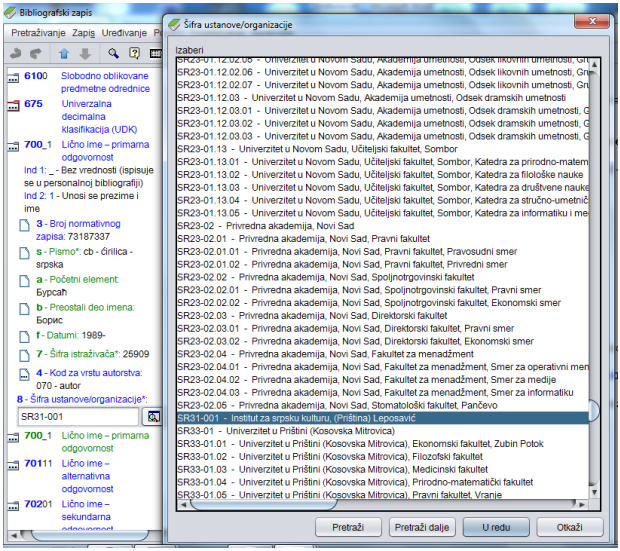

Figure 2. Scientific research organization code list in the COBISS.SR system

3 The Mining and Metallurgy Institute

The Mining and Metallurgy Institute (IRM)[9] is a scientific and research organization with prevailing activity including applied and developmental research aimed at meeting the needs of direct beneficiaries, and fundamental research as a basis for applied and developmental research (IRM 2023). Currently, the Mining and Metallurgy Institute Bor has 28 employees with a PhD, 7 with an MSc degree, 37 with a Master's degree,as well as 49 employees with a university degree.[10] Researchers in the Institute perform a wide range of activities in the field of geology, mining, metallurgy, and technology, and carry out expertise, produce studies, pre-investment and investment studies and projects, investment programs, and investment-technical documentation. IRM also creates scientific research projects and interdisciplinary programs, to support technological and scientific research development. Moreover, the Institute performs research in the fields of mining, mineral processing, new materials, technologies, environmental protection, and recycling.

The Mining and Metallurgy Institute was the first NIO to submit the bibliographies of its researchers to the University Library, in May and June of 2022. Seven librarians from the Cataloguing Department of the University Library with the highest professional title were included in the bibliographic processing of the material. They processed 244 papers from 51 researchers in the COBISS.SR system. The scientific research materials were in Serbian and English. During the processing of these materials, librarians encountered numerous specific issues, because it was necessary to create bibliographic records for patents, technical documentation, technical solutions, projects, video conferences, etc., which they had not previously encountered in their daily work. However, there were no major problems when assigning the typology because the available code list (Figure 1) offered adequate typology items for this type of scientific material. On the other hand, for many papers adding the block of intellectual responsibility (block 7) was demanding.

Example 1 illustrates a bibliographic record for laboratory tests, where the first highlighted author is a collective body, the Mining and Metallurgy Institute (entered in the fields **200f** and **710** of COBISS.SR record), while all other authors were entered in the field **200g** and subsequently in the field **702** with authorship code **070**. Although field **702** refers to secondary

9. The Mining and Metallurgy Institute

10. The data are from the Institute's official website on 27. 12. 2023., https://irmbor.co.rs/o-nama/zaposleni/

authorship (translator, editor, arranger, etc.), in this example, authors are listed here because they are not explicitly highlighted on the paper itself, i.e., on the front page. The same case is for project documentation in example 3.1. In the case of multiple authorships (more than three listed authors), the first author and the standardized formulation "... et al." (example 2.1) are entered in field **200f**, and all remaining authors are listed in field 701. Example 2.2 illustrates a study with a collective body, the Mining and Metallurgy Institute, as the first highlighted author (entered in the fields **200f** and **710** of the COBISS.SR record), followed by highlighted authors entered in the fields **200g** and **701**, while other contributors were entered in the field **702** with authorship code **070**. The investor was entered in field **338**. In example 3.2 the chief designer was entered as the first author in the field **701**, while research contributors were entered in the field **702** with authorship code **927**. The bibliographic record for this specific scientific material will be presented in the text that follows.

3.1 Examples

Example 1. Laboratory tests[11]

001 ac - ispravljeni zapis bl - elektronski izvori cm - monografska publikacija d0 - nema hijerarhijskog odnosa t2.12 - završni izveštaj o rezultatima istraživanja 7ba - latinica
100 c2021 hsrp - srpski lba - latinica
101**0** aeng - engleski
102 asrb - Srbija
135 ad - tekst bz - drugo
200**0** aLaboratory tests for waste materials treatment bElektronski izvor hPt. 3 iLaboratory tests for secondary slag treatment fInstitut za rudarstvo i metalurgiju Bor gSrđana Magdalinović, Sanja Petrović
210 aBor cInstitut za rudarstvo i metalurgiju d2021
215 a1 datoteka PDF
230 aTekstualni podaci
300 aNasl. sa naslovnog ekrana
337 aSistemski zahtevi: nisu navedeni.
338 **1** bKPME Ltd. Ukraine
610**0** zsrp - srpski aotpadni materijali alaboratorijska ispitivanja
675 a622.7 bRUDARSTVO. RUDARSKA TEHNIKA. RUDARSKI

11. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/70910217, downloaded on 28. 12. 2023.

RADOVI I ISTRAŽIVANJA c622.7 - Prerada mineralnih sirovina sRUDARSTVO
702**01** 35481063 sba - latinica aMagdalinović bSrđana f1967- 712305 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 35481063 scb - ćirilica - srpska aМагдалиновић bСрђана f1967- 712305 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 360041481 sba - latinica aPetrović bSanja f1981- 712312 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 360041481 scb - ćirilica - srpska aПетровић bСања f1981- 712312 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
710**02** aInstitut za rudarstvo i metalurgiju cBor
830 a12312-21
830 a12305-21
856**41** uhttps://unilib.phaidrabg.rs/o:936
902**01** 35481063 sba - latinica 9srp - srpski aMagdalinović bSrđana R. f1967-
902**01** 360041481 sba - latinica 9srp - srpski aPetrović bSanja J. f1981-
902**01** 360041481 5k - devojačko prezime sba - latinica 9srp - srpski aBugarinović bSanja f1981-

Example 2. Study
Example 2.1[12]
001 ac - ispravljeni zapis bb - tekstualna građa, rukopis cm - monografska publikacija d0 - nema hijerarhijskog odnosa t2.13 - elaborat, predstudija, studija 7ba - latinica
100 bd - publikacija, zaključena prilikom izlaska ili u okviru kalendarske god. c2021 ek - odrasli, ozbiljna (nije lepa knjiž.) hsrp - srpski lba - latinica
101**0** asrp - srpski
102 asrb - Srbija bcs - Centralna Srbija
105 aa - ilustracije
200**1** aTehnološka ispitivanja prerade nestandardnog jarosit PbAg taloga na uvećanom laboratorijskom nivou eizveštaj f[istraživački tim Vesna Conić ... et al.]
210 aBor c[Institut za rudarstvo i metalurgiju] d2021
215 a39 str. cilustr. d30 cm
300 aNaručilac: Metal Recovery D.O.O.
300 aIzvršilac: Institut za rudarstvo i metalurgiju Bor, Centar za razvojne

12. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/65960969, downloaded on 28. 12. 2023.

tehnologije u metalurgiji
6100 zsrp - srpski ajarosit PbAg talog aprerada atehnološka ispitivanja
675 c669 - Metalurgija a669 b669 - METALURGIJA
70111 355525641 sba - latinica aConić bVesna f1971- 712300 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 355525641 scb - ćirilica - srpska aЦонић bВесна f1971- 712300 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 352519945 sba - latinica aBožić bDragana f1980- 712299 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 352519945 scb - ćirilica - srpska aБожић bДрагана f1980- 712299 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 323392871 sba - latinica aAvramović bLjiljana 707823 f1964- 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 323392871 scb - ćirilica - srpska aАврамовић bЉиљана 707823 f1964- 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 377776905 sba - latinica aDragulović bSuzana f1960- 712301 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 377776905 scb - ćirilica - srpska aДрагуловић bСузана f1960- 712301 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 323394663 sba - latinica aJonović bRadojka 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
70111 323394663 scb - ćirilica - srpska aЈоновић bРадојка 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
830 a12300-21
830 a12299-21
830 a07823-21
830 a12301-21
85641 uhttps://unilib.phaidrabg.rs/o:469
90111 355525641 5k - devojačko prezime scb - ćirilica - srpska 9srp - srpski aСоколов bВесна f1971-
90111 355525641 scb - ćirilica - srpska 9srp - srpski aЦонић bВесна T. f1971-
90111 352519945 scb - ćirilica - srpska 9srp - srpski aБожић bДрагана C. f1980-
90111 323392871 scb - ćirilica - srpska aАврамовић bЉиљана P. f1964-
90111 377776905 scb - ćirilica - srpska 9srp - srpski aДрагуловић bСузана C. f1960-

901**11** 323394663 sba - latinica 9eng - engleski aJonovic bRadojka

Example 2.2[13]

001 ac - ispravljeni zapis bl - elektronski izvori cm - monografska publikacija d0 - nema hijerarhijskog odnosa t2.13 - elaborat, predstudija, studija 7ba - latinica
100 c2021 hsrp - srpski lba - latinica
101**0** asrp - srpski
102 asrb - Srbija
135 ad - tekst bz - drugo
200**0** aElaborat o rezervama i resursima bakra i zlata u porfirskoj mineralizaciji ležišta Čukaru Peki, do nivoa -1.152 m.n.v bElektronski izvor estanje: 01.09.2021. godine fInstitut za rudarstvo i metalurgiju Bor gautori elaborata Mile Bugarin, Vladan Marinković
210 aBor cInstitut za rudarstvo i metalurgiju d2021
215 a1 datoteka PDF
230 aTekstualni podaci
300 aNasl. sa naslovnog ekrana
337 aSistemski zahtevi: nisu navedeni.
338 **1** bMinistarstvo građevinarstva, saobraćaja i infrastrukture eRepublika Srbija
610**0** zsrp - srpski abakar azlato aležišta aČukaru Peki
675 a622.7 bRUDARSTVO. RUDARSKA TEHNIKA. RUDARSKI RADOVI I ISTRAŽIVANJA c622.7 - Prerada mineralnih sirovina sRUDARSTVO
701**11** 31664103 sba - latinica aBugarin bMile f1962- 712247 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
701**11** 31664103 scb - ćirilica - srpska aБугарин bМиле f1962- 712247 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
701**11** 384862729 sba - latinica aMarinković bVladan f1975- 712271 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
701**11** 384862729 scb - ćirilica - srpska aМаринковић bВладан f1975- 712271 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 360041481 sba - latinica aPetrović bSanja f1981- 712312 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 360041481 scb - ćirilica - srpska aПетровић bСања f1981- 712312

13. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/68219145, downloaded on 28. 12. 2023.

4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 35481063 sba - latinica aMagdalinović bSrđana f1967- 712305 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 35481063 scb - ćirilica - srpska aМагдалиновић bСрђана f1967- 712305 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 323392871 sba - latinica aAvramović bLjiljana 707823 f1964- 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 323392871 scb - ćirilica - srpska aАврамовић bЉиљана 707823 f1964- 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 385244425 sba - latinica aMilutinović bSandra f1987- 712306 4927 - saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 385244425 scb - ćirilica - srpska aМилутиновић bСандра f1987- 712306 4927 - saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
710**02** aInstitut za rudarstvo i metalurgiju cBor
830 a12247-21
830 a12271-21
830 a12312-21
830 a12305-21
830 a07823-21
830 a12306-21
856**41** uhttps://unilib.phaidrabg.rs/o:551
901**11** 31664103 sba - latinica 9srp - srpski aBugarin bMile M. f1962-
901**11** 384862729 sba - latinica 9eng - engleski aMarinkovic bVladan f1975-
902**01** 360041481 sba - latinica 9srp - srpski aPetrović bSanja J. f1981-
902**01** 360041481 5k - devojačko prezime sba - latinica 9srp - srpski aBugarinović bSanja f1981-
902**01** 35481063 sba - latinica 9srp - srpski aMagdalinović bSrđana R. f1967-
902**01** 323392871 scb - ćirilica - srpska aАврамовић bЉиљана P. f1964-
902**01** 385244425 sba - latinica 9srp - srpski aTrpković bSandra f1987-

Example 3. Project documentation
Example 3.1[14]

14. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/66725385, downloaded on 28. 12. 2023.

001 ac - ispravljeni zapis bl - elektronski izvori cm - monografska publikacija d0 - nema hijerarhijskog odnosa t2.14 - projektna dokumentacija (idejni projekat, izvođački projekat) 7ba - latinica
100 c2021 hsrp - srpski lba - latinica
101**0** asrp - srpski
102 asrb - Srbija
135 ad - tekst bz - drugo
200**0** aIzgradnja zelenog terminala u luci Prahovo bElektronski izvor iProjekat za građevinsku dozvolu za izgradnju novih lučkih kapaciteta Luke Prahovo (PGD) h7.2 iTehnološki projekat za građevinsku dozvolu zelenog terminala fizrada Institut za rudarstvo i metalurgiju Bor g[odgovorni projektant Vojka Gardić]
210 aBor cInstitut za rudarstvo i metalurgiju d2021
215 a1 datoteka PDF (46 str.)
230 aTekstualni podaci
300 aNasl. sa naslovnog ekrana
337 aSistemski zahtevi: nisu navedeni.
338 **1** bMinistarstvo građevinarstva, saobraćaja i infrastrukture eRepublika Srbija
540**0** aProjekat građevinske dozvole za izgradnju zelenog terminala u luci „Prahovo“ u okviru rekonstrukcije, dogradnje lučkih kapaciteta na novoj teritoriji Luke Prahovo
610**0** zsrp - srpski aluka Prahovo aizgradnja azeleni terminal
675 a624 bGRAĐEVINSKO INŽENJERSTVO. c624 - Građevinarstvo i konstrukcije uopšte (Građevinski zanati vidi: 69, Građevinski materijali vidi: 691, Građevinski delovi vidi: 692)
702**01** 32789735 sba - latinica aGardić bVojka f1971- 712302 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 32789735 scb - ćirilica - srpska aГардић bВојка f1971- 712302 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
710**02** aInstitut za rudarstvo i metalurgiju cBor
830 a12302-21
856**41** uhttps://unilib.phaidrabg.rs/o:853
902**01** 32789735 sba - latinica 9srp - srpski aGardić bVojka R. f1971-
902**01** 32789735 sba - latinica 9eng - engleski aGardic bVojka f1971-
902**01** 32789735 sba - latinica 9srp - srpski aAndrejević bVojka f1971-

Example 3.2[15]

001 ac - ispravljeni zapis bl - elektronski izvori cm - monografska publikacija d0 - nema hijerarhijskog odnosa t2.14 - projektna dokumentacija (idejni projekat, izvođački projekat) 7ba - latinica
100 c2021 hsrp - srpski lcb - ćirilica - srpska
101**0** asrp - srpski
102 asrb - Srbija
135 ad - tekst bz - drugo
200**0** aДопунски рударски пројекат изведеног стања постројења за припрему минералних сировина и одлагалишта рударског отпада и концентрата пирита из лежишта Чукару Пеки - Горња зона bЕлектронски извор fизрада Институт за рударство и металургију Бор gглавни пројектант Ивана Јовановић g[сарадници на пројектовању ПМС (припрема минералних сировина) постројења Сандра Милутиновић и Весна Цонић]
210 aBor cInstitut za rudarstvo i metalurgiju d2021
215 a1 datoteka PDF
230 aTekstualni podaci
300 aNasl. sa naslovnog ekrana
337 aSistemski zahtevi: nisu navedeni.
610**0** zsrp - srpski apostrojenje amineralne sirovine arudarski otpad aprerada
675 a622 bRUDARSTVO. RUDARSKA TEHNIKA. RUDARSKI RADOVI I ISTRAŽIVANJA c622 - Rudarstvo. Rudarska tehnika. Rudarski radovi i istraživanja sRUDARSTVO
701**11** 379412745 scb - ćirilica - srpska aЈовановић bИвана синжењер рударства f1977- 708364 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
701**11** 379412745 sba - latinica aJovanović bIvana cinženjer rudarstva f1977- 708364 4070 - autor 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 385244425 scb - ćirilica - srpska aМилутиновић bСандра f1987- 712306 4927 - saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 385244425 sba - latinica aMilutinović bSandra f1987- 712306 4927 - saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 355525641 scb - ćirilica - srpska aЦонић bВесна f1971- 712300 4927

15. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/66992137, downloaded on 28. 12. 2023.

- saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
702**01** 355525641 sba - latinica aConić bVesna f1971- 712300 4927 - saradnik na istraživanju 8SR11-059 - Institut za rudarstvo i metalurgiju (IRM), Bor
710**02** aInstitut za rudarstvo i metalurgiju cBor
830 a08364-21
830 a12306-21
830 a12300-21
856**41** uhttps://unilib.phaidrabg.rs/o:627
901**11** 379412745 sba - latinica 9srp - srpski aJovanović bIvana M. f1977-
902**01** 385244425 sba - latinica 9srp - srpski aTrpković bSandra f1987-
902**01** 355525641 5k - devojačko prezime scb - ćirilica - srpska 9srp - srpski aСоколов bВесна f1971-
902**01** 355525641 scb - ćirilica - srpska 9srp - srpski aЦонић bВесна T. f1971-

3.2 Institute for Serbian Culture Pristina – Leposavić

Institute for Serbian Culture Priština – Leposavić (ISK)[16] is a multidisciplinary scientific institution with departments for Serbian language and literature, history, archeology, art history and ethnography. It has 51 employees out of which 44 work in the scientific sector and 7 in the administration. The scientific sector consists of associates, including 28 with a PhD (2 scientific advisors, 3 full professors (2 expert advisors), 10 senior scientific associates, 15 scientific associates); 6 doctoral students as research associates, 6 doctoral students as research trainees and 5 doctoral students as expert associates.[17] In 2023, the Institute delivered the scientific researchers' material to the University Library for processing. As of December 2023,scientific material from 37 researchers from the Institute was processed in the COBISS.SR system, a total of 334 papers: articles in domestic and foreign journals, articles in proceedings from domestic and foreign conference and chapters in domestic and foreign monographic publications. Material was in Serbian, English and Russian. During the processing of the material, the librarians did not encounter any major difficulties. Example 4 shows one bibliographic record, while Example 5 shows a record in the authority database CONOR for Dr. Borivoj Baltezarević, one of the researchers in the Institute.

16. Institute for Serbian Culture Pristina – Leposavić
17. The data is from the Institute's official website on 25. 01. 2024., https://iskp.co.rs/o-institutu/

The examples contain all mandatory metadata previously mentioned in this paper.

Example 4. Bibliographic record in Russian published in conference proceedings[18]

001 an - novi zapis ba - tekstualna građa, štampana ca - analitički nivo (sastavni deo) d2 - zapis je ispod najvišeg nivoa
t1.08 - objavljeno naučno izlaganje na konferenciji 7ba - latinica
100 c2021 hsrp - srpski lca - ćirilica - nije specifikovana
1010 arus - ruski deng - engleski drus - ruski
102 arus - Rusija
2000 aСила и мощь – международно-правовые аспекты fМарина Д. Миятович
215 aСтр. 35-40
320 aБиблиографија: стр. 40.
464 **1** 1109922313 (TI=Политическое пространство и социальное время: : глобальные вызовы и цивилизационные ответы : в двух томах. Т. 2 AU=Сенюшкина, Татьяна Александровна)
5170 aForce and power – international and legal aspects
6100 zrus - ruski aсила aмощь aгосударство aполитика aмеждународно-правовые аспекты
6100 zeng - engleski aforce astate apolitics ainternational legal aspects
675 a32 c32 - Politika
700 **1** 321569127 scb - ćirilica - srpska aМијатовић bМарина Д. f1989- 712209 4070 - autor 8SR31-001 - Institut za srpsku kulturu, (Priština) Leposavić
700 **1** 321569127 sba - latinica aMijatović bMarina D. f1989- 712209 4070 - autor 8SR31-001 - Institut za srpsku kulturu, (Priština) Leposavić
830 a12209
85641 uhttps://unilib.phaidrabg.rs/o:1312
900 **1** 321569127 scb - ćirilica - srpska 9srp - srpski aМијатовић bМарина f1989-
900 **1** 321569127 sca - ćirilica - nije specifikovana 9rus - ruski aМиятович bМарина Д. f1989-

18. Record available at: https://iskp.co.rs/o-institutu/, downloaded on 28. 12. 2023.

Example 5. Record in authority database CONOR[19]

001 ac - ispravljeni zapis bx - normativni zapis ca - lično ime
0177 a0000-0002-6798-6981 2orcid - ORCID
100 ba - usvojena csrp - srpski gcb - ćirilica - srpska
101 asrp - srpski aeng - engleski
102 asrb - Srbija
106 a0 - može da se koristi i kao predmetna oznaka
120 ab - muški ba - lično ime se razlikuje
152 aPPIAK - Pravilnik i priručnik za izradbu abecednih kataloga
19011 a1976 b04 c25
200 1 7cb - ćirilica - srpska aБалтезаревић bБоривоје f1976- r12193
200 1 7ba - latinica aBaltezarević bBorivoje f1976- r12193
340 aДоктор културолошких наука. Области научног истраживања: филозофија науке, (културни) идентитет, култура сећања и питања слободе појединца у контексту глобализације и живота посредованог технологијом.
400 1 7cb - ćirilica - srpska 9srp - srpski aБалтезаревић bБоривоје B. f1976-
400 1 7ca - ćirilica - nije specifikovana 9rus - ruski aБалтезаревич bБоривое B. f1976-
400 1 7ba - latinica 9eng - engleski aBaltezarevic bBorivoje f1976-
810 aOtimanje materijalnog blaga Kosova i Metohije od strane međunarodnih i domaćih faktora / Marko M. Milović, Borivoje Baltezarević. - U: Megatrend revija : međunarodni časopis za primenjenu ekonomiju. - ISSN 1820-3159. God. 18, br. 4 (2021), str. 293-302
810 aУтицај технолошких иновација на тржиште рада и креирање потребе за новим стручним профилима / Оливера В. Милутиновић, Боривоје В. Балтезаревић. - У: Баштина : гласник. - ISSN 0353-9008. Св. 49 (2019), стр. 203-210

3.3 Institute for Cardiovascular Diseases "Dedinje"

Institute for Cardiovascular Diseases "Dedinje" (IKVBD)[20] is a scientific institution within the Faculty of Medicine of University of Belgrade, Clinical Center of Serbia. It has 65 employees of which three senior research associates, 15 research associates, six research assistants, and 38 junior research

19. Record available at: https://plus.cobiss.net/cobiss/sr/sr/conor/15177063, downloaded on 28. 12. 2023.
20. Institute for Cardiovascular Diseases "Dedinje"

assistants.[21] Librarians processed scientific material delivered by this NIO in the COBISS.SR system in September and October 2023, a total of 126 papers by 14 researchers. During the work, librarians encountered some specific issues while entering typology in the COBISS.SR records. As part of scientific research, researchers from IKVBD publish various types of articles in journals, for example, case studies, case reports, scientific reports, clinical investigations, clinical research, and others. The existing typology code list (Figure 1) in the COBISS.SR system does not have such detailed codes for scientific articles, so the librarians made compromise solutions during processing and entered typologies from the list that most closely define the existing material categorization. For example, for „case report", the typology „other scientific articles" or „review scientific paper" was entered, for „clinical investigation", the typology „original scientific paper" was entered, etc.

Another challenge for librarians was multiple authorship. Researchers from IKVBD collaborate with foreign experts from related scientific fields and they jointly present their research results in papers. Thus, in many papers processed on this occasion, in addition to researchers from IKVBD dozens of foreign researchers were also signed. According to the bibliographic processing rules, all signed authors are listed in the field **200f** in the COBISS.SR system as follows: up to three authors, all authors are listed, if there are more than three authors signed, then the first one is listed and the formulation „... [и др.]" for papers in Cyrillic script or formulation „... [et al.]" for papers in Latin script or foreign language. In the intellectual responsibility block (block 7 in the COBISS.SR system) all authors are listed as follows: up to three authors, the first one is entered in field **700** and the remaining two in field **701**. If there are more than three authors all of them are entered in field **701**. As a large number of submitted papers were signed by dozens of authors and co-authors, of which the largest number were foreign researchers, the librarians decided not to include all of them in the processing. If three to ten authors were signed on the paper the first one and the formulation „*...[et al.]*" were enteredin field **200f**. For example „*Zachi I. Attia... [et al.]*" (Example 6). The remaining authors, both domestic and foreign, were entered in field **300a**, and then their respective field **701**, using subfield **3**, was linked to the CONOR record of the first author (a new record was created in the CONOR database if necessary), and the authors with affiliation „Institute for Cardiovascular Diseases "Dedinje"". If

21. The data are from the Institute's official website on 13. 10. 2023, https://www.ikvbd.org/en/scientific-activity/list-of-researchers/

the first signed author in the paper was an author with affiliation „Institute for Cardiovascular Diseases "Dedinje"", only one field **701** was assigned.

If more than 10 authors were signed in the paper the content of the field **200f** was the same as in the previous example, but only authors with affiliation „Institute for Cardiovascular Diseases "Dedinje"" were listed in the field **300a**. The field **701** was filled in the same way as in the previous example. In this case the field **970**, subfield **b**, was also assigned with data about the number of signed authors in the paper, written in Arabic numerals. Example 6 illustrates a bibliographic record in the COBISS.SR system for a paper with 48 signed authors, i.e. coauthors. In the example it can be observed that three **701** fields were filled, of which the first one refers to the first signed author in the paper (it was necessary to create a new record in CONOR database), while the other two **701** fields were linked with the CONOR records for authors with affiliation „Institute for Cardiovascular Diseases "Dedinje"".

Example 6. Bibliographic record for the paper with 48 signed authors[22]

001 ac – ispravljeni zapis bl – elektronski izvori ca – analitički nivo (sastavni deo) d2 – zapis je ispod najvišeg nivoa t1.01 – izvorni naučni članak 7ba – latinica
011 a1942-5546 (TI=Mayo Clinic Proceedings [Elektronski izvor])
017 adoi.org/10.1016/j.mayocp.2021.05.027 2doi – digitalni identifikator objekta
100 c2021 hsrp – srpski lba – latinica
1010 aeng – engleski deng – engleski
102 agbr – Velika Britanija
105 aa – ilustracije
2001 aRapid exclusion of COVID infection with the artificial intelligence electrocardiogram fZachi I. Attia... [et al.]
215 astr. 2081-2094 cilustr. IVol. 96 hno. k2021
300 aOstali autori iz Srbije: Goran Lončar, Vladan Vukomanović.
320 aBibliografija: str. 2093-2094
320 aAbstract.
6100 zsrp – srpski aCOVID akorona virus aveštačka inteligencija amašinsko učenje arespiratorne infekcije aelektrokardiogram
675 c616.1 – Bolesti srca i krvotoka. Hematologija a616.12-073.7:004.85

22. Record available at: https://plus.cobiss.net/cobiss/sr/sr/bib/125801225, downloaded on 28. 12. 2023.

b616.1 – KARDIOVASKULARNE BOLESTI
675 c616-07 – Semiologija. Simptomatologija. Dijagnostika
675 c004.8 – Veštačka inteligencija. Veštački razum

701**11** 3105100553 sba – latinica aAttia bZachi 4070 – autor
701**11** 3105100553 scb – ćirilica – srpska aАтиа bЗаки 4070 – autor
701**01** 329116519 sba – latinica aLončar bGoran f1976- 713295 4070 – autor 8SR13-01.08.41 – Univerzitet u Beogradu, Medicinski fakultet, Institut za kardiovaskularne bolesti 'Dedinje'
701**01** 329116519 scb – ćirilica – srpska aЛончар bГоран f1976- 713295 4070 – autor 8SR13-01.08.41 – Univerzitet u Beogradu, Medicinski fakultet, Institut za kardiovaskularne bolesti 'Dedinje'
701**01** 361903369 sba – latinica aVukomanović bVladan f1969- 4070 – autor 8SR13-01.08.46 – Univerzitet u Beogradu, Medicinski fakultet, KBC 'Dr Dragiša Mišović'
701**01** 361903369 scb – ćirilica – srpska aВукомановић bВладан f1969- 4070 – autor 8SR13-01.08.46 – Univerzitet u Beogradu, Medicinski fakultet, KBC 'Dr Dragiša Mišović'

856**41** uhttps://unilib.phaidrabg.rs/o:2966

901**11** 3105100553 sba – latinica 9eng – engleski aAttia bZachi I.
901**11** 3105100553 sba – latinica 9eng – engleski aAttia bZachi Itzhak
901**01** 329116519 sba – latinica aLončar bGoran M. f1976-
901**01** 329116519 sba – latinica 9eng – engleski aLoncar bGoran f1976-
901**01** 361903369 sba – latinica 9srp – srpski aVukomanović bVladan D. f1969-
901**01** 361903369 sba – latinica 9eng – engleski aVukomanovic bVladan f1969-

970 b48

The scientific material collection of researcher Milan Milojević, as the most extensive from the IKVBD at that moment, was separately delivered. An other specificity, in addition to those already explained in this section, was that authors were not always signed with affiliation "Institute for Cardiovascular Diseases "Dedinje"" and so in a large number of bibliographic records, subfield **8** in block **7** was not filled.

4 Collection structure in the digital repository PHAIDRA

After bibliographic description of scientific research material from these three NIOs librarians who maintain the digital repository PHAIDRA in the University Library stored the submitted digital objects. Three separate digital collections were formed: "Mining and Metallurgy Institute" (PHAIDRA ID o:179),[23] „Papers of professors and associates at the Institute for Serbian Culture Priština – Leposavić" (PHAIDRA ID o:1311)[24] and „Papers of associates at the Institute for Cardiovascular Diseases "Dedinje"" (PHAIDRA ID o:2793).[25] Each collection is described by the following metadata: title (srp) (srb. наслов), contributor (srb. сарадник), description (srp) (srb. опис), object language (srb. језик објекта), date (srb. датум креирања колекције), number of objects in the collection (srb. број објеката у колекцији) (Figure3). Metadata can be exported into the Dublin Core[26] and LOM Schema. Collections were created manually and the digital objects also stored in them manually.

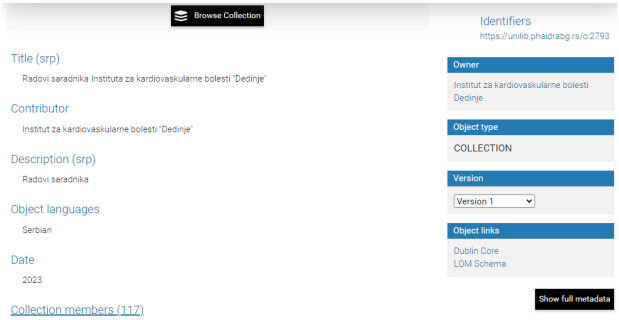

Figure 3. Метаподаци за колекцију „Радови сарадника Института за кардиоваскуларне болести Дедиње"

23. Mining and Metallurgy Institute
24. Papers of professors and associates of the Institute for Serbian Culture Priština - Leposavić
25. Papers of associates of the Institute for Cardiovascular Diseases, Dedinje
26. Dublin Core

Similarly to collections, during the storage, each digital object got its own PHAIDRA ID number,which is entered in the field **856** subfield **u**, of the COBISS.SR record. In addition to the ID number the material is described with following metadata: title (srp) (srb. наслов), author (srb. аутор), publisher (srb. издавач), description (srp) (srb. опис), object language (srb. језикобјекта), date (srb. датум креирања колекције), access rights (srb. право приступа), member of the collection(s) (srb. део колекције(а)) (Example 7). Created digital objects can be accessed in two ways: by means of metadata „collection members" within one collection, when all digital objects are listed, and by searching metadata in a browser. Users are enabled to download the full text of the object, reviews of the object in the PHAIDRA browser, as well as export metadata in the Dublin Core and LOM Schema (Figure 4).

Example 7. Metadata in the digital repository PHAIDRA for digital object in the collection "Mining and Metallurgy Institute"[27]

Title (srp)
Glavni rudarski projekat pripreme mineralnih sirovina i odlagališta rudarskog otpada i koncentrata pirita iz ležišta Čukaru Peki – Gornja zona : rešenje o imenovanju radnog tima
Author
Jovanović, Ivana
Publisher
Institut za rudarstvo i metalurgiju, Bor
Description (srp)
Projektna dokumentacija Rešenje br. 2687/20 od 17.11.2020.
Object languages
Serbian
Date
2020
Rights
© All rights reserved
Member of the Collection(s) (1)
o:179 Institut za rudarstvo i metalurgiju Bor

Metadata structure in the PHAIDRA repository differs from those in the COBISS.SR system. Already explained problems with material typology and

27. Example available at:https://enauka.gov.rs/handle/123456789/605134. The same example in the eScience system, https://enauka.gov.rs/handle/123456789/605134, downloaded on 19. 12. 2023.

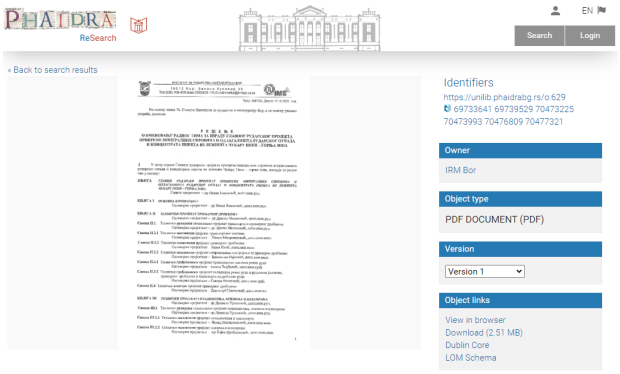

Figure 4. Дигитални објекат из колекције „Института за рударство и металургију Бор“ у репозиторијуму PHAIDRA

multiple authorship are solved in a different way in the PHAIDRA repository. The typology system of digital objects in PHAIDRA is adapted to the eScience system according to the OpenAIRE typology[28], where the solutions for some examples are not the best, and such examples were encountered when depositing material from the aforementioned NIOs. For example, for different reviews, the assigned typology can be „article“ or „original scientific article“, while „conference paper pertains to all papers from a conference, including abstracts. It remains to consider in the future whether it is possible to change the typology list and solve this type of problems. Table 1 shows how typology mapping was done in the system, while Figure 5 shows the list of available typology in the metadata editor in the PHAIDRA, visible to users.

Multiple authorship, another specific issue explained in this paper, was resolved in PHAIDRA in a different way than in the COBISS.SR system. As it is explained in previous section, if there are more than 10 signed authors in one paper not all are entered in the COBISS.SR record, while in PHAIDRA, all signed authors were entered in the metadata field “Author”. This is because the eScience system displays an error if the entered number of authors in the system doesn’t match the number of authors signed in the paper. In the most cases all metadata,together with appropriate digital object (mostly paper in PDF) are harvested from the PHAIDRA into

28. OpenAIRE Guidelines for Literature Repositories v3: Publication Type (M)

Table 1. Metadata mapping in PHAIDRA according to OpenAIRE typology

Типологија у репозиторијуму PHAIDRA	**Типологија у OpenAIRE**
Article	article
Doctoral dissertation	doctoralThesis
Other	other
Original research paper	article
Research dataset	dataset
Report	report
Book	book
Patent	patent
Book chapter	bookPart
Review article	review
Preprint	preprint
Review	review
Peer review	review
Conference proceeding	conferenceProceedings
Habilitation	other
Professional paper	article
Final paper	other

the eScience system, so the number of entered authors in the PHAIDRA metadata structure had to be the same as the number of authors signed in the paper that is stored. As we can see Example 6 in field **970b** we can see that 48 authors are signed in the paper. If we look at Figure 6 we can see the same example in PHAIDRA and all 48 authors from the paper in the metadata field „Author“.[29]

5 Conclusion

In this paper we explained and illustrated the processing of scientific research results from three scientific research organizations in Serbia that

29. Paper available at: https://unilib.phaidrabg.rs/o:2966, downloaded on 14. 12. 2023.

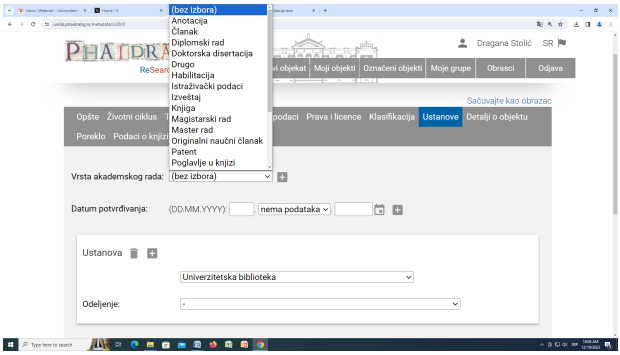

Figure 5. Typology in the metadata editor in PHAIDRA visible to users

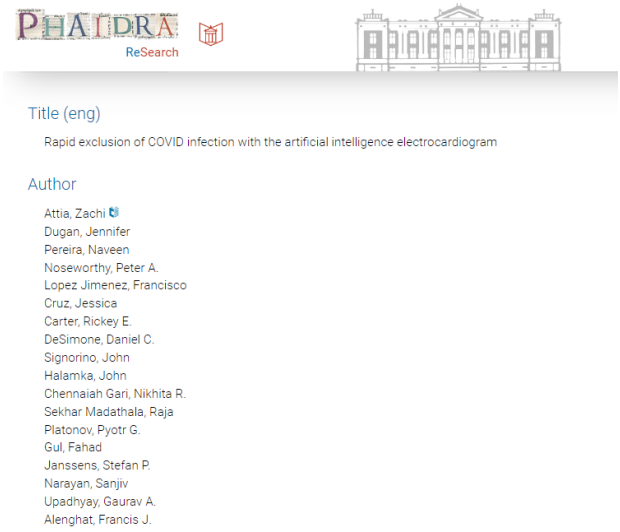

Figure 6. Metadata in the repository PHAIDRA for the paper signed by 48 authors

turned to the University Library „Svetozar Marković“ for help for scientific harvesting research data to the eScience system. The Mining and Metallurgy Institute, the Institute for Serbian Culture Priština – Leposavić and the Institute for Cardiovascular Diseases “Dedinje” delivered scientific research material of their researchers to be processed and stored in the library-information systems maintained in the University Library, important for data harvesting in the eScience system. The processing included bibliographic processing in the COBISS.SR system and depositing digital objects in the digital repository PHAIDRA. To that end, a huge number of different papers were bibliographically processed and stored in the digital repository, whereby three separate digital collections were created. During the work librarians encountered different challenges from library and information science, which they successfully solved. The scientific research result processed in this way was successfully harvested to the eScience system, and the librarians of the University Library will continue to provide services and help to all NIOs that need it.

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