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ABSTRACT.

Objective. The study aims to understand the impact of descriptive metadata in academic events. It focuses on the need for analytical frameworks that take into account the characteristics of the events and the interests of the participants.

Design/Methodology/Approach. The article focuses on academic event management and metadata quality based on user preferences and feedback. It conducted a survey among Ukrainian organizers and scholars between August and October 2022, analyzing the responses of 1,270 participants using descriptive statistics and qualitative analysis in RStudio.

Results/Discussion. The survey showed that most (over 84%) of organizers and academics are dissatisfied with the quality of metadata, with a third rating it as very bad. Frequent errors in metadata emphasized the need for better management, including a preference for using identifiers like ORCID and DOI and a preference for open access to information about academic events.

Conclusions. The results highlight the importance of developing specialized tools for metadata management and standardization of metadata elements in Ukraine to facilitate organization and participation in academic events at national and international levels.

Originality/Value. The study makes an important contribution to the understanding of descriptive metadata management in academic events in Ukraine, suggesting ways to improve efficiency in this area.

Keywords: academic events, conference management, descriptive metadata, Ukrainian legislation.

1. INTRODUCTION

Academic events (AEs) play a crucial role in disseminating scholarly knowledge and facilitating information exchange, networking, and collaboration among researchers. This study emphasizes the importance of qualitatively assessing metadata for documenting these events. The current research landscape is experiencing a surge in data volume due to improved recording methods, complex simulations, and the correlation of heterogeneous data sources. As the data complexity increases, the need for a specific and suitable data description becomes paramount. The existing data processing methods are reaching their capacity limit, and necessitating novel approaches for managing newer, more complex data. As emphasized by Hillmann and Westbrooks (2004), metadata are vital for cataloging, retrieving, and managing academic information, ensuring accessibility and value for diverse stakeholders. Gamble and Goble (2011) stress the responsibility of organizers in implementing parameters for the quality of AEs, considering quality a critical element in science. Academic conferences are viewed as communities contributing to ongoing professional development, requiring organizers to go beyond traditional formats. Examining the opinions of academic event organizers and participants on metadata for AEs is crucial for assessing event quality from different perspectives. The key to findability is metadata, which is essential for accessibility in research institutions, where responsibilities include collecting, managing, preserving, and disseminating information. Open standards, protocols, formats, and technologies should be employed, and institutions must ensure high data quality through curation. The development of scientific metadata for AEs is an important element of the country's research infrastructure. Unified metadata simplifies the processes of aggregating and collecting information on AEs, helps automate registration processes, and simplifies searches for both Ukrainian and foreign researchers. On the other hand, the system will serve as a tool to check providers of AEs, which will help to protect scientists from participation in unfair "predatory" events. When developing the system, special attention should be given to the compatibility (FAIR principles)

of the platform (Hauschke *et al.*, 2021). In conclusion, this study emphasizes the pivotal role of metadata in enhancing the quality, accessibility, and overall effectiveness of AEs in the evolving landscape of scholarly research.

In Ukraine, the science and education sector is undergoing substantial modernization driven by legislative initiatives to enhance the scientific process and elevate standards in specialist training and research. The need for mechanisms enabling remote access to databases and information resources has become a crucial development direction. Amidst Ukraine's integration into the international scientific community and the national plan for open science development (Government of Ukraine, 2022), effective organization and conduct of AEs are gaining prominence. This study focused on the qualitative registration and evaluation of AEs, emphasizing the optimal use of metadata, in line with IFLA (2017). The evaluation of AEs should encompass both quantitative and qualitative indicators reflecting the achievement of event goals and their impact on the academic community. Driscoll and Kraaykamp (2019) highlighted the necessity of developing and applying integrated methodologies for evaluating AEs based on their multidimensionality and contextual relevance.

This research analyses necessary descriptive metadata and qualitative characteristics for evaluating AEs, specifically examining the preferences and practices of organizers and researchers in Ukraine. This study aimed to identify the approaches, complexities, and needs of key stakeholders—event organizers and researchers involved in AEs—for forming a unified and effective system of AE registration in Ukraine. This study, based on the methodological framework proposed by Denzin and Lincoln (2011) and Flick (2018), seeks to improve the quality and accuracy of metadata for AEs. This study not only addresses current challenges in AE management but also contributes to the development of better curation methods, enhancing the understanding of key requirements and preferences of academic event participants for improved effectiveness in Ukraine. Therefore, researchers at different stages of their scientific activity need access to information about AEs that is relevant to their research interests and areas of research. Currently, there is no unified database of AEs in Ukraine, and information about conferences is usually posted on the websites of the organizing institutions. This situation makes the search for relevant AEs time-consuming. In addition, the lack of control and verification of AE organizers contributes to the creation and functioning of so-called "predatory" conferences (Auhunas *et al.*, 2022).

This study focused on exploring ways to improve the structure and use of metadata for identifying AEs. The main focus was to assess satisfaction with the existing registries for AEs and to identify opportunities for improving the quality of these events in Ukraine based on the opinions and requests of AE organizers and scholars. The main methodology of the study was quantitative analysis using an anonymous survey aimed at assessing descriptive AE metadata in Ukraine among AE scholars and organizers. This work also aimed to improve the quality of AE organization and planning and automation of AE registration processes in the country.

The study questions address the following research questions:

RQ1: What is the current state of academic event metadata in Ukraine?

RQ2: What are the key priorities of organizers and scholars of AEs in the context of metadata standardization in Ukraine?

RQ3: What methods and tools for collecting and analyzing AEs do organizers and researchers prefer?

RQ4: What are the requirements for metadata in different aspects of AEs?

This study is structured as follows: The introductory section provides an overview of AEs in Ukraine, delving into data management and the broader academic landscape. The sections titled "Ukrainian legislation on academic events" and "Academic events management" explore the structure and development of AE management in Ukraine, including an analysis of the legislative framework governing AEs. The "Methodology" section details the research methods employed, while the "Results" section presents the primary data collected from the questionnaire survey. The "Discussion and Conclusion" section examines the key findings of the study and draws overarching conclusions. Considering Ukraine's unique cultural and scientific characteristics, this study emphasizes the need for special attention to national and international standards in the metadata of AEs within the country.

2. ACADEMIC EVENTS IN UKRAINE: A BRIEF OVERVIEW

2.1 Ukrainian legislation on academic events

The legislative framework governing AEs in Ukraine is characterized by targeted, specific regulations that address key aspects of the field. Rather than encompassing a broad spectrum, these legal documents, primarily attachments, concentrate on distinct segments of activity in the science and education domain. The foundation of Ukraine's legislative system for science and education relies on pivotal laws and regulations that delineate standards, strategies, and control mechanisms. Within this framework, special emphasis is placed on laws guiding the organization and execution of scientific conferences and seminars, reflecting the evolving legislative landscape tailored to contemporary academic demands.

The Law of Ukraine "On Scientific and Scientific-Technical Activities" (No. 848-VIII, 26.11.2015) (Official Bulletin of the Verkhovna Rada of Ukraine, 2016) stands as a cornerstone legislative piece shaping the country's scientific and technical sector. This law significantly influences the orchestration of AEs, playing a pivotal role in advancing scientific progress. It covers several crucial areas: facilitating scientific travel, providing financial support for research endeavors, and offering grant support via the National Research Foundation of Ukraine, emphasizing the significance of these events for fostering scientific development and dissemination. Moreover, the Ministry of Education and Science of Ukraine (MESU) issued directives, such as the communication outlining plans for organizing AEs in 2015 (Institute for Educational Content Modernization), in compliance with the "Higher Education" Law (Official Bulletin of the Verkhovna Rada, 2014). This initiative ensures the participation rights of students and young scientists in congresses, forums, and conferences, detailing the specific requirements for inclusion in these events. The Ministry's guidelines also encompass instructions on organizing and conducting these events, addressing financial aspects and actively engaging educational institutions, students, and young scientists. The requirements for dissertations, as per the Ministry's order, mandate a detailed appendix listing the author's publications and the nature of their participation in AEs. However, a challenge arises as some researchers participate nominally in conferences by submitting abstracts without actual physical presence, potentially compromising the validation of their research. Clarifications on the mode of participation are necessary for the dissertation defense process. Furthermore, while the cabinet of ministers in Ukraine has introduced criteria for awarding academic degrees, there remains ambiguity regarding the recognition of publications in international AEs (Cabinet of Ministers of Ukraine, 2017). Equating publications in Ukrainian scientific journals to those in foreign journals for dissertation evaluation purposes has been proposed but lacks comprehensive guidelines. Regulations, such as the Resolution of the Cabinet of Ministers of Ukraine No. 1187, set conditions for educational activities, demanding scholarly productivity, including publications related to participation in conferences. Additionally, credits are assigned for participation and publication at conferences, workshops, and similar events, highlighting the government's acknowledgment of such academic engagements (National Agency of Ukraine on Civil Service, 2019). In healthcare, Resolution of the Cabinet of Ministers No. 725 mandates continuing professional development for healthcare professionals (Cabinet of Ministers of Ukraine, 2021). This requires providers to design curriculum specifics, outlining competencies, event structures, and control measures for educational events, in addition to scientific conferences, to foster lifelong professional growth among healthcare practitioners.

According to the order of the MESU (No. 40, 12.01.2017) "On Approval of Requirements for the Preparation of a Dissertation" (Ministry of Education and Science of Ukraine 2017), dissertations should contain an appendix that lists the author's publications and describes in detail the examination of the research results. The appendix should include the names, places and dates of relevant AEs, such as conferences, congresses, symposiums, workshops and schools, as well as the character of the author's participation. This requirement extends section 3.4.1.8 of the Requirements for the Preparation of Dissertations and Dissertation Abstracts (Bulletin of the Higher Attestation Commission of Ukraine, No. 9-10, 2011), which obliges applicants to list the AEs where their dissertation research was presented. However, it should be noted that many researchers, especially at conferences, participate only nominally, submitting abstracts and not being physically present at them, thus not confirming the validity of their research. Consequently, the requirement to indicate the mode of participation (physical presence, virtual, with or

without actual presentation) is relevant, although how this will be taken into account in the dissertation defense process has yet to be determined (Ministry of Education and Science of Ukraine 2017).

In addition, in the draft resolution of the Cabinet of Ministers of Ukraine "On Approval of the Procedure for Awarding Academic Degrees" (Cabinet of Ministers of Ukraine, 2017), no criteria for the approval of scientific results were initially established. However, the current version (Cabinet of Ministers of Ukraine, 2013) provides mandatory confirmation of the dissertation content at various AEs, including conferences and workshops. In addition, the preliminary requirements for the submission of doctoral dissertations are outlined, including the publication of a certain number of articles in peer-reviewed journals indexed in global scientometric databases such as Scopus or the Web of Science Core Collection; however, the specifics of publications submitted to international AEs are unclear (Biriukov *et al.*, 2017). Here, the guidelines for academic faculty recognition do not consider participation in AEs as part of the research validation process. This lack of consideration may prevent both early career and advanced researchers from participating in AEs. Another proposal of the cabinet of ministers of Ukraine (Cabinet of Ministers of Ukraine, 2016) is to equate publications in Ukrainian scientific journals included in international scientific databases, as recommended by the National Agency for Quality Assurance in Higher Education, with publications in foreign scientific journals on the subject of the dissertation, including those presented at international conferences.

Overall, Ukraine's legislative landscape, while emphasizing certain aspects of AEs, faces challenges in evaluating the true impact of participation in AEs for research validation across various domains. Clarifications and streamlined guidelines are necessary for the effective implementation and recognition of academic engagement.

2.2 Academic events management in Ukraine

The Ukraine has an extensive system of registered AEs that is maintained by various official institutions that hold relevant registries. Every year, the country hosts hundreds of conferences, workshops, congresses and symposiums, many of which are organized with the support of key scientific and educational organizations. Among them are the MESU, the Ministry of Health of Ukraine (MHU), and the National Academy of Sciences of Ukraine (NASU), which play important roles in developing plans, registries, and strategies for such events. It should be noted that until 2015, one of the leading providers of registered AEs was the Ukrainian Institute of Scientific and Technical Expertise and Information (UkrISTEI)*.

The management of the registered AEs in Ukraine is shown schematically in Figure 1. There are four main types of plans for organizing AEs in Ukraine: (1) Plans related to scientific conferences and workshops on higher education and science implemented under the MESU. This area covers a wide range of topics relevant to the needs of the educational sector and the scientific community. (2) Plans for international and national scientific conferences for higher education students, postgraduate students, and young scientists. These events include congresses, forums, conferences, and workshops aimed at supporting and developing young scientists, PhD students, and students. (3) A list of congresses, symposia, and scientific conferences supported by the MHU. These events are important for the development of medical science and healthcare in the country. (4) The list of AEs that were available in the database "Scientific and Technical Events of Ukraine", which was active until 2015. This database provides valuable information about various scientific and technical events in the country. These four approaches to organizing AEs play key roles in coordinating and supporting scientific activities in Ukraine, stimulating knowledge exchange, and promoting professional growth.

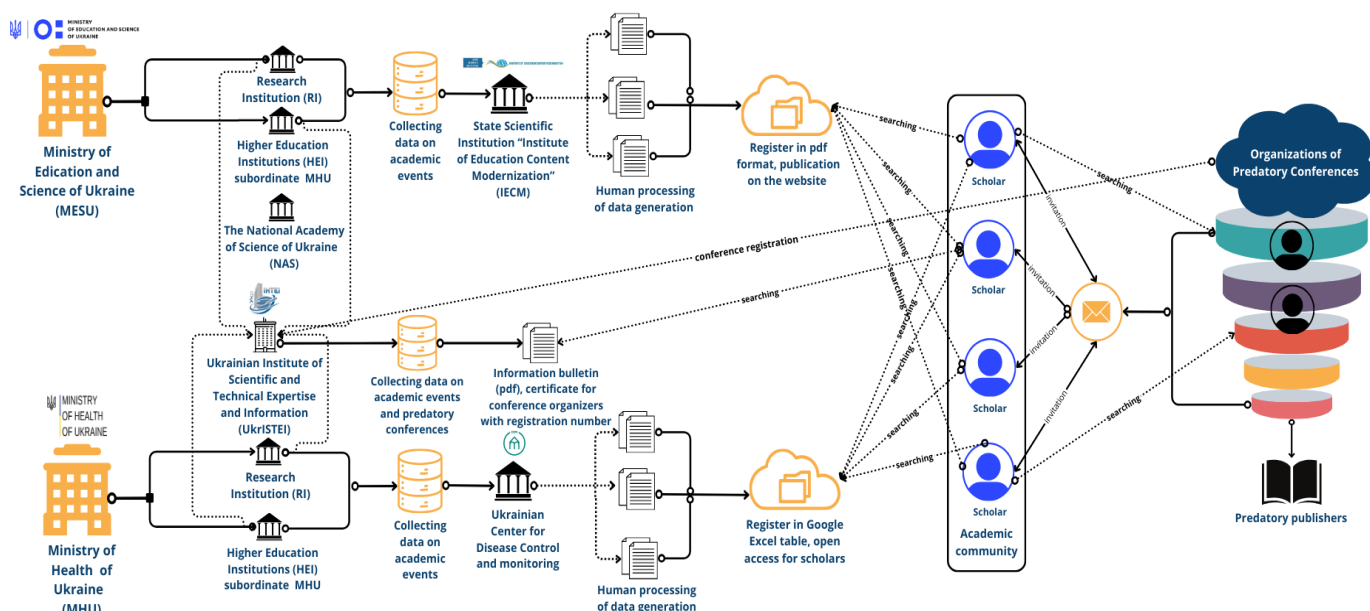


Fig. 1. Management of registration of academic events in Ukraine

Every year, at the beginning of September, the MESU published an official call for the creation of a list of scientific conferences related to higher education and science. Higher education institutions and research institutions under the jurisdiction of the MESU, as well as the National Academies of Sciences, are required to submit information about their planned AEs for the next year. This information is submitted in electronic format (in doc. format) and on paper. To create this register, the staff of the State Scientific Institution "Institute for Educational Content Modernization" (IECM) perform thorough manual work to collect and process the submitted data. As a result of their efforts, a detailed register of planned AEs was generated and published electronically (in pdf. format) on their official website, providing an important resource for coordinating and planning research activities in the educational and scholarly community of Ukraine.

The registers of AEs compiled in Ukraine include two key sections: the first is dedicated to national scientific conferences, and the second to international scientific and workshops aimed at higher education students and young researchers. These registers, which are in PDF format, are regularly published on the official website of the IECM. In the general structure of scientific conferences on higher education and science in the system of the MESU, international and all-Ukrainian AEs are distinguished separately. A study of international conferences showed that the most common formulations of the types of conferences used in the titles are scientific and practical, scientific and technical, and scientific (Biryukov et al., 2017). Moreover, information about national conferences and international conferences is separated and includes descriptive metadata such as the title of the conference, the person responsible for its organization, address, phone number, e-mail, venue and date, and number of participants. Although the existing AE registries are important resources, they have certain limitations, such as the lack of filtering functions to search for criteria such as discipline or format (hybrid, online, or face-to-face). In addition, the registries lack hyperlinks to AE websites, which could allow interested parties to obtain more detailed information about the events. Recommendations on the procedure for organizing and conducting international and national scientific workshops include the following: "An international conference is held in cooperation with foreign academic organizations or institutions that are part of the co-organizers of the event. There were no fewer than five participating countries and 100 or more participants were included. The conference languages used are Ukrainian and foreign. The national conference is held by the common efforts of national higher education institutions and covers all regions of Ukraine. The number of participants was 100 participants or more. The language of the conference was Ukrainian. These events can be held in physical and virtual form" (Biryukov et al., 2017).

The second provider of AEs is the Ministry of Health of Ukraine and the National Academy of Medical Sciences of Ukraine. Scientific institutions and universities (registered providers) annually at the beginning of September submit events to the Administrator to be included in the List of Continuing Professional Development (CPD) events. The registration of activities is carried out by the Provider by filling out a Google form (Biryukov et al., 2017). In accordance with the developed instructions of the Ministry of Health to the "Center for Testing of Professional Competence of Specialists with Higher Education in the fields of Medicine and Pharmacy at the Ministry of Health of Ukraine" (Testing Board*). The Testing Board processes the information received by the institution staff and creates an electronic public Google Excel file that is publicly available on the Testing Board website and updated accordingly during the year (Ministry of Health of Ukraine). The register of AEs includes the following descriptive metadata: registration number of the provider; information on the possibility/impossibility of awarding points; event number; the form of participation; event status; type of event; number of CPD points; event topic; event start date; event end date; medical specialty; pharmacy specialty; specialties of junior specialists with medical education; link to register for the event; the name of the contact person of the provider responsible for organizing and conducting the event; phone number of the contact person of the provider who is responsible for organizing and holding the event; location (exact address) of the event; and a link to the provider's website where information about the event is posted.

Information about each academic event for which healthcare professionals are credited with CDP points must be posted separately on the official website of the Provider in the form developed by the MHU. After checking the information about the CDP event on the official website of the Provider, the Testing Board assigned a structured registration number to each CDP event, ensuring its uniqueness within the current year. Each event for which healthcare professionals are awarded CDP points is registered separately. Certificates are issued by the Provider upon completion of the CDP event. The certificate contains the following descriptive metadata: the full legal name of the Provider (according to the Unified State Register of Legal Entities, Individual Entrepreneurs and Public Organizations); the type of CDP activity; the topic of the CDP activity; medical/pharmaceutical specialties; the number of CDP points; the date of the CDP activity; the certificate number; the signature; and the name of the Provider (Ministry of Health of Ukraine).

In accordance with the established requirements of the MHU, a legal entity that intends to be a provider of CDP events for medical and pharmaceutical professionals for which points are awarded must register and collect the supporting documents for this as needed: Application in electronic form (certified by electronic signature). An extract from the Unified State Register of Legal Entities, Individual Entrepreneurs and Public Organizations with a full list of economic activities. Regulations on the evaluation of continuing professional development events for signs of academic integrity and compliance with the principles of evidence-based medical/pharmaceutical/rehabilitation practice, approved by the Provider. Methodology for assessing the acquired knowledge, competencies and practical skills of healthcare professionals approved by the Provider (Testing Board). The administrator submits information about the Provider to the CDP System and assigns a registration number to the Provider.

Until 2015, in Ukraine, there was another provider of registered AEs, UkrISTEI, whose task was to create a base for the formation of national information resources on scientific, technical and innovation activities and access them and to build a system of information and analytical services for users of all levels—from the state to the student level. UkrISTEI registered scientific and technical events—scientific, scientific and practical symposiums; congresses; conferences; workshops; and meetings planned to be held in Ukraine in the current and next years—and created the database "Scientific and Technical Events of Ukraine" based on this information.

The database was created based on the results of annual registration and scheduling of scientific and technical events (ESTs) held in Ukraine by ministries, departments, and institutions of the National Academy of Sciences and other organizations since 2005. The information was systematized according to the Interstate Rubric of Scientific and Technical Information, which included a multilevel indexing system. The search engine allowed searching by topic, heading, type, type of academic event, venue, etc. Information about AEs was posted on the UkrINTeI website (Ukrainian Institute of Scientific and Technical Expertise and

Information). Based on the results of registration, UkrISTEI also issued a quarterly newsletter titled "Plan of scientific, technical symposiums, congresses, conferences, workshops in Ukraine". Currently, there is no database on AEs.

Thus, today, there are no systems that automate the collection of information about such events through unique identifiers, although they are important components of scientific activity. Additionally, it is quite common for websites (or website pages) containing information about AEs to cease to function after it has been held. In addition, the most common forms of sharing information about conferences are PDFs and docs, which are not machine readable, and information about AEs is not presented in a standardized form. However, the usability of organizing such a process is highly questionable in terms of rationality and convenience. First, the data from these registries cannot be reused (FAIR principles) (Hauschke *et al.*, 2021); second, it is inconvenient for scholars to search for the desired academic event by their profile and other filters (e.g., organizer, scientific field, date, venue, and other important criteria). Third, there is no possibility for scientists to import data from such registers into their scientific profiles; i.e., there is no active system of permanent identifiers. Fourth, institutions cannot add to the registers of the Ministry of Education and Science of Ukraine during the year or have a complicated process of time-consuming and time-consuming collection of documents for additional registration of AEs. Although there are conference registries in Ukraine, not all influential conferences are included in these lists. Thus, an important step for Ukraine to study the necessary metadata of AEs and their decision-making quality indicators, which will be conducted in accordance with the standards of quality, transparency and integrity that characterize legitimate and authoritative conferences, as well as the need to develop a single point of registration of AEs and providers as one of the structural modules of the Ukrainian Scientific Information System "URIS" (Kaliuzhna and Auhunas, 2022).

3. MATERIALS AND METHODS

3.1 Data collection method

Based on quantitative research methods, including surveys and data analysis (Denzin and Lincoln, 2011), this study aimed to explore how organizers and scholars evaluate the current descriptive metadata system and its impact on academic event management in Ukraine. This research is simple descriptive research conducted using a questionnaire survey method. Open-ended and closed-ended questions, multiple-choice questions and 5-point Likert scale questions were developed as data collection instruments. Respondents were informed about the purpose of the survey and how the results would be used. It was emphasized that their participation was completely optional and that their comments would be unanimous and confidential. This research utilized a quantitative approach to study the descriptive metadata of AEs. A quantitative approach is used to determine the significance of individuals or groups, such as organizers of AEs and participants, in those events (Creswell *et al.*, 2007).

To engage participants in this study, a purposive sampling strategy was used. This targeted approach, as elucidated by Creswell *et al.* (2007), entails the intentional selection of individuals or groups based on their specific knowledge and expertise related to the subject being investigated. This study concentrates on two key demographic topics: those who organize AEs and those scholars with substantive experience participating in such events. Participants were recruited through two main strategies. The first involved the use of a database of E-mails related to AEs, which were imported from national conference registries for the last five years and published on the portal of the State Scientific Institution "Institute of Education Content Modernization" (Institute for Educational Content Modernization) and the website of the State Non-Profit Enterprise Testing Board for Professional Competence Assessment of Higher Education Trainees in Medicine and Pharmacy at the Ministry of Public Health of Ukraine (Testing Board). The second strategy involved the use of the information channel of the Ministry of Education and Science of Ukraine, which distributed an information letter about the questionnaire to 421 universities under its jurisdiction. The open data platform Unified State Electronic Database on Education (USEDE) (Unified state electronic database on education) was also used to collect the electronic addresses of universities.

The sample consisted of 543 conference organizers and 727 scholars, categorized as organizers of AEs and academic participants, respectively. Invitations, which were sent between August 1 and August 15, 2022, included project details, Google

Form Survey links, research objectives, data privacy information, and participation benefits. An anonymous online survey, conducted from August to October 2022 through Google Forms, sought participation based on implied consent upon survey commencement. To ensure diverse insights, a maximum of five responses per educational institution were anticipated from both organizers and attendees. The anonymity of the respondents was maintained to safeguard their data.

3.2 Survey questionnaire

The survey, available in Ukrainian, was standardized for both organizers and scholars. Participants selected their role at the survey's outset, facilitating subsequent cross-group analysis. The comprehensive questionnaire consisted of 32 questions, encompassing demographic information, professional background, satisfaction with the current metadata quality, and suggestions for improvement. Of these, 21 questions, primarily focused on closed-ended queries, were subjected to analysis.

Structured into three sections, the questionnaire included 6 questions about demographic data, covering gender, position, research interests, event participation frequency, preferred format, and participant roles. The second section, comprising 8 questions, utilized Likert-scale queries to gauge the current state of the descriptive metadata and required registration data. The third section (6 questions) also employed Likert scales to assess event quality and improvement strategies within the Ukrainian context. The discipline classification adhered to the official Ukrainian list and was aligned with the International Standard Classification of Education (Cabinet of Ministers of Ukraine, 2015), as shown in Table 2.

3.3 Data analysis method

Data management, analysis and graphical representation were performed using Microsoft Excel 2016 version 16.0.5422.100 and RStudio (Open Source Edition) version 2023.09.1 (Franklin *et al.*, 2021) with the data visualization libraries ggplot (Wickham, 2016) and reshape2 (Larsson and Gustavsson, 2018; Larsson and Gustafsson, 2018). The data were initially collected in an Excel spreadsheet, cleaned using OpenRefine version 3.7.3 (OpenRefine, 2023) and subsequently converted to RStudio software for statistical data. This study used descriptive statistical analysis and visualization to process the quantitative data collected and the data obtained using a 5-point Likert scale (Mirahmadizade, (2018). For categorical variables, descriptive statistics are presented in the form of numbers and percentages. To determine the statistical significance of differences in the distribution of responses between organizers and scholars, the chi-square test (Adesola and Musa, 2017) was used to identify relationships or significant differences between categorical variables and the percentages presented. The chi-square statistic and the contribution of each question category to the overall statistic were calculated using the following formula:

$$\text{Contribution to } \chi^2 = \frac{(\text{Observed} - \text{Expected})^2}{\text{Expected}},$$

where "observed" is the observed value;

"Expected" is the expected value.

The level of significance was set at 0.05, with p values less than 0.05 indicating the presence of statistically significant differences between groups. A heatmap displaying statistically significant p values was generated to visualize the results, allowing visualization of the contribution of each category to the overall chi-square statistic for the two study groups. Bright colors on the heatmaps indicate a greater contribution to the chi-square statistic, highlighting the categories with the most significant differences between groups, while darker shades reflect a smaller contribution.

4. RESULTS

4.1 Demographics and respondents' profiles

Table 1 shows the demographic and professional profiles of the respondents, comprising 543 organizers and 727 scholars, for a total of 1,270 respondents. The sex distribution revealed a significant prevalence of females in both groups, with 64.02% (n=813) of the total sample being female. A majority of the organizers were female (64.09%; n=348), while 63.96% (n=465) were

female. Public universities are more prominently represented, with 199 respondents compared to 54 from private institutions. Regarding professional positions, organizers were primarily associate professors (52.30%, n=284), department heads (20.81%, n=113), and research assistants (n=72). In contrast, scholars are predominantly research assistants (44.98%, n=327), associate professors (19.94%, n=145), and heads of departments (18.29%, n=133%). Other roles, including administration, PhD students, and employees from other departments, are less represented.

Category	Organizers N = 543 (%)	Scholars N = 727 (%)	Total N = 1270 (%)
Gender			
Female	348 (64.09)	465 (63.96)	813 (64.02)
Male	195 (35.91)	262 (36.04)	457 (35.98)
University type			
Public	76	123	199
Private	32	22	54
Academic position			
Associate professor	284 (52.30)	145 (19.94)	429 (33.78)
Head of the department	113 (20.81)	133 (18.29)	246 (19.37)
Research assistant	72 (13.26)	327 (44.98)	399 (31.42)
Administration of the institution	27 (4.97)	30 (4.13)	57 (4.49)
PhD students	36 (6.63)	60 (8.25)	96 (7.56)
Other employees of other departments	11 (2.03)	32 (4.40)	43 (3.39)

Table 1. Demographic and professional profile

Table 2 presents an in-depth analysis of the distribution of academic disciplines among two respondent categories: organizers and scholars. The study included a total of 1,270 respondents, comprising 543 organizers and 727 scholars. In the "arts and humanities" category, organizers represent 1.84%, and scholars 5.91%, with an overall representation of 4.17%. The notable difference between the groups is underscored by a p value of 0.0003. In "education," a substantial 22.65% of the organizers were represented, compared to only 6.46% of the scholars, resulting in a combined percentage of 13.39%. This significant disparity is highlighted by a p value of less than 0.0001. For "social sciences, journalism, and information," organizers account for 18.78%, and scholars account for 20.08%, leading to a total representation of 19.53%. The p value of 0.5637 suggested that there was no significant difference between the categories. In the "Business, Management, and Law" field, 15.47% of the organizers and 13.76% of the scholars participate, summing up to 14.49%, with a p value of 0.3905 indicating no significant difference. In the realm of "science, mathematics, and statistics," organizers composed 8.29%, and scholars 15.41%, totaling 12.36%. A p value of 0.0001 indicated a significant difference. "Information Technology" shows nearly equal representation in both groups, with 4.05% of organizers and 3.99% of scholars, adding up to 4.02%. A p value of 0.9552 indicated no significant difference. For "engineering, manufacturing, and construction," organizers and scholars account for 7.73% and 14.03%, respectively, with a combined percentage of 11.34%. A p value of 0.00 points to a significant difference. In "Agriculture, Forestry, Fisheries, and Veterinary," both categories showed limited representation (1.66% organizers, 3.30% scholars), totaling 2.60%. The p value of 0.0685 suggested a borderline significant difference. "Healthcare and Social Security" comprises 9.76% of organizers and 7.02% of scholars, amounting to 8.19%, with a p value of 0.0775 indicating an insignificant difference. "Security and Defense" included 7.00% of the organizers and 5.09% of the scholars, for a total of 5.91%. A p value of 0.1534 indicates no significant difference. Finally, in the "Services" sector, 2.76% of organizers and 4.95% of scholars are represented, for a combined percentage of 4.02%. The p value of 0.0493 suggested that there was no significant difference between the groups. Overall, this analysis reveals distinct

variations in the distribution of academic disciplines among organizers and scholars, with some disciplines showing significant differences, while others demonstrating similar levels of representation across both categories.

Code and title of the discipline *	Organizers N = 543 (%)	Scholars N = 727 (%)	Total N = 1270 (%)	p value
Arts and humanities	10 (1.84)	43 (5.91)	53 (4.17)	0.0003
Education	123 (22.65)	47 (6.46)	170 (13.39)	< 0.0001
Social sciences, journalism and information	102 (18.78)	146 (20.08)	248 (19.53)	0.5637
Business, management and law	84 (15.47)	100 (13.76)	184 (14.49)	0.3905
Natural sciences, mathematics and statistics	45 (8.29)	112 (15.41)	157 (12.36)	0.0001
Information technologies	22 (4.05)	29 (3.99)	51 (4.02)	0.9552
Engineering, production and construction	42 (7.73)	102 (14.03)	144 (11.34)	0.00
Agriculture, forestry, fisheries and veterinary medicine	9 (1.66)	24 (3.30)	33 (2.60)	0.0685
Healthcare and social security	53 (9.76)	51 (7.02)	104 (8.19)	0.0775
Security and defense	38 (7.00)	37 (5.09)	75 (5.91)	0.1534
Services	15 (2.76)	36 (4.95)	51 (4.02)	0.0493

Table 2. What area or specialization of academic discipline do you predominantly relate?

***Note:** The cabinet of ministers of Ukraine. The list of fields of knowledge and specialties in which higher education students are prepared. April 29, 2015, No. 266 (Cabinet of Ministers of Ukraine, 2015). The list is structurally and quantitatively close to the list of branches of the International Standard Classification of Education. Key to significance level: Highly significant: p value < 0.001, Significant: p value \geq 0.001 and < 0.05, Not significant: p value \geq 0.05.

Table 3 outlines the distinct roles of AEs, with organizers primarily occupying exclusive leadership roles, including deputy chairs (24.68%, n=134), contact persons (18.05%, n=98), and responsible executives (15.29%, n=83). Scholars predominantly engaged as participants (58.46%, n=425) and speakers (41.54%, n=302). Organizers also serve as chairs (12.52%, n=68) and event moderators (10.31%, n=56). There is a clear demarcation of roles; organizers do not participate as speakers or attendees, and scholars do not take up organizational roles, emphasizing the specialized nature of each group's contribution. Organizers also serve as members (12.25%, n=66) and co-organizers (7.00%, n=38), contributing to the collaborative effort required in organizing successful AEs.

Role*	Organizers N = 543 (%)	Scholars N = 727 (%)	Total N = 1270 (%)
Chair	68 (12.52)	-	68 (5.35)
Contact person	98 (18.05)	-	98 (7.72)
Deputy Chair	134 (24.68)	-	134 (10.55)
Event moderator	56 (10.31)	-	56 (4.41)
Member	66 (12.25)	-	66 (5.20)
Participant	-	425 (58.46)	425 (33.46)
Responsible executive	83 (15.29)	-	83 (6.54)
Speaker	-	302 (41.54)	302 (23.78)
Co-organizer	38 (7.00)	-	38 (2.99)

Table 3. What is your role in academic events?

***Note:** The table shows the distribution of responses of which organizers and scholars were sorted into groups based on their role, which they chose at the beginning of the survey.

Table 4 reveals the frequency of AE organization and attendance by conference organizers and scholars. This study provides essential insights into the engagement levels of these groups in the academic landscape. A substantial portion of organizers (42.36%, n=230) and a considerable number of scholars (29.57%, n=215) participate in AEs only once a year, with organizers being more likely to limit their involvement in this frequency (statistically significant, p value < 0.001). The most common frequency for both groups was 2-5 times a year, with 44.75% of organizers (n=243) and 44.02% of scholars (n=320) engaging at this rate (no statistically significant difference, p value=0.8386). Scholars (11.00%, n=80) are more likely than organizers (6.26%, n=34) to participate 5-10 times a year, indicating a higher level of engagement among scholars within this range (statistically significant, p value=0.0047). Furthermore, a greater percentage of scholars (15.41%, n=112) engage in AEs more than 10 times a year than do organizers (6.63%, n=36), emphasizing the greater tendency among scholars to engage in high event activity (statistically significant, p value < 0.001).

Category	Organizers N = 543 (%)	Scholars N = 727 (%)	Total N = 1270 (%)	p value *
1 time a year	230 (42.36)	215 (29.57)	445 (35.04)	<0.001
2-5 times a year	243 (44.75)	320 (44.02)	563 (44.33)	0.8386
5-10 times a year	34 (6.26)	80 (11.00)	114 (8.98)	0.0047
> 10 times a year	36 (6.63)	112 (15.41)	148 (11.65)	<0.001

Table 4. How frequently do (conference organizers) organize (academic events organizers) and attend academic events (scholars)?

***Note:** Average percentage of respondents who attend AEs at each frequency across both groups and the variability of these frequencies within the groups- These p values indicate whether there is a statistically significant difference between the two groups' opinions. A common threshold for significance is p<0.05. Key to significance level: Highly significant: p value < 0.001, Significant: p value ≥ 0.001 and < 0.05, Not significant: p value ≥ 0.05.

Table 5 compares the preferred formats for organizing and participating in AEs. Scholars (29.85%, n=217) showed a stronger preference for hybrid formats than did organizers (14.36%, n=78), resulting in an overall preference of 23.22% (n=295), which was a significant difference (p value <0.001). Offline events are favored more by organizers (20.07%, n=107) than by scholars (7.29%, n=53), contributing to a total preference of 12.75% (n=162), with a significant difference (p value <0.001). Online events are highly favored by both groups, with 65.56% of organizers (n=356) and 62.86% of scholars (n=457) leading to a total preference of 64.01% (n=813). No significant difference was observed between the groups (p value=0.3508), indicating that there was a shared consensus on the convenience and reach of online formats.

Category	Organizers N = 543 (%)	Scholars N = 727 (%)	Total N = 1270 (%)	P value *
Hybrid	78 (14.36)	217 (29.85)	295 (23.22)	<0.001
Offline	109 (20.07)	53 (7.29)	162 (12.75)	<0.001
Online	356 (65.56)	457 (62.86)	813 (64.01)	0.3508

Table 5. What format do you prefer for the organization of academic events and for scholars to participate in them?

***Note:** Average percentage of respondents who attend AEs at each frequency across both groups and the variability of these frequencies within the groups- These p values indicate whether there is a statistically significant difference between the two groups' opinions. A common threshold for significance is p<0.05. Key to significance level: Highly significant: p value < 0.001, Significant: p value ≥ 0.001 and < 0.05, Not significant: p value ≥ 0.05.

4.2 What is the current state of descriptive metadata for academic events in Ukraine?

Figure 2 shows survey results on metadata quality perception in AEs in Ukraine, categorized by organizer and scholar responses. A total of 1,270 respondents were included, with 543 organizers and 727 scholars. For the "Very Bad" rating, 32.52% of respondents (n=413) found the metadata quality to be very poor, with 22.84% of the organizers (n=124) and 39.75% of the scholars (n=289) in agreement. Regarding the "bad" rating, 35.91% of respondents (n=456) perceived the metadata negatively, with 32.78% of the organizers (n=178) and 38.24% of the scholars (n=278) expressing this sentiment. Satisfactory ratings were given by 21.73% of the respondents (n=276), 34.62% of the organizers (n=188) and 12.10% of the scholars (n=88) found the metadata satisfactory. Additionally, 6.61% of respondents (n=84) considered the metadata "good," with 5.89% of the respondents being organizers (n=32) and 7.15% being scholars (n=52) holding this opinion. The "Very Good" rating was the least common, with 3.23% of participants (n=41), comprising 3.87% of organizers (n=21) and 2.75% of scholars (n=20), having a highly favorable view of metadata quality in AEs in Ukraine.

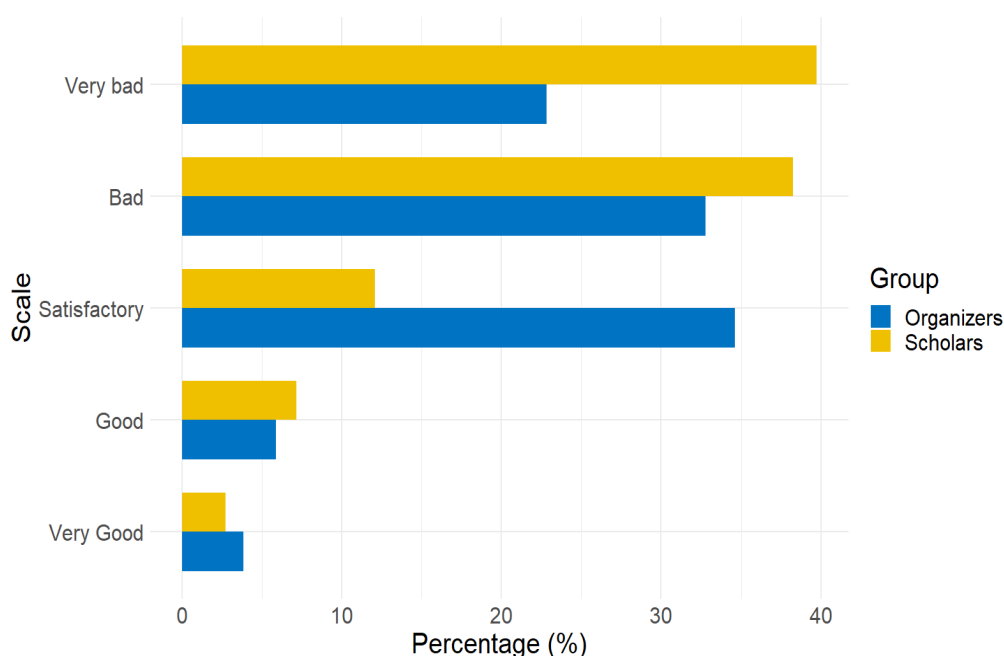


Fig. 2. Question: What is the current state of metadata in the area of academic events in Ukraine?
(organizers n=543; scholars n=727; total n=1270)

Figure 3 shows survey responses on the importance of enhancing metadata quality for organizing and participating in AEs, with a distinction between organizers and scholars. Among 543 organizers, 84.90% (n=461) believe it is "very often" important, mirrored by 89.96% of scholars (654 out of 727). Combining "frequently" and "very often," 97.79% of the organizers and 98.35% of the scholars acknowledged the necessity of improving metadata quality. For lower importance ratings, only 1.10% of organizers (n=6) and 1.24% of scholars (n=9) find it "occasionally" important. Even fewer respondents, 0.74% of whom were organizers (n=4) and 0.41% of whom were scholars (n=3), rate this topic as "seldom" important. Only 0.37% of the organizers (n=2) found it "very seldom" important, with no scholars choosing this option. Among the 1,270 respondents, 87.80% (n=1,115) considered it "very often" important, and 10.31% (n=131) found it "frequently" important. Those regarding it as important only occasionally, seldom, or very seldom make up a marginal 2.89% of the total responses.

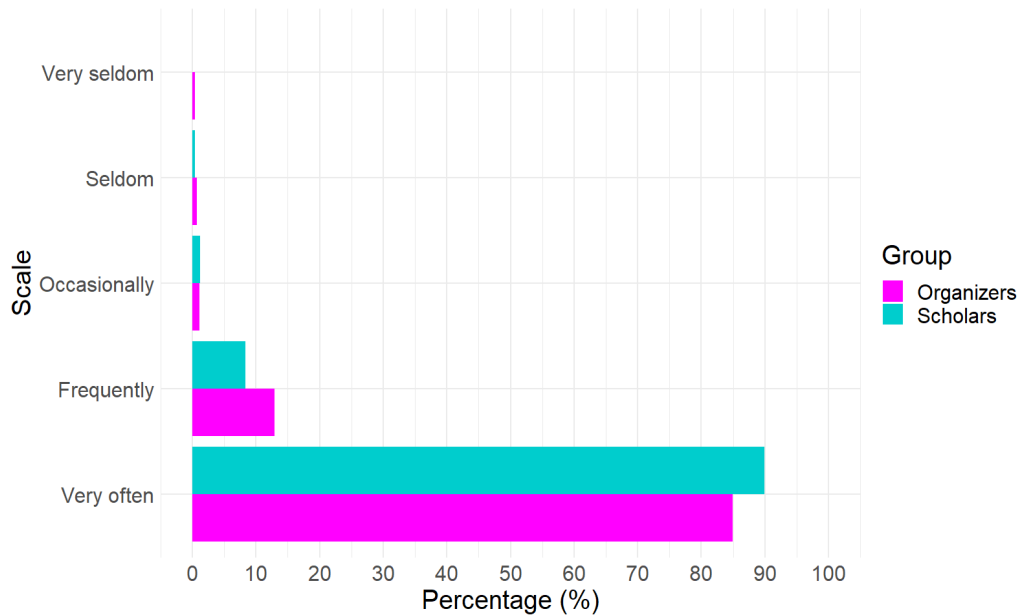


Fig. 3. Question: How important is it to improve metadata quality for effective organization and participation in academic events? (organizers n=543; scholars n=727; total n=1270)

The survey data show a discrepancy between the perceived importance of metadata quality and the frequency of metadata inaccuracy among scientific professionals. Approximately 40.70% (n=221/543) of the organizers and 38.93% (n=283/727) of the scholars rarely experienced metadata problems. Episodic inaccuracies were reported by 22.65% (n=123/543) of the organizers and slightly more by 26.00% (n=189/727) of the scholars, indicating the constant concern of a significant minority. Moreover, 25.05% (n=136/543) of the organizers and 21.73% (n=158/727) of the scholars frequently encountered inaccuracies, implying that a quarter of the respondents had recurring problems related to metadata quality. Although less common, 3.87% (n=21/543) of the organizers and 6.60% (n=48/727) of the scholars regularly encountered these problems. Among the overall pool of respondents (n=1270), 39.69% (n=504/1270) rarely encountered inaccuracies, 24.57% (n=312/1270) did so occasionally, 23.15% (n=294/1270) encountered them frequently, and a remarkable 5.43% (n=69/1270) encountered them very frequently (see Fig. 4).

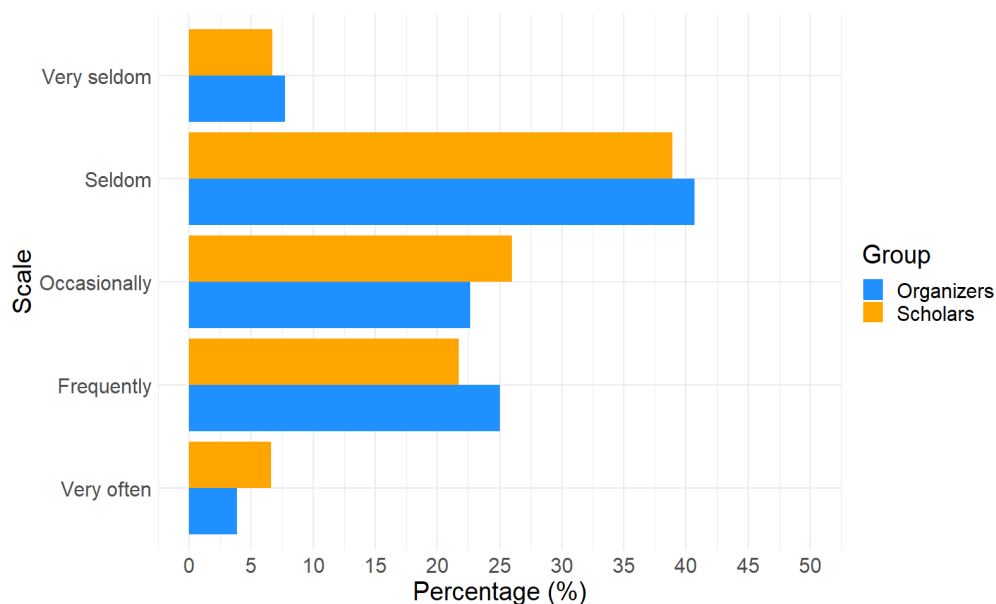


Fig. 4. Question: How often do you experience mistakes or inaccuracies in the metadata of academic events? (organizers n=543; scholars n=727; total n=1270)

Figure 5 shows data on the perceived difficulty of collecting and managing academic event metadata by two distinct groups: organizers and scholars. A substantial proportion of both groups found managing metadata to be easier, with 43.46% (n=236/543) of organizers and 43.88% (n=319/727) of scholars rating it as "very easy." Additionally, 22.28% (121/543) of the organizers and a smaller percentage (6.19%; n=45/727) of the scholars found it "Easy". Conversely, 11.05% (n=60/543) of the organizers and 10.59% (n=77/727) of the scholars found it "very difficult" to manage metadata. A further 17.50% (n=95/543) of the organizers and 15.96% (n=116/727) of the scholars found it "difficult". The option "moderate" reversed the pattern, with a lower percentage of organizers (5.71%; n=31/543) than did the other options (23.38%; n=170/727). Overall, 43.70% (n=555/1270) of the respondents perceived metadata management as "very easy," and 13.07% (n=166/1270) perceived it as "easy." Among those findings, 15.83% (n=201/1270), 16.61% (n=211/1270), and 10.79% (n=137/1270) were "moderate", "difficult", or "very difficult", respectively.

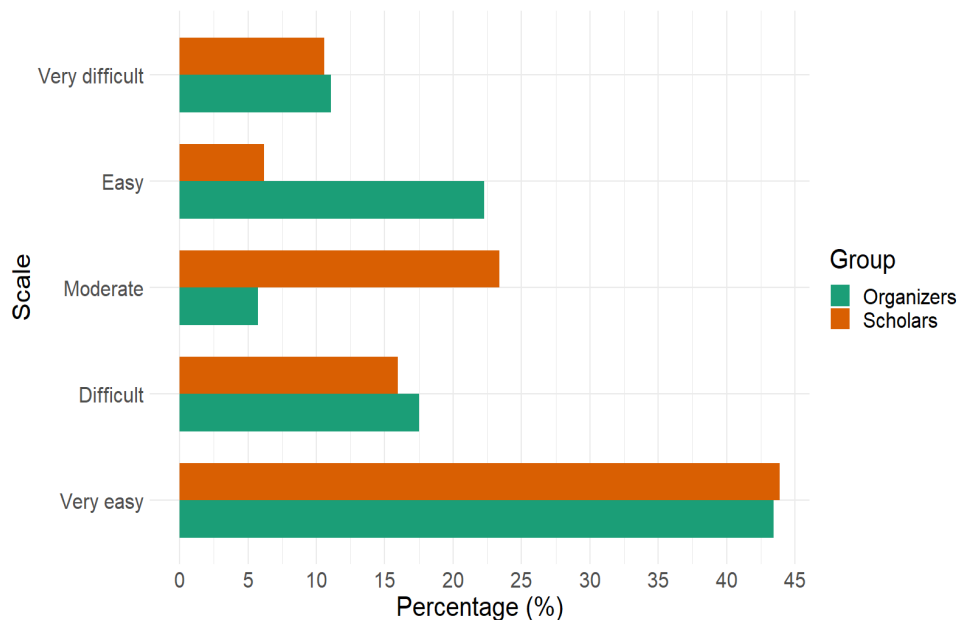


Fig. 5. Question: Is it difficult for you to collect and manage academic event metadata?
(organizers n=543; scholars n=727; total n=1270)

4.3 What are the key priorities of academic event organizers and scholars in the context of descriptive metadata standardization in Ukraine?

Figure 6 shows the survey results for the five most common metadata fields that organizers and academics consider important for academic events (AMs). The event description was a priority for 14.04% (n=427) of the organizers and 10.70% (n=324) of the scholars, for a combined total of 12.38% (n=751). Event field and event type are considered important, with organizers rating event field at 13.91% (n=423) and scholars rating event type at 13.78% (n=417). The event website is more important to scholars (14.97%, n=453) than to organizers (7.14%, n=217). The personality of the event organizer had an overall importance of 11.70% (n=710) for both groups. The scientific scope of the event is crucial, especially for organizers (13.05%, n=397), while scholars give it less importance (1.39%, n=42). The location of the event was more important to scholars (7.27%, n=220) than to organizers (4.41%, n=134), possibly reflecting the economic considerations of scholars attending the event.

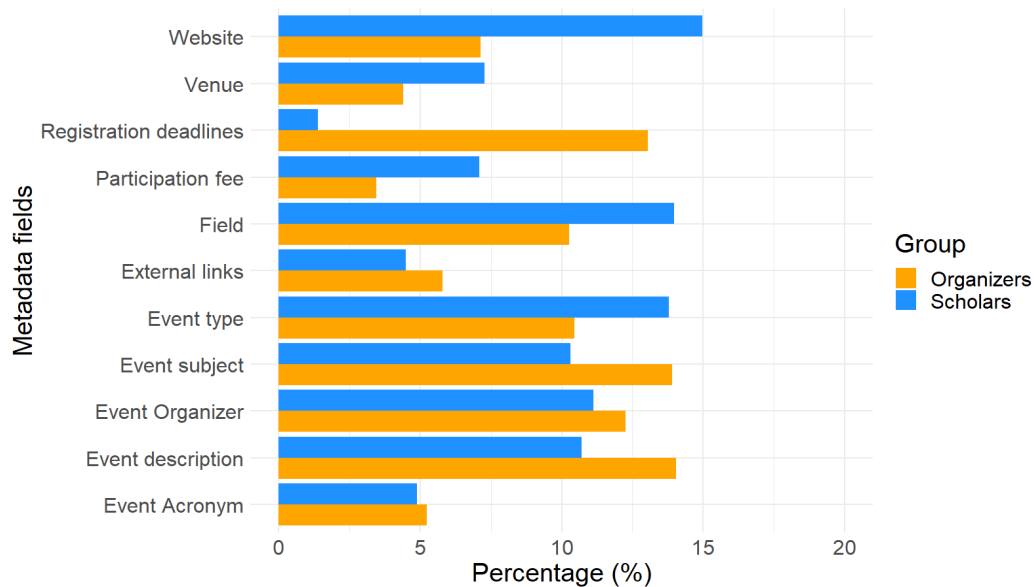


Fig. 6. Question: What are the most important metadata fields for academic events?

(5 most important in your opinion) (multiple choice) (MC organizers n=3041; MC scholars n=3027; MC total n=6068).

***Note:** MC - (multiple choice) - more than one response alternative was possible.

Figure 7 shows a heat map showing the results of a survey of respondents on the question, "What are the five most important metadata points for academic events, in your opinion (multiple choice)?" The data show that the most important metadata for both groups of respondents, organizers, and scholars is "Registration deadlines," with chi-square values of 142.39 and 143.05, respectively. These values are highlighted in red, indicating their particular importance and strong influence on respondents' choices. In addition, the "Website" metadata also had high values for both groups (42.01 for organizers and 42.21 for scholars), indicating the significant importance of online resources for event information. Other metadata such as Venue, Participation Fee, Field, External Links, Event Type, Event Subject, Event Description, and Event Acronym show moderate chi-square values ranging from 0.17 to 19.21. These results, highlighted by lighter shades of yellow, suggest that while these aspects are relevant, they are not as critical as the "Registration deadline." The "event organizer" metadata had the lowest chi-square values (0.83) for both groups.

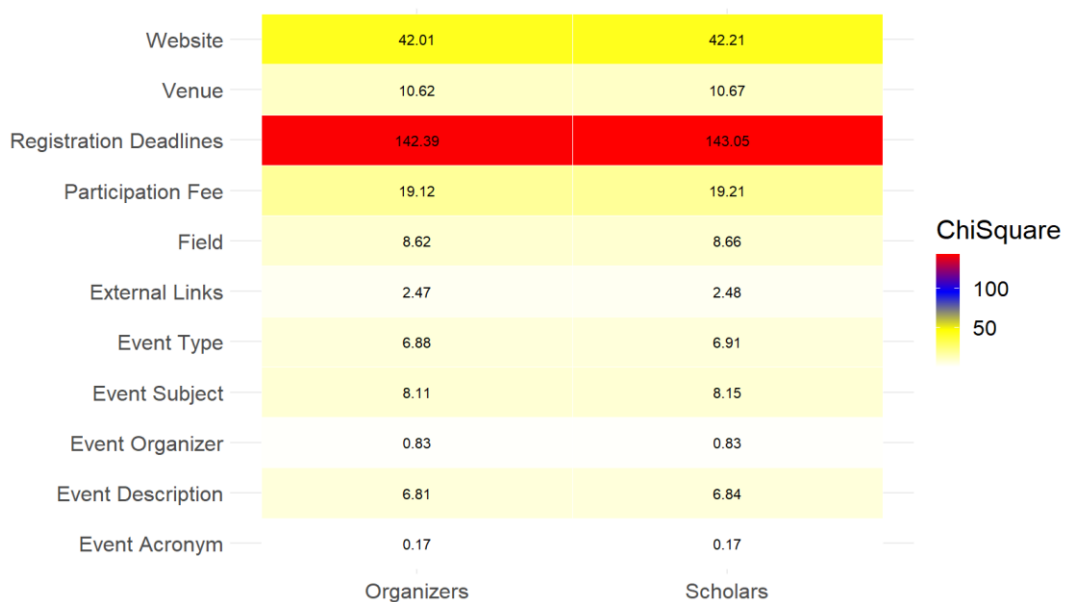


Fig. 7. Chi-square* values for each category in response to the question: What are the most important metadata fields for academic events? (5 most important in your opinion) (multiple choice)

***Note:** These p values indicate whether there is a statistically significant difference between the two groups. A common threshold for significance was $p < 0.05$. The color intensity corresponds to the chi-square value, highlighting the degree of agreement or discrepancy between the two groups.

Figure 8 shows the data on the perceived importance of different metadata for academic events with funding. Both organizers and scholars preferred metadata related to formal agreements with government authorities and reputable institutions: 35.91% (n=195) of organizers and 36.73% (n=267) of scholars, for a total of 36.38% (n=462). The emphasis on free events was greater among scholars (30.40%, n=221) than among organizers (15.10%, n=82), with a total value of 23.86% (n=303). Organizers considered nationality more important (16.21%, n=88) than scholars did (9.22%, n=67), and scholars valued autonomy and independence (12.38%, n=90) more than organizers did (9.58%, n=52), for a total value of 11.18% (n=142). International participation is a higher priority for organizers (11.60%, n=63) than for scholars (4.40%, n=32), for a total of 7.48% (n=95). Sponsorship details were considered least important for both groups at 1.73% (n=22). Some respondents found it difficult to answer: organizers, 9.39% (n=51); scholars, 5.50% (n=40), indicating uncertainty or lack of consensus on the importance of these metadata, for a total of 7.17% (n=91).

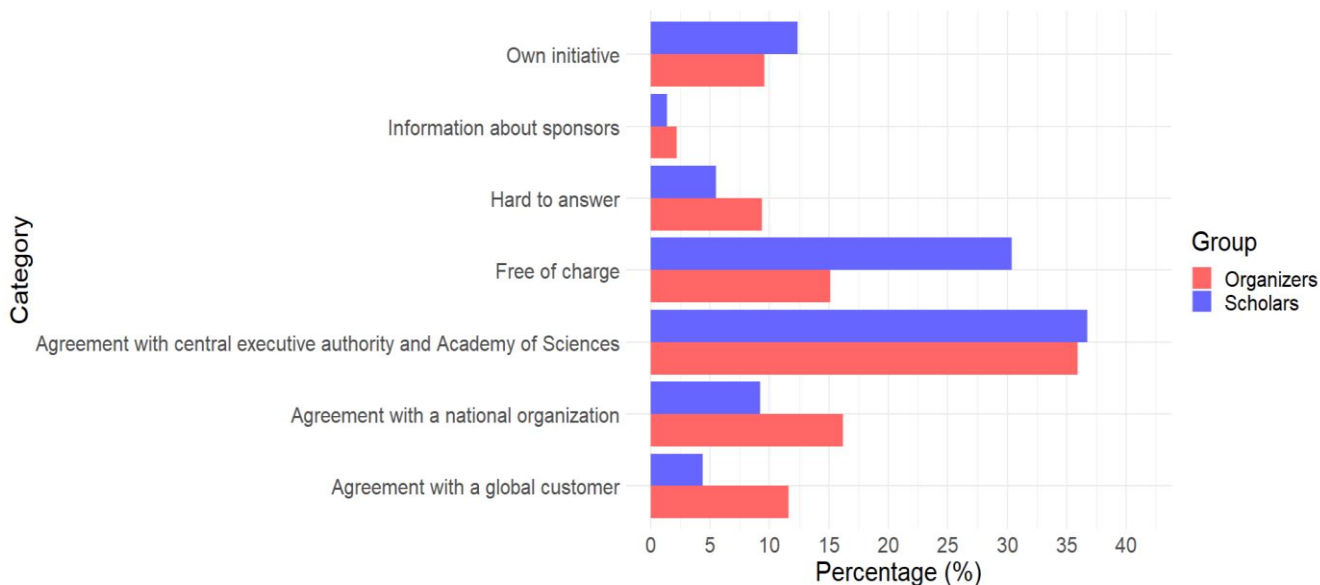


Fig. 8. Question: If the academic event has a funding organization (sponsor), which metadata do you think is important? (organizers n=543, scholars n=727, total n=1270).

4.4 What methods and tools for collecting and analyzing academic events do organizers and researchers use?

In an intriguing exploration of the intricacies involved in organizing AEs, a survey was conducted to delve into the challenges faced by organizers and scholars in collecting and managing academic event metadata. The survey, with a sample size of 543 organizers and 727 scholars, yields a comprehensive overview of the perceived difficulty of this task, revealing trends and divergences in experience between the two cohorts (Figure 9).

The data suggest a promising trend: a significant majority of both organizers (43.46%, n=236) and scholars (43.88%, n=319) find managing academic event metadata to be "very easy." This substantial alignment between the two groups indicates that, despite the complex nature of event metadata, the tools and processes currently in place facilitate an efficient management experience. However, beneath this veneer of ease, the survey uncovers a disparity in the perception of difficulty. While a notable 22.28% (n=121) of the organizers found the task "Easy," only 6.19% (n=45) of the scholars shared this sentiment. This discrepancy could indicate the different roles that each group plays in the academic ecosystem, with organizers perhaps having more direct access to or familiarity with metadata management tools and protocols, while scholars might encounter such tasks less frequently,

leading to a steeper learning curve. Interestingly, a "moderate" level of difficulty was reported more frequently by scholars (23.38%; n=170) than by organizers (only 5.71%; n=31). This middle ground reflects a nuanced challenge in metadata management that could be attributed to varying levels of exposure, expertise, or resource availability. Regarding facing challenges, a considerable portion of participants reported finding metadata management "difficult," with organizers and scholars closely aligned at 17.50% (n=95) and 15.96% (n=116), respectively. This finding points to a subset of the academic population that could significantly benefit from improved support systems, enhanced training, or more user-friendly metadata management solutions. A minority of the respondents found the task "very difficult," with 11.05% (n=60) of the organizers and 10.59% (n=77) of the scholars reporting such challenges. Although they represent a smaller fraction of the total respondents, the difficulties they encounter are nontrivial and merit attention. This group's struggles may reflect more profound issues such as complex metadata requirements, insufficient training, or suboptimal management tools that require immediate redress to streamline the organizational aspect of AEs.

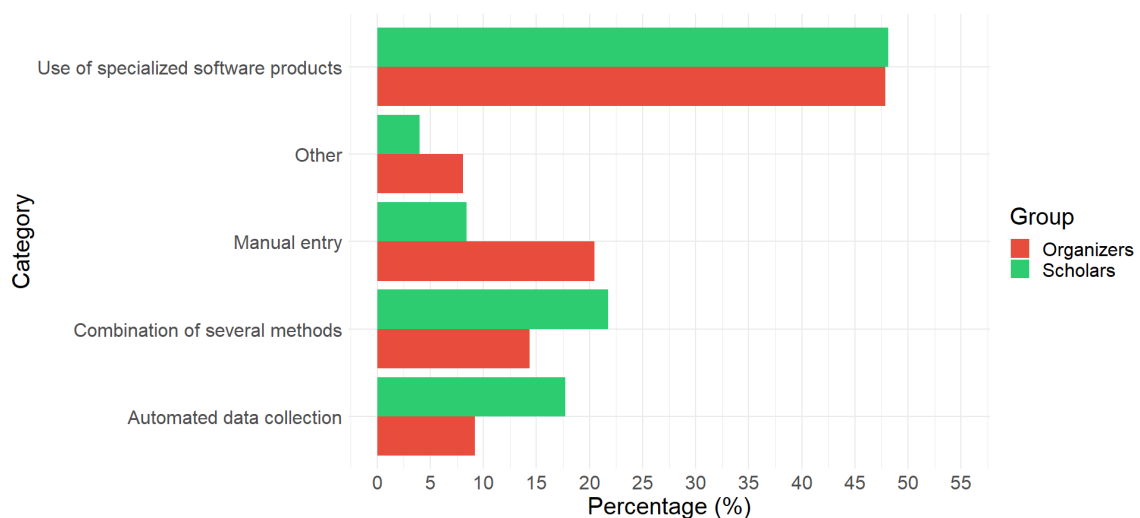


Fig. 9. Question: What methods or tools for collecting and analyzing academic event metadata do you prefer?
(organizers n=543; scholars n=727; total n=1270)

4.5 What are the requirements for descriptive metadata in different aspects of academic events?

Figure 10 shows the impact of metadata quality on the quality of academic events (AM) based on the responses of 2,046 organizers and 2,290 scholars. Scholars (26.24%, n=601) cite lack of standardization in event descriptions as a major problem more often than organizers (20.72%, n=424), with a total of 23.64% (n=1025) of participants recognizing this as a key factor reducing metadata quality. Both organizers (26.44%, n=541) and scholars (25.33%, n=580) expressed the most common concern: insufficient attention given to metadata quality, resulting in a consensus of 25.85% (n=1121) of the total responses. Technical problems related to metadata creation and updating are highlighted, with organizers (25.32%, n=518) being slightly more affected than scholars (20.66%, n=473), representing 22.86% (n=991) of participants overall. A lack of information resources and tools affects 23.17% (n=474) of organizers and 23.58% (n=540) of scholars, for a total of 23.39% (n=1014). Technical problems related to metadata creation and updating are highlighted, with organizers (25.32%, n=518) being slightly more affected than scholars (20.66%, n=473), representing 22.86% (n=991) of respondents overall.

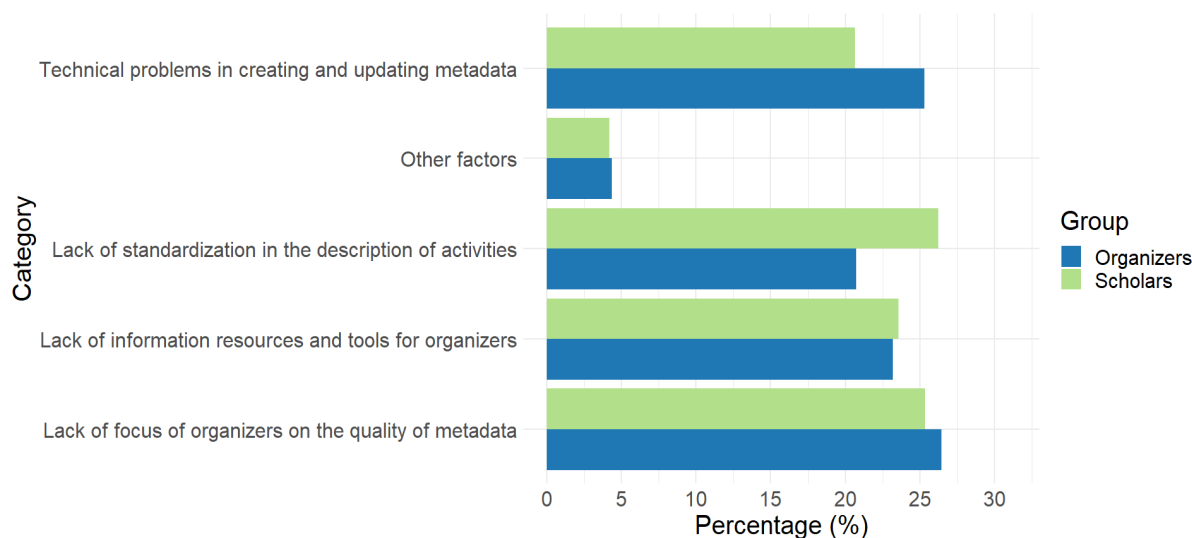


Fig. 10. Question: “What factors might influence metadata quality for academic events? (multiple choice)
(MC* organizers n=2046; MC scholars n=2290; MC total n=4336).

***Note:** MC - (multiple choice) - more than one response alternative was possible.

Figure 11 shows the survey results, in which 5,089 responses were received from respondents - including responses from 2,307 organizers and responses from 2,782 scholars - and in which quality criteria for academic events (AM) were identified. The main priorities and expectations of both organizers and scholars were identified. "High quality of publications" was the most valued attribute and was mentioned by 18.34% of the organizers and more than 20.56% of the scholars, for a total of 19.55% (n=995). "Proven regular event" was a significant attribute noted by 16.10% of scholars and 13.91% of organizers for a total of 15.11% (n=769), indicating a preference for events with a consistent track record. "Well-known keynote speakers" were represented by 16.78% of the organizers and 13.19% of the scholars, for a total of 14.82% (n=754). Notably, 9.10% of the organizers and 10.14% of the scholars "organized by highly recognized event organizers" indicated the credibility of events hosted by reputable figures. "Organized by a reputable institution" was recognized by 7.24% of the organizers and slightly more scholars (9.71%), for a total of 8.59% (n=437). Affiliation with a "reputable university/research institution" was considered important by 11.53% of the organizers and 7.94% of the scholars, for a total of 9.57% (n=487). The preference for "specialized events" was greater among organizers (8.58%) than among scholars (6.79%), for a total of 7.60% (n=387), reflecting the desire for focused scientific exchange. "Free participation" was more valued by scientists (4.13%) than by organizers (2.51%), for a total of 3.40% (n=173). "Peer recommendation" and "high-quality website" are recognized by both organizers and scholars at approximately 4.0%. A "comfortable location" and "attended colleagues" were the least influential factors, with overall percentages of 1.06% (n=54) and 1.67%, respectively (n=85). A "comfortable location" and "attachment of colleagues" were the least influential factors, with overall percentages of 1.06% (n=54) and 1.67% (n=85), respectively.

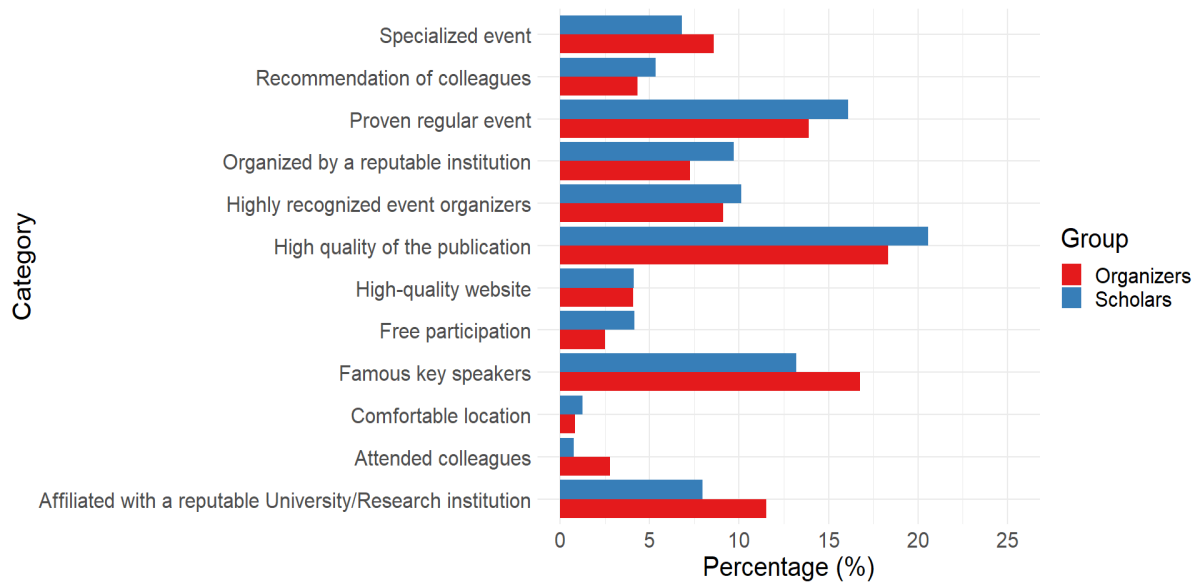


Fig. 11. Question: What criteria define a quality academic event (multiple choice)?
(MC* organizers n=2307; MC scholars n=2782; MC total n=5089).

*Note: MC (multiple choice) - more than one response alternative was possible.

Figure 12 shows that the heat map provides insight into the responses of organizers and scholars regarding the criteria that determine the quality of an academic event based on multiple-choice questions. The most significant criterion for both organizers and scholars was "Attendance colleagues," with chi-square values reaching 16.83 and 13.96, respectively, which are highlighted in red. The key criterion is also "Organized by reputable institution," with 9.27 points for organizers and 7.68 points for scholars, highlighted in dark orange and yellow tones. Other criteria, such as "Free participation," "Famous key speakers," and "organized by a reputable institution," are moderately significant, with values ranging from 4.05 to 5.97 for organizers and 4.41 to 5.32 for scholars. The chi-square value for high-quality websites in both groups was 0, indicating that there was no difference between the responses of the organizers and scholars. Lesser criteria such as "Specialized event," "Recommendation of colleagues," "Proven regular event," "Highly recognized event organizers," "High quality of the publication," and "Comfortable location" have lower chi-square values.

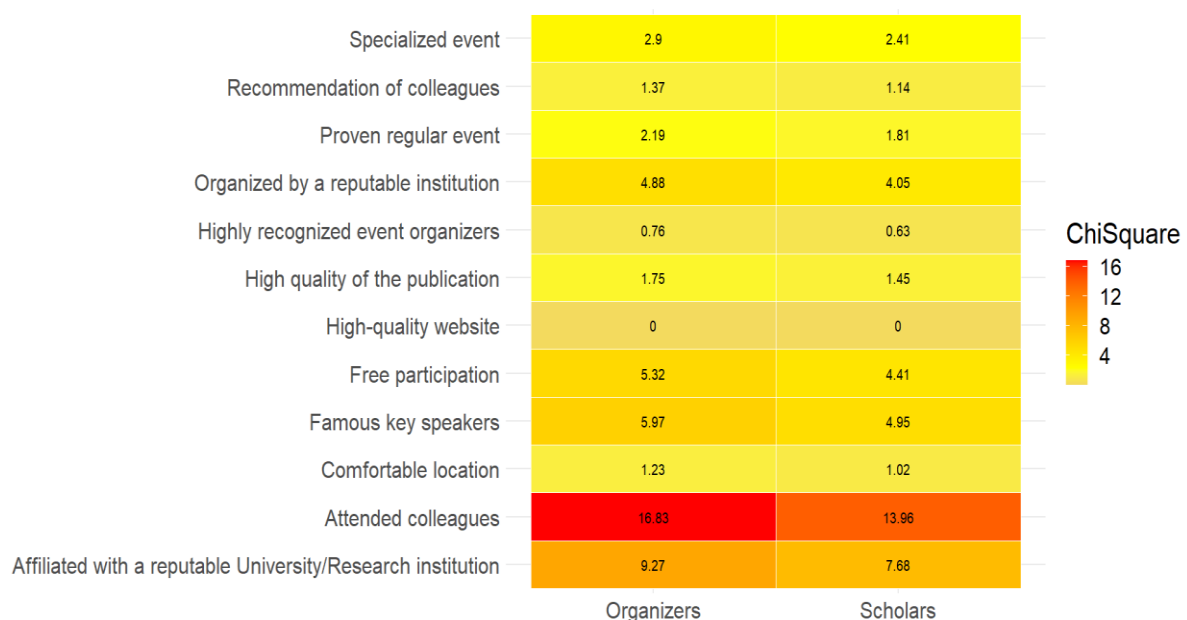


Fig. 12. Chi-square* in each category response to the following question:
What criteria define a quality academic event? (multiple choice)

***Note:** These p values indicate whether there is a statistically significant difference between the two groups. A common threshold for significance was $p < 0.05$. The color intensity corresponds to the chi-square values, highlighting the degree of agreement or discrepancy between the two groups.

Figure 13 of the survey results reveals the preferences for persistent identifiers (PIDs) among academic event organizers and scholars. The main PIDs for academic events were assessed for 3,231 respondents (organizers: 1,544, scholars: 1,687) using multiple choice theory. ORCID was the most common infection type, with 30.44% being organizers ($n=470$) and 36.75% being scholarly ($n=620$) approvals, totaling 33.74% (1,090 responses). A total of 30.05% of the DOIs were organizers ($n=464$), and 2.19% were scholars ($n=37$), for a total of 15.51% (501 responses). Researcher ID was approved by 18.59% of the organizers ($n=287$) and 17.01% of the scholars ($n=287$), resulting in 17.77% (574 responses). ISSN and ISBN were preferred more by scholars (19.86%, $n=335$; 18.79%, $n=317$) than by organizers (9.00%, $n=139$; 7.58%, $n=117$), with overall response rates of 14.67% (474 responses) and 13.43% (434 responses), respectively. Lesser-known PIDs, such as the ROR, URN, PMID, and GDPR, received minimal attention, with total responses of 1.61%, 1.24%, 1.15%, and 0.90%, respectively, amounting to fewer than 52 responses each.

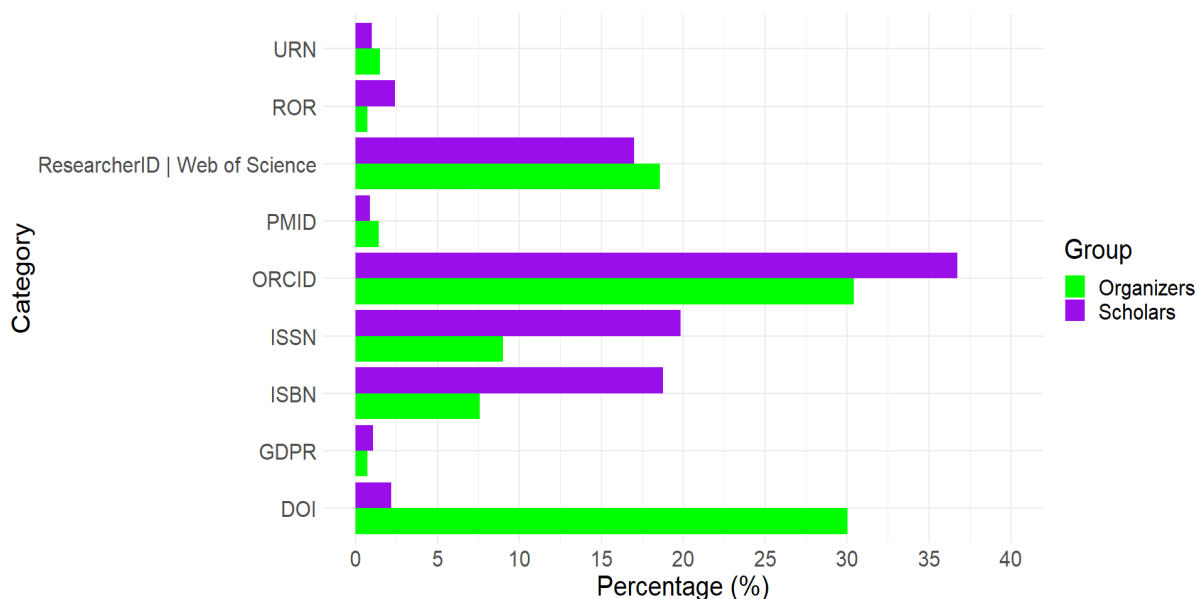


Fig. 13. Question: What persistent identifiers (PIDs) should be considered in scientific activities (multiple choice)?
(MC* organizers $n=1544$; MC scholars $n=1687$; MC total $n=3231$)

***Note:** MC (multiple choice) - more than one response alternative was possible.

Figure 14 shows the views of the organizers and academics on which the AE-related documents and data should be openly accessible based on 4,901 multiple-choice responses. The highest agreement (21.85%, $n=1071$) was on the importance of accessible, detailed event descriptions, with organizers (20.87%, $n=530$) and scholars (22.90%, $n=541$) nearly aligned. A close second is the need for a detailed agenda or schedule, which is valued almost equally by organizers (21.62%, $n=549$) and scholars (21.72%, $n=513$), totaling 21.67% ($n=1062$) of the responses. Conference proceedings are also highlighted, with 17.01% ($n=432$) of the organizers and 13.63% ($n=322$) of the scholars emphasizing their importance, totaling 15.38% ($n=754$) of the responses. Interest in articles showed a significant disparity, with scholars (8.89%, $n=210$) nearly doubling the interest of organizers (4.96%, $n=126$). Organizers were more valued for presenting these findings (7.52%, $n=191$) than scholars were (5.88%, $n=139$). Less critical elements included educational materials (2.98%, $n=146$ responses) and posters (5.00%, $n=245$), which received less priority from both groups. Moderate interest was shown in the video recordings (4.79%, $n=235$ responses), reflecting a trend toward visual media, while the audio recordings were least valued (1.00%, $n=49$ responses). Event resolutions are somewhat

important (7.51%, n=368 responses), whereas certificates (2.49%, n=122 responses) and an option for all listed points (3.73%, n=183 responses) receive minimal attention, suggesting that formal outcomes and personal accreditation from events are less crucial overall.

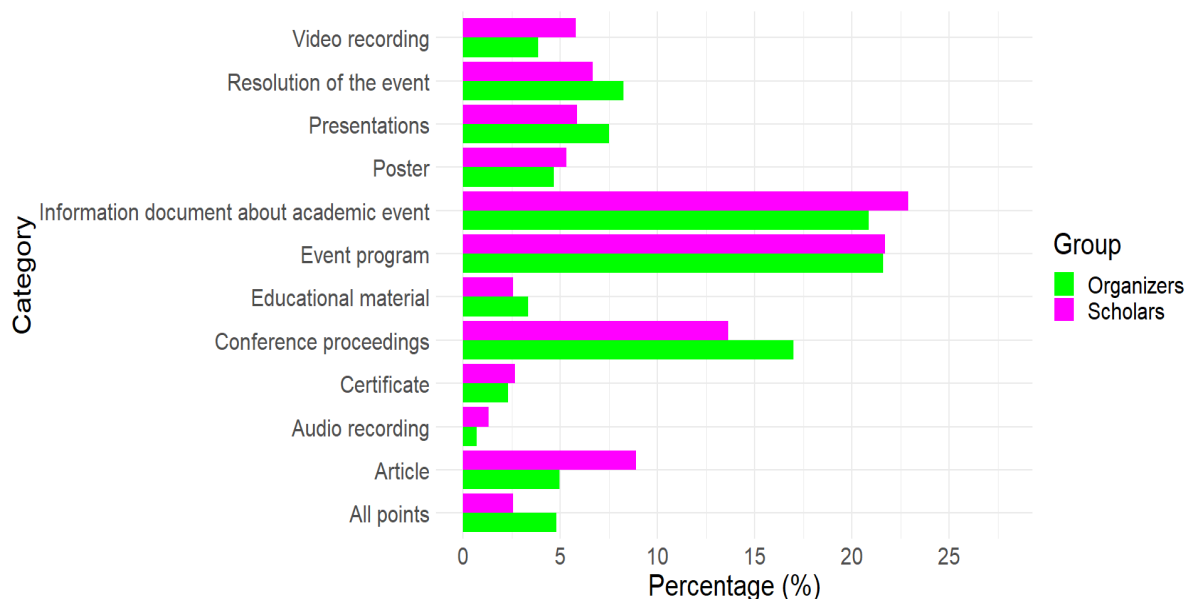


Fig. 14. Question: In your opinion, what documents/data about academic events should be placed in the open access in the profile of the academic events? (multiple choice)

(MC organizers n=2539; MC scholars n=2362; MC total n=4901).

***Note:** MC (multiple choice) - more than one response alternative was possible.

Figure 15 shows a heat map visualizing the significant differences in the chi-square test results between organizers and academics regarding which AE documents or data should be open access. There is a notable divergence in the importance attributed to articles, with chi-square values of 13.27 for organizers and 14.27 for scholars, indicating a significant difference in their valuation, likely due to varying reasons or emphases. The idea of making all the documents and data publicly available shows a considerable difference, with organizers at a chi-square value of 7.8 and scholars at 8.39, revealing a strong yet varied interest in comprehensive access to event materials. The importance of conference proceedings is similarly high for both, with minor differences (organizers: 4.38, scholars: 4.71), reflecting a mutual acknowledgment of their value. Video content is similarly valued by both groups (organizers: 4.63, scholars: 4.98), suggesting a consensus on its growing relevance. Educational materials are moderately important to both parties, with chi-square values of 1.16 for organizers and 1.25 for scholars, indicating a shared viewpoint. There was unanimous agreement between the two groups on the importance of the event program (chi-square value of 0). Posters are deemed less important by both (organizers: 0.49, scholars: 0.53). Resolutions and certificates receive relatively low chi-square values (below 2.5 for both), highlighting a minor difference in opinions and overall lower importance. Although slightly more important for scholars (2.31) than for organizers (2.15), audio recordings are still considered less critical than other materials.

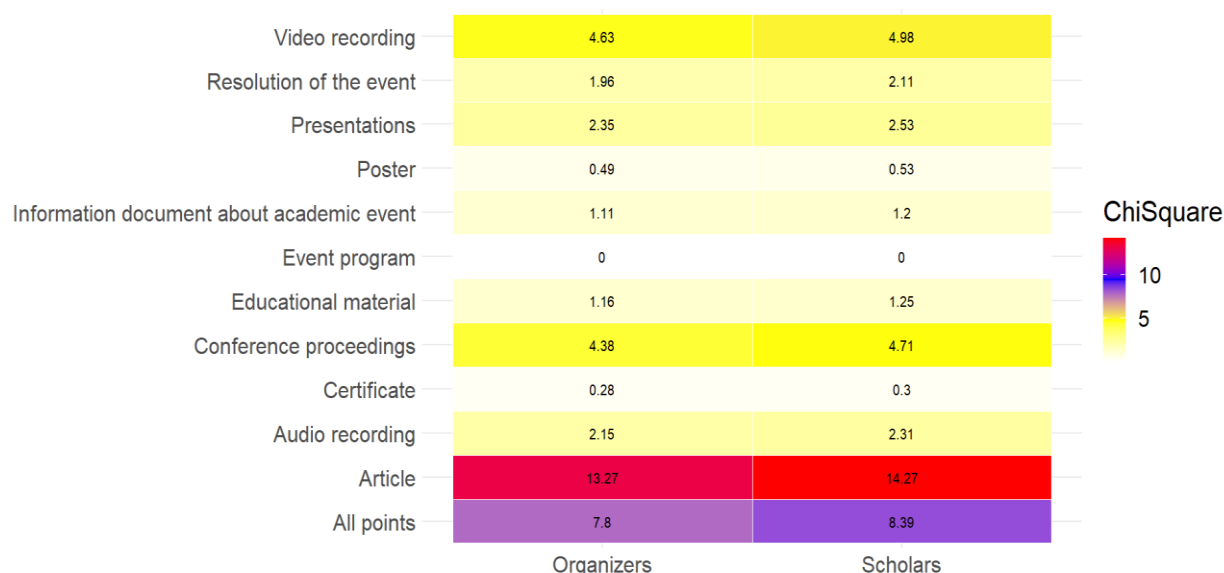


Fig. 15. In each category, chi-square* was used in response to the following question: In your opinion, what documents/data about academic events should be placed in the open access in the profile of the academic events?
(multiple choice)

***Note:** These p values indicate whether there is a statistically significant difference between the two groups. A common threshold for significance was $p < 0.05$. The color intensity corresponds to the chi-square value, highlighting the degree of agreement or discrepancy between the two groups.

5. DISCUSSION

The study investigated preferences for organizing and participating in AEs, uncovering differences between scholars and organizers (Table 5). Notably, 29.85% of the scholars preferred hybrid formats, whereas 14.36% preferred organizers ($p < 0.001$), indicating scholars' appreciation for the flexibility of hybrid events. Organizers favored offline events (20.07%) more than scholars did (7.29%), emphasizing the value of face-to-face interaction. Both groups showed a strong preference for online events, highlighting the overall acceptance of convenient digital formats (Hauss, 2020). Understanding these preferences is crucial for tailoring future AEs to meet the needs of both groups amidst the evolving landscape of academic events. This significant difference (p value < 0.001) may reflect the traditional benefits of face-to-face networking. Among the respondents, organizers (65.56%) and scholars (62.86%) expressed a strong preference for online events, but the difference was not significant. This trend underscores the general acceptance of the convenience and accessibility of formats the Internet offers. Online conferencing facilitates the participation of people with financial or physical limitations, but maintaining interactive and effective communication in the digital space remains a challenge, as indicated in the study by Pavluković *et al.* (2020). The influence of factors such as climate crises and inequality (Raven *et al.*, 2023) on the choice of event format must also be considered. Understanding these preferences is critical for tailoring future AEs to meet the needs of both scholars and organizers. As the landscape of AEs continues to evolve, flexibility and responsiveness to these preferences will play key roles in creating successful AEs.

Analysis of the data presented in Figure 2 reveals significant differences in the ratings of metadata quality between organizers and scholars. Among organizers, 22.84% ($n=124$) rated metadata quality as "very bad", whereas among academics, 39.75% ($n=289$) felt this way, for a total of 32.52% ($n=413$) of the total number of respondents. These findings highlight the critical need for metadata improvement in the context of academic developments in Ukraine and echo the findings of Lackner *et al.* (2021), indicating problems with metadata quality in academia. Bryl *et al.* (2014) emphasized the importance of metadata in assessing the "quality and relevance" of conferences. Lackner *et al.* (2021) conducted a study focusing on the outputs of AEs, mainly in computer science, using the definition of quality as usability.

Hauss (2020) did not use the term quality directly but studied the social and scientific impact of conference attendance, addressing some aspects of usability used in this study. Together, these studies emphasize the importance of metadata in ensuring the quality and relevance of AEs and point to current challenges and opportunities for improvement in this area.

As shown in Figure 3, most of the organizers (84.90%, n=461) and scholars (89.96%, n=654) considered improving metadata quality to be "very important." This confirms that metadata quality issues are highly prioritized in academia. Similar findings were made in a study by Porter (2016), who noted the importance of metadata for the effective management of academic resources—not as about low static records but as about objects as they move between systems and organizations.

According to Figure 4, there is an imbalance between the importance of metadata and the frequency of errors; 40.70% of organizers and 38.93% of scholars encounter metadata problems only "sometimes", indicating a need to improve its accuracy and reliability. These findings align with the results of Muntabir (2023), who emphasized the frequency of errors in metadata for digital objects and their impact on academic study.

Figure 5 shows that most respondents find metadata management relatively easy, with 43.46% of organizers and 43.88% of scientists rating it as "very easy." However, 11.05% of the organizers and 10.59% of the scholars found it "very difficult." This finding is consistent with the findings of a previous study (Amarmet, 2023) that discussed the complexities associated with metadata management in academic environments. From these results, it is clear that improving metadata quality is a critical task for both organizers and scholars. Additional resources and training may be needed to improve metadata quality and develop more intuitive tools for metadata management. Establishing metadata governance requires five activities: developing a metadata strategy, understanding metadata needs, defining a metadata architecture, creating and managing metadata, and querying, reporting, and analyzing metadata. The three planning procedures for metadata management include developing a metadata strategy, defining metadata needs, and developing a metadata architecture. The metadata management industry would benefit from a comprehensive and effective data management system. An enterprise needs a metadata management system that includes an assessment of metadata responsibilities, lifecycle, and statistics, and how different activities utilize metadata. A metadata strategy ensures consistency across an organization's data environment (Amarmet, 2023). These data can contribute to the development of policies and strategies to improve the quality of metadata, which in turn will improve the academic environment and academic resource management in Ukraine.

The results presented in Figure 6 show that both groups prioritized "event description," with a total importance score of 12.38%. The prioritization of "event topic" and "event type," with a combined importance of 12.11%, each indicates a common understanding of their importance in the academic landscape, which supports Rowell's (2016) findings on the standardization of academic metadata.

Figure 7, a heat map based on chi-square values, shows significant differences in the weights that organizers and scholars give to different factors when evaluating academic activities. The high importance of personal recommendations is consistent with the findings of Pavluković *et al.* (2020), who emphasized the influence of social validation on decisions to participate in AEs. Thus, the results of exploratory factor analysis revealed the six-factor structure of the conference participation decision-making process: destination stimuli, costs, and destination accessibility, educational and professional opportunities, intervening opportunities, location factors, and conference factors. These findings confirm previous related works by other researchers (Aktas and Demirel (2019); Jung and Tanford (2017); Liang and Latip (2018)). One of the underlying dimensions of conference attendance appears to be the destination. In this study, three factors related to the destination were identified: destination stimuli, costs and destination accessibility, and location factors. The first factor, Destination stimuli, emphasizes the importance of destination attractiveness when an academic chooses a conference to participate in. These findings are consistent with the findings of Malekmohammadi *et al.* (2011).

The results of Figure 8 show the importance of metadata relating to funders or sponsors, with organizers accounting for 35.91% and academics accounting for 36.73%, indicating a collective assessment of formal academic support. This reflects the

trends identified, which note the increasing role of institutional financial support in decision-making in AEs. Taken together, the findings suggest that despite awareness of the need for high-quality metadata, actual practice is inadequate, echoing the call for action in the larger European academic context. These findings should encourage event organizers to focus on the accuracy and completeness of metadata, given the close relationship between metadata quality and academic engagement.

Figure 9 shows the survey results on the easy-to-manage metadata of AEs from the perspective of organizers and scholars. The results are very revealing: the majority of organizers (43.46%, n=236) and academics (43.88%, n=319) stated that it is "very easy" to manage metadata. This finding suggests that existing metadata management tools and systems are effective for most users. However, these results should be interpreted with caution, as apparent ease may obscure the deeper issues faced by a minority of users. In contrast, a smaller but notable proportion of organizers (22.28%, n=121) and an even smaller proportion of scholars (6.19%, n=45) found metadata management 'easy', indicating potential inequalities in access to or familiarity with the necessary tools and protocols for metadata management. This discrepancy may reflect the different roles and responsibilities inherent in organizers and scholars. A significant number of scholars (23.38%, n=170) reported a moderate level of complexity, which was greater than that of organizers (5.71%, n=31). This moderate level may indicate varying levels of familiarity with metadata management, as noted by Palavitsinis *et al.* (2019), who emphasize the need for more intuitive and accessible metadata tools in academia. The study revealed an important feature: a significant part of the academic community faces problems in managing metadata: 17.50% of organizers and 15.96% of scholars find it "complicated". This finding suggests the need for more usable metadata management tools and more effective training programs that could improve the management of AEs.

The results of the survey (see Fig. 10) indicate problems related to metadata management. A total of 26.24% of the scholars, compared to 20.72% of the organizers, considered lack of standardization to be a major problem, indicating that 23.64% of the respondents were concerned about this aspect. This finding is consistent with the findings of Vahdati *et al.* (2016), who identified standardization as a key factor for metadata integrity in academic databases. According to DAMA-DMBOKv2, five actions are required to organize metadata management: developing a metadata strategy, understanding metadata needs, defining metadata architecture, creating and managing metadata, and querying, reporting, and analyzing metadata (Amarmet *et al.*, 2023). Concerns about metadata quality are almost equal among organizers (26.44%) and scholars (25.33%), indicating a shared recognition of their importance to academic research. Technical challenges in creating and updating metadata are also important, more so for organizers (25.32%) than for academics (20.66%), which matches the concerns recorded by Hagemann Wilholt *et al.* (2020) in their study. The ConfIDent project aims to develop a service platform for the collaborative curation of semantically structured metadata of AEs, providing reliable and transparent data for various stakeholders (Choudhury *et al.*, 2023). The impact of the quality of conference metadata is evident in the higher citation rate of papers at conferences with low adoption rates than at conferences with high adoption rates.

Figure 11 highlights that the academic community places great importance on "High quality of publication," with organizers and scholars rating its significance at 18.34% and 20.56%, respectively. This focus on publication quality echoes the observations of Bryl *et al.* (2014), who noted the difficulty in accessing necessary data for decision-making on conference submissions, often concealed within conference management systems. Scholars value the consistency of "proven regular events" (16.10%) more than organizers (13.91%), likely due to their reliance on these events for ongoing academic engagement. The significance of "Famous keynote speakers" and "Highly recognized event organizers" is also evident, underlining the role of reputation and credibility in attracting participants, as discussed in studies such as Cavusoglu *et al.* (2023). Lackner *et al.* (2021) noted that the composition of organizing committees and keynote speakers often changes with event location, although the core program committee remains largely stable.

The literature also addresses the impact of conference publication quality on conference reputation, with (Laplante *et al.*, 2009) and (Peller, 2013) discussing the effects of subpar papers and the integration of technology on the perceived quality of conferences. Martins *et al.* (2010), Zhuang *et al.* (2007), and Stevic *et al.* (2019) proposed methods for assessing conference

quality, including bibliographic citations and analysis of program committee characteristics. The importance of descriptive and bibliographic metadata in the scientific literature is emphasized by Ball (2011) and Tarrant *et al.* (2008), with ongoing research into the automatic extraction and analysis of scholarly metadata (Bertin and Atanassova (2012); Doerfel *et al.* (2012), Guo and Jin (2011), and Nasar *et al.* (2018) to facilitate bibliometric analysis and enhance the overall quality of conference publications.

Figure 12 shows the differences in the chi-square criterion between the opinions of the organizers and scholars on the criteria of the event. The importance given by organizers to the criterion "Attended colleagues" (16.83) was greater than that given by scholars (13.96), who emphasize the networking aspect of events, as confirmed by Vladimirovich *et al.* (2019), who believe that networking is a key determinant of event attendance. These ideas emphasize the importance of networking at conferences and the different measurements and mechanisms involved in building professional relationships. The importance of "free participation" and "famous keynote speakers" to organizers suggests that they aim to reach a larger audience, as evidenced by Trost *et al.* (2018) and Yamashita *et al.* (2023), who studied the impact of incentives on event attendance.

The results in Figure 13 show a preference for ORCID by both organizers (30.44%) and scholars (36.75%), which is in line with the global trend toward persistent identifiers for researchers, as noted by Demeranville (2018) ORCID not only simplifies the process of recording publications and research achievements but also contributes to the visibility and accessibility of scientists' work in the international academic community. On the other hand, the preference for DOI by conference organizers (30.05%) over scholars (2.19%), as indicated by Klump *et al.* (2016), highlights the importance of tracking digital publications. The purpose of using DOI in the context of conferences, as described by Franken *et al.* (2022), emphasizes the potential for automatic indexing and real-time updating of metadata. This approach would greatly improve the availability and quality of metadata, making it more "FAIR" (discoverable, accessible, interoperable, reusable). As Wilkinson (2016) noted, the key data consumers in the scholarly sector are publishers, indexing services, current research information systems (CRISs), funding organizations, and higher education institutions. These actors play different but highly intertwined roles in the process of metadata collection, processing, and dissemination. Their contributions are invaluable in the context of making scholarly information accessible and effective.

Figure 14 shows that organizers and scholars agree on the importance of open access to event descriptions and proceedings, which demonstrates the general value of transparency and accessibility in academia and supports the argument for the importance of open access in disseminating scientific information. Figures 10-14 show that there is a recognized need for better metadata management, more accessible and high-quality academic publications, and the importance of reputation and credibility in identifying AEs.

6. CONCLUSIONS

This study provides key information about the field of AEs in Ukraine, revealing different preferences and shared values among organizers and academics. There is a general emphasis on the importance of event descriptions and event management in academia. Key factors in deciding whether to participate in AEs include personal recommendations and academic reputation. Metadata relating to sponsors or funders is critical because it reflects the role of institutional support in AEs. Quality publications are prioritized, indicating their importance in enhancing the reputation of AEs. Organizers value networking more, and free participation and outstanding speakers are needed to attract a wider audience. Both groups preferred ORCID, which aligns with global trends in academia, while organizers showed a greater propensity for DOIs to track digital publications. Overall, the study emphasizes the need for better descriptive metadata management, quality publications, and open access to AEs. It also emphasizes the importance of networked, online, and hybrid formats of AEs, as well as institutional support in shaping the participation and governance of AEs, providing key information for strategizing in Ukraine's academic sector.

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Conflict of interest

Conflict of interest the authors have no relevant financial or nonfinancial interests to disclose.

Statement of data consent

The responses of respondents generated during the development of this study cannot be made available in the open access raw data underlying this study to protect the anonymity of respondents and their organizations but can be requested by email sabina.auhunyas@tib.eu. Dataset UA_Academic_Events: created during the development of this study were archived in Zenodo and are available at <https://doi.org/10.5281/zenodo.10468460>.

Abbreviations and acronyms

AEs - academic events

MC - multiple choice

PIDs - persistent identifiers

MESU - Ministry of Education and Science of Ukraine

MHU - Ministry of Healthcare of Ukraine

IECM - Institute for Educational Content Modernization

USEDE - Unified State Electronic Database on Education

CDP - Continuing Professional Development

UkrISTEI - Ukrainian Institute of Scientific and Technical Expertise and Information

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