

## Stavovi studenata informacijskih nauka prema otvorenoj nauci

### Information science students' attitudes toward open science

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#### Sažetak / Abstract

**Cilj:** Cilj ovog istraživanja jeste ispitivanje stavova studenata informacijskih nauka prema otvorenoj nauci.

**Metodologija:** Istraživanje je provedeno u mjesecu maju 2025. godine, a u istraživanju je, kao primarna, korištena kvalitativna metoda – fokus grupa, u kojoj je učestvovalo pet studenata treće i četvrte godine studija informacijskih nauka i druge studijske grupe (književnosti, odnosno jezika) na Univerzitetu u Sarajevu – Filozofskom fakultetu. Razgovor je, uz prethodnu saglasnost svih učesnika, sniman alatom otvorenog koda Audacity, dok je transkripcija razgovora izvršena djelimično uz pomoć softvera otvorenog koda Whisper AI-a, pri čemu je, s obzirom na specifičnosti jezika, urađena dodatna provjera preslušavanjem te bilježenjem. Nakon transkripcije izvršena je analiza dobivenih odgovora, koji su potom grupisani u kategorije s obzirom na učestalost njihovog pojavljivanja. Kodiranje je urađeno bez unaprijed definiranih shema kodiranja, kodovi su formirani na osnovu odgovora studenata, tako da svaki kod oslikava osnovno značenje iznesenog stava. Podaci su obrađeni u Excel-u, a rezultati prikazani tabelarno.

**Rezultati:** Rezultati istraživanja pokazuju da studenti informacijskih nauka imaju pozitivan stav prema otvorenoj nauci. Prednosti otvorene nauke prepoznaju primarno u osiguravanju otvorenog pristupa sadržajima, što omogućava jednako obrazovanje i učenje za sve, te doprinosi transformaciji i napretku nauke i obrazovanja, odnosno samom razvoju nauke i društva. Prepreke u implementaciji otvorene nauke identificiraju u tehnološkim barijerama te nedostatku edukacije o otvorenoj nauci, koja je istovremeno i ključno rješenje za uspješnu implementaciju otvorene nauke na bh. visokoškolskim ustanovama, a u kojoj neupitnu i inicijalnu ulogu, prema stavovima studenata, imaju visokoškolski bibliotekari. Rezultati našeg istraživanja se ne mogu generalizirati na studente drugih studijskih grupa, međutim, dobiveni nalazi su dobra osnova za kreiranje skale za mjerenje stavova o otvorenoj nauci.

**Originalnost:** Fokus grupa realizirana s namjerom identificiranja stavova studenata informacijskih nauka prema otvorenoj nauci u kontekstu visokog obrazovanja, prema našim saznanjima, prvo je istraživanje ove problematike iz oblasti informacijskih nauka koje je provedeno u Bosni i Hercegovini.

**Aim:** The aim of this paper is to examine the attitudes of information science students toward open science.

**Methodology:** This research was conducted in May 2025 using a qualitative method as the primary approach, a focus group, involving five students who study Information science in combination with another study program (Literature or Language) at the University of Sarajevo, Faculty of Philosophy. With the prior consent of all participants, the discussion was recorded using the open-source tool Audacity. The transcription of the discussion was carried out partially with the assistance of the open-source software Whisper AI, followed by additional verification through listening

and manual annotation due to language-specific considerations. After transcription, responses were analysed and subsequently grouped into categories based on their frequency of occurrence. Coding was performed without predefined coding schemes; codes were generated inductively from the students' responses so that each code reflects the core meaning of the expressed attitude. The data were processed in Excel and results were presented in tabular form.

**Results:** Findings indicate that Information science students hold a positive attitude toward open science. They primarily recognize the advantages of open science in ensuring open access to content, which enables equal opportunities for education and learning, and contributes to the transformation and advancement of science and education, as well as the overall development of science and society. The obstacles to implementing open science are identified in technological barriers and the lack of education on open science, which simultaneously serves as the key solution for successful implementation within higher education institutions in Bosnia and Herzegovina. According to the students' views, academic librarians have an indisputable and initial role in this educational process. While the results of our study cannot be generalized to students of other study programs, these findings provide a solid basis for developing a scale for measuring attitudes toward open science.

**Originality:** To the best of our knowledge, the focus group conducted with the aim of identifying the attitudes of Information science students toward open science in the context of higher education represents the first study on this topic within the field of Information science carried out in Bosnia and Herzegovina.

## 1. Uvod

Otvorena nauka predstavlja pokret čiji je osnovno načelo to da se naučno znanje, nezavisno od toga u kojem se obliku nalazi i kojim kanalima distribuirati, učini dostupnim svim zainteresovanim osobama. Koncept otvorenosti naučnog znanja svoj puni iskaz pronalazi u današnjem vremenu koje prati ubrzani razvoj informacijsko-komunikacijskih tehnologija i raznolikih alata koji se koriste u procesima kreiranja, organiziranja, ali i diseminacije informacija i znanja.

Zbog njena neprijeporno važnog značaja, otvorena nauka je već neko vrijeme predmetom različitih istraživanja. U tom smislu, Fecher & Friesike (2013) detektovali su čak pet različitih škola mišljenja vezanih uz koncept otvorene nauke: a) javna škola (koja obuhvata proces uključivanja društva u proizvodnju znanja – građanska nauka), b) demokratska škola (vezana uz pravo na pristup informacijama i znanju kao osnovnim ljudskim slobodama), c) pragmatična škola (s načelom transparentnosti naučnog istraživanja i saradnje naučnika), d) infrastrukturna škola (vezana za infrastrukturu koja omogućava otvoren pristup naučnom znanju i pratećim sistemima) te e) škola mjerenja uticaja (tzv. mjeriteljska škola, koja otvorenu nauku veže uz načine valorizacije naučnoistraživačkog rada) (Fecher & Friesike, 2013).

Istovremeno, brojne su organizacije međunarodnog karaktera usmjerile velike napore k osvještavanju o otvorenoj nauci, zagovaranju programa (pro)aktivne implementacije otvorene nauke u naučnoistraživačkim, obrazovnim, odnosno društvenim procesima,

## 1. Introduction

Open science represents a movement whose fundamental principle is that scientific knowledge, regardless of the form in which it exists or the channels through which it is distributed, should be made accessible to all interested individuals. The concept of openness in scientific knowledge finds its full expression in the present era which is characterized by the rapid development of information and communication technologies (ICT) and the diverse tools used in the processes of creating, organizing and disseminating information and knowledge.

Due to its unquestionably significant importance, open science has for some time been the subject of various research studies. In this context, Fecher & Friesike (2013) identified five distinct schools of thought related to the concept of open science: (a) the public school, which encompasses the process of involving society in knowledge production known as Citizen science; (b) the democratic school, concerned with the right to access information and knowledge as fundamental human freedoms; (c) the pragmatic school, based on the principles of transparency in scientific research and collaboration among scientists; (d) the infrastructural school, which focuses on the infrastructure that enables open access to scientific knowledge and related systems; (e) the impact measurement school (also known as the evaluative school), which links open science to methods of research valorisation and assessing scientific research output (Fecher & Friesike, 2013).

At the same time, numerous international organizations have dedicated substantial efforts to raising

u spektru kojih, naprimjer, UNESCO (engl. *United Nations Educational, Scientific and Cultural Organization*) definira otvorenu nauku kao “inkluzivni koncept koji objedinjuje različite pokrete i prakse s ciljem da višejezično naučno znanje bude otvoreno dostupno, pristupačno i ponovo upotrebljivo za sve, kako bi se povećala naučna saradnja i dijeljenje informacija u korist nauke i društva” (UNESCO, 2021). Prema UNESCO-u otvorena nauka uz to “teži otvaranju procesa stvaranja, evaluacije i komunikacije naučnog znanja prema društvenim akterima izvan tradicionalne naučne zajednice”, obuhvatajući pet sljedećih stubova: “otvoreno naučno znanje, otvorena naučna infrastruktura, naučna komunikacija, otvoreno uključivanje društvenih aktera i otvoreni dijalog s drugim sistemima znanja” (UNESCO, 2021).

Tome slično, i Međunarodni naučni savjet (engl. *International Science Council*), otvorenu nauku, kako to navodi Boulton (2021) sagledava kao nauku “koja je otvorena za provjeru i kritičko preispitivanje te za potrebe i interese šire javnosti. Otvorena nauka čini naučni zapis – njen rastući fond znanja, ideja i mogućnosti – dostupnim i besplatnim za sve, bez obzira na geografiju, spol, etničku pripadnost ili finansijske okolnosti. Ona omogućava da podaci i dokazi nauke budu dostupni i ponovo upotrebljivi za sve, uz poštovanje ograničenja vezanih za sigurnost, zaštitu i privatnost. Otvorena je za saradnju i angažman s drugim društvenim akterima u zajedničkom nastojanju da se stvori novo znanje i da se podrži čovječanstvo u postizanju održivog i pravednog života na planeti Zemlji” (Boulton, 2021).

Uočavajući važnost otvorene nauke za globalni razvoj društva te pojašnjavajući da otvorena nauka “olakšava dijeljenje i saradnju, čime se ubrzava proces otkrivanja, poboljšava kvaliteta istraživanja i nauka čini utjecajnijom i centralnom za ljudski i društveni razvoj” (Evropska komisija, s. a.), Evropska komisija izdvaja sljedeće prakse otvorene nauke: rano i otvoreno dijeljenje istraživanja kroz preregistraciju, registrovane izvještaje, pohranjivanje podataka u zajedničke repozitorije, objavljivanje preprint verzija radova; otvorenu saradnju unutar naučne zajednice i s drugim proizvođačima i korisnicima znanja; omogućavanje neposrednog i neograničenog otvorenog pristupa naučnim publikacijama, istraživačkim podacima, modelima, algoritmima, softveru, protokolima, bilješkama, radnim tokovima i svim drugim istraživačkim rezultatima; osiguravanje provjerljivosti i ponovljivosti istraživačkih rezultata; odgovorno upravljanje istraživačkim rezultatima (publikacijama, podacima i drugim

awareness of open science and advocating programs for the (pro)active implementation of open science in research, educational, and social processes. For example, UNESCO (United Nations Educational, Scientific and Cultural Organization) defines open science as “an inclusive concept that brings together various movements and practices with the aim of making multilingual scientific knowledge openly available, accessible, and reusable for all, in order to enhance scientific collaboration and information sharing for the benefit of science and society” (UNESCO, 2021). According to UNESCO, open science, in addition to the above, “aims to open up the processes of the creation, evaluation, and communication of scientific knowledge to social actors beyond the traditional scientific community,” encompassing five key pillars: “open scientific knowledge, open scientific infrastructure, scientific communication, open engagement of societal actors, and open dialogue with other knowledge systems” (UNESCO, 2021).

Similarly, the International Science Council (ISC), as noted by Boulton (2021), views open science as science “that is open to scrutiny and challenge, and to the knowledge needs and interests of wider publics. Open science makes the record of science, its evolving stock of knowledge, ideas and possibilities accessible and free to all, irrespective of geography, gender, ethnicity or financial circumstance. It makes the data and evidence of science accessible and re-usable by all, subject to constraints of safety, security and privacy. It is open to engagement with other societal actors in the common pursuit of new knowledge, and to support humanity in achieving sustainable and equitable life on planet Earth” (Boulton, 2021).

Recognizing the importance of open science for the global development of society, and emphasizing that open science “facilitates sharing and collaboration, thereby accelerating the discovery process, improving research quality, and making science more impactful and central to human and societal development” (Evropska komisija, s. a.), the European Commission highlights the following open science practices: early and open sharing of research through preregistration, registered reports, data deposition in shared repositories, and the publication of preprint versions of papers; open collaboration within the scientific community and with other knowledge producers and users; enabling immediate and unrestricted open access to scientific publications, research data, models, algorithms, software, protocols, notes, workflows, and

ishodima) u skladu s FAIR principima (engl. Findable, Accessible, Interoperable, and Reusable – pronalazljivo, dostupno, interoperabilno i ponovo upotrebljivo); promovisanje uključivanja javnosti u istraživanje i inovacije, jačanje građanske nauke i povećanje povjerenja javnosti u nauku (Evropska komisija, s. a.).

Širina shvatanja samog koncepta otvorene nauke, koji se kreće od osiguravanja pristupa naučnim informacijama, preko uspostavljanja infrastruktura koje omogućavaju neometanu razmjenu naučnih informacija i/ili pratećih metapodataka, do aktivnog sudjelovanja društva u tim procesima te, u konačnici, i u samim procesima naučnoistraživačke djelatnosti, uvjetovala je razgranatu i bogatu taksonomiju otvorene nauke. Tako je još 2014. godine unutar inicijative Facilitating Open Science Training for European Research započeta izrada FOSTER taksonomije, a već 2015. godine Pontika et al. predložili su njen prvi oblik. Taksonomija je sadržavala sljedeće kategorije: otvoreni pristup, otvoreni podaci, otvoreno istraživanje, evaluacija, politike i alati. Primarne kategorije dalje su razgranate na pripadajuće potkategorije, s namjerom lakše sistematizacije elemenata otvorene nauke, pri čemu je izvorna FOSTER taksonomija otvorene nauke ažurirana tokom vremena te je poslužila i kao osnova za izradu drugih taksonomija otvorene nauke (npr. Baumgartner, 2019; Silveira et al., 2021).

Otvorena nauka očito na međunarodnom nivou predstavlja vrlo značajnu agendu koju je pratilo, pored navedenog, i pokretanje različitih inicijativa, te donošenje brojnih preporuka ili deklaracija. Počevši od Budimpeštanske inicijative (2001) i Berlinske deklaracije o otvorenom pristupu naučnom znanju (2003),<sup>1</sup> kojima se precizira, sugerira i podstiče značaj osiguravanja otvorenog pristupa naučnim informacijama, zatim Pariške deklaracije o otvorenim obrazovnim sadržajima (2012),<sup>2</sup> koja podstiče otvorenost u kontekstu obrazovnih sadržaja, preko napora pojedinih vlada da reguliraju slobodni, neometani, otvoreni pristup znanju, istraživačkim podacima i infrastrukturi, kroz uspostavljanje i definiranje pravnih propisa, jasno se mogu pratiti naponi usmjereni k implementaciji otvorene nauke u globalnom naučnoistraživačkom prostoru te i u užem evropskom prostoru, u kojem planovi, programi i

all other research outputs; ensuring the verifiability and reproducibility of research results; responsible management of research outputs (publications, data, and other outcomes) in accordance with the FAIR principles (Findable, Accessible, Interoperable, and Reusable); promoting public engagement in research and innovation, strengthening citizen science, and increasing public trust in science (Evropska komisija, s. a.).

The concept of open science encompasses a broad spectrum, ranging from ensuring access to scientific information, establishing infrastructures that facilitate the seamless exchange of scientific data and associated metadata, to fostering active societal participation in these processes, and ultimately, in the research activities themselves. This expansive understanding has led to a correspondingly rich and branched taxonomy of open science. In 2014, the Facilitating Open Science Training for European Research (FOSTER) initiative began developing the FOSTER taxonomy, and by 2015, Pontika et al. proposed its first formal version. The taxonomy comprised six primary categories: open access, open data, open research, evaluation, policies, and tools. These primary categories were further subdivided into subcategories to facilitate the systematic organization of open science elements. Over time, the original FOSTER taxonomy has been updated and has also served as a foundation for the development of other open science taxonomies (e.g., Baumgartner, 2019; Silveira et al., 2021).

Open science clearly represents a highly significant agenda at the international level, which has been accompanied not only by abovementioned but also by the launch of various initiatives and the adoption of numerous recommendations and declarations. Beginning with the Budapest Open Access Initiative (2001) and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003),<sup>1</sup> which specify, advocate, and promote the importance of ensuring open access to scientific information, and the Paris Declaration on Open Educational Resources (2012),<sup>2</sup> which encourages openness in the context of educational content, through efforts by individual governments to regulate free, unrestricted, and open access to knowledge, research data, and infrastructure through the establishment and defini-

<sup>1</sup> Detaljnije: *Berlinska deklaracija o otvorenom pristupu naučnom znanju*. [http://eprints.rclis.org/4571/1/prijevod\\_berlinske\\_deklaracije.pdf](http://eprints.rclis.org/4571/1/prijevod_berlinske_deklaracije.pdf)

<sup>2</sup> Detaljnije: *Pariška deklaracija o otvorenim obrazovnim sadržajima*. <https://unesdoc.unesco.org/ark:/48223/pf0000246687/PDF/246687eng.pdf.multi>

<sup>1</sup> For more information, see: *Berlinska deklaracija o otvorenom pristupu naučnom znanju*. [http://eprints.rclis.org/4571/1/prijevod\\_berlinske\\_deklaracije.pdf](http://eprints.rclis.org/4571/1/prijevod_berlinske_deklaracije.pdf)

<sup>2</sup> For more information, see: *Pariška deklaracija o otvorenim obrazovnim sadržajima*. <https://unesdoc.unesco.org/ark:/48223/pf0000246687/PDF/246687eng.pdf.multi>

sl. poput Horizon 2020,<sup>3</sup> Horizon Europe,<sup>4</sup> Plana S (2018),<sup>5</sup> Evropskog oblaka za otvorenu nauku (engl. *European Open Science Cloud*, EOSC)<sup>6</sup> sugeriraju opredijeljenost Evropske unije da daje podršku implementaciji otvorene nauke.

Istovremeno, u bosanskohercegovačkom kompleksnom okruženju, ne postoje aktuelne zasebne politike ili strategije razvoja otvorene nauke u Bosni i Hercegovini, a koje imaju oznaku nacionalnih.

Na nivou Bosne i Hercegovine, posljednja je donesena, sada već zastarjela, Strategija razvoja nauke u Bosni i Hercegovini: 2017–2022: revidirani okvirni dokument (22/18), u kojoj je, nedetaljno, u poglavlju 6, pod sekcijom F) obuhvaćen “Otvoren pristup rezultatima istraživanja finansiranih iz javnih sredstava”, s pojašnjenjem, između ostalog, da “Naučno-istraživačke institucije treba da garantuju pristup rezultatima istraživanja i publikacijama koje su finansirane iz javnih sredstava”, kao i da “Promocija otvorenog pristupa naučnim rezultatima će se mjeriti brojem naučnih radova koji spadaju u kategoriju otvorenog pristupa znanju i podrazumijevaju Zlatni otvoreni pristup u kojem su rezultati istraživanja dostupni svima bez naknade i Zeleni otvoreni pristup<sup>7</sup> koji se temelji na pristupu rezultatima istraživanja na osnovu godišnje pretplate za bazu podataka.”<sup>8</sup>

Ipak, u Bosni i Hercegovini, naprimjer na nižim nivoima vlasti, donose se drugi, s otvorenom naukom povezani dokumenti, pa se tako, primjerice, kao jedan od posljednjih, u Kantonu Sarajevo donio prednacrt *Strategije za razvoj nauke u Kantonu Sarajevo 2025–2028*, koji u dijelu koji se odnosi na unapređenje sistema finansiranja naučnoistraživačkog rada (Strateški fokus 2) kao buduće aktivnosti izdvaja i one koje se odnose na usmjera-

tion of legal frameworks, clearly demonstrate ongoing initiatives aimed at implementing open science in the global research landscape. Within the more specific European context, plans, programs, and frameworks such as Horizon 2020,<sup>33</sup> Horizon Europe,<sup>4</sup> Plan S (2018),<sup>5</sup> and the European Open Science Cloud (EOSC)<sup>6</sup> indicate the European Union’s commitment to supporting the implementation of open science.

At the same time, within the complex context of Bosnia and Herzegovina, there are currently no distinct national-level policies or strategies for the development of open science.

At the national level in Bosnia and Herzegovina, the most recent framework document, now outdated, is the Science Development Strategy in Bosnia and Herzegovina: 2017–2022—Revised Framework Document (22/18). Within this strategy, open science is addressed only briefly in Chapter 6, Section F, under the heading “Open Access to Research Results Funded by Public Resources.” The strategy states, among other points, that research institutions are expected to ensure access to research results and publications financed through public funds. Furthermore, it specifies that the promotion of open access will be measured by the number of publications categorized as open access, including both the Gold Open Access model, where research results are freely available to all, and the Green Open Access model,<sup>7</sup> which provides access to research results via annual subscription databases.<sup>8</sup>

At subnational levels, however, more recent initiatives have begun to address open science more explicitly. For instance, the draft Science Development Strategy for the Sarajevo Canton 2025–2028 includes, under Strategic Focus 2 on improving research funding systems, plans to

<sup>3</sup> Detaljnije: *Horizon 2020*. [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en)

<sup>4</sup> Detaljnije: *Horizon Europe*. [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en)

<sup>5</sup> Detaljnije: *Plan S*. <https://www.coalition-s.org/>

<sup>6</sup> Detaljnije: *European Open Science Cloud (EOSC)*. [https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc_en)

<sup>7</sup> Zlatni otvoreni pristup predstavlja model objavljivanja u otvorenom pristupu u kojem se rad odmah po objavljivanju nalazi u otvorenom pristupu. S druge strane, zeleni model predstavlja model otvorenog pristupa u kojem se rad objavljuje / arhivira u npr. institucionalnom repozitoriju, uz karakterističan embargo period koji definiraju izdavačke politike. Hibridni model obuhvata kombinirani model otvorenog pristupa koji karakteriše izvjestan broj radova koji su dostupni u otvorenom pristupu i onih koji iziskuju plaćanje, odnosno pretplatu. Detaljnije: *Otvorena znanost*, s. a.

<sup>8</sup> Detaljnije: *Strategija razvoja nauke u Bosni i Hercegovini: 2017–2022. Službene novine BiH*, br. 22/18. <http://www.sluzbenenovine.ba/page/akt/aKohz4nh78h77t85FLQx8=>

<sup>3</sup> For more information, see: *Horizon 2020*. [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en)

<sup>4</sup> For more information, see: *Horizon Europe*. [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en)

<sup>5</sup> For more information, see: *Plan S*. <https://www.coalition-s.org/>

<sup>6</sup> For more information, see: *European Open Science Cloud (EOSC)*. [https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/open-science/european-open-science-cloud-eosc_en)

<sup>7</sup> Gold open access represents a publishing model in which an article is made openly accessible immediately upon publication. In contrast, the Green model refers to an open access approach in which the article is published or archived, for example in an institutional repository, subject to an embargo period defined by the publisher’s policies. The Hybrid model encompasses a combined form of open access, characterized by a certain number of articles that are freely available and others that require payment or subscription. For more information, see: *Otvorena znanost*, s. a.

<sup>8</sup> For more information, see: *Strategija razvoja nauke u Bosni i Hercegovini: 2017–2022. Službene novine BiH*, br. 22/18. <http://www.sluzbenenovine.ba/page/akt/aKohz4nh78h77t85FLQx8=>

vanje finansijskih sredstava “u skladu s principima otvorene nauke” s pojašnjenjem da bi ta sredstva “trebalo usmjeravati u skladu sa principima otvorene nauke, stimuliranja saradnje više institucija i različitih disciplina s obzirom da multidisciplinarni pristupi u nauci omogućavaju najbolje domete u targetiranju problema savremenog društva, uključujući naročito međunarodnu saradnju pojedinaca i institucija.”<sup>9</sup>

Strategija kao jedan od prioriteta (1.3) također izdvaja “Unapređenje postojećih i usvajanje nedostajućih pravnih okvira” (i s njom povezanu Mjeru 1.3.1, “Usvojiti ključne dokumente i politike/pravilnike koji se odnose na otvoreni pristup, prava intelektualne svojine, zaštitu podataka, povjerljivost, odgovornost i načine korištenja istraživačke infrastrukture”<sup>10</sup>), dok se prioritet 1.4. Strategije odnosi pak na “Praćenje istraživanja i upravljanje podacima”.<sup>11</sup>

Imajući na umu da su i stavovi i mišljenja sudionika visokoškolskog obrazovanja o otvorenoj nauci važna komponenta planiranja i implementacije otvorene nauke na javnim visokoškolskim ustanovama, ovo istraživanje se fokusira na ispitivanje stavova studenata informacijskih nauka prema otvorenoj nauci, odnosno identifikaciju faktora koji bi prema stavovima studenata mogli uticati na (ne)uspješnost implementacije otvorene nauke u prostoru bosanskohercegovačkog visokoškolskog obrazovanja.

## 2. Prikaz literature

Kompleksnost otvorene nauke, kao koncepta koji obuhvata različite segmente, uvjetovala je i raznolikost istraživačkih tema u oblasti. Neke od njih fokusirane su na sagledavanje otvorenog pristupa naučnim informacijama (McGrath, 2002; Chan & Costa, 2005), odnosno i na razvoj otvorenog pristupa i njegov uticaj na naučnu komunikaciju (Bjdrk, 2017; Hebrang Grgić, 2015), ili pak na važne odgovornosti bibliotekara u implementaciji otvorene nauke, počevši, između ostalog, od njihove uloge u zagovaranju i podizanju svijesti o otvorenoj nauci, što FOSTER<sup>12</sup> prepoznaje kao jednu od njihovih značajnih odgovornosti, ili u izradi strategija, poli-

direct financial resources “in accordance with the principles of open science.” The draft clarifies that such funding should be allocated to foster collaboration among multiple institutions and disciplines, recognizing that multidisciplinary approaches in science enable the most effective solutions to contemporary societal challenges, including international collaboration among individuals and institutions.<sup>9</sup>

The Strategy also identifies, as one of its priorities (1.3), the “Improvement of existing and adoption of missing legal frameworks,” along with the associated Measure 1.3.1, which calls for the “Adoption of key documents, policies, and regulations related to open access, intellectual property rights, data protection, confidentiality, accountability, and the use of research infrastructure.”<sup>10</sup> Priority 1.4 of the strategy focuses on “Research monitoring and data management.”<sup>11</sup>

Considering that the attitudes and opinions of higher education participants regarding open science constitute an important component of planning and implementing open science within public higher education institutions, this study focuses on examining the attitudes of information science students toward open science. Specifically, it aims to identify factors that, according to students, may influence the (un)successful implementation of open science within the context of higher education in Bosnia and Herzegovina.

## 2. Literature Review

The complexity of open science, as a concept encompassing various facets, has also shaped the diversity of research topics in the field. Some studies focus on exploring open access to scientific information (McGrath, 2002; Chan & Costa, 2005), while others examine the development of open access and its impact on scientific communication (Bjdrk, 2017; Hebrang Grgić, 2015). Additionally, research highlights the crucial responsibilities of librarians in implementing open science, including advocacy and raising awareness, recognized by FOSTER<sup>12</sup> as one of their key role, as well as the development of

<sup>9</sup> Dalje se u prednacrtu Strategije pojašnjava da “(...) u skladu sa ovim principima, također je neophodno unaprijediti i procese podrške nauci, istraživanju i razvoju u smislu povećanja vidljivosti i transparentnosti u procesu podrške, ali i u procesima praćenja realizacije i sagledavanja rezultata.” *Strategija za razvoj nauke Kantona Sarajevo: 2025–2028: prednacrt*, str. 40. [https://mon.ks.gov.ba/sites/mon.ks.gov.ba/files/2024-07/Strategija%20za%20razvoj%20nauke\\_prednacrt.pdf](https://mon.ks.gov.ba/sites/mon.ks.gov.ba/files/2024-07/Strategija%20za%20razvoj%20nauke_prednacrt.pdf)

<sup>10</sup> Ibid., 53.

<sup>11</sup> Ibid.

<sup>12</sup> Detaljnije: FOSTER, s. a.

<sup>9</sup> Furthermore, the draft Strategy explains that “(...) in accordance with these principles, it is also necessary to improve the processes of supporting science, research and development in terms of increasing visibility and transparency in the support process, as well as in the processes of monitoring implementation and assessing results.” *Strategija za razvoj nauke Kantona Sarajevo: 2025–2028: prednacrt*, p. 40. [https://mon.ks.gov.ba/sites/mon.ks.gov.ba/files/2024-07/Strategija%20za%20razvoj%20nauke\\_prednacrt.pdf](https://mon.ks.gov.ba/sites/mon.ks.gov.ba/files/2024-07/Strategija%20za%20razvoj%20nauke_prednacrt.pdf)

<sup>10</sup> Ibid., 53.

<sup>11</sup> Ibid.

<sup>12</sup> For more details, see: FOSTER, s. a.

tika otvorene nauke, na što su IFLA (2021)<sup>13</sup> i ALA (2021)<sup>14</sup> pored ostalog, skrenule pažnju.

Uloga biblioteka u otvorenoj nauci ogleda se ne samo kroz njihovo učešće u izgradnji i održavanju infrastruktura i/ili edukacije o načinima korištenja izvora i podataka dostupnih u otvorenom pristupu (Allard et al., 2005; Liu & Liu, 2023; Bailey, 2005; Crow, 2002; Marinclin, 2024) već i kroz učešće, između ostalog, u primjeni praksi i politika vezanih i za otvorene istraživačke podatke (Pasquetto et al., 2017). U tom smislu, složenost i brojnost zadataka biblioteka, odnosno bibliotekara, u implementaciji otvorene nauke, kao koncepta koji je utemeljen na osiguravanju otvorenog pristupa izvorima, sadržajima, istraživačkim podacima, edukativnim materijalima, softveru, koji je vezan za otvorene institucionalne repozitorije, otvorene metodologije i evaluaciju, na jednom mjestu pokušala je okupiti i Radna grupa LIBER-a za digitalne vještine bibliotečkog osoblja i istraživača,<sup>15</sup> sagledavajući vještine bibliotečkog osoblja (i istraživača) u ovim procesima kroz četiri ključna područja: FAIR podatke, građansku nauku, integritet istraživanja, naučno izdavaštvo te metrike i nagrade.

Osim spomenutih istraživanja, pojedina istraživanja povezana s konceptom otvorene nauke fokusirala su se i na ispitivanje stavova sudionika visokoškolskog obrazovanja, kao i istraživača, prema otvorenoj nauci, korištenjem tehnika kvantitativne i/ili kvalitativne metodologije.

Primjerice, Adeyemi et al. (2025) pažnju su posvetili percepciji visokoškolskih bibliotekara o izvorima dostupnim u otvorenom pristupu i njihovoj upotrebi u odabranim visokoškolskim bibliotekama u Nigeriji, otkrivajući da su visokoškolski bibliotekari mišljenja da izvori u otvorenom pristupu smanjuju troškove, odnosno pomažu ekonomsku održivost tih biblioteka. Percepciji i osviještenosti bibliotekara iz Pakistana, između ostalog i o modelima otvorenog pristupa, pažnju su posvetili Sultan i Rafiq (2021), konstatujući nešto nižu osviještenost bibliotekara o naprimjer zlatnom, zelenom i dijamantnom tipu otvorenog pristupa, a Santos-Hermosa i Boté-Vericad (2024) pak percepciji visokoškolskih bibliotekara iz Španije prema otvorenoj nauci, ispitujući (pored ostalog) i njihove stavove oko toga koji su osnovni pokretači i prepreke otvorene nauke. U tom smislu, u dijelu njihova istraživanja, koji je uključivao i fokus grupu, kao glavne prepreke bibliotekari su izdvojili, naprimjer, nedostatak svijesti ili pak treninga.

open science strategies and policies, as emphasized by IFLA (2021)<sup>13</sup> and ALA (2021).<sup>14</sup>

Libraries' role in open science extends beyond participating in the creation and maintenance of infrastructure or providing education on the use of open access resources and data (Allard et al., 2005; Liu & Liu, 2023; Bailey, 2005; Crow, 2002; Marinclin, 2024). It also includes active engagement in the implementation of practices and policies related to open research data (Pasquetto et al., 2017). In this regard, the LIBER Working Group on Digital Skills for Library Staff and Researchers<sup>15</sup> has addressed the complexity and range of tasks that libraries (and librarians in particular) face in implementing open science. Open science, as a concept, is based on ensuring open access to resources, content, research data, educational materials, and software, and encompasses open institutional repositories, methodologies, and evaluation practices. The group examined the skills of library staff (and researchers) in these processes across four key areas: FAIR data, Citizen science, Research integrity, Scholarly publishing and Metrics and rewards.

In addition to the previously mentioned studies, some research related to the concept of open science has also focused on examining the attitudes of higher education participants, including researchers, towards open science, employing quantitative and/or qualitative methodological approaches.

For instance, Adeyemi et al. (2025) examined academic librarians' perceptions of open access resources and their use in selected Nigerian universities, finding that librarians viewed these resources impacting cost reductions and supporting economic sustainability. Sultan & Rafiq (2021) explored Pakistani librarians' awareness of open access models, noting relatively low familiarity with the gold, green and diamond open access models. Similarly, Santos-Hermosa & Boté-Vericad (2024) studied Spanish academic librarians' perceptions of open science, including their views on its main drivers and barriers. In focus group discussions, librarians highlighted key obstacles such as limited awareness and insufficient training.

Regarding researchers' perceptions, Melero and Navarro-Molina (2020) investigated researchers' attitudes toward practices of sharing, reusing and ensuring open access to research data in the field of food technology. Their study revealed, among other findings, that researchers recognize the benefits of

<sup>13</sup> Detaljnije: IFLA, 2021.

<sup>14</sup> Detaljnije: ALA, 2021.

<sup>15</sup> Detaljnije: LIBER, 2020.

<sup>13</sup> For more details, see: IFLA, 2021.

<sup>14</sup> For more details, see: ALA, 2021.

<sup>15</sup> For more details, see: LIBER, 2020.

Kada su percepcije istraživača u pitanju, istraživačke Melero i Navarro-Molina (2020) o stavovima istraživača o praksama dijeljenja, ponovne upotrebe i osiguravanja otvorenog pristupa istraživačkim podacima u oblasti prehrambenih tehnologija otkriva, između ostalog, da istraživači prednosti otvorenog dijeljenja istraživačkih podataka prepoznaju u omogućavanju ponovljivosti istraživanja, povećavanju vjerovatnoće citiranja rada te ispunjavanju zahtjeva finansijera, ali i većim mogućnostima za saradnju i tome slično.

Donaldson i Koepke (2022), s druge strane, analizirali su stavove istraživača / naučnika iz pet različitih disciplina (geologija, računarstvo, hemija, ekologija i neuronauka) o upravljanju podacima i njihovom značaju za istraživanje i nauku, navodeći da su, između ostalog, učesnici kao problematična područja identifikovali kontrolu kvaliteta metapodataka i potrebnu obuku o upravljanju podacima.

Slično, kada je edukacija o otvorenoj nauci u pitanju, Sousa et al. (2025) proveli su sveobuhvatno istraživanje s namjerom identificiranja praksi otvorene nauke na visokoškolskoj ustanovi u Portugalu, zaključivši da su među učesnicima principi otvorene nauke bili široko prihvaćeni, međutim, kao glavna prepreka identificiran je nedostatak edukacije o otvorenoj nauci, u prvom vidu nedostatak obuke oko objavljivanja sadržaja u otvorenom pristupu.

Dok su Ferguson et al. (2023) u svom istraživanju na uzorku autora koji su objavljivali u deset najcitiranijih časopisa i doktoranata s dvadeset najbolje rangiranih sjevernoameričkih odsjeka iz oblasti ekonomije, političkih nauka, psihologije i sociologije, pored ostalog, uočili pretežno naklonjene stavove ispitanika prema upotrebi praksi otvorene nauke, Rodriguez (2014) u svom istraživanju o poznavanju otvorenog pristupa među sudionicima akademske zajednice koji su doktori nauka i njihovim stavovima prema objavljivanju u otvorenom pristupu otkriva osviještenost o objavljivanju u otvorenom pristupu među svim dobnim grupama, pri čemu za grupe mlađe životne dobi bilježi veći postotak objavljivanja u otvorenom pristupu.

Osim na ispitivanje percepcija istraživača ili visokoškolskih bibliotekara u prostoru visokoškolskog obrazovanja, pojedina istraživanja fokusirala su se i na ispitivanje stavova studenata o pojedinim segmentima otvorene nauke. Tako u smislu stalno rastućih troškova visokoškolskog obrazovanja, uključujući troškove neophodne za pribavljanje obavezne ili preporučene literature, ispitivali su se stavovi studenata prema udžbenicima dostupnim u otvorenom pristupu, odnosno otvoreni obrazov-

open data sharing in enabling research reproducibility, increasing the likelihood of citations, meeting funder requirements and fostering greater opportunities for collaboration.

Donaldson and Koepke (2022), on the other hand analysed the attitudes of researchers/scientists from five different disciplines (geology, computer science, chemistry, ecology and neuroscience) regarding data management and its significance for research and science. They reported that participants identified problematic areas, including metadata quality control and the need for training in data management.

Similarly, regarding education in open science, Sousa et al. (2025) conducted a comprehensive study to identify open science practices at a higher education institution in Portugal. They found that the principles of open science were widely accepted among participants; however, the main barrier was a lack of education on open science, particularly insufficient training on publishing content in open access.

In a related study, Ferguson et al. (2023) examined authors publishing in the ten most-cited journals and doctoral students from the twenty top-ranked North American departments in economics, political science, psychology, and sociology. They found that respondents generally held favourable attitudes toward adopting open science practices. Similarly, Rodriguez (2014), investigating awareness of open access among doctoral-level academics and their attitudes toward open access publishing found that doctoral-level academics were generally aware of open access across all age groups, with younger academics more frequently publishing in open access. Beyond exploring the perceptions of researchers and academic librarians, some studies within higher education have also examined students' attitudes toward various aspects of open science. In the context of the ever-increasing costs of higher education, including expenses necessary for acquiring required or recommended literature, studies have examined students' attitudes toward textbooks available through open access, or more broadly, open educational resources (Delimont et al., 2016; Cuttler, 2019; Howard & Whitmore, 2020). Related research has explored the extent to which students' use of open educational resources improves their performance, specifically the grades they receive in individual courses (Colvard et al., 2018), as well as how participation in MOOCs (Massive Open Online Courses) is associated with students' learning strategies (Al Murshidi et al., 2025).

In this regard, for example, the study conducted by Angelopoulou, Hodhod & Perez (2022) showed

ni sadržaji (Delimont et al., 2016; Cuttler, 2019; Howard & Whitmore, 2020), a s tim u vezi i to u kojoj mjeri upotreba otvorenih obrazovnih sadržaja od strane studenata poboljšava rezultate, odnosno ocjene koje studenti dobivaju iz pojedinih predmeta (Colvard et al., 2018), ili kako je upotreba MOOC-ova (engl. *Massive Open Online Course*), masovnih online otvorenih kurseva, povezana sa strategijama učenja studenata (Al Murshidi et al., 2025).

U tom pogledu, naprimjer, istraživanje Angelopoulou, Hodhod i Perez (2022) je pokazalo da studenti s većom motivacijom za učenje doživljavaju otvorene obrazovne sadržaje kao bolje izvore od tradicionalnih udžbenika (u poređenju sa studentima s nižom motivacijom za učenje), a istraživanje Hallam, Newman i Bangert (2025), u dijelu koji se odnosi na fokus grupu sa studentima, o njihovim stavovima o otvorenim obrazovnim sadržajima, otkrilo je čak povezanost otvorenih obrazovnih sadržaja sa stavovima studenata prema nastavnicima; naime, "studenti su izjavili da bi nastavno osoblje koje koristi otvorene obrazovne sadržaje doživljavali kao brižnije i da bi se osjećali cjenjenijim kao studenti" (Hallam et al., 2025: 76).

Načini na koji koriste / pretražuju izvore dostupne u otvorenom pristupu, kao i stavovi studenata o objavljivanju vlastitih sadržaja u otvorenom pristupu, također su bili predmetom pojedinih studija. Scott i Craig (2025) u svojoj studiji, koja je podrazumijevala davanje zadatka studentima da napišu rad koristeći isključivo izvore u otvorenom pristupu, identificirali su, naprimjer, da se prepreke s kojima su se studenti suočavali u tom procesu odnose i na "dodatno utrošeno vrijeme za provjeru dobivenih izvora informacija ili nedostatak dostupnih istraživanja relevantnih za njihov zadatak" (Scott & Craig, 2025: 6).

S druge strane, u svom istraživanju Chen i Hendricks (2023) također su prepoznali izvjesne prepreke s kojima se studenti susreću prilikom pak objavljivanja svojih radova u otvorenom pristupu. Naime, studenti su zamoljeni da rade studije slučaja u obliku otvorenih obrazovnih sadržaja, s namjerom da ih kasnije, ako žele, podijele na institucionalnoj Wiki platformi, kao i da im pri tome dodijele otvorenu licencu za dalju diseminaciju. Od ukupno 126 studenata koji su učestvovali u istraživanju, 34 njih je izjavilo da su odlučili svoje studije slučaja ne objaviti javno. Zabrinutost zbog kvaliteta rada bila je najčešće navođen razlog za ovu odluku, a potom osjećaj ranjivosti, kao i briga za vlastitu digitalnu reputaciju, što prema autorima "sugerira da bi zabrinutost studenata oko kvaliteta rada mogla biti povezana sa strahom od dijeljenja netačnih informacija

that students with higher learning motivation perceive open educational resources as better sources than traditional textbooks, compared to students with lower learning motivation. Similarly, Hallam, Newman & Bangert (2025), in the section of their study focusing on a student focus group and their attitudes toward open educational resources, found a connection between the use of open educational resources and students' perceptions of instructors. Specifically, "students reported that teaching staff who use open educational resources would be perceived as more caring, and that they would feel more valued as students" (Hallam et al., 2025: 76).

The ways in which students use or search for open access resources, as well as their attitudes toward publishing their own content in open access, have also been the focus of several studies. For instance, in their study, Scott & Craig (2025) assigned students the task of writing a paper using only open access sources. They found that the challenges students faced during this process included "the additional time required to verify the information obtained from sources or the lack of available research relevant to their assignment" (Scott & Craig, 2025: 6).

On the other hand, Chen & Hendricks (2023) also identified certain barriers that students encounter when publishing their own work in open access. In their study, students were asked to create case studies in the form of open educational resources, with the option to later share them on an institutional Wiki platform and assign an open license for broader dissemination. Out of 126 participating students, 34 reported that they chose not to make their case studies publicly available. Concern about the quality of their work was the most frequently cited reason for this decision, followed by feelings of vulnerability and concern for their digital reputation. According to the authors, this "suggests that students' concerns about the quality of their work may be linked to a fear of sharing incorrect information and/or how they might be perceived by others" (Chen & Hendricks, 2023: 31).

In the context of Bosnian Herzegovinian research, to the best of our knowledge, no studies in the field of information science have examined students' attitudes toward open science or any of its specific components. Existing research on open science has focused, for example, on the role of academic libraries within the system of scholarly communication (Khattab & Hajdarpašić, 2019), as well as on the services provided by academic libraries during the COVID-19 pandemic, including those related to open educational resources (Hajdarpašić et al.,

i/ili načinom na koji bi ih drugi mogli percipirati” (Chen & Hendricks, 2023: 31).

Unutar bosanskohercegovačkog istraživačkog područja, shodno našim saznanjima, nije bilo istraživanja iz oblasti informacijskih nauka o stavovima studenata prema otvorenoj nauci, odnosno nekom od njenih segmenata. Postojeća istraživanja u pogledu otvorene nauke fokusirala su se na, naprimjer, ulogu visokoškolskih biblioteka u sistemu naučne komunikacije (Khattab & Hajdarpašić, 2019), ili pak usluge visokoškolskih biblioteka u vremenu COVID-19 pandemije, kojima su obuhvaćene i one koje se odnose na naprimjer otvorene obrazovne sadržaje (Hajdarpašić et al., 2021). Također, istraživanja u užem prostoru visokog obrazovanja Univerziteta u Sarajevu (UNSA) pažnju su posvetila trendovima u pogledu naučnog izdavaštva u otvorenom pristupu (Hajdarpašić & Dizdar, 2023) ovoga Univerziteta u Bosni i Hercegovini, u okviru kojih se objavljuju naučni časopisi, ali i naučne monografije i druga vrsta građe u otvorenom pristupu<sup>16</sup> (Grebović et al., 2023), ali i, primjerice, uslugama visokoškolskih biblioteka UNSA povezanim s otvorenim obrazovnim sadržajima (Adilović, 2022; Hajdarpašić et al., 2023).

Kao doprinos rečenim nepoznanicama, u pripremi ovoga istraživanja o stavovima studenata informacijskih nauka prema otvorenoj nauci izabrali smo fokus grupu kao primarnu istraživačku metodu zbog toga što se zasniva na fenomenološkom pristupu te pruža informacije koje generiraju nove istraživačke hipoteze. Budući da u Bosni i Hercegovini nisu do sada ispitani stavovi studenata prema otvorenoj nauci na sistematičan način, provedena je fokus grupa s ciljem opisivanja i tumačenja iskustava učesnika, prikupljanja novih spoznaja te boljeg razumijevanja mišljenja ispitanika bez polaznih hipoteza.

### 3. Metodologija

U cilju prikupljanja podataka o stavovima studenata informacijskih nauka prema otvorenoj nauci provedena je tehnika kvalitativne metodologije. U fokus grupi učestvovalo je pet studenata treće i četvrte godine dvopredmetnog studija informacijskih nauka i druge studijske grupe (iz oblasti književnosti i jezika) na Univerzitetu u Sarajevu – Filozofskom fakultetu. Fokus grupa je održana u mjesecu maju 2025. godine i trajala je devedeset minuta, uz poštivanje svih etičkih pravila. Snimanje razgovora, nakon dobivene saglasnosti studenata, započelo je po završetku njihovog predstavljanja te je učesnicima

2021). Additionally, studies within the higher education context of the University of Sarajevo (UNSA) have examined trends in open access scholarly publishing at the university (Hajdarpašić & Dizdar, 2023), encompassing the publication of scientific journals, monographs, and other types of open access materials<sup>16</sup> (Grebović et al., 2023), as well as, for instance, the services of UNSA academic libraries related to open educational resources (Adilović, 2022; Hajdarpašić et al., 2023).

As a contribution to the gaps in knowledge, in the preparation of this study on the attitudes of information science students toward open science, we selected focus groups as the primary research method. This choice was made because focus groups are grounded in a phenomenological approach and provide insights that can generate new research hypotheses. Since, to date, the attitudes of students in Bosnia and Herzegovina toward open science have not been systematically examined, a focus group was conducted with the aim of describing and interpreting participants’ experiences, gathering new insights, and achieving a better understanding of respondents’ perspectives without predefined hypotheses.

### 3. Methodology

To gather data on the attitudes of information science students towards open science, a qualitative methodology technique was employed. Five students in their third and fourth years of a double-major program in Information science and another study group (Literature and Languages) at the University of Sarajevo – Faculty of Philosophy participated in the focus group. The focus group was held in May 2025 and lasted ninety minutes, adhering to all ethical guidelines. Recording of the discussion began after obtaining the students’ consent and following their introductions and participants were guaranteed anonymity during the analysis of the collected data. The conversation was recorded using the open-source tool Audacity,<sup>17</sup> while the transcription was carried out partially with the help of the open-source software Whisper AI,<sup>18</sup> with additional verification performed through listening and manual note-taking due to language-specific considerations.

Following transcription, a thematic analysis of the collected responses was conducted, with the data subsequently organized into categories according to

<sup>16</sup> Vidjeti: *Otvoreni pristup na Univerzitetu u Sarajevu*. <https://otvoreni pristup.unsa.ba/>

<sup>16</sup> For more details, see: *Otvoreni pristup na Univerzitetu u Sarajevu*. <https://otvoreni pristup.unsa.ba/>

<sup>17</sup> For more details, see: *Audacity*. <https://www.audacityteam.org/>

<sup>18</sup> For more details, see: *Whisper*. <https://openai.com/index/whisper>

zagarantirana anonimnost prilikom analize dobivenih podataka. Razgovor je sniman alatom otvorenog koda Audacity,<sup>17</sup> dok je transkripcija razgovora izvršena djelimično uz pomoć softvera otvorenog koda Whisper AI-a,<sup>18</sup> pri čemu je, s obzirom na specifičnosti jezika, urađena i dodatna provjera, preslušavanjem te bilježenjem.

Nakon transkripcije izvršena je tematska analiza dobivenih odgovora, koji su nakon toga grupisani u kategorije odgovora s obzirom na učestalost njihovog pojavljivanja. Budući da istraživanje ima za cilj ispitati stavove studenata informacijskih nauka prema otvorenoj nauci, prilikom analize nisu korištene unaprijed definirane sheme kodova, nego su induktivnim pristupom i manualno dodijeljeni kodovi koji su nastali iz dobivenih podataka, odnosno razvijeni nakon analize na osnovu sadržaja transkripta, na način da odražavaju osnovno značenje izjava. Fokus grupa je ciljano provedena sa studentima informacijskih nauka, zbog njihove ekspertnosti, što je ujedno i ograničenje našeg pilot istraživanja. Dobiveni rezultati ne pružaju nam informacije o tome kakvi su stavovi studenata drugih studijskih grupa, ali rezultati do kojih smo došli vrijedan su nam izvor informacija u kreiranju skale za mjerenje stavova.

U ispitivanju stavova studenata informacijskih nauka prema otvorenoj nauci, definirala su se sljedeća istraživačka pitanja (IP):

1. Kako studenti definišu i doživljavaju otvorenu nauku?
2. Koje prednosti i nedostatke studenti prepoznaju u kontekstu otvorene nauke u obrazovnom procesu?
3. Prema mišljenju studenata, ko bi i kada u obrazovnom procesu trebao educirati o otvorenoj nauci?
4. Kakav je stav studenata o objavljivanju njihovih radova u otvorenom pristupu?
5. Koje prepreke studenti izdvajaju za efikasnu implementaciju otvorene nauke u prostoru visokog obrazovanja?
6. Kakvi su stavovi studenata o budućnosti otvorene nauke u visokom obrazovanju na području Federacije Bosne i Hercegovine?

#### 4. Rezultati i diskusija

Izdvojeni ključni pojmovi, shodno izjavama učesnika, grupisani u šire tematske cjeline, donose se i diskutiraju u nastavku prema ranije postavljenim istraživačkim pitanjima.

the frequency of occurrence. Given that the aim of this study was to explore the attitudes of information science students toward open science, no pre-defined coding schemes were applied. Instead, an inductive, manual coding approach was employed, with codes emerging directly from the data and developed based on the content of the transcripts, ensuring that they accurately reflected the underlying meaning of participants' statements. The focus group was intentionally conducted with information science students due to their subject-matter expertise, which also constitutes a limitation of this pilot study. While the findings do not provide insight into the attitudes of students from other study programs, they offer a valuable foundation for the development of a scale to measure attitudes.

Following research questions (RQs) were formulated:

1. How do students define and perceive open science?
2. Which advantages and disadvantages do students perceive regarding open science in the educational process?
3. According to students, who should provide education on open science and at what stage in the educational process?
4. What are students' attitudes toward publishing their work in open access?
5. What obstacles do students identify for the effective implementation of open science in higher education?
6. What are students' perspectives on the future of open science in higher education in the Federation of Bosnia and Herzegovina?

#### 4. Results and Discussion

The key concepts identified, based on the participants' statements, were grouped into broader thematic categories and are presented and discussed below in accordance with the previously formulated research questions.

<sup>17</sup> Detaljnije: *Audacity*. <https://www.audacityteam.org/>

<sup>18</sup> Detaljnije: *Whisper*. <https://openai.com/index/whisper>

## 1. Kako učesnici definišu i doživljavaju otvorenu nauku?

Studenti doživljavaju otvorenu nauku kao koncept koji omogućava jednakost u kontekstu obrazovanja, koja se ostvaruje kroz otvoren, neograničen pristup znanju, koje je primarno u službi razvoja pojedinca i društva. Za studente je otvorena nauka: “digitalna renesansa”, “model prevazilaženja fizičkih granica”, “dijeljenje znanja”, “nadograđivanje znanja”, “vrlo značajna za istraživače”. Ovim izjavama su dodijeljeni odgovarajući kodovi u Tabeli 1, ispod.

Kategorizacija dobivenih navoda pokazuje da učesnici fokus grupe otvorenu nauku vežu uz jednakost / pristupačnost (u kontekstu osiguravanja pristupa izvorima za učenje i obrazovanje) (40%), transformaciju / napredak unutar obrazovanja i nauke (40%) te uz razvoj / inovaciju u nauci i pripadajućim oblastima (20%) (Tabela 2).

Ključni odgovori poput “znanje nije privilegija” te “znanje treba biti besplatno” ukazuju na demokratsku komponentu unutar obrazovanja. Za studente otvorena nauka obuhvata i proces demokratske i otvaranja znanja svima, odnosno daje mogućnost dolaska do naučnih spoznaja svim zainteresovanim licima, što je osnov individualnog razvoja.

Vežući otvorenu nauku za pojmove poput obrazovanja, znanja, u kontekstu istraživanja i nauke, može se zaključiti kako je studenti definiraju posmatrajući informacije kroz prizmu naučne informacije, a obrazovanje, odnosno istraživanje, u konceptima naučne komunikacije. Na tom tragu, studenti otvorenu nauku doživljavaju unutar globalne dimenzije – učenje i proces obrazovanja, ali i umjetnosti, nisu lokalnog karaktera, već širi i sveobuhvatniji globalni konstrukt koji otvorena nauka nudi.

To govori u prilog tome da studenti imaju pozitivan stav prema otvorenoj nauci, povezujući je i s individualnim razvojem pojedinca, ali i napretkom društva, u najširem smislu te riječi. Ovakvi pozitivni stavovi studenata prema otvorenoj nauci odgovaraju primjerice onima koje su predstavili Scott i Craig (2025), iako dolaze izvan bosanskohercegovačkog konteksta, u dijelu koji se odnosi na otvoreni pristup, koji je jedan od temeljnih segmenata otvorene nauke i koji omogućava dostupnost i razmjenu (naučnih) informacija na globalnom nivou.

## 2. Koje prednosti i nedostatke učesnici prepoznaju u kontekstu otvorene nauke u obrazovnom procesu?

Odgovori studenata ukazuju na to da studenti posmatraju otvorenu nauku, a osobito njen segment – otvoreni pristup informacijama i znanju, kao kon-

## 1. How do students define and perceive open science?

Students perceive open science as a concept that enables equality in the context of education, achieved through open and unrestricted access to knowledge, which primarily serves the development of both the individual and society. For the students, open science is described as a “digital Renaissance,” a “model for overcoming physical boundaries,” “knowledge sharing,” “knowledge enhancement,” and “highly significant for researchers.” These statements have been assigned the corresponding codes, as presented in Table 1 below.

The categorization of the obtained statements shows that focus group participants associate open science with equality/accessibility (in the context of ensuring access to learning and educational resources) (40%), transformation/progress within education and science (40%), and scientific development/innovation (20%) (Table 2).

Key responses such as “knowledge should not be a privilege” and “knowledge should be free” point to a democratic component within education. For students, open science encompasses both the process of democratization and the openness of knowledge to all, providing access to scientific insights for anyone interested, which forms the basis for individual development.

By associating open science with concepts such as education and knowledge, in the context of research and science, it can be concluded that students define it by perceiving information through the lens of scientific knowledge, and education or research within the framework of scientific communication. In this regard, students experience open science within a global dimension—learning and the educational process, along with the arts, are not confined to a local context, but rather form a broader, more inclusive global framework facilitated by open science.

This indicates that students hold a positive attitude toward open science, associating it both with individual development and with society progress in the broadest sense. Such positive student attitudes toward open science correspond, for example, to those presented by Scott & Craig (2025), even though their findings come from outside the Bosnian Herzegovinian context, particularly regarding open access—a fundamental component of open science that enables the availability and exchange of (scientific) information on a global scale.

**Tabela 1.** Kategorizacija dobivenih navoda  
Table 1. Categories of participants' statements

Student	Odgovor Response	Kod(ovi) / Teme Codes / Themes
1	Znanje nije privilegija Knowledge should not be a privilege	Jednakost / Pristupačnost Equality / Accessibility
2	Znanje treba biti besplatno Knowledge should be free	Jednakost / Pristupačnost Equality / Accessibility
3	Digitalna renesansa Digital Renaissance	Transformacija / Napredak Transformation / Progress
4	Prevazilaženje fizičkih granica Model for overcoming physical boundaries	Transformacija / Napredak Transformation / Progress
5	Značajna za istraživače Highly significant for researchers	Razvoj nauke / Inovacija Scientific Development / Innovation

**Tabela 2.** Distribucija stavova prema otvorenoj nauci  
Table 2. Distribution of attitudes toward open science

Kako učesnici definišu i doživljavaju otvorenu nauku? How do participants conceptualize and perceive open science?	
Equality / Accessibility Jednakost / Pristupačnost	40%
Transformation / Progress Transformacija / Napredak	40%
Scientific Development / Innovation Razvoj nauke / Inovacija	20%

**Tabela 3.** Kategorizacija dobivenih navoda  
Table 3. Categories of participants' statements

Student	Odgovor	Kod(ovi) / Teme
1	Mogućnost većeg izbora radova Wider selection of publications via open access	Dostupnost
2	Pristup novijim člancima Access to the most recent publications	Recentnost
3	Veća preglednost [sadržaja] Greater clarity [of content]	Dostupnost
4	Ne moramo plaćati pretplate No subscription fees required	Dostupnost
5	Radovi u otvorenom pristupu su dostupni [uvijek] Uninterrupted access to open access publications	Dostupnost

cept koji omogućava pristup velikom broju radova, recentnim naučnim sadržajima, što kroz tradicionalne načine pristupa sadržajima koji nisu u otvorenom pristupu, prema stavovima studenata, nije moguće ostvariti. Studenti su stava da otvorena nauka često nudi sadržaje koji su ažurirani, recentni i u skladu sa savremenim trendovima naučne komunikacije te da su zbog toga što su u digitalnom obliku ti sadržaji lakše dostupni (Tabela 3).

Kako prikazuje Tabela 4, studenti otvorenu nauku ponajviše cijene zbog dostupnosti sadržaja (80%), što smatraju njenom ključnom prednošću. Također, značajnim se pokazuje i pristup aktuelnoj literaturi te savremenim obrazovnim, naučnim i stručnim izvorima.

Takvi dobiveni rezultati odgovaraju dosta i onima koji su predstavljeni u istraživanju Ayeni (2017) o percepciji studenata o časopisima dostupnim u otvorenom pristupu, dok je i slično istraživanje Bala i Partap (2018) utvrdilo da studenti i nastavno osoblje koriste izvore dostupne u otvorenom pristupu najprije zbog njihove dostupnosti, odnosno mogućnosti da ih konsultiraju bilo kada.

Razmatrajući prednosti otvorene nauke u kontekstu dostupnosti sadržaja, učesnici fokus grupe koristili su izraze poput “naučni časopis”, “naučni rad”, “članak”, što sugerira kako dostupni sadržaj vežu uz formalne nositelje naučne komunikacije, pa se može zaključiti da njihovo shvatanje prednosti otvorene nauke u kontekstu dostupnosti sadržaja podrazumijeva prvenstveno naučni / obrazovni sadržaj.

S druge strane, analizirajući odgovore studenata u kontekstu nedostataka otvorene nauke, a nakon njihovog grupisanja u tematske cjeline, dodijeljeni su sljedeći kodovi, koji sadrže osnovno značenje dobivene poruke: tačnost i stručnost radova, problem autorskih prava i prava intelektualnog vlasništva, koja obuhvataju i etično postupanje i priznavanje autorstva, citiranje (Tabela 5).

Rezultati analize (Tabela 6) pokazuju kako najveći nedostatak koji studenti uočavaju kada je riječ o otvorenoj nauci predstavlja autorskoppravna regulativa (80%), a zatim tačnost / stručnost radova (20%). Iako je primjetan pozitivan stav studenata prema otvorenoj nauci, posebno prema otvorenom pristupu naučnim informacijama, može se uočiti kako su studenti svjesni potencijalnih rizika otvorenih sadržaja. Ovi rizici iskazani su kroz pouzdanost kvalitete informacije i kredibiliteta izvora – autora, kao i kroz potencijalnu zloupotrebu informacija u kontekstu neetičkog postupanja prema sadržaju u otvorenom pristupu, u prvom vidu plagijarizma.

## 2. Which advantages and disadvantages do students perceive regarding open science in the educational process?

Student responses indicate that they perceive open science, particularly open access to information and knowledge, as a concept that provides access to many publications and recent scientific content—access that, according to the students, is often not possible through traditional, non-open access channels. Students believe that open science frequently offers up-to-date content aligned with contemporary trends in scientific communication, and that, being in digital form, such content is more easily accessible (Table 3).

As shown in Table 4, students value open science primarily for the accessibility of content (80%), which they consider its key advantage. Access to current literature as well as contemporary educational, scientific, and professional resources is also perceived as significant.

These findings correspond closely with those reported by Ayeni (2017) regarding students’ perceptions of open access journals, while a similar study by Bala and Partap (2018) found that both students and academic staff primarily use open access resources due to their availability, that is, the possibility to consult them at any time.

When considering the advantages of open science in the context of content accessibility, focus group participants used terms such as ‘scientific journal,’ ‘research paper,’ and ‘article,’ suggesting that they associate open access content with formal carriers of scientific communication. It can therefore be concluded that their understanding of the advantages of open science, in terms of content accessibility, primarily pertains to scientific and educational materials.

On the other hand, analysing students’ responses in the context of the disadvantages of open science, and after grouping them into thematic categories, the following codes were assigned, reflecting the core meaning of the obtained statements: accuracy and quality of publications, issues of copyright and intellectual property rights, including ethical conduct and proper attribution and citation (Table 5).

The results of the analysis (Table 6) show that the main disadvantage identified by students regarding open science is copyright regulation (80%), followed by the accuracy and scholarly quality of publications (20%).

Although students generally hold a positive attitude toward open science, particularly regarding

**Tabela 4.** Distribucija stavova o prednosti otvorene nauke  
**Table 4.** Distribution of participant perspectives on the advantages of open science

Koje su prednosti otvorene nauke? What are the advantages of open science?	
Dostupnost Accessibility	80%
Recentnost Recency	20%

**Tabela 5.** Kategorizacija dobivenih navoda  
**Table 5.** Categories of participants' statements

Student	Odgovor	Kod(ovi) / Teme
1	Može uploadovati svoj rad bilo ko Anyone can upload their paper	Tačnost / Stručnost radova Accuracy / Quality of publications
2	Plagijarizam i plagijati Plagiarism and Plagiarized Works	Autorska prava / Zaštita intelektualnog vlasništva Copyright and intellectual property rights
3	Kako citirati radove How to cite publications	Autorska prava / Zaštita intelektualnog vlasništva Copyright and intellectual property rights
4	Navođenje autora i elemenata Citing Authors and Bibliographic Details	Autorska prava / Zaštita intelektualnog vlasništva Copyright and intellectual property rights
5	Mora se navesti autor... The author must be cited	Autorska prava / Zaštita intelektualnog vlasništva Copyright and intellectual property rights

**Tabela 6.** Distribucija stavova o nedostacima otvorene nauke  
**Table 6.** Distribution of participant perspectives on the disadvantages of open science

Koji su nedostaci otvorene nauke? What are the disadvantages of open science?	
Autorskoppravna regulativa Copyright and intellectual property rights	80%
Tačnost / stručnost radova Accuracy / Quality of publications	20%

**Tabela 7.** Kategorizacija dobivenih navoda o nivoima obrazovanja na kojima treba početi edukacija o otvorenoj nauci  
**Table 7.** Categorization of received statements about the levels of education at which education about open science should begin

Student	Odgovor Response	Kod(ovi) / Teme Codes / Themes
1	Tokom 6. ili 7. razreda osnovne škole, onaj prelaz... During the 6th or 7th grade of primary school, at that transitional stage...	Rani početak (osnovna škola) Early-stage introduction (primary education)
2	Taj period, jer u tom periodu djeca počinju dobivati zadatke That period, as it is during this time that children begin to receive tasks	Rani početak (osnovna škola) Early-stage introduction (primary education)
3	Ali otvorena nauka baš za nivo zrelosti srednje škole But open science precisely suited to the maturity level of secondary-school students	Srednja škola High school
4	Nešto u osnovnoj, a ostalo u srednjoj školi... Some of it in primary school and the rest in high school	Kombinovani pristup A combined approach
5	Rano, u školi osnovnoj još... Early on, while still in primary school...	Rani početak (osnovna škola) Early-stage introduction (primary education)

**Tabela 8. Distribucija stavova – edukacija o otvorenoj nauci**  
**Table 8. Distribution of participant perspectives—education on open science**

Edukacija o otvorenoj nauci Education on open science	
Rani početak (osnovna škola) Early-stage introduction (primary education)	60%
Srednja škola High school	20%
Kombinovani pristup A combined approach	20%

Anonimni karakter otvorenih sadržaja učesnici fokus grupe također identificiraju kao jedan od nedostataka, kao i problem autorskopravne regulative, gdje studenti kao rješenje vide adekvatnu edukaciju o pravima autora i izdavača te edukaciju o načinima poštivanja akademskih načela i navođenja – citiranja korištenih informacijskih izvora.

Kritično promišljanje i svjesnost o navedenim elementima povezanim s otvorenim pristupom kod studenata može biti rezultat činjenice da je riječ o studentima informacijskih nauka, koji su tokom studija osviješteni o prednostima i nedostacima, prirodi i karakteru Mreže i mrežnih, odnosno digitalnih sadržaja, istovremeno i o postojanju alternativnih modela zaštite autorskih prava, poput korištenja Creative Commons (CC) licence<sup>19</sup> ili sličnih licenci. Ove licence, koje se vežu uz načine zaštite autorskih prava, predstavljaju ključni element osiguravanja otvorenog pristupa informacijama, dozvoljavajući autorima da definiraju način na koji će se koristiti njihovo djelo. To podrazumijeva definiranje uvjeta korištenja, distribucije, remiksovanja sadržaja shodno definiranoj licenci. Iako fleksibilne u svojim zahtjevima, ove licence u službi su etičkog postupanja sa sadržajima u otvorenom pristupu i mehanizam su zaštite prava autora.

### 3. Prema mišljenju studenata, ko bi i kada u obrazovnom procesu trebao educirati o otvorenoj nauci?

Edukacija o otvorenoj nauci je kod svih studenata identificirana kao jedan od vrlo važnih koraka u implementaciji otvorene nauke u obrazovnom procesu, odnosno na visokoškolskim ustanovama. Iako dijele mišljenje o značaju edukacije o otvorenoj nauci, kao pretpostavki njene uspješne implementacije, učesnici imaju različite stavove o tome na kojem nivou obrazovanja bi trebalo započeti s edukacijom o otvorenoj nauci. Na osnovu odgovora učesnika, u tom pogledu, dodijeljeni su sljedeći kodovi: rani po-

open access to scientific information, it is evident that they are also aware of the potential risks associated with open content. These risks are expressed in terms of the reliability and quality of information, the credibility of sources and authors, as well as the potential misuse of information in the context of unethical conduct, primarily in the form of plagiarism.

Focus group participants also identified the anonymous nature of open content as a disadvantage, along with issues related to copyright regulations. As a potential solution, students suggested adequate education on authors' and publishers' rights, as well as training on adhering to academic principles and properly citing the information sources used.

Critical reflection and awareness of the elements associated with open access among students may result from the fact that they are students in Information science, who, during their studies, become familiar with the advantages and disadvantages, nature and characteristics of the Web and digital content. At the same time, they acquire an understanding of alternative copyright protection models such as the use of Creative Commons (CC)<sup>19</sup> licenses or similar licenses. These licenses, which relate to methods of copyright protection, constitute a key element in ensuring open access to information, allowing authors to define how their work may be used. This includes specifying the conditions for use, distribution and remixing of content in accordance with the chosen license. Although flexible in their requirements, these licenses serve the ethical use of open access content and act as a mechanism for protecting authors' rights.

### 3. According to students, who should provide education on open science and at what stage in the educational process?

Education on open science was identified by all students as one of the key steps in implementing open

<sup>19</sup> Detaljnije: *Creative Commons*. <https://creativecommons.org/>

<sup>19</sup> For more details, see: *Creative Commons*. <https://creativecommons.org/>

četak (osnovna škola), srednja škola, kombinovani pristup (Tabela 7).

Većina studenata smatra da ova edukacija treba započeti još u osnovnoj školi: “Tokom 6. ili 7. razreda osnovne škole”, jer “u tom periodu djeca počinju dobivati zadatke, a da nikad nisu dobili tačna uputstva kako da nađu tačne informacije”. Edukacija o pojedinim elementima otvorene nauke treba se realizovati u osnovnoj školi kao “edukacija oko pretraživanja informacija”, a ostali segmenti, prema mišljenju pojedinih studenata, trebali bi biti realizirani tokom srednjoškolskog obrazovanja (Tabela 8).

Učesnici su saglasni u mišljenju da ne postoje institucionalni okviri unutar formalnog obrazovanja koji se bave ovom problematikom, niti dijelovi kurikula; edukacije su rijetke i više su produkt individualnih napora, na različitim visokoškolskim ustanovama / fakultetima. U tom smislu, svi studenti identificiraju bibliotekare kao one koji su u obavezi da provode ove oblike edukacije, ali i koji posjeduju neophodne vještine educiranja o otvorenoj nauci, u najširem smislu te riječi, što posljedično može dodatno ojačati bibliotekare na njihovim pozicijama posredništva između korisnika i znanja.

Stavovi potvrđuju visoku osviještenost studenata o tome da bi, kao sudionici naučne komunikacije, kao “temeljni pokretači otvorene znanosti” (OECD, 2015: 12), biblioteke trebale aktivno sudjelovati ne samo u procesima oblikovanja, upravljanja i diseminacije naučnog znanja nego i u osvještavanju i u edukaciji svih sudionika visokoškolskog obrazovanja o konceptu otvorene nauke, nudeći raznolike edukacijske programe u tom kontekstu.

O kojem širokom spektru aktivnosti, odnosno podrške je riječ, svjedoči i sistematizovani pregled literature koji su predstavili Scotti et al. (2025), u kojem je mapiran angažman američkih visokoškolskih biblioteka u oblasti otvorene nauke, a koji pokazuje da te biblioteke u okviru svoje edukativne uloge nude brojne aktivnosti poput “radionica o upravljanju podacima, kodiranju, otvorenim procesima rada i naučnoj komunikaciji, istovremeno integrišući alate otvorenog koda i usmjeravajući upotrebu otvorenih licenci” (Scotti et al., 2025: 19). Uz to, da je edukatorska uloga biblioteka u implementaciji otvorene nauke jedna od ključnih uloga visokoškolskih bibliotekara (Vassilakaki & Papaconstantinou, 2014) i da se ne iscrpljuje samo u oblikovanju edukativnih sadržaja za studente, potvrđuje, pored spomenutog istraživanja Sousa et al. (2025), i iz našeg regiona istraživanje Montan i Aparac-Jelušić (2016) o ulozi visokoškolske biblioteke (Fakulteta za menadžment u turizmu i ugostiteljstvu u Opatiji) u na-

science within the educational process in higher education institutions. Although they share the view that education on open science is essential for its successful implementation, the participants expressed differing opinions regarding the educational level at which such instruction should begin. Based on participants’ responses, the following codes were assigned: Early introduction (primary school), High school and A combined approach (Table 7).

Most students believe that this type of education should begin already in primary school: “During the 6th or 7th grade of primary school”, because “at that age children start receiving assignments without ever having been given proper guidance on how to find accurate information.” Education on certain elements of open science should be implemented in primary school as “instruction on searching for information,” while other components, according to some students, should be introduced during secondary education (Table 8).

The participants agree that there are no institutional frameworks within formal education that address this issue, nor are there curricular components devoted to it; training opportunities are rare and stem largely from individual initiatives across different higher-education institutions and faculties. In this regard, all students identify librarians as those who are responsible for delivering such forms of education, as well as those who possess the necessary skills to provide instruction in open science in the broadest sense of the term, which may consequently further strengthen librarians in their roles as intermediaries between users and knowledge.

These perspectives confirm the high level of awareness among students that, as participants in scholarly communication and as “the fundamental drivers of open science” (OECD, 2015: 12), libraries should actively engage not only in the processes of shaping, managing and disseminating scientific knowledge, but also in raising awareness and educating all participants in higher education about the concept of open science, offering a range of educational programmes.

The wide range of activities and support is also evidenced by the systematic literature review presented by Scotti et al. (2025), which mapped the engagement of U.S. academic libraries in the field of open science. The review shows that these libraries, within their educational role, offer numerous activities such as “workshops on data management, coding, open workflows and scholarly communication, while simultaneously integrating open-source tools and guiding the use of open licenses” (Scotti

učnoj komunikaciji, koje je pokazalo da u kontekstu osiguravanja različitih programa edukativnog tipa u bibliotekama za nastavno osoblje, od 25 ispitanika, nastavnog osoblja, koji su učestvovali u intervjuu, “svega četvero ispitanika nije istaknulo potrebu za produbljanjem znanja, što zbog preopterećenosti informacijama, što zbog nepostojanja potrebe ili interesa” (Montan & Aparac-Jelušić, 2016: 38).

#### **4. Kakav je stav studenata o objavljivanju njihovih radova u otvorenom pristupu?**

Pojedini studenti imaju iskustva u objavljivanju sadržaja koje su kreirali, uglavnom iz oblasti književnosti, te su njihovi stavovi prema modelu objavljivanja njihovih radova različiti.

Tradicionalni model objavljivanja, objavljivanje sadržaja u štampanom obliku, prema mišljenju učesnika je adekvatniji za objavljivanje radova iz književnosti (“lično ja spremam knjigu da izdam i izabrala sam tradicionalni način izdavanja knjige samo zato što je meni lično bliži taj način, ja više volim čitati knjigu u fizičkom formatu, nego online”, “u svom okruženju imam dosta poznanika koji su zapravo pisci... to su mladi autori, to je posebno bilo zanimljivo... nisu željeli da im knjige budu u elektronskom izdanju”).

S druge strane, podrška objavljivanju sadržaja u otvorenom pristupu identificirana je kod studenata u kontekstu ponovljivosti rezultata naučnih istraživanja (“...pa ja bih iskreno sve stavila u otvorenom pristupu... ako ćemo gledati kroz naučno, samo tako se može nadograditi i onda neko iz druge nauke može nešto vidjeti, primijetiti i reći svoje”).

Pluralizam stavova studenata (uvjetno preferiranje tradicionalnog modela izdavaštva, te podrška otvorenom pristupu) može ukazivati na različit pristup tumačenju naučnih djela i odvajanju, odnosno razlikovanju takvih djela od onih nastalih u okvirima književnosti, gdje učesnici shvataju književna djela u kontekstu tradicionalnih modela objavljivanja kao prestiž, dok za objavljivanje djela koja imaju oznaku “naučnih” preferiraju otvoreni pristup, a zbog njihovog razumijevanja nauke kao sistematiziranog znanja, podložnog promjenama i provjerama.

Također, može se pretpostaviti da je ova razlika u stavovima studenata uzrokovana njihovim različitim obrazovnim usmjerenjima. Učesnici fokus grupe studiraju dvopredmetne studijske programe, odnosno, uz studij informacijskih nauka, pohađaju i studijske programe iz oblasti književnosti ili jezika, te biraju način objavljivanja njihovih radova u odnosu na vrstu sadržaja, a ne drugih kriterija ili razloga, u vezi s kojima su naprimjer, u ranije spomenu-

et al., 2025:19). Moreover, the role of libraries as educators in the implementation of open science is recognized as one of the key functions for academic librarians (Vassilakaki & Papaconstantinou, 2014), and it is not limited solely to the development of educational content for students. This is confirmed, in addition to the above-mentioned study by Sousa et al. (2025), by research from our region conducted by Montan and Aparac-Jelušić (2016) on the role of the academic library at the Faculty of Tourism and Hospitality Management in Opatija in scholarly communication. Their study demonstrated that, in the context of providing various educational programs for academic staff in libraries, out of 25 staff members interviewed, “only four respondents did not emphasize the need for deepening their knowledge, either due to information overload or due to lack of need or interest” (Montan & Aparac-Jelušić, 2016:38).

#### **4. What are students’ attitudes toward publishing their work in open access?**

Some students have experience in publishing content they have created, primarily in the field of literature, and their attitudes toward the model of publishing their work vary.

The traditional publishing model, i.e., publishing content in print form, is considered by participants to be more appropriate for literary works (“Personally, I am preparing a book to publish and I chose traditional method simply because it is closer to me”; “I prefer reading a book in physical format rather than online”, “In my environment, I know many acquaintances who are writers... these are young authors, which was particularly interesting... they did not want their books to be available in electronic format”).

On the other hand, support for publishing content in open access was identified among students in the context of the reproducibility of scientific research (“...honestly, I would put everything in open access... from a scientific perspective, that is the only way to build upon it and then someone from another field can see, notice and contribute their input”).

The plurality of students’ attitudes (conditional preference for the traditional publishing model alongside support for open access) may indicate a differentiated approach to interpreting scholarly works and distinguishing them from literary works. Participants perceive literary works within the context of traditional publishing models as a form of prestige, whereas they prefer open access for works labelled as ‘scientific,’ due to their understanding of science as systematized knowledge that is subject to change and evaluation.

tom istraživanju Chen i Hendricks (2023), studenti kao jedan od razloga odluke da ne objavljuju svoje radove u otvorenom pristupu naveli zabrinutost oko kvaliteta njihova rada i tome slično.

Studenti kao važne uslove za izbor modela objavljivanja njihovih radova navode i politike izdavača (“Ogromni profiti su... u pisanju radova i pregledavanju, ali ne sad da će zarađivati naučnici, koliko će sam izdavač zarađivati”), zatim problem finansiranja istraživanja (“Ako neko društvo, neka država, ne podržava finansijski svoje naučnike, naučnici onda neće imati izbora nego da onda na osnovu svog rada traže zaradu”) te i problem vrednovanja akademskih postignuća (“Izbjegavao bih one časopise koje su paywall. Jedini strah u kontekstu toga jeste ako bi sad domaća vlast stavila da ja moram objavljivati u nekim visokorangiranim časopisima, koji hoće da se sve njima plaća, da izdavači zarađuju više nego naučnici...”).

Politike izdavača reguliraju uvjete objavljivanja naučnoistraživačkih radova unutar časopisa, koje je u uskoj vezi s napredovanjem i vrednovanjem u naučnoistraživačkoj karijeri. Embargo izdavača predstavlja vrlo aktivnu prepreku kada je riječ o omogućavanju otvorenog pristupa naučnim informacijama. Izdavač može ograničiti autora na mogućnost objavljivanja u otvorenom pristupu na određeni period, s namjerom zaštite komercijalne pretplate. Time se osiguravanje otvorenog pristupa naučnim informacijama izmješta iz pozicije autora i autorove volje na poziciju izdavača.

Tako i Smederevac et al. (2020) zaključuju kako “zeleni otvoreni pristup podrazumijeva objavljivanje u časopisu za koji se plaća pretplata, ali autor ima pravo da arhivira svoje članke u digitalne repozitorijume (ili na svojoj internet stranici/blogu). Putem zlatnog otvorenog pristupa autori mogu objavljivati u svim elektronskim časopisima kojima je besplatan pristup, ali troškove pripreme za objavljivanje snose autori ili ustanove, a ne izdavač. U oba slučaja, izdavač može da zabrani pristup publikaciji dok ne protekne određeni, tzv. embargo period (najčešće 12, 24 ili 36 mjeseci) ili da potpuno zabrani elektronsko arhiviranje naučnih radova (tzv. bijeli put, eng. *white road*). Ovakva poslovna politika izdavačkih kuća prvenstveno je motivisana savremenim tokovima u izdavačkoj djelatnosti. S aspekta autorskopravne zaštite, poslovanje se zasniva na različitim ugovorima kojima autori, odnosno nosioci prava raspolazu svojim isključivim ovlašćenjima.” (Smederevac et al., 2020: 146)

Dakle, nerijetko se dešava da politike izdavača i embargo diktiraju sam proces objavljivanja, pa au-

It can also be assumed that this difference in students’ attitudes is influenced by their diverse educational backgrounds. Focus group participants are enrolled in double-major study programs; alongside studying Information science, they are also enrolled in study programs in Literature or Languages. They choose the method of publishing their work based on the type of content rather than other criteria or reasons. In contrast, for example, in the previously mentioned study by Chen & Hendricks (2023), students cited concerns about the quality of their work and similar factors as reasons for not publishing their work in open access.

Students identify publisher policies as an important factor in choosing the model for publishing their work (“The huge profits are... in writing and reviewing papers, but it’s not that the scientists will earn, it’s how much the publisher will make”), as well as the issue of research funding (“If a society, a state, does not financially support its scientists, then scientists will have no choice but to seek income based on their work”) and the evaluation of academic achievements (“I would avoid journals that are behind a paywall. The only concern in this context would be if the domestic authority required me to publish in high-ranking journals that charge for everything, so that publishers earn more than the scientists...”).

Publisher policies regulate the conditions for publishing research articles in journals, which are closely linked to career advancement and evaluation in research. Publisher embargoes represent a significant barrier to enabling open access to scientific information. A publisher may restrict an author’s ability to publish in open access for a certain period in order to protect commercial subscriptions. This shifts the provision of open access to scientific information from the author’s position and intent to that of the publisher.

Thus, Smederevac et al. (2020) conclude that “green open access entails publishing in a subscription-based journal, while the author retains the right to archive their articles in digital repositories (or on their own website/blog). Through gold open access, authors may publish in any electronic journal that provides free access, but the costs of preparing the publication are borne by the authors or their institutions, rather than by the publisher. In both cases, the publisher may restrict access to the publication until the expiration of a specified embargo period (typically 12, 24, or 36 months) or may entirely prohibit the electronic archiving of scholarly works (the so-called white route). Such business practices of pub-

tori, i pored volje za objavljivanjem u otvorenom pristupu, nisu u mogućnosti to realizovati odmah po objavljivanju njihovih istraživanja. Istovremeno, institucionalna podrška može izostati te dovesti istraživače u poziciju da djeluju prema uvjetima finansijera njihovih istraživanja.

Ostali odgovori studenata koreliraju s činjenicom da u Bosni i Hercegovini ne postoje nacionalne strategije koje bi podsticale istraživače da objavljuju u otvorenom pristupu, vrednujući takva nastojanja u kontekstu napredovanja u naučnoistraživačka, odnosno nastavnička zvanja, ali nerijetko i u kontekstu finansiranja istraživanja. Rješenje može biti u pribjegavanju objavljivanja radova u časopisima dostupnim u otvorenom pristupu, ali istovremeno, na institucionalnom nivou i kroz reguliranje politika, ovakve istraživače i njihova postignuća treba evaluirati ne samo kroz standardne mehanizme, odnosno metrike. Zagovornici otvorene nauke u tom smislu predlažu naprimjer altmetriju<sup>20</sup> naspram tradicionalnih metrika vrednovanja, kao način vrednovanja naučnog rada.

### **5. Koje prepreke studenti izdvajaju za efikasnu implementaciju otvorene nauke u prostoru visokog obrazovanja?**

Analizajući stavove studenata, identificirane su dvije grupe prepreka za implementaciju otvorene nauke na visokoškolskim ustanovama. Prva od njih okuplja tehničke, odnosno tehnološke barijere, koje obuhvataju različite alate i tehnološka rješenja za pristup izvorima. Unutar ove grupe identificirane su i poteškoće koje se odnose na nepostojanje i/ili neadekvatne edukacije oko upotrebe alata za pretraživanje informacija, korištenje i diseminaciju sadržaja u otvorenom pristupu, nedostatak tehničke i informacijske, odnosno digitalne pismenosti (“...ja bih lično uvela možda neke edukacije, jer mislim da ne možemo kriviti nekog ko ne zna zato što ne zna. Definitivno mu se treba ponuditi neka vrsta edukacije koja će olakšati sam proces pretraživanja”). Druga grupa prepreka, prema mišljenju studenata, vezana je i za autorskopravnu regulativu, pitanja autorskih i srodnih prava, odnosno intelektualnog vlasništva. Studenti su stava da je izuzetno dug period (70 godina od smrti autora) u kojem neko djelo prelazi u prostor javne domene, koju prepoznaju kao referalni korpus otvorene nauke.

U svojim stavovima studenti su iznova naglasili kako ne postoji sistemsko educiranje o otvorenoj nauci, načinima korištenja digitalnih alata i tehnologija, o licenciranju, vrstama licenci i slično, su-

lishing houses are primarily motivated by contemporary trends in the publishing industry. From the perspective of copyright protection, these practices are grounded in various agreements through which authors, or other rights holders, exercise their exclusive rights.” (Smederevac et al., 2020:146)

Consequently, it often happens that publisher policies and embargoes dictate the publication process itself, so that authors, despite their willingness to publish in open access, are unable to do so immediately upon the release of their research. At the same time, institutional support may be lacking, placing researchers in a position where they must act according to the conditions set by the funders of their research.

Students' responses correlate with the fact that in Bosnia and Herzegovina there are no national strategies encouraging researchers to publish in open access, nor frameworks that recognize such efforts in the context of advancement in research or teaching positions and often not even in the context of research funding. A potential solution may lie in publishing work in open access journals. However, at the institutional level, researchers and their achievements should also be evaluated not solely through standard mechanisms or traditional metrics. Advocates of open science, in this regard, suggest, for example, altmetrics<sup>20</sup> as an alternative to traditional evaluation metrics, as a means of assessing scientific work.

### **5. What obstacles do students identify for the effective implementation of open science in higher education?**

Analysing students' attitudes, two groups of barriers to the implementation of open science in higher education institutions were identified. The first group comprises technical or technological barriers, which include various tools and technological solutions for accessing sources. Within this group, difficulties related to the absence and/or inadequacy of training on the use of information retrieval tools, as well as the use and dissemination of open access content, were identified, alongside a lack of technical, information and digital literacy (“...personally, I would introduce some training, because I think we cannot blame someone for not knowing; they definitely need to be offered some kind of education that will facilitate the search process itself”). The second group of barriers, according to students, is related to copyright regulation, issues of authors' and related rights, or intellectual property. Students perceive the very long period (70 years after the author's death)

<sup>20</sup> Detaljnije: Evropska komisija, s. a.

<sup>20</sup> For more details, see: Evropska komisija, s. a.

gerirajući kreatorima obrazovnih politika da je za uspješnu implementaciju otvorene nauke u kontekstu bh. visokog obrazovanja neophodno oblikovati odgovarajuće edukacije sudionika visokog obrazovanja o otvorenoj nauci, odnosno njenim segmentima, u saradnji s bibliotekama.

### **6. Kakvi su stavovi studenata o budućnosti otvorene nauke u visokom obrazovanju na području Federacije Bosne i Hercegovine?**

Studenti imaju pozitivan stav kada je riječ o budućnosti otvorene nauke u visokom obrazovanju na području Federacije Bosne i Hercegovine (FBiH) te su mišljenja i kako postoji i razvijena svijest kod istraživača, odnosno naučnika o ovom pitanju (“... mislim da, što se tiče naučnika i istraživača, da imaju prilično dobru svijest, odnosno da ljudi idu u tom smjeru dostupnosti...”).

Prepreke u budućoj implementaciji otvorene nauke u tom prostoru vide u finansiranju (“problem je najčešće – financiranje... mislim da bi tu država trebala da podrži i naučnika i istraživača...”), a identificirajući biblioteku kao centralnu kariku u naučnoj komunikaciji (kao “mjesto gdje se okupljaju ideje, gdje ideje putuju, avionima, vozovima, ka drugim institucijama, tako da ta razmjena stalno funkcionira”), studenti smatraju kako je proces implementacije otvorene nauke u direktnoj vezi s poslovanjem biblioteke te da inicijative vezane za otvorenu nauku trebaju dolaziti iz pozicije bibliotekara, ali biti institucionalno realizovane.

Stavovi studenata informacijskih nauka prema budućnosti otvorene nauke sugeriraju i razvijenu svijest studenata, kao budućih profesionalaca, o njihovoj ulozi u naučnoj komunikaciji, u najširem smislu te riječi, gdje spremnost na promjene i aktivno sudjelovanje u njima prepoznaju kao odliku bibliotečko-informacijske profesije. Takvo što odgovara i drugim sličnim istraživanjima, koja su također utvrdila visok nivo osviještenosti studenata informacijskih nauka s drugih visokoškolskih ustanova o npr. primjer otvorenim obrazovnim sadržajima (Wiche & Ogunbodede, 2021) ili časopisima u otvorenom pristupu (Achugbue & Ogunbodede, 2025).

### **7. Zaključak**

Učesnici fokus grupe su koristili deskriptore s pozitivnom valencom, što sugerira da su njihove emocije prema otvorenoj nauci pozitivne, što pak korespondira s njihovim uvjerenjima i znanju o važnosti otvorene nauke.

Otvorena nauka za studente predstavlja “digitalnu renesansu”, preporod u kontekstu obrazovanja,

before a work enters the public domain (which they recognize as a reference corpus for open science) as a significant obstacle.

In their statements, students repeatedly emphasized that there is no systemic education on open science, education on the use of digital tools and technologies, licensing, types of licenses and similar topics. They suggest to educational policy makers that, for the successful implementation of open science within the context of higher education in Bosnia and Herzegovina, it is necessary to develop appropriate educational programs for participants in higher education in field of open science and its various components, in collaboration with libraries.

### **6. What are students' perspectives on the future of open science in higher education in the Federation of Bosnia and Herzegovina?**

Students hold a positive view regarding the future of open science in higher education within the Federation of Bosnia and Herzegovina (FB&H), and they also believe that researchers and scientists already possess a developed awareness on this matter (“...I think that, regarding scientists and researchers, they have quite a good awareness, that people are moving in the direction of accessibility...”).

The barriers to the future implementation of open science in this context are seen primarily in funding (“The problem is most often funding... I think the state should support both scientists and researchers...”). By identifying the library as a central hub in scientific communication (“... a place where ideas converge, where ideas travel by planes, trains, to other institutions, so that this exchange continuously functions”), students believe that the implementation of open science is directly linked to library management and that open science initiatives should originate from librarians while being institutionally supported.

The attitudes of Information science students regarding the future of open science also indicate a developed awareness among students, as future professionals, of their role in scientific communication in the broadest sense of the term. They recognize readiness for change and active participation in it as a characteristic of the library and information science profession. This aligns with similar studies, which have also found a high level of awareness among Information science students from other higher education institutions regarding, for example, open educational resources (Wiche & Ogunbodede, 2021) or open access journals (Achugbue & Ogunbodede, 2025).

ključni faktor transformacije obrazovnog i naučno-istraživačkog procesa u savremenom složenom informacijskom okruženju.

Prednosti otvorene nauke, poput dostupnosti i recentnosti sadržaja u otvorenom pristupu, predstavljaju centralnu komponentu učenja i obrazovanja za studente, u okruženju koje je u znaku spomenute “digitalne renesanse”; istovremeno, autorskoppravna regulativa u smislu zaštite autorskih i srodnih prava sadržaja u otvorenom pristupu, predstavlja primarnu prepreku koja prati implementaciju otvorene nauke, prema stavovima studenata.

Važan uslov za odgovarajuću implementaciju otvorene nauke studenti prepoznaju u edukaciji svih sudionika obrazovnog i naučnoistraživačkog procesa, koja treba biti institucionalnog karaktera, ali istovremeno usko vezana uz djelovanje bibliotekara. Prema stavovima većine studenata, bibliotekari su ti koji bi još od osnovne škole mogli započeti edukaciju korisnika o pretraživanju, identificiranju i korištenju izvora, a potom, u kasnijem periodu, i edukaciju o drugim segmentima otvorene nauke, a ujedno i informacijskoj i medijskoj pismenosti.

Kada su stavovi studenata oko objavljivanja njihovih radova u otvorenom pristupu u pitanju, zanimljivo je da studenti za objavljivanje svojih djela koja imaju oznaku “naučnih” preferiraju otvoreni pristup, dok radove iz oblasti književnosti (književna djela) preferiraju objavljivati u štampanom obliku, sugerirajući da studenti koji uz polje informacijskih nauka pohađaju i studijske programe iz humanističkih nauka (književnost, odnosno jezici) biraju način objavljivanja sadržaja u odnosu na vrstu sadržaja (“naučni” ili književni radovi), što dalje treba ispitati na većem uzorku ispitanika tog studijskog profila.

Dok kao glavne prepreke u implementaciji otvorene nauke u prostoru visokog obrazovanja studenti izdvajaju tehničke, odnosno tehnološke barijere, uključujući nepostojanje i/ili neadekvatne edukacije o otvorenoj nauci, ipak imaju i pozitivan stav prema budućnosti otvorene nauke u prostoru visokoškolskog obrazovanja u FBiH, iznova u tom pogledu, prepoznajući biblioteke i bibliotekare kao ključne partnere u uspješnoj implementaciji otvorene nauke.

U tom smislu, osim u oblikovanju edukacijskih programa, uz podršku biblioteka, rješenja prepoznaju i u izdvajanju više sredstava u nauku, a time i u otvorenu nauku – kroz izgradnju infrastrukture, podršku istraživačima koji nastoje objavljivati u otvorenom pristupu, reguliranje zakonskih propisa koji definiraju uvjete napredovanja, reguliranje politika izdavača i časopisa, sugerirajući kreatorima bh. obrazovnih politika da ulaganje u otvorenu nauku

## 5. Conclusion

The focus group participants used descriptors with positive valence, suggesting that their emotions toward open science are positive, which in turn corresponds to their beliefs and knowledge about the importance of open science.

For students, open science represents a “digital Renaissance”, a revival within the context of education and a key factor in transforming educational and research processes in today’s complex information environment.

The advantages of open science, such as the accessibility and recency of open access content, constitute a central component of students’ learning and education within this “digital Renaissance” environment. At the same time, copyright regulations aimed at protecting authors’ and related rights to open access content represent the primary obstacles accompanying the implementation of open science, according to students’ views.

Students identify the education of all participants in the educational and research process as an important condition for the proper implementation of open science; education that should be institutional in nature yet closely linked to the work of librarians. According to most students, librarians are the ones who could begin educating users as early as primary school on how to search for, identify and use information sources, and later provide education on other aspects of open science, as well as on information and media literacy.

Regarding students’ attitudes toward publishing their work in open access, it is noteworthy that students prefer open access for works labelled as ‘scientific,’ while they prefer to publish their literary works in printed form. This suggests that students who, in addition to the field of Information Science, are enrolled in study programs in the humanities (Literature or Languages) choose the mode of publication based on the type of content (“scientific” or literary works). This relationship should be further examined using a larger sample of students with this study profile combination.

While students identify technical and technological barriers, including the absence and/or inadequacy of education on open science, as the main obstacles to implementing open science in higher education, they nevertheless hold a positive outlook on the future of open science within the higher education sector in the FB&H. In this regard, they consistently recognize libraries and librarians as key partners in the successful implementation of open science.

u kontekstu visokog obrazovanja može dugoročno donijeti veliki broj pozitivnih promjena.

U cilju dodatne interpretacije te komparacije ovdje sumiranih rezultata istraživanja, a s obzirom na to da unutar bh. istraživačkog prostora nisu realizirana slična istraživanja, bilo bi korisno u nadolazećem periodu ispitati i stavove drugih studenata prema otvorenoj nauci, onih koji pohađaju studijske programe iz oblasti prirodnih, tehničkih i drugih nauka, u specifičnom bh. visokoškolskom okruženju, pri čemu su rezultati do kojih smo došli vrijedan izvor informacija u kreiranju skala za mjerenje stavova.

Osim što ovo istraživanje može poslužiti kao polazna tačka za komparativna istraživanja u okvirima i drugih akademskih disciplina, s namjerom sveobuhvatnijeg uvida u stavove studenata različitih naučnih oblasti, istovremeno, istraživanje može ponukati realizaciju srodnih nedostajućih istraživanja orijentiranih k ispitivanju stavova i drugih sudionika visokoškolskog obrazovanja, odnosno naučnoistraživačkog procesa, prema otvorenoj nauci, u cilju planiranja i oblikovanja odgovarajućih politika otvorene nauke na bh. visokoškolskim ustanovama.

In this sense, in addition to the development of educational programmes with the support of libraries, students also see solutions in allocating more funding to science and thus to open science through building infrastructure, supporting researchers who seek to publish in open access, regulating legal frameworks that define promotion criteria and regulating publisher and journal policies. They suggest to policymakers in Bosnia and Herzegovina that investing in open science within the context of higher education can yield a wide range of long-term positive outcomes.

For the purpose of further interpretation and comparison of the research results summarized here and given that similar studies have not been conducted within the Bosnian Herzegovinian research context, it would be useful in the upcoming period to examine the attitudes of other students toward open science, specifically those enrolled in study programmes in the natural sciences, engineering and other field within the BH-specific higher education environment. The results obtained in this study represent a valuable source of information for the development of scales to measure attitudes.

In addition to serving as a starting point for comparative studies within other academic disciplines, aimed at providing a more comprehensive insight into the attitudes of students from various scientific fields, this research may also encourage the conduct of related, yet currently lacking, studies focused on examining the attitudes of other participants in higher education and the research process toward open science, with the goal of planning and developing appropriate open science policies at Bosnian Herzegovinian higher education institutions.

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