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ZAGADNIENIA INFORMACJI NAUKOWEJ

Studia Informacyjne

ISSUES IN INFORMATION SCIENCE

Information Studies

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Warszawa 2020

ISSUES IN INFORMATION SCIENCE – INFORMATION STUDIES

The core purpose of *Issues in Information Science – Information Studies (Zagadnienia Informacji Naukowej – Studia Informacyjne,* ZIN – *Studia Informacyjne)* is to provide a forum for the dissemination of scientific papers and research results in the field of information science and other disciplines which analyze social and technological aspects of various information-related activities performed by contemporary communities. Moreover, the journal is to disseminate critical reviews and summaries of new publications in the field of information science and reports from important conferences discussing contemporary information problems.

We publish papers in Polish or English. For each paper a set of metadata is provided: an abstract and keywords in both languages) as well as author's bio and contact information.

The subtitle of the journal – *Information Studies* – emphasizes the interdisciplinary nature of its subject profile covering a broad spectrum of issues studied by various academic disciplines and professional activity domains related to access to resources of recorded information and knowledge and the use of these resources by contemporary man and society. Other subjects to be covered by ZIN – *Information Studies* involve: (1) theoretical ponderings on the practice of information-related activities performed by various communities, (2) the results of research on the conditions influencing those activities and ways of improving methods and tools employed for the activities in question, (3) the methodology of information science research, information science history and education concerning the information science. The subject profile of ZIN – *Information Studies* covers, among else, the issues of:

- information services in institutions of science, culture, business, education and administration,
- information and knowledge management,
- traditional and online scholarly communication,
- information and knowledge organization,
- metadata theory and practice,
- Web 2.0,
- Semantic Web,
- information architecture,
- information websites usability,
- digital humanities,
- human-computer interaction,
- natural language processing,
- information retrieval,
- use of information and behavior of the information users,
- social response to modern information technologies,
- culture of information,
- information, digital and media skills,
- information policy,
- information ethics.

ZIN – *Information Studies* is addressed to: (1) information science teachers and lecturers, researchers and students, (2) practitioners of information-related activities who analyze methods and tools used to implement those activities in various domains and organizational environments, (3) politicians and donators related to information activities in various domains. The journal content may also be of some interest to teachers, students and researchers in other disciplines of science which deal with various aspects of information existence and use in the contemporary world.

ZIN – *Information Studies* is included in the list of journals scored by Polish Ministry of Science and Higher Education and indexed by: Central European Journal in Social Sciences and Humanities (CEJSH), Central and Eastern European Online Library (CEEOL), Cambridge Scientific Abstracts (CSA), Library and Information Science and Technology Abstracts (LISTA), Polish Bibliography of Book Studies (PBB), Knowledge Organization Literature, Worldcat and Polish Scholarly Bibliography (PBN). The journal is registered in the European Reference Index for the Humanities (ERIH Plus).

ZAGADNIENIA INFORMACJI NAUKOWEJ – STUDIA INFORMACYJNE

Głównym celem *Zagadnień Informacji Naukowej – Studiów Informacyjnych* (ZIN – *Studia Informacyjne*) jest zapewnienie forum dla rozpowszechniania artykułów naukowych i wyników badań z zakresu nauki o informacji (informatologii) oraz innych dyscyplin, w których podejmowane są analizy społecznych i technologicznych aspektów działalności informacyjnej prowadzonej w różnych sferach współczesnego życia społecznego. Czasopismo służyć ma również rozpowszechnianiu krytycznych recenzji i omówień publikacji z tego zakresu oraz problemowych sprawozdań z ważnych konferencji poświęconych współczesnym problemom informacyjnym.

Publikujemy artykuły w językach polskim i angielskim. Każdy artykuł posiada zestaw metadanych: abstrakt i słowa kluczowe (w obu językach) oraz nota biograficzna autora i dane do kontaktu z nim.

Czasopismo adresowane jest zarówno do czytelnika polskiego jak i zagranicznego, publikujemy artykuły zarówno w języku polskim jak i angielskim. Podtytuł czasopisma – *Studia Informacyjne* – podkreśla interdyscyplinarny charakter jego profilu tematycznego, który obejmuje szeroki zakres problemów podejmowanych przez dyscypliny akademickie i dziedziny działalności zawodowej związane z zapewnianiem dostępu do utrwalonych zasobów informacji i wiedzy oraz ich wykorzystywaniem przez współczesnego człowieka i współczesne społeczeństwo. Czasopismo publikuje też artykuły prezentujące teoretyczną refleksję o praktycznej działalności informacyjnej prowadzonej w różnych dziedzinach i obszarach życia społecznego, a także wyniki badań służących poznaniu różnych uwarunkowań tej działalności oraz doskonaleniu jej metod i narzędzi. Na łamach ZIN publikowane są także artykuły poświęcone metodologii badań informatologicznych, historii nauki o informacji oraz edukacji w zakresie nauki o informacji. Profil tematyczny półrocznika ZIN – *Studia Informacyjne* obejmuje m.in. problematykę:

- usług informacyjnych w instytucjach nauki, kultury, biznesu, edukacji i administracji,
- zarządzania informacją i wiedzą,
- komunikacji naukowej i cyfrowej komunikacji naukowej,
- organizacji informacji i wiedzy,
- teorii i praktyki metadanych,
- zagadnień Web 2.0,
- zagadnień Sieci Semantycznej,
- architektury informacji,
- projektowania użytecznych serwisów informacyjnych,
- humanistyki cyfrowej,
- interakcji człowiek – komputer,
- przetwarzania języka naturalnego,
- wyszukiwania informacji,
- wykorzystywania informacji i zachowań informacyjnych użytkowników,
- społecznej recepcji nowoczesnych technologii informacyjnych,
- kultura informacji,
- kompetencji informacyjnych i cyfrowych,
- polityki informacyjnej,
- etyki informacyjnej.

Zagadnienia Informacji Naukowej – Studia Informacyjne adresowane są do wykładowców, badaczy i studentów nauki o informacji, a także praktyków działalności informacyjnej, krytycznie analizujących metody i narzędzia jej realizacji w różnych środowiskach dziedzinowych i organizacyjnych oraz polityków i donatorów działalności informacyjnej w różnych dziedzinach. Lektura czasopisma może też zainteresować wykładowców, studentów i badaczy innych dyscyplin, które zajmują się różnymi aspektami funkcjonowania informacji we współczesnym świecie.

Zagadnienia Informacji Naukowej znajdują się na liście czasopism punktowanych Ministerstwa Nauki i Szkolnictwa Wyższego. Czasopismo jest indeksowane w bazach: Central European Journal in Social Sciences and Humanities (CEJSH), Central and Eastern European Online Library (CEEOL), Cambridge Scientific Abstracts (CSA), Library and Information Science and Technology Abstracts (LISTA), Polska Bibliografia Bibliologiczna (PBB), Knowledge Organization Literature, Worldcat, Polska Bibliografia Naukowa (PBN). Czasopismo jest zarejestrowane w European Reference Index for the Humanities (ERIH Plus).

CRISIS SITUATIONS AND INFORMATION SCIENCE

SYTUACJE KRYZYSOWE A NAUKA O INFORMACJI

Contents | Spis treści

THESES. RESEARCH. MATERIALS | ROZPRAWY. BADANIA. MATERIAŁY

Preface

This issue of *Zagadnienia Informacji Naukowej – Studia Informacyjne* presents seven articles submitted in response to the Call for Papers, in which our Editorial Board invited submissions devoted to different aspects of crisis situations which have recently become a popular subject of research in information science. The intention of the Editorial Board was to present various aspects of crisis situations, with an emphasis on the role of information science in controlling and managing them in effective ways. We invited research and review articles reflecting on five main areas of information science we identified in the Call, i.e., users; resources and services; information management strategies; research and scholarly communication; and impact of crisis situations on the development of information technology and its applications.

The opening article, entitled *Crisis Situations and Information Science. Selected Issues in the Context of the COVID-19 Pandemic*, is of my authorship. I provide a critical review of selected scholarly literature on the issues related to the current global health crisis published by information science scholars and professionals, as well as initiatives related to information science, undertaken to provide access to reliable and valid information in crisis situations.

In the following article, entitled *The Implications of Epidemic Risks for Scholarly Communication and Higher Education Processes. Preliminary Remarks*, Piotr Tafiłowski presents reflections on changes in scholarly communication, basing on discussions with second-year students taking a course on scholarly communication. The aim of this paper is to start a discussion on the changes in scholarly communication, both in research and in teaching, that have occured during the current epidemic crisis.

The next two articles consider the strategies that Polish academic libraries employed during the COVID-19 lockdown introduced in the spring of 2020.

The article by Bożena Jaskowska – *Management of Academic Libraries in Poland During the COVID-19 Lockdown* – presents results of a study conducted among the directors of Polish academic libraries regarding the organization of information and library services during the lockdown and the management obstacles which the libraries faced.

The article by Anna Kamińska, Anna Książczak-Gronowska, and Zuzanna Wiorogórska – *The Use of Information and Communication Technologies in Academic Libraries in a Crisis Situation. Experiences of the University of Warsaw Library* – investigates the impact of the crisis situation caused by the spread of COVID-19 on the work of library information and IT systems, with the University of Warsaw Library as a case study. However, unlike most of the other studies, it focuses on electronic resources and service hubs, rather than on the library understood as a public space and a store of printed publications.

The next article – *Information Behavior in Crisis Situations* – by Monika Krakowska discusses the research on information behavior during crises, conflicts and disasters. The article presents various concepts and models concerning the identification of heterogeneous information activities and an attempt to define and characterize various crisis situations.

In the sixth article, entitled *The Impact of COVID-19 on the Information Literacy of Business Sharing Groups Users*, Dorota Rak determines whether COVID-19 has affected

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information competences of users of a specific type, i.e. members of business sharing Facebook groups. In her pilot study, she surveyed eight groups from Lesser Poland, as well as Tri-City, Silesia, and Mazovia, collecting responses on the following issues: recognizing information needs and obtaining information, evaluating and using information, defining and self-assessing information competences.

The issue ends with an article by Anna Matysek and Jacek Tomaszczyk – *Digital Wisdom in Research Work* – which focuses on digital wisdom as defined by Marc Prensky. The authors present select digital tools that increase the efficiency of scientific research and facilitate conceptual work, information retrieval, note-taking and the writing process. Access to the newest tools and the development of digital wisdom have become crucial during the COVID-19 pandemic.

These diverse articles published in our thematic issue attempt to understand how the current crisis situation has affected information management and work of researchers and information organizations,; they show the best strategies that have been employed to adjust the work to the conditions of the pandemic; and the changes in the functioning of the information systems. We hope that the issue will be of interest to our readers and contribute to the continuously growing body of scholarly literature on the current crisis situation.

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Warsaw, 18 December, 2020

Crisis Situations and Information Science. Selected Issues in the Context of the COVID-19 Pandemic

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Abstract

Purpose/Thesis: This paper attempts to organize and systematize scholarly literature on the issues relating to the current global health crisis published by information science scholars and professionals, as well as on the information science-related initiatives undertaken to provide access to reliable and valid information in crisis situations.
Approach/Methods: A critical review of selected literature, as well as observation and a descriptive analysis of websites and Web platforms were conducted to establish the thematic corpus.
Results and conclusions: Even though the topic is recent, several subfields of information science have already been the subject of studies conducted in different parts of the world. It may imply that information science scholars and professionals react quickly to change and they are aware of the fact that their discipline may play an important role during crisis situations. This role may involve facilitating better management in future crises if they do happen.
Research limitations: Since the topic is new and the situation is dynamic, new research results, or online projects are being issued almost on a daily basis. Hence, it can be assumed that shortly after its publication, this paper will not present the current state of the art anymore.
Originality/Value: First scholarly publications on the issues relating to the current global health crisis appeared in early Spring 2020. According to the author's knowledge, no summary has been published that would systematize and classify the publications and other initiatives from the information science field.

Keywords

COVID-19 pandemic. Health crisis. Information science. Information studies.

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1. Introduction

The global health crisis we have been witnessing since the beginning of 2020 inspired a more general reflection on the role of information in crisis situations. As Virginia Barbour and Martin Borchert, Australian researchers, stated, "The current crisis offers an opportunity to refashion a better system" (Barbour & Borchert, 2020), for example to build a new, more open research infrastructure and to reshape the policy of research output communication. Furthermore, the intense data production and the proliferation of channels for sharing this

data on a daily basis have challenged current research practices; they have also moved the scholarly communication to less formal channels, proving that preprints and social media play an important role in research dissemination. It has reshaped the research culture, and made research itself more fast-paced (Kupferschmidt, 2020). It exposed the need for an innovative infrastructure that would support digital scholarly communication – a need which has already been discussed before the pandemic, during the "Digital Transformation in Scholarly Communication" workshop organized by Science Europe in November 2019 in Brussels (Science Europe, 2020).

In February 2020, International Internet Preservation Consortium (IIPC), collaborating with Archive-It, identified already existing websites and began crawling newly established websites to create a collection that would preserve Web content related to the outbreak of COVID-19 (IIPC, 2020). In April, IIPC launched a survey to map information on collecting Internet content related to the COVID-19 pandemic. The participants included libraries, archives and other institutions managing Web archive collections.

Furthermore, various associations of information management professionals have issued guidelines, recommendations; they also shared resources and tool hubs (see for ex. ALA, 2020; IFLA, 2020) to help institutions in their everyday informational work and service delivery.

This paper attempts to organize and systematize the selected scholarly literature on the issues relating to the global health crisis published by information science scholars and professionals, as well as information science-related initiatives undertaken to provide access to reliable information in critical situations.

A review of selected literature, as well as observation and a descriptive analysis of websites and Web platforms were conducted to establish the thematic corpus. Then, after introducing relevant categories, the publications were classified.

2. Thematic coverage

For the purposes of this paper, five information-related areas were distinguished. These were: 1. Users; 2. Information management strategies; 3. Research and scholarly communication; 4. Impact of crisis situations on the development of social media content; and 5. The role of information professionals in management of crisis situations. The division was arbitrary. These areas comprised more detailed subfields and themes.

2.1. Users

Users need access to immediate information (Zeng et al., 2020), but they also need immediate access to information to continue their everyday research work or education regardless of the external circumstances. The sudden lockdown which prevented access to onsite information sources disrupted professional and educational plans of many, and forced the information professionals to rapidly change how they worked and to adjust the services they provided to the users' needs.

The pandemic and the resulting lockdown also revealed an urgent need to improve skills and competences relating to information literacy, which involves evaluation of sources, assessing its reliability, or critical thinking among information users.

Several authors indicated that information overload was one of the main challenges during the pandemic (Chang et al., 2020; Zeng et al., 2020).

Ángeles Moreno et al. (2020) surveyed the influence of information forms and sources on the public information-seeking behaviors, particularly in the context of trust in diverse information sources and channels, as well as the perception of government communication management in Spain. The results of their study reflected the findings of previous research on the trust in government communication. During the first stages of an emergency the trust in those sources was moderate as was the criticism of public authorities, which became more pronounced as the crisis evolved.

Samuli Laato et al. (2020) described a phenomenon of cyberchondria in the context of the COVID-19 pandemic. Cyberchondria is extreme anxiety that might be provoked by information overload. In this case, it was caused by obsessional browsing the Web in search for medical information, which became a regular occupation of the individuals frightened by the spreading misinformation regarding the threat and casualties of COVID-19.

Rubén Alcaraz-Martínes and Mireia Ribera-Turró (2020) drew attention to a defavorized group of information users – people with low vision. Unlike people with major sight loss, this group of visually disabled users is not yet forced to rely on assistive technologies to read electronic content. Thus, certain efforts are required to ensure these users have equal access to essential information – in this case, information on the pandemic-related issues. In their study, the authors reviewed the accessibility of the statistical charts about the COVID-19 crisis published by the governments of Brazil, Russia, the UK, the USA, and the European Union. The results were satisfactory.

2.2. Information management strategies

The journal *Data and Information Management* devoted a special issue to the theme of the COVID-19 global pandemic in the context of using data and information management responses to the global health crisis. In an editorial article, Feicheng Ma (2020) highlighted three issues that in his opinion deserve serious consideration. These are: 1) accurate collection and analysis of epidemic-related data; 2) effective screening of erroneous/ false information; 3) user information behavior in public health emergencies.

The pandemic also challenged knowledge organization systems (KOSs), particularly health-related terminologies. To face information overload and eliminate semantic conflicts, controlled, standardized, and shared vocabularies have become critical to information exchange and communication during the COVID-19 pandemic (Zeng et al., 2020). Moreover, ontologies are in use to enhance interoperability. They link different vocabularies and data coded in diverse standards; they also allow semantic solutions to process data. COVID-19 Surveillance Ontology (NCBO, 2020b) or Coronavirus Infectious Disease Ontology (NCBO, 2020a) might serve as examples. An interesting study which experimented with merging datasets and diverse taxonomies was conducted by Yi-Yun Cheng and Bertram Ludäscher (2020).

Tomás Saorín et al. (2020) designed an algorithm that helps build controlled vocabularies relating to the COVID-19 pandemic, based on Wikidata and Wikipedia terminologies. The authors implemented the algorithm in an open-source application, which allowed them to publish the results of their work on the pandemic vocabulary collection in a repository.

We can also observe launching of advanced aggregating platforms, which use big data analysis and computer modelling.

COVID-19 Primer (https://covid19primer.com) uses national language processing algorithms to crawl summaries of the latest research papers which it presents on a user-friendly, data dashboard updated every 24 hours.

LitCovid is an open-source literature hub tracking up-to-date international research publications on COVID-19 (Chen et al., 2020). The COVID-19 Open Research Dataset, abbreviated "CORD-19" (SST, 2020) is a free resource of over 52.000 scholarly articles about COVID-19 and the coronavirus family of viruses, which is freely available to the global research community. About 30 library guides (as cited by Yu & Mani, 2020)academic libraries in the United States were reportedly responding to challenges by pivoting to new ways to meet the users' needs. This observational study was designed to investigate the status, services, and resources disclosed via websites of academic medical/health sciences libraries (MHSLs provides direct links to these two resources, which proves its relevancy and reliability.

A French project CoVprehension (at https://covprehension.org/) can serve as example of a user-friendly simulator of social models. It uses spatial data infrastructures to create simulations and to share data.

Data management and sharing is extremely important during crisis situations. In response to the outbreak of the current global pandemic Research Data Alliance published COVID-19 data management Guidelines and Recommendations (RDA, 2020).

2.3. Research and scholarly communication

In October 2020, Frontiers published a report on the survey entitled "The Academic Response to COVID-19" (Rijs & Fenter, 2020), which was conducted between May and June 2020 among over 25.000 researchers from 152 countries. The results showed that the majority of researchers had been able to continue working; writing papers for publication has been the most common occupation during the pandemic, alongside research and online teaching. According to most of the participants, their institutions were prepared for a shift to remote working; they assessed positively the support received from their workplaces. A part of the survey concerned open science and research results sharing. Here, the answers varied significantly across different countries. Cultural differences played a part in whether researchers were more likely to publish in open access journals or share their research data. Still, in some countries, nearly half of the researchers was more likely to deposit work on a preprint server, or to share data, or to publish in an open access journal. On the other hand, a quarter of the researchers suggested that they could contribute through sharing their expertise with scholars in other disciplines. It also should be mentioned that almost half of the researchers expressed concerns about the impact of the current crisis on future funding of research.

Daniel Torres-Salinas (2020) conducted a bibliometric study focusing on scholarly articles concerned with COVID-19. The results of his work were published in March 2020. He counted nearly 9500 publication; at the time when the daily global growth rate was 500 publications (in PubMed database even 1000), with the production doubling every 15 days. More than a half year later, those numbers are certainly out of date and probably have grown

significantly. Torres-Salinas concluded that three out of four publications analyzed were available in open access. In the light of the abovementioned Frontiers' report, this allows for more optimism when it comes to sharing of the research results.

2.4. Impact of crisis situations on the development of social media content

Another interesting field of investigation for information science is the spread of information in social media in a crisis situation. As a microblog, Twitter is a popular means for rapid sharing information with large numbers of people. The platform is more and more frequently used as an official information channel by public institutions, such as governments or health public agencies. This is likely why tweets were the most often analyzed means of communication in information science scholarship (Chong, 2020; Dinh & Parulian, 2020; Fan et al., 2020; Karami & Anderson, 2020; Thelwall & Thelwall, 2020; Zheng et al., 2020).

YouTube was studied by Enrique Orduña-Malena et al. (2020). They conducted an informetrics study and analyzed over 39.000 videos between January and April 2020 to characterize the impact of those videos and to categorize the broadcast channels.

2.5. The role of information professionals in management of crisis situations

Jiangping Chen conducted a small study among her doctoral students in information studies at the University of North Texas (Chen, 2020). She wanted to investigate the students' (future information science scholars) perspectives on what information scientists can do to help individuals and societies to survive global health crises such as the COVID-19 pandemic. The participants identified six key responsibilities: (1) fighting against misinformation and disinformation; (2) collaboration (involved in point 1; this may also refer to interdisciplinary and interinstitutional collaboration which could help vulnerable populations to access information and resources; (3) research on information behavior (which also helps in preventing information overload and the abovementioned cyberchondria); (4) digital archiving (since archives of material created in these extraordinary circumstances will allow for later comparative analyses in other fields); (5) information access for vulnerable populations (which are often disadvantaged even at the best of times) to equip them with digital technologies and information skills; (6) information and data literacy.

The latter is not only the key responsibility of information scientists, but, more importantly, the key 21st century skill for all individuals which they should constantly improve through formal and non-formal life-long learning; the skill indispensable for the critical evaluation of sources and information (information literacy) and processing, sorting, and filtering vast quantities of information, which require knowing how to search, how to filter and process, to produce and synthesize that information (i.e., data literacy as defined by Koltay, 2016).

Dora Sales et al. (2020) examined how social sciences faculty assessed their own and their students' levels of information and digital competences (IDC). The results showed that the lockdown which forced them to move their teaching online (a process which the authors called "virtualization of teaching") revealed certain gaps and deficits at both parties of didactic process. Considering that IDC is a key component of inclusive and sustainable society,

university authorities should consider implementing a systematic institutional solution to facilitate the development of IDC. Academic libraries may be partners in this endeavor.

Libraries and librarians are also important players on the field of information. Although they have been traditionally perceived as primarily responsible for book curation and preservation, in reality they have long served as mediators between analog or digital documents, and the information users. And during this difficult period, which some authors identified as an "infodemic" (cf. Aleixandre-Benavent et al., 2020; García-Marín, 2020; Yu & Mani, 2020), librarians were continuously and actively responding to the patrons' needs.

In the USA, at the early stage of the pandemic, a nation-wide online survey on the US Academic Library Response to COVID-19 was launched (Janicke Hinchliffe & Wolff-Eisenberg, 2020). The survey explored strategies employed by the libraries during lockdown and the challenges they were facing while shifting online the delivery both of library services (what impacted them directly) and of teaching (what impacted their patrons).

Among several types of libraries, medical and health science libraries are assigned a singular task. Not only do they serve their users in everyday queries, they also need to quickly adapt to crisis situations in order to provide services that will equip the researchers with the latest and relevant information necessary to find the methods to overcome the disease. In March and April 2020, Fei Yu and Nandita Mani (2020) conducted an observational study in 157 libraries of that type in the USA. They concluded that the expertise of medical and health science libraries helped to combat the information crises brought on by the pandemic; librarians partnered with healthcare professionals, public health leaders, and policymakers.

The authors of this study also emphasized the importance of health literacy education and data management. To ensure the former, libraries provided guidance on the evaluation of information and fact-checking. Some of the surveyed libraries redirected their users towards another noteworthy project that has shaped health literacy and fights against misinformation, i.e., "The COVID-19 Health Literacy Project" at https://covid19healthliteracyproject.com. It offers coronavirus fact sheets in more than 30 languages. The project was a grass-roots initiative of a Harvard Medical School student, but it quickly turned into a coalition of US medical students representing several language groups, further fostering its multilingualism.

The call for papers published by a Canadian journal *Documentation et bibliothèques*, for its thematic issue entitled *Be a part of the equation* (Fr. *Faire partie de l'équation*), to be published in 2021, focuses on improving the position of informational professionals and the services they may offer in times of the pandemic (ASTED, 2020). It seems that this topic is inexhaustible and is constantly inspiring new ideas.

3. Conclusion

Even though the theme and the exceptional circumstances in which we are living have a very brief history, several subfields of information science and their relation to the global health crisis have already been studied in different parts of the world. It might imply that information science scholars and professionals react quickly and that they are aware that their discipline may play an important role during crisis situations. This role may facilitating

better management in future crises – if they do happen. Due to the topic's novelty and dynamics, new results of studies, or online projects are being issued almost on a daily basis. Hence, it can be assumed that shortly after its publication, this paper will not present the current state of the art anymore. Therefore, a further, more thorough study could be conducted in few months and / or after the pandemic ends, to expand and update the initial review of literature presented in this paper.

References

ALA (2020). *Pandemic Preparedness. Resources for Libraries* [online]. American Libraries Association [13.11.2020], http://www.ala.org/tools/atoz/pandemic-preparedness

Alcaraz-Martínez, R., Ribera-Turró, M. (2020). An Evaluation of Accessibility of Covid-19 Statistical Charts of Governments and Health Organisations for People with Low Vision. *El Profesional de La Información*, 25(5), https://doi.org/10.3145/epi.2020.sep.14

Aleixandre-Benavent, R., Castelló-Cogollos, L., Valderrama-Zurián, J.-C. (2020). Información y comunicación durante los primeros meses de Covid-19. Cronología, infodemia y desinformación, noticias falsas, investigaciones en curso y papel de los especialistas en información. *El Profesional de La Información*, 29(4), https://doi.org/10.3145/epi.2020.jul.08

ASTED (2020). *Appel de texte Documentation et bibliothèques – Volume 67, no 1 : Faire partie de l'équation* [online]. L'Association pour l'avancement des sciences et des techniques de la documentation [13.11.2020], https://tinyurl.com/y3vhrrtz

Barbour, V., Borchert, M. (2020). *Open Science: After the COVID-19 Pandemic There Can Be No Return to Closed Working* [online]. Australian Academy of Science [13.11.2020], https://www.science.org.au/curious/policy-features/open-science-after-covid-19-pandemic-there-can-be-no-return-closed-working

Chang, S., McKay, D., Caidi, N., Mendoza, A., Gomes, C., Dedeoglu, C. E. (2020). From Way Across the Sea: Information Overload and International Students During the COVID-19 Pandemic. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.289

Chen, J. (2020). Beyond Information Organization and Evaluation: How Can Information Scientists Contribute to Independent Thinking? *Data and Information Management*, 4(3), 171–176, https://doi.org/10.2478/dim-2020-0017

Chen, Q., Allot, A., Lu, Z. (2020). Keep up With the Latest Coronavirus Research. *Nature*, 579(7798), 193.

Cheng, Y., Ludäscher, B. (2020). Through the Magnifying Glass: Exploring Aggregations of COVID-19 Datasets by County, State, and Taxonomies of U.S. Regions. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.355

Chong, M. (2020). Network Typology, Information Sources, and Messages of the Infodemic Twitter Network Under COVID-19. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.363

Dinh, L., Parulian, N. (2020). COVID-19 Pandemic and Information Diffusion Analysis on Twitter. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.252

Fan, L., Yu, H., Yin, Z. (2020). Stigmatization in Social Media: Documenting and Analyzing Hate Speech for COVID-19 on Twitter. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.313

García-Marín, D. (2020). Infodemia global. Desórdenes informativos, narrativas fake y fact-checking en la crisis de la Covid-19. *El Profesional de La Información*, 29(4), https://doi.org/10.3145/epi.2020.jul.11

IFLA (2020). *COVID-19 and the Global Library Field* [online]. International Federation of Libraries and Associations [13.11.2020], https://www.ifla.org/covid-19-and-libraries

IIPC (2020). *Novel Coronavirus (COVID-19)* [online]. International Internet Preservation Consortium [13.11.2020], https://archive-it.org/collections/13529

Janicke Hinchliffe, L., Wolff-Eisenberg, C. (2020). *US Academic Library Response to COVID19 Survey* [online]. Google Docs. Public Document of Links [13.11.2020], https://docs.google.com/document/d/e/2PACX-1vTUm3ZmNwiYXG6ghLmYYSJ7FbB7vqYhQQaokqne18J68GSLufY6ZHguNi16zJMXl10a0HaiBgROR-R7/pub

Karami, A., Anderson, M. (2020). Social Media and COVID-19: Characterizing Anti-Quarantine Comments on Twitter. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.349

Koltay, T. (2016). Data Governance, Data Literacy and the Management of Data Quality. *IFLA Journal*, 42(4), 303–312, https://doi.org/https://doi.org/10.1177/0340035216672238

Kupferschmidt, K. (2020). 'A Completely New Culture of Doing Research.' Coronavirus Outbreak Changes How Scientists Communicate. *Science*, (26 Feb.), https://doi.org/10.1126/science.abb4761

Laato, S., Islam, A. K. M. N., Islam, M. N., Whelan, E. (2020). What drives unverified information sharing and cyberchondria during the COVID-19 pandemic? *European Journal of Information Systems*, 29(3), 288–305, https://doi.org/10.1080/0960085X.2020.1770632

Ma, F. (2020). How Can Information and Data Management Be Used to Address Global Health Crisis. *Data and Information Management*, 4(3), 127–129, https://doi.org/10.2478/dim-2020-0018

Moreno, A., Fuentes-Lara, C., Navarro, C. (2020). Covid-19 Communication Management in Spain: Exploring the Effect of Information-Seeking Behavior and Message Reception in Public's Evaluation. *El Profesional de La Información*, 29(4), https://doi.org/10.3145/epi.2020.jul.02

NCBO (2020a). *Coronavirus Infectious Disease Ontology* [online]. National Center for Biomedical Ontology [13.11.2020], from https://bioportal.bioontology.org/ontologies/CIDO

NCBO (2020b). *COVID-19 Surveillance Ontology* [online]. National Center for Biomedical Ontology [13.11.2020], https://bioportal.bioontology.org/ontologies/COVID19/

Orduña-Malea, E., Font-Julián, C. I., Ontalba-Ruipérez, J.-A. (2020). Covid-19: análisis métrico de vídeos y canales de comunicación en YouTube. *El Profesional de La Información*, 29(3), https://doi.org/10.3145/epi.2020.jul.01

RDA (2020). *RDA COVID-19 Guidelines and Recommendations* [online]. Reseacrh Data Alliance [13.11.2020], https://www.rd-alliance.org/group/rda-covid19-rda-covid19-omics-rda-covid19-epidemiology-rda-covid19-clinical-rda-covid19-0

Rijs, C., Fenter, F. (2020). The Academic Response to COVID-19. *Frontiers in Public Health*, 8, https://doi.org/10.3389/fpubh.2020.621563

Sales, D., Cuevas-Cerveró, A., Gómez-Hernández, J.-A. (2020). Perspectives on the Information and Digital Competence of Social Sciences Students and Faculty Before and During Lockdown Due to COVID-19. *El Profesional de La Información*, 29(4), https://doi.org/10.3145/epi.2020.jul.23

Saorín, T., Pastor-Sánchez, J.-A., Baños-Moreno, M.-J. (2020). Uso de Wikidata y Wikipedia para la generación asistida de un vocabulario estructurado multilingüe sobre la pandemia de Covid-19. *El Profesional de La Información*, 29(5), https://doi.org/10.3145/epi.2020.sep.09

Science Europe (2020). *Digital Transformation in Scholarly Communication Event Report* [online]. Science Europe [13.11.2020], http://www.scienceeurope.org/media/yyjngo3x/se-workshop-report--digital-transformation.pdf

SST (2020). *CORD-19. COVID-19 Open Research Dataset* [online]. Semantic Scholar Team [13.11.2020], https://www.semanticscholar.org/cord19

Thelwall, M., Thelwall, S. (2020). COVID-19 Tweeting in English: Gender Differences. *El Profesional de La Información*, 29(3), https://doi.org/10.3145/epi.2020.may.01

Torres-Salinas, D. (2020). Ritmo de crecimiento diario de la producción científica sobre Covid-19. Análisis en bases de datos y repositorios en acceso abierto. *El Profesional de La Información*, 29(2), https://doi.org/10.3145/epi.2020.mar.15

Yu, F., Mani, N. (2020). How American Academic Medical/Health Sciences Libraries Responded to the COVID-19 Health Crisis: An Observational Study. *Data and Information Management*, 4(3), 200–208, https://doi.org/10.2478/dim-2020-0013

Zeng, M. L., Hong, Y., Clunis, J., He, S., Coladangelo, L. P. (2020). Implications of Knowledge Organization Systems for Health Information Exchange and Communication during the COVID-19 Pandemic. *Data and Information Management*, 4(3), 148–170, https://doi.org/10.2478/dim-2020-0009

Zheng, H., Goh, D. H. -L., Lee, C. S., Lee, E. W. J., Theng, Y. L. (2020). Uncovering Temporal Differences in COVID-19 Tweets. *Proceedings of the Association for Information Science and Technology*, 57(1), https://doi.org/10.1002/pra2.233

Sytuacje kryzysowe a nauka o informacji. Wybrane zagadnienia w kontekście pandemii COVID-19

Abstrakt

Cel/Teza: Celem artykułu jest usystematyzowanie piśmiennictwa z zakresu nauki o informacji, powiązanego ze światowym kryzysem zdrowia, a opublikowanego przez badaczy nauki o informacji oraz praktyków zarządzania informacji, a także innych inicjatyw powiązanych z nauką o informacji, powziętych w celu ułatwiania dostępu do rzetelnej i jakościowej informacji w sytuacjach kryzysowych.
Koncepcja/Metody badań: Wykorzystano krytyczną analizę wybranego piśmiennictwa oraz stron i platform internetowych.
Wyniki i wnioski: Mimo, że tematyka jest nowa, wiele pól zainteresowań nauki o informacji zdążyło już zostać przedmiotami badań prowadzonych w różnych częściach świata. Można zatem wnioskować, że badacze nauki o informacji oraz praktycy zarządzania informacji szybko reagują na zmiany, oraz że są świadomi ważności roli, jaką pole ich działań naukowych i zawodowych może odgrywać podczas sytuacji kryzysowych. Roli, która może także ułatwić lepsze zarządzanie podczas kolejnych kryzysów, jeśli do takich dojdzie w przyszłości.
Ograniczenia badań: Jako że tematyka jest nowa i rozwija się dynamicznie, wiele rezultatów nowych badań oraz nowe projekty wirtualne ukazują się niemal codziennie. Dlatego można założyć, że krótko po publikacji niniejszy artykuł nie będzie przedstawiał aktualnego stanu badań.
Oryginalność/Wartość poznawcza: Pierwsze publikacje naukowe dotyczące obecnego światowego kryzysu zdrowia ukazały się wiosną 2020 r. Zgodnie z wiedzą autorki jak dotąd nie ukazało się żadne podsumowanie systematyzujące i klasyfikujące publikacje oraz inne inicjatywy dotyczące nauki o informacji w tym kontekście.
Słowa kluczowe
Nauka o informacji. Pandemia COVID-19. Światowy kryzys zdrowia.

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Literacy and Research Data Management in Two Top Universities in Poland. Raising Awareness (2018, co-authors: J. Leśniewski, E. Rozkosz, E.; published in: S. Kurbanoğlu, J. Boustany, S. Špiranec, E. Grassian, D. Mizrachi (eds), Information Literacy in the Workplace: 5th European Conference*, ECIL 2017, Cham: Springer. https://doi.org/10.1007/978-3-319-74334-9_22); The Importance of Information Literacy for Asian Students at European Universities: Outlines (2018, Paideia, https://doi.org/10.33034/PAIDEIA.2018.6.1.103);* Nauka o informacji w okresie zmian. Innowacyjne usługi informacyjne *(co-editors: B. Sosińska-Kalata, P. Tafiłowski, Warszawa, 2017).*

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The Implications of Epidemic Risks for Scholarly Communication and Higher Education Processes. Preliminary Remarks

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Abstract

Purpose/Thesis: The aim of this paper is to reflect and to start a discussion on changes in scholarly communication, both in the field of scientific research and university instruction, during an epidemiological crisis.
Approach/Methods: Presented reflections on changes in scholarly communication are of theoretical nature. The text emerged from online discussions with second-year students taking the course on Scholarly Communication as a part of their degree in Information Space Architecture (Faculty of Journalism, Information and Book Studies, University of Warsaw), in March 2020.
Results and conclusions: The epidemic threat of the coronavirus (COVID-19), which has disrupted our social life in recent weeks, affects the communication processes in science as well. The most obvious effect of the pandemic in the area under discussion will be the development of distance learning methods and technologies. This may also increase the scope of scientific papers available in the open access. Changes are inevitable, therefore we encourage a reflection on their direction so that we can prepare for the shift and actively participate in the designing of the future form of the scholarly communication.
Originality/Value: This type of consideration is justified by the current state of affairs. We are now in the middle of a transformation that needs to be acknowledged & discussed to give it the desired direction as far as possible.

Keywords

COVID-19. Distance learning. Scholarly communication.

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1. Introduction

The situation we faced immediately after the outbreak of the COVID-19 pandemic was something completely new in the experience of modern societies, including the world of science. We have to deal with it on different levels of our life, not only in private but also in the social sphere. The pandemic has fundamentally changed our lives, habits and schedules. We should pay attention to this problem to consider how it affects the communication processes in science and, in university instruction which is its part.

The deliberations presented in this paper are primarily theoretical. We would like for this paper to be not only a collection of guidelines for coping with this difficult period,

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but also a starting point for further discussion. The pandemic is a serious test for the system of scholarly communication. It is worth pondering what this situation means for science in general, but also for our discipline (we assume that scholarly communication is a part of the communication studies [or: communication sciences]) and what effects it will have in the long term. We want to consider both the negative and positive sides of the situation. For, as in any crisis, it is not only threats that are apparent, but also new directions of development.

2. Scholarly communication

The issue of contemporary scholarly communication, within its framework of sharing information and knowledge, has already been studied and discussed many times in information studies literature (for more recent Polish scholarship see e.g. Cisek & Sapa, 2007; Kotuła, 2013; Krakowska, 2008; Nahotko, 2010; Sapa, 2009; Świgoń, 2015; as well as references attached to those texts). Today, scholarly communication is increasingly reliant on new technologies, moving to the virtual world and taking on the characteristics of informal behavior (see Barjak, 2006; Genoni et al. 2005; Genoni et al. 2014; Nahotko, 2008, 171–175), which is particularly important in the current state of the art and helps to maintain these processes.

We can observe a multi-directional sharing of information and knowledge in social networks. Each user may be not only the recipient, but also the sender and very often an intermediary (broker) of information flowing through different channels, as well as transferred from one information channel to another. Knowledge sharing by researchers participating in online social networks takes many different forms: blogging, discussion on forums, editing Wikipedia (or more generally: activities on Wiki-type sites), posting on Twitter or Facebook, preprinting articles on social networking sites and so on.

This paper follows Emanuel Kulczycki in framing scholarly communication as a practice implemented on two levels:

- individual – publication of scientific papers, communication with other researchers, popularization of science, etc;
- social – maintaining the functioning of science as a kind of social practice.

Scholarly communication is a part of the scientific process and one of its stages, following the collecting, analysis and processing of data (source information). Therefore, communication in science is not only treated as "information about the work of scientists", but becomes a process that strengthens science itself (Kulczycki, 2012). Therefore, we are discussing about communication **about** science (liaison of scholars with the outside word) and **within** science as well. It also includes university instruction, as we understand it for the purposes of this study[1].

[1] We are aware, however, that university instruction is usually not featured in the scholarly communication cycles. See e.g. Borgman, 2007; Regazzi, 2015.

3. Transformative time

The closure of many state institutions, including academic institutions and onsite classes conducted there, forces participants of scholarly communication processes to act in a situation previously unknown to them. The degree of disorganization of scientific activity is not as great as in other sectors (such as health care), but here too we are dealing with some measure of disorder. This situation forces us to make rapid adjustments, thanks to which the academy can continue to function to some extent. These are not only institutional changes, which take time to prepare, but also the change of habits and behaviors, breaking the functional schemes and routines developed so far. For if we dare to break the routine, we may experience it not only as a threat and a loss, but also an opportunity to open and develop new, yet untested routes in our life, work and research (Kozłowski, 2020).

All kinds of scholarly meetings (regular stationary classes, conferences, symposia, conventions, but also daily interactions with fellow researchers) are replaced by remote contact, facilitated by digital technologies, or suspended at all. According to the regulation of the Polish Ministry of Science and Higher Education, all collegiate bodies, such as promotion committees, scholarship committees, electoral colleges, etc., as defined in the university's statutes, are to operate remotely. As a result, some delays are going to occur, e.g. in important for our milieu matters of granting of scientific degrees and promotions. Moreover, the period subjected to applying quantitative measures has been extended for one more year for universities. These are forced changes, which for the time being we have to accept.

Nevertheless, we are in such a lucky situation that the suspension of stationary teaching and regular scholarly communication in the information society does not cause such a dramatic breakdown as it would have had even a dozen or so years ago, in the "pre-Internet era". Although we have to be aware that the virtualization of scientific processes cannot take place overnight, *ad hoc*, forced by the crisis on the contrary, it takes time to implement sensibly and effectively, we already have many potentialities to act on and tools to choose. We can use them. It is important to acknowledge and appreciate this.

In a situation where standard teaching cannot be conducted, a method of non-stationary education, so-called distance learning (D-learning or dLearning) is used. This method of learning is characterized by a separation of the teacher from the student and of the student from the group of learners, replacing direct interpersonal communication (typical for conventional education) with communication mediated by communication technology (cf. e.g. Bednarek & Lubina, 2008; Frania, 2017; Lewowicki & Siemieniecki, 2009; Madej et al., 2016; McAvinia, 2016; Plebańska, 2011; Wierzbicka, 2019). The current crisis may contribute to a significant development of methods and techniques of distance learning, which in the future may have a positive effect in the form of an increase in the general level of education of societies, including adult education. A project of this kind has already been launched, for example, by the Warsaw Digital Centre (Pol. *Centrum Cyfrowe*).

With the implementation of distance learning, students have to work from home. The problem in continuing education in these circumstances may be common laziness or inability to focus and lack of discipline. Everyone knows what conditions are favorable for them to study and what conditions are not. For example, some people can only focus in a distraction-free environment of the library to which they currently have no access.

The way the classes are conducted and the type of tasks assigned to the students have fundamentally changed now. However, this does not necessarily have to affect the amount of knowledge gained during performing these new tasks, because "who does not want to learn anyway will not do so" under any circumstances (Doda, 2020). The problem of engagement comes into play here, which may become smaller when the lecture hall is converted into a private room. Nevertheless, the fact that such a system of conducting classes requires more student's own work may have benefits as it fosters independence and good work organization. Pandemic is a technical test for the scholarly communication system, as mentioned above, but it is also a test of maturity for participants in the communication processes in science.

Further problems may arise in certain special cases. The first of these would be the conducting of the exams, difficult to organize online. Different platforms make it possible for students to take a test, but the reliability of the results is not very high. Thus, an oral examination in recorded Q&A's session provided by an audio-video connection remains potentially the best solution. It is hard to imagine, however, this could be an option in the case of doctoral exams. Perhaps it would be worthwhile to design a more satisfactory mode of remote examination system for the future.

An even larger issue will be the suspension of field exercises, necessary e.g. for archaeologists. Students and researchers requiring access to specialized laboratories or laboratories with necessary equipment (e.g. students of the Academy of Fine Arts or faculties of medicine or natural sciences) are in a difficult situation, cut off from much-needed facilities. Not everything can be replaced by communication technologies. Representatives of humanities and social sciences, as theorists, are in a relatively better situation.

Although it seems that the current level of technological development is so high that we can rely on digital devices, in practice it sometimes turns out that technology may disappoint. Suffice to say that the most popular e-learning systems in Poland did not withstand the situation because they were not prepared to handle such intensive network traffic. These systems were subjected to a difficult test, which showed their unsuitability for critical situations. System designers should draw conclusions from this for the future.

We must also take into account those (hopefully infrequent) cases where students and academics face technological barriers. Such a barrier may be a lack of appropriate equipment, lack of access to a fast Internet connection, or lack of skills necessary to function efficiently only in an online environment (Świgoń, 2006).

As mentioned above, the enforced changes are too sudden for us to adapt easily to them. The human factor usually turns out to be the weak link. Students point out that it is better if the lecturers teach on a platform that they already know well. One of the group members said, "I lost 15 minutes of classes just because I was muted by the lecturer". Lecturers may also prepare short instruction manuals for students on how they should use the new tools. One hears the voices of young people who have problems with installing or operating unknown software (already mentioned technological barrier).

Lecturers and educators, must be aware that the current situation places new demands on them. They have to carry the burden of creating interesting and easy-to-learn materials for online classes. The existing models of classes must be changed. Lecturers have to develop a different skill-set than that sufficient to conduct onsite classroom lectures. This is an effort that needs to be made and another barrier that needs to be overcome – but all this,

as e-learning practitioners point out, will quickly pay off. Perhaps in the future, thanks to the experience gained now, a higher percentage of academic teachers will reach for modern methods and tools, learned and used *nolens volens* during quarantine.

4. Tools

There are many tools available for implementing and maintaining the scholarly communication. Professionals and practitioners create and share special lists of tools for remote work, which can be very useful, especially now[2]. The Foundation for the Development of the Information Society (Pol. Fundacja Rozwoju Społeczeństwa Informacyjnego) has prepared a specific guide available online: *Digital competence in times of pestilence – a scenario and other resources for learning and remote working*.

Students mention following communicators and tools for remote work as the most frequently used: Skype, ClickMeeting, Google Hangouts Meet, Google Classroom, Webinar, COME, Discord, Teamspeak, Moodle, ClassDojo or Facetime. One of the students says, "I have recently had the pleasure of using all of these tools and I think they are great as scholarly communicators" (Żukowska, 2020). Students emphasize the usefulness of the Google Classroom, in which it is possible to assign exercises to specific students, enforce terms, and evaluate jobs – including adding comments (especially useful in evaluating text documents) (Doda, 2020). A Google account within institutional G Suite is set up for every student, so that everyone has access to all services of this provider. They are worth using.

According to one of the students,

> (...) it would be most convenient and intuitive to combine Google and Discord services. The Google Hangouts Meet tool allows to organize classes online. Other Google services offer fast file exchange, creation of presentations, documents and group management (Google Classroom). An alternative to holding classes could be Discord, which has now abolished the user limit for video transmission on free servers. This service allows users to create their own servers to be used for communication purposes. A function of automatic audio muting when the user does not speak is included, which eliminates background noises in the transmission. The program allows users to modify the server for their specific needs. The browser version does not even require setting up an account. The free version of Discord allows to upload files up to 8 MB, which is completely sufficient to share students' work or shorter scholarly papers.
>
> On the other hand, a tool like GoToWebinar is not very intuitive and one should think carefully before proposing it as the default tool of communication with students. It lacks the functionalities that can be required from such a software (shortcut to mute, clear menu, account management available from the application level).
>
> The nature of regular classes, according to previous experience, is best reflected in a videoconference, especially since commonly used tools make it possible to share a desktop screen, e.g. a presentation, which usually supports the lecture. However, there are courses that are based on individual tasks, in which continuous interaction with the lecturer is not required. For such cases, platforms for sharing tasks, together with simple task editors, are good and sufficient tools (Doda, 2020).

[2] See e.g. Polish: https://bazawiedzy.socialtigers.pl/articles/90-narzedzi-do-pracy-zdalnej-megalista

The multitude of tools, is pleasing on the one hand, but, on the other, it causes further problems. Students ask to standardize the selection of tools, which they and the lecturers have to share. For them, it is a major inconvenience to be forced to use many different platforms, chosen freely according to the lecturers' liking or knowledge. Reaching an agreement on this issue, which would allow all classes to take place on the same platform, would not only make it easier for students to learn and control the educational materials, but also foster coherence and order in instruction (Kozłowski, 2020). However, we are aware that this proposal is difficult to implement, in a way that would account both for the specifics of individual classes and for the lecturers' preferences and level of digital competence.

5. What in return?

One of the biggest problems we have faced in the first weeks of the lock-down was the closure of academic libraries. This limits the range of readings that students can prepare for classes, as not all texts have been digitized yet (older books and journals) or are available as electronic books (new scientific publications). This can be a big problem for people conducting their research or writing their thesis. Fortunately, some academic libraries are launching digitization services on a wider scale, enabling students and staff to order scans of the necessary texts. Administrators of scientific paid databases are expanding the range of publications available free of charge, providing open access to the resources previously available only by a paid subscription. Publishers make their books available as e-books for free, or at a discount of several dozen percent. Bookshops constantly encourage us to stay at home and read books, offering not only discounts, but also the possibility of free shipping of purchased books.

In this situation, the importance of home book collections is growing, although handy workshop facilities are usually available to scholars with a lot of experience and a higher degree – rarely to students. The role of open educational resources available to all (Kulczycki, 2016) and various types of online courses, which we already have at our disposal today, will grow in the future (to name just a few international examples: Merlot, MIT Open Courseware, Khan Academy, OpenLearn, Coursera; Polish examples: Copernicus College or Navoica). A search engine for open online courses can be found at https://www.mooc-list.com/. Popular science channels on YouTube may play an important role. We are more aware of the role and importance of digital libraries and various types of repositories, social networks for scholars (academia.edu, researchgate.net), and finally, of various types of library catalogues available online and bibliographic databases providing valuable bibliographic information. Researchers should consider using these social networking sites, blogging platforms and microblogs more widely in scholarly communication (Tafiłowski, 2016).

The darker side of the phenomenon will probably be the inevitable increase of the degree of use of various types of pirate websites with scholarly papers (Bohannon, 2016) or websites services of which are in breach of copyright (or close to it). Internet Archive, for example, has been heavily criticized after it granted free, unlimited access to copyrighted works within the framework of the initiative called "National Emergency Library".

The changes taking place today will probably gradually facilitate access to scientific papers, and thus facilitate and improve scholarly communication processes. A crisis induces

publishers to introduce certain facilities for researchers. It remains an open question whether these changes will be sustainable. We can only wish that the end of the quarantine will not bring the loss of access to scientific publications.

6. The future

All this will lead, as can be expected, to increased importance and development of access based on the Open Access philosophy. The current crisis may result in the development of Open Science, wider opening of access to research results, especially those financed by public funds, and the development of technology designed for these purposes. We may expect an accelerated virtualization of communication processes in science. Some changes are likely to occur in science metrics and bibliometrics systems, as the role of altmetric indicators may increase (Puckett Rodgers & Barbrow, 2014).

Virtual space fosters creation of invisible colleges, i.e. informal groups of scholars coming from different institutions, usually distant from each other in geographical space. John Gresham wrote about the transformation of the invisible colleges, the concept of which was conceived as early as in the 17th century, into a digital college, or a cyberspace college (Gresham, 1994, 39). The pandemic may accelerate and intensify the processes of creating virtual colleges of this kind. This is an interesting problem, worth observing further.

According to Vincent Larivière, FeiShu and Cassidy R. Sugimoto,

> The coronavirus (COVID-19) outbreak exposes an inconvenient truth about science: the current scholarly communication system does not serve the needs of science and society. More specifically, the crisis makes manifest two inefficiencies in the research system: the default to closed science and the overemphasis on elite, English-only publishing, irrespective of the context and consequences of the research (Larivière et al., 2020).

Such reservations have been raised for a long time, but now, in crisis, the problem becomes even more serious. It may also be possible to learn lessons for the future and to change the situation. The pandemic has clearly shown how important it is to make research results available in national languages. It has also shown how crucial it is for political decision-makers to realize that researchers everyday are facing problems more important than applying quantitative measures and position of universities in international rankings.

We do not know yet how the pandemic will affect the publishing process. For a long time now, interactions between authors, editors, and reviewers have been taking place via e-mail and Internet platforms designed for the purpose, so the pandemic should not have a major impact on the process. However, we know that the publishing process, at least for some journals, is being delayed. Editors work remotely, out of their offices, and reviewers are less willing to accept papers for evaluation. However, it is impossible to assess to what extent this is actually a result of an epidemiological threat[3].

The pandemic and the resulting quarantine is a challenge and a demanding test, for researchers and lecturers, as well as for students. We are doomed to isolate and perform our duties using the Internet, with the applications and tools available. Regardless of when and how the pandemic will end, it has forced us to confront problems that we have

[3] More on long-term impact of COVID-19 on processes in discussion see for example Cochran, 2020.

to solve on an ongoing basis. They will certainly cause changes in the process of scholarly communication that we will experience in the future, even if we are not able to predict them now. It is important that we prepare for the coming changes, and above all that we actively design our future.

References

Barjak, F. (2006). The Role of the Internet in Informal Scholarly Communication. *Journal of the American Society for Information Science and Technology*, 57(10), 1350–1367, https://doi.org/10.1002/asi.20454

Bednarek, J., Lubina, E. (2008). *Kształcenie na odległość. Podstawy dydaktyki*. Warszawa: Wydaw. Naukowe PWN.

Bohannon, J. (2016). Who's Downloading Pirated Papers? Everyone. *Science* [online]. April 26, [05.08.2020], https://www.sciencemag.org/news/2016/04/whos-downloading-pirated-papers-everyone#

Borgman, Ch.L. (2007). *Scholarship in the Digital Age: Information, Infrastructure, and the Internet*. Cambridge, MA: MIT Press.

Cisek, S., Sapa, R. (2007). Komunikacja naukowa w Internecie – mity i rzeczywistość. In: W. Lubaszewski (ed.). *Komputer – Człowiek – Prawo* (39–49). Kraków: Wydaw. UJ.

Cochran, A. (2020). *What Will We Learn About Scholarly Publishing as a Result of COVID-19?* The Scholarly Kitchen [online]. April 28 [05.08.2020], https://scholarlykitchen.sspnet.org/2020/04/28/what-will-we-learn-about-scholarly-publishing-as-a-result-of-covid-19/

Doda, S. (2020). Student – Wykładowca, przemyślenia na temat nauczania zdalnego [online]. Architekci recenzują, [05.08.2020], https://apirecenzje.blogspot.com/2020/04/student-wykadowca--przemyslenia-na-temat.html

Frania, M. (2017). *Nowe media, technologie i trendy w edukacji. W kierunku mobilności i kształcenia hybrydowego*. Kraków: Oficyna Wydawnicza „Impuls".

Genoni, P., Merrick, H., Willson, M. (2014). Virtual Symposia: An Investigation into Scholarly Communities Online [online]. *VALA2004 Proceedings* [05.08.2020], https://www.vala.org.au/vala2004/2004pdfs/28GeMeWi.PDF

Genoni, P., Merrick, H., Willson, M. (2005). Community, Communication, Collaboration: Scholarly Practice in Transformation. *Proceedings of the Next Wave of Collaboration: Educause Australasia 2005, April 5–8, 2005* [online]. Auckland, NZ: Curtin University, [05.08.2020], http://espace.library.curtin.edu.au/R?func=dbin-jump-full&local_base=gen01-era02&object_id=19204

Kotuła, S.D. (2013). *Komunikacja bibliologiczna wobec World Wide Web*. Lublin: Wydaw. UMCS.

Kozłowski, M. (2020). Komunikacja naukowa w czasach pandemii [online]. Architekci recenzują, [05.08.2020], https://apirecenzje.blogspot.com/2020/04/komunikacja-naukowa-w-czasach-pandemii.html

Krakowska, M. (2008). *Nowe formy komunikacji społecznej w europejskiej przestrzeni edukacyjnej*. Kraków: Wydaw. UJ.

Kulczycki, E. (2012). *Komunikacja naukowa, czyli co?* [online]. Warsztat badacza, [05.08.2020], http://ekulczycki.pl/teoria_komunikacji/komunikacja-naukowa-czyli-co/

Kulczycki, E. (2016). *Otwarte Zasoby Edukacyjne w edukacji akademickiej* [online]. Warsztat badacza, [05.08.2020], http://ekulczycki.pl/warsztat_badacza/otwarte-zasoby-edukacyjne-w-edukacji-akademickiej/

Larivière V., Shu F., Sugimoto C. R. (2020). *The Coronavirus (COVID-19) Outbreak Highlights Serious Deficiencies in Scholarly Communication* [online]. London: The London School of Economics and Political Science, [05.08.2020], https://blogs.lse.ac.uk/impactofsocialsciences/2020/03/05/the-coronavirus-covid-19-outbreak-highlights-serious-deficiencies-in-scholarly-communication/

Lewowicki, T., Siemieniecki, B. (2009). *Kształcenie na odległość w praktyce edukacyjnej.* Toruń: Wydaw. Adam Marszałek.
Madej, M., Faron, A., Maciejewski, W. (2016). *E-learning w dydaktyce szkoły wyższej. Założenia, doświadczenia, rekomendacje*. Wrocław: Wyższa Szkoła Handlowa.
McAvinia, C. (2016). *Online Learning and its Users. Lessons for Higher Education*. Oxford: Chandos Publishing.
Nahotko, M. (2008) Czy nastąpi koniec druku? Komunikacja naukowa XXI wieku oparta na publikacjach elektronicznych. In: D. Pietruch-Reizes, W. Babik (eds.) *Wymiana informacji i rozwój profesjonalnych usług informacyjnych w edukacji, nauce i kulturze na rzecz społeczeństwa opartego na wiedzy* (78–91). Katowice: PTIN.
Nahotko, M. (2010). *Komunikacja naukowa w środowisku cyfrowym: globalna biblioteka cyfrowa w informatycznej infrastrukturze nauki*. Warszawa: Wydaw. SBP.
Plebańska, M. (2011). *E-learning: tajniki edukacji na odległość*. Warszawa: Wydaw. C. H. Beck.
Puckett Rodgers, E., Barbrow, S. (2014). Wskaźniki altmetryczne i ich rosnące znaczenie w bibliotekach naukowych, *Biuletyn EBIB* [online], 6(151), [05.08.2020], http://ebibojs.pl/index.php/ebib/article/view/355
Regazzi, J. (2015). *Scholarly Communications: A History From Content as King to Content as Kingmaker*. Lanham, MD: Rowman & Littlefield.
Sapa, R. (2009). *Metodologia badań obszaru pośredniczenia w komunikacji naukowej z perspektywy nauki o informacji*. Kraków: Wydaw. UJ.
Świgoń, M. (2006). *Bariery informacyjne*. Warszawa: Wydaw. SBP.
Świgoń, M. (2015). *Dzielenie się wiedzą i informacją: specyfika nieformalnej komunikacji w polskim środowisku akademickim*. Olsztyn: Wydaw. UWM.
Tafiłowski, P. (1016). Media społecznościowe jako źródło informacji bibliograficznej w naukach humanistycznych. Komunikat z badań. *Zagadnienia Informacji Naukowej*, 54(1), 55–66, https://doi.org/10.36702/zin.287
Wierzbicka, A. (2019). *Dydaktyczne i komunikacyjne aspekty e-edukacji akademickiej*. Łódź: Wydaw. Uniwersytetu Łódzkiego.
Żukowska, M. (2020). Komunikacja naukowa – raport [online]. Architekci recenzują, [05.08.2020], https://apirecenzje.blogspot.com/2020/04/komunikacja-naukowa-raport.html

Wpływ zagrożenia epidemiologicznego na procesy komunikacji naukowej. Uwagi wstępne

Abstrakt

Cel/teza: Celem artykułu jest zaprezentowanie refleksji oraz propozycja dyskusji nad zmianami w komunikacji naukowej w okresie kryzysu epidemiologicznego, zarówno w zakresie badań naukowych, jak i dydaktyki uniwersyteckiej.
Koncepcja/metody badań: Prezentowane rozważania dotyczące zmian w komunikacji naukowej mają charakter refleksji teoretycznej. Tekst powstał z dyskusji internetowych ze studentami II roku studiów stacjonarnych na kierunku Architektura przestrzeni informacyjnych, w ramach przedmiotu Komunikacja naukowa w marcu 2020 r.
Wyniki i wnioski: Zagrożenie epidemiologiczne związane z rozprzestrzenianiem się wirusa COVID-19, dezorganizujące w ostatnich tygodniach nasze życie społeczne, nie pozostanie bez wpływu również na procesy komunikowania w nauce. Wydaje się, że najbardziej oczywistymi skutkami

pandemii w interesującym nas zakresie będą rozwój metod i technologii nauczania zdalnego oraz wzrost zasobów tekstów naukowych w wolnym dostępie. Zmiany są nieuchronne, w związku z czym proponujemy refleksję nad ich kierunkiem, byśmy mogli przygotować się na nie oraz czynnie uczestniczyć w ich projektowaniu.
Oryginalność/wartość poznawcza: Podjęcie tego typu rozważań wydaje się być uzasadnione bieżącymi wypadkami. Znajdujemy się obecnie w centrum procesu zmian, nad którymi należy debatować po to, by w miarę możliwości nadawać im pożądany kierunek.

Słowa kluczowe

COVID-19. Komunikacja naukowa. Zdalne nauczanie.

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Management of Academic Libraries in Poland During the COVID-19 Lockdown

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Abstract

Purpose/Thesis: The article considers the management strategies employed at Polish academic libraries during a crisis situation, using the lockdown imposed as a result of the COVID-19 pandemic as a case study. The lockdown is defined here as the period between March 12th and June 2020. The study identifies the most significant obstacles to operating efficiently in the unstable VUCA environment.
Approach/Methods: The author uses research methods of sociology, collecting data from the directors of Polish academic libraries by the means of an online survey, with the response rate approximating 30%. The survey included questions about the organization of information and library services during the lockdown, and about the management obstacles the libraries faced.
Results and conclusions: The results suggest that both directors and staff of academic libraries did their best in the crisis situation. They adjusted the information and library service procedures, seeking to efficiently organize remote work, and manage the dispersed work environment. The most often mentioned management obstacles included the necessity for rapid adjustment, the impossibility of long-term planning, and the changing duties. However, the libraries implemented a number of solutions, which may serve them in the future if need be, such as rotational shifts, higher flexibility of organization, and task-oriented approach to professional duties.
Practical implications: The study presents procedures to be applied in the case of another lockdown, identifies good practices, and relays the experiences of other academic libraries in order to improve information services at the reader's place of employment; it may inspire them to optimize information and library processes.
Originality/Value: It is the first such study of the activity of Polish academic libraries during the lockdown. The results may contribute to discussions about the organizational flexibility of academic libraries and their capacity for adjustment, and well as about the future development or phaseout of certain areas of their activity.

Keywords

Academic libraries. COVID-19 epidemic. Lockdown. Management. VUCA.

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1. Introduction

In early 2020, the COVID-19 pandemic – a disease caused by the SARS-CoV-2 strain of the coronavirus – paralyzed the entire world. It was first identified in China; from there, it spread to the rest of Asia, the Americas, and Europe. In many countries, the situation had

rapidly spun out of control as healthcare systems operated above their maximum capacity, while the number of infections – and deaths – continued to grow. The airborne transmitted virus, for which there had been no cure, nor vaccine, pushed all other problems into the background. Following the advice of experts, epidemiologists, and health professionals, many states decided that only a strict lockdown would effectively slow down the spread of the disease. The governments imposed severe restrictions on public life and on the economy. Businesses, schools, airports, cultural institutions, restaurants and offices were all closed down. Free movement was restricted, and the borders closed.

The world stood still, but in many areas, rapid and unpredictable changes followed. Institutions, corporations and organizations, in some cases for the first time, faced the conditions described by the acronym VUCA. The VUCA environment, characterized by volatility, uncertainty, complexity, and ambiguity, forced many leaders to reexamine their management methods and procedures for internal control (Worley & Jules, 2020). The concept of VUCA, developed in military education and leadership practices introduced in response to the 2001 crisis, became acutely relevant to everyone affected by the COVID-19 pandemic. The capacity to make agile and bold adjustments to the unexpected became more important than ever.

Volatility might be defined as the difficulty of predicting future events and their pace, which results in an increasing sense of anxiety and uncertainty. Uncertainty may disrupt decision-making processes and make it necessary to prepare for a number of different scenarios, or to approximate the likelihood of certain events (determine the risk). Complexity, simplicity's opposite, is a result of an overlay of a multitude of events and information; it is characterized by large, varied, and shifting sets of data and system dynamics. Ambiguity is a feature of unfamiliar or unclear situations, which cannot be explained on the basis of logic or previous experiences.

On the one hand, we suddenly found ourselves in a VUCA environment; on the other, it was necessary that the information shared at this time was reliable and verified. Muhammad Yousuf Ali and Peter Gatiti (2020) identified the most important duties of library and information services in the time of the COVID-19 pandemic: raising awareness of public healthcare, supporting research teams, scholars and lecturers, providing them with the newest research results and relevant literature, as well as fulfilling the basic needs of library users They emphasized the crucial role that information specialists and librarians play in ensuring access to reliable and verified information on COVID-19 and in combating fake news and conspiracy theories – which became so wide-spread during the pandemic that a new term "infodemic" was coined to describe the phenomenon (VSSE, 2020).

The conditions of VUCA may paralyze leaders, tempt them to take more control than necessary, or provoke them to make reckless decisions. However, for many it might be an opportunity to redefine their organizations' aims, practices, and methods for managing human resources, thus increasing the organizations' overall efficiency. How did information services fare in the new conditions brought on by the COVID-19 pandemic? Did the library directors and staff meet the challenges these conditions posed? How did the information and library services cope with uncertainty, complexity, and unpredictability? What were the most difficult problems the situation posed, and what were the opportunities it offered? These questions, and the author's personal experience of managing an academic library during this period, were the basis and inspiration for the following study.

2. Legal conditions and guidelines regarding the functioning of universities and other institutions of higher education

During the lockdown period, i.e., between March 12th and early June 2020, Polish academic libraries functioned in the accordance with the regulations introduced by the Ministry of Health and the Ministry of Science and Higher Education, and the restrictions imposed by the authorities at specific universities, following those regulations. Specific guidelines regarding the functioning of academic libraries were published by the Ministry of Economic Development, Labor and Technology and by the National Library; more general recommendations were published on the websites of the Polish Librarians' Association, EBIB, and on the social media pages of related groups. Executive decisions regarding the activity of universities were left to the rectors. Although information, recommendations, and regulations abounded, they were ambiguous and contingent. The library directors had not prepared for the circumstances they had suddenly found themselves in, and had to make quick decisions, protecting life and safety of the staff and fulfilling the information needs of academic community – which became very dependent on academic libraries during the lockdown.

On March 11th 2020, following the recommendation of the Government Team for Crisis Management (GTCM), the Ministry of Science decided to introduce preventive measures to counteract the spread of the COVID-19 at the institutions of higher education (MNiSW, 2020a). On March 12th, the universities suspended classes, stressing that the measures were not intended to stop research activity itself. Executive decisions regarding operating of specific universities, their administrative work and provision of online classes, were left to the rectors. On March 13th, the Ministry published guidelines for online teaching, suggesting maximum use of e-resources and online channels of communication. These guidelines had implications for the academic libraries, as they prescribed that the institutions "make use of already existing support structures as they develop teaching e-resources to offer help and advice to individuals without experience in this area". On March 16th, following the introduction of further restrictions and an imposition of a sanitary regime, the Ministry published a new set of guidelines on limiting the work of university staff, including those without teaching responsibilities, recommending remote work, or the system of rotational shifts in the case of jobs that cannot be performed remotely, as well as restricting the access to university buildings. On the same day, the Ministry's website published a notice that university staff would no longer be required to report for duty, unless it would be absolutely necessary in order to maintain the continuity of the university's functioning. The Ministry opined that the universities were obliged to maintain their accounts and pay their employees, as well as maintain laboratories, and care for animals. The staff of university libraries were not considered to be as essential. The Ministry of Health's declaration of the state of epidemic emergency on March 20th informed the following decisions regarding the operations of the education system: on April 10th, the universities were closed – initially with the intention to reopen on April 26th, then on May 24th. In the meantime – on April 28th – the Ministry of Economic Development published extended *Guidelines Regarding the Functioning of Libraries During the COVID-19 Pandemic in Poland* (MR, 2020), which included recommendations for ensuring safety of the library staff and inside library buildings, as well as suggestions of procedures in response to a suspicion of an infection. They included extending the distance between employees to min. 1.5 m., limiting the number

of employees in common spaces, providing the librarians with means for personal protection, and following the rules concerning cleaning and disinfecting of surfaces, as well as limiting the use of touchpad devices, and restricting the access to open stacks and to paper catalogues. At the same time, the National Library was publishing recommendations for the public libraries. Although public libraries had been allowed to reopen since May 4th, academic libraries functioning in a university system remained physically closed.

On May 22nd, the Ministry of Science notified the public that the restrictions imposed on universities would be gradually lifted, e.g., allowing exceptions to the rule that all teaching should be conducted online. The Ministry also published guidelines for establishing new procedures, accepted by the Chief Sanitary Inspector, and intended to ensure safe functioning under the threat of COVID-19 infection (MNiSW, 2020b). As far as the libraries were concerned, the guidelines were in accordance with the abovementioned recommendations published by the Ministry of Economic Development on April 28th (MR, 2020), and emphasized the necessity of limiting the number of people allowed inside the building, providing the staff with means of personal protection, i.e. masks and gloves, introducing an online borrowing system to reduce the contact between the patrons and the library staff, and establishing conditions for contact-free service, disinfection of hands, and use of gloves.

In early June, while university continued to provide most of the teaching remotely, academic libraries began to reopen to the public, following the sanitary regime and ensuring safety of the patrons and the staff. Although they implemented various solutions, most shared the following practices: they limited the number of people allowed to be in the building at a single time, occasionally designating specific rooms as "open areas", installed plexiglass shields at stations where direct contact between the staff and the patrons was necessary, enforced the use of masks and hand-disinfectant, put returned items under a quarantine, ensured regular air circulation in rooms, disinfected surfaces, provided the staff with masks, gloves and face shields, changed opening hours, and restricted access to computers and reading rooms. It remains to be seen which of these safety measures will remain in place, and which will disappear as the epidemic fades (Mousumi, 2020).

3. Provision of information and library services during the lockdown – an analysis of personal research

The author employed research methods of sociology to investigate the functioning of Polish academic libraries during lockdown (defined here as the period between March 12th and early June 2020). An online survey was shared with the Conference of Polish Academic Libraries Directors' mailing list. To collect the data from the directors of the libraries attached to private institutions, the author also sent the survey to the libraries at the top ten private universities, as per the 2019 ranking in the *Perspektywy* (Perspectives) magazine. The data was collected between June 29th and July 10th 2020. As the response rate approximated 30% (37 filled surveys were returned), the results should not be considered representative for all Polish academic libraries. However, they give an overview of the principles according to which Polish information services operated during the lockdown, and into the associated management processes; thus, they contribute to the discussion of individuals' capacity for adjustment to changes and functioning in the VUCA environment.

3.1. Research sample

To adequately characterize the research sample, we should note the size of the staff at the libraries considered, as in many cases it informs the management strategies, and the capacity for flexible adjustment in a changing environment. The directors participating in the survey managed libraries with varying numbers of employees (Fig. 1). However, the majority of the libraries studied hired between 16 and 50 employees. 84% of the libraries studied were attached to public universities, as opposed to privately-owned institutions.

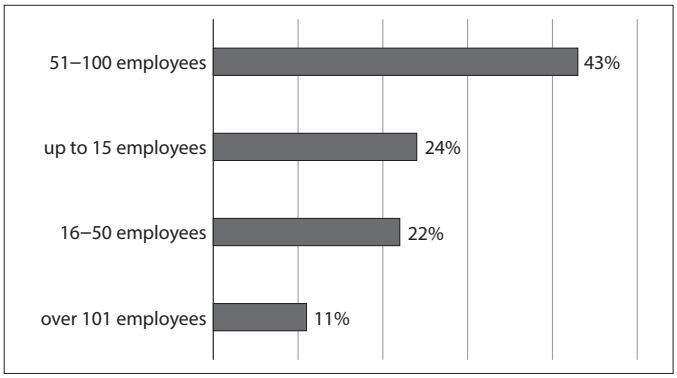

Fig. 1. The number of employees in the libraries studied

The research sought to uncover the principles which informed the management of academic libraries, and to examine their capacity for adjustment to the VUCA environment, characterized by volatility, uncertainty, complexity, and ambiguity. The research asked the following questions: How was the academic libraries' activity organized, and in what mode did the staff work? Which information and library services were prioritized during the lockdown? Were there any new procedures introduced? Which phenomena disrupted the libraries' management processes? Did the modifications of management introduced during the lockdown succeed, and if so – which? May they be successfully redeployed in the future? The research answered most of these questions.

The definite majority (89%) of Polish academic libraries provided information and library services during the lockdown (Fig. 2). However, the service provision was limited. Among the libraries studied, only one in ten institutions (10.8%) was entirely closed to the readers (which does not mean it did not provide online services). It is not surprising that the period of lockdown witnessed an intensified provision of e-resources; more than half (57%) of the libraries studied purchased access to additional resources; even more (84%) libraries "opened" licensed resources to free access for the duration of the COVID-19 pandemic. It is worth mentioning that every fifth library studied organized online events targeting its users (e.g. talks with authors), which they had not done before. It was a perfect example of a successful and creative adjustment to the situation and the readers' needs.

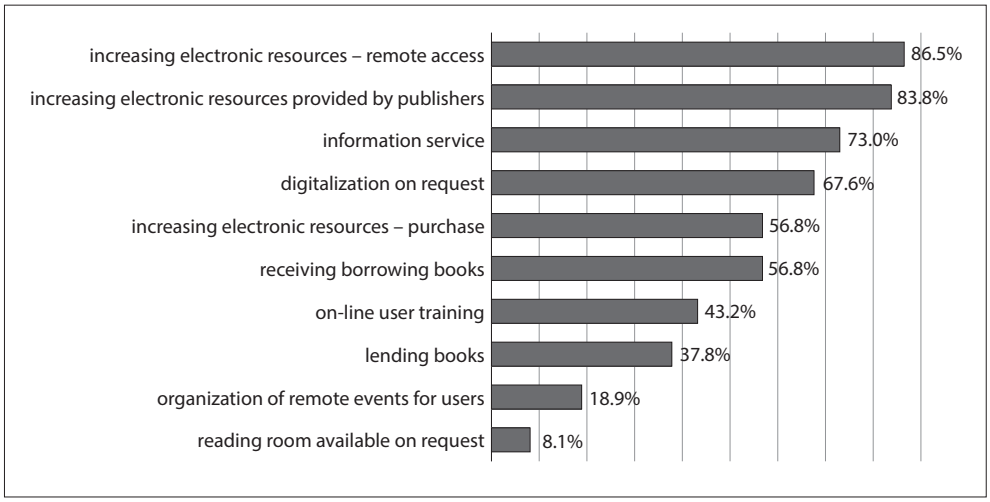

Fig. 2. Services provided by academic libraries during the lockdown

3.2. Organization and supervision of work

Majority of the directors declared that, according to the guidelines published by the university authorities, they were free to decide how to organize work at the library. Only 8% of the directors responded that these decisions were not their to make. Did they articulate any strategy? It turns out that the best response to the unpredictability of the pandemic was to be flexible, as in 81% of the libraries studied, the strategy was articulated in response to the current situation. Only one survey participant answered that no specific strategy was articulated.

Did the decision-making processes change after the lockdown was imposed? The research shows (Fig. 3) that in over half of the libraries (57%), the decision-making process did not change. However, it should be emphasized, that in many cases the situation did change: in 27% libraries, the mid-level staff was more involved in the decision-making process than it had been before, and in 11% of the libraries, heads of individual departments were excluded from the process. It is surprising that it was primarily smaller libraries that changed their decision-making processes; in majority of the institutions employing above 50 people, these processes did not change. It would suggest that the complicated conditions of VUCA do not admit simple, formulaic and universal solutions, applicable in every case.

Organizing work in a dispersed and shifting environment was not easy. The survey asked questions regarding the information flow and the dominant modes of communication (Fig. 4). It turns out that the most common modes of communication were e-mail and telephone calls. 41% of the libraries purchased paid communication applications; every fourth library relied on free external programs. The applications mentioned in responses to the open question were as follows: MS Teams, Zoom, Slack, Big Blue Button, and Google Meet. It should be mentioned that the survey suggested "maximum limiting of information flow" as a possible answer to the question, but no participant chose it. It confirms that the communication processes were adjusted to the situation, rather than limited, or eliminated.

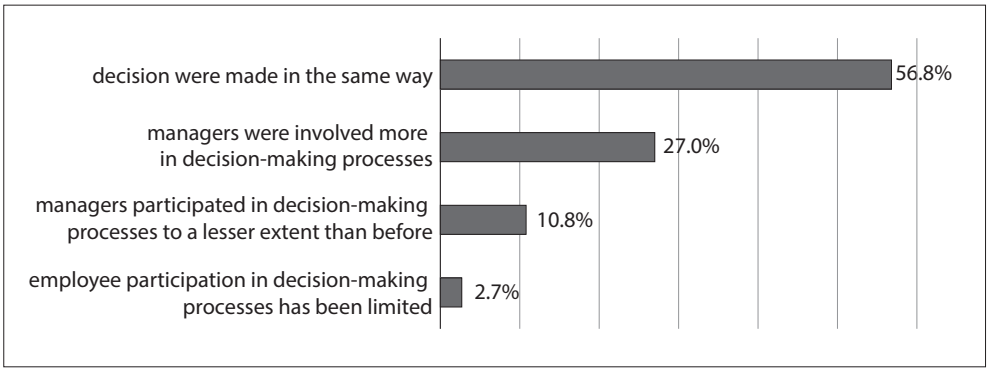

Fig. 3. Decision-making processes in academic libraries during the lockdown

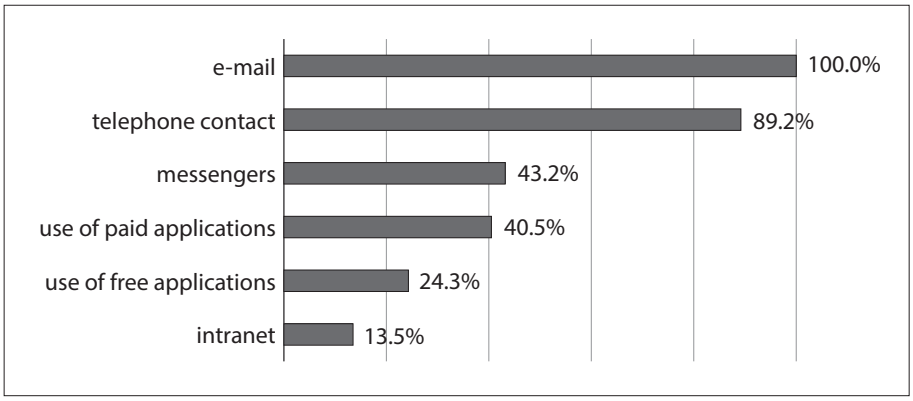

Fig. 4. Communication and information flow in the academic libraries during the lockdown

Were the employees supervised, and how? The research shows that the most common methods of supervision were regular online meetings (a method employed at 35% of the libraries studied), weekly reports to the immediate superior (30%) and supervision of work with the use of computer systems (24%). In every fifth library studied, the mode of reporting was determined by the superior's decision, and occurred irregularly, if the need arose. Although the methods of supervising work varied, no director left their staff unsupervised.

Answers to the question regarding the changes introduced to the employees' duties (Fig. 5) complement previous insights into the organization of work. In many cases, the librarians whose previous activities were impossible to move online, were keen to find new tasks. A definite majority (84%) of libraries changed the scope of their employees' duties – in most cases, this took place informally. It is another example of the flexible approach to managing under VUCA conditions.

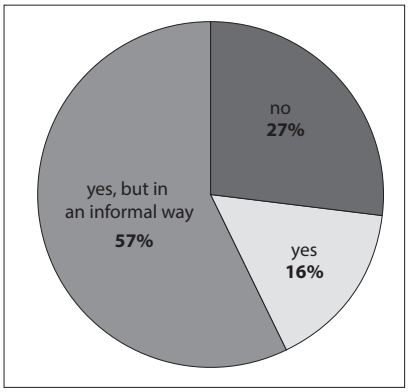

Fig. 5. The changes to staff duties introduced during the lockdown

Many doubts and ethical issues came with the decision to put some of the employees on standby, i.e., to pay them their wages while they do not work, or work remotely, or, in a rotational system, when they are at home while other employees are working. The employees were put on "standby" in more than half of the libraries studied. However, it is worth mentioning that the libraries rarely put more than 25% of their staff on standby; usually only larger libraries, employing more than 50 people, took the decision to put some of them on standby.

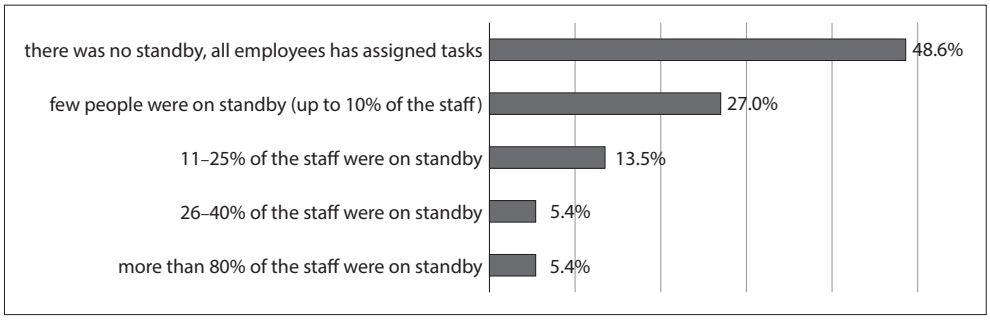

Fig. 6. "Standby" in academic libraries during lockdown

3.3. Remote work

The Ministry of Science and Higher Education recommended that the universities reduce the size of the staff working on campus. This informed the decisions the directors of academic libraries made regarding the organization of work during the lockdown (Fig. 7). The research shows that the most common model of work was a combination of remote work with rotating shifts in the library. It has to be said that a large part of librarians worked remotely, which had not been a wide-spread practice before. Many libraries employed the rotational system, with different methods of organizing shifts: alternating work on campus with remote work, or alternating shifts with "standby" – a mode without a precedent in the activity of Polish academic libraries.

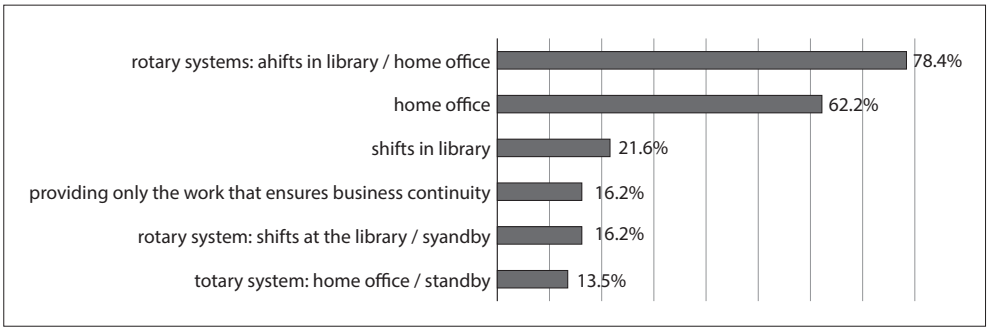

Fig. 7. Organization of work during the lockdown

The survey included questions about the specifics of remote work organization. It is not surprising that many librarians (at 54% of the libraries studied) relied on their own computer devices for work. In 19% of the libraries studied, the staff used their own devices. In a similar number (18%) of the libraries, the staff were provided with the required devices by the employer. Some libraries provided the staff not only with computer devices, but also with extra data plan.

What IT solutions were used to work remotely? The most common, implemented at more than a half libraries studies, were: VPN access to library servers (implemented at 59% of the libraries) and access via remote desktop (54%). Other solutions included the cloud (40%), as well as dispersed offline work, which was later "uploaded" onsite into the central system (19%). The majority of librarians was supported by the library IT specialists (at 49% of the studied libraries), or by the university IT department (40%). The survey also asked about the procedures for ensuring the safety of information processed over the course of online work (e.g., if the staff used their personal devices, did ensure the safety of their temporary place of work, did they lock their documents by password, and so on). It turns out that more than a half (51%) of the studied libraries had already developed relevant procedures, which proved adequate for the current situation. Every fourth library (24% of replies) had to update their procedures and adjust them to the lockdown conditions. In 10% of the libraries studied, the procedures were introduced as the situation developed. Surprisingly, a few libraries adopted no procedures to ensure the safety of information processed online – a state which continued until the time of writing this paper (July 2020).

The survey also encompassed the mode of work and, thus, the types of tasks performed remotely. The participants were asked to indicate on a scale which tasks were performed, and to what extent. Figure 8 shows the task which, according to the participants, were always or often performed remotely. It does not come as a surprise that the librarians prioritized communicating with the library users (89%) and maintaining social media accounts (86%) – these tasks dominated the remote work. Many librarians worked on documentation (65%), which usually involved completing the records of the scientific output of the library staff, as well as correcting the data collected in the Polish Scientific Bibliography (*Polska Bibliografia Naukowa*), which were to migrate to the new version of the system. They also prepared bibliometric analyses (59%) and library queries (54%). It is worth noting that in almost 60% of the libraries studied, librarians devoted this time to personal self-development. Other answers to the question were interesting as well. In many cases, librarians

were included in university e-learning teams and worked alongside university professors to prepare specific digital learning materials (written, audio, and audiovisual). Furthermore, they were developing procedures to ensure safety and other legal-organization tasks; they also purchased drop-boxes and prepared promotion materials.

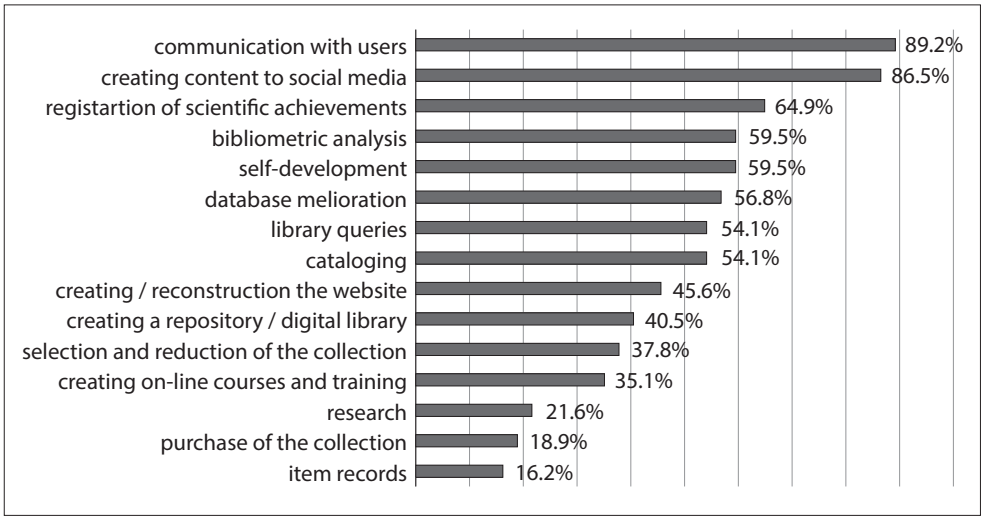

Fig. 8. Tasks performed remotely during lockdown

3.4. Problems, chances, challenges

Alongside investigating the principles which determined the organization of information and library processes, the research sought to identify the problems the directors faced in managing the academic libraries during lockdown. Figure 9 presents the issues which according to the directors came up always, very often, and often. It turns out that many problems were caused by the need to quickly develop new procedures in a VUCA environment, characterized by unpredictability which makes it impossible to form any long-term plans. Other issues included the perceived injustice of distribution of work between the employees, and the need to assign new meaningful tasks which the librarians may perform remotely. The dispersion of employees and the lack of physical contact made the directors feel that they did not have control over the situation, nor the tools to effectively motivate their staff. Responding to the open question, the directors additionally stressed the palpable lack of immediate contact with their staff ("social and emotional bonds"). They also mentioned the inflexibility of data base distributors and electronic platforms when it came to extending access to their resources, and the inadequacy of copyright in the current conditions.

Occasionally, the participants noted the lack of emotional stability among their staff. It justified the question whether the librarians were provided with mental health support. It turns out that in in most cases (at 78% libraries), they were not.

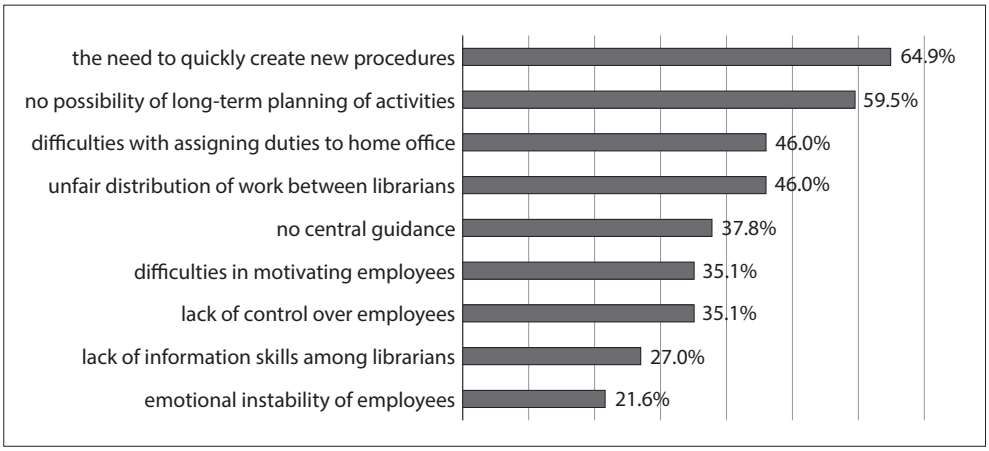

Fig. 9. Management obstacles at the academic libraries during lockdown

Without a doubt, it was difficult to manage an academic library during lockdown. It was equally difficult to prepare for the reopening following the central guidance and the imposed sanitary regime, ensuring the health of the librarians and the users, and fulfilling the users' information needs. The survey asked the participants to evaluate on a scale whether the process of "returning to normal" caused any problems. It turns out that there were no problems with securing financial means for the purchase of basic sanitary equipment (e.g. masks, face shields, plexiglass shields), nor with their timely introduction. However, the participants pointed out that it was difficult to secure funds required to implement additional safety measures, e.g. drop-boxes, or smoother organization of the processes made necessary by the sanitary regime. The participants also mentioned the "human" factor: the employees' anxiety about the return, and the sense that the tasks had not been distributed fairly. It is worth emphasizing that, according to the participants, the university authorities and library users accepted the rules libraries introduced after reopening.

Which management solutions implemented during the lockdown were successful, and which will be used in the future? Figure 10 presents the practices which, according to the participants – asked to evaluate the probability of implementing them in the future on the scale from 1 to 5 (where 1 meant none, and 5 absolute certainty) – had the probability of 3, 4, and 5. Without a doubt, remote work proved successful and this is confirmed by additional comments which the directors shared in their responses to the open question. The task-oriented approach, as opposed to work "from 9 a.m. to 5 p.m." also worked well; 62% of the participants expects these practices to be continue; 57% of the participants expect a further development of the IT tools and solutions, which facilitate the flow of information and documents, as well as make it easier to perform professional duties remotely. Organizational flexibility and rapid adjustment to the situation are also expected to be a part of future management processes. The participants emphasized the importance of close collaboration between the librarians and the university professors when it came to preparing didactic materials and groundwork for further research.

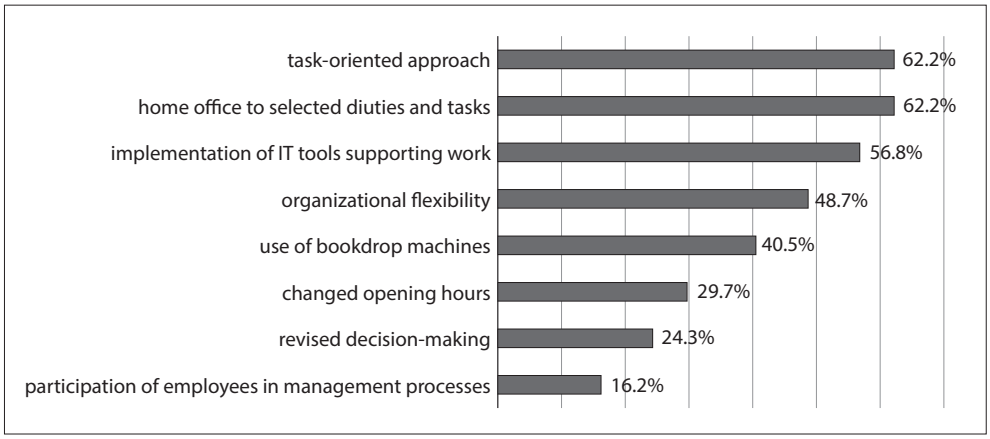

Fig. 10. The solutions introduced during the lockdown expected to return in the future

Finally, it is worth citing select answers to the open question about the "take-aways" from the lockdown regarding management, and additional comments and observations, which the participants shared. They offer an important conclusion to our discussion.

- *A lesson in efficient management, often without the superiors' support. Quite a practice in humility in the face of the employees' fears, without showing personal weaknesses and worries.*
- *The need for quick and meaningful decisions and reactions in response to sudden difficulties and predicting possible future problems.*
- *The library remains overstaffed.*
- *The threat of coronavirus forced us to change our system of work, to solve problems creatively, to react quickly to new needs; it is necessary to reevaluate current organizational solutions, rethink the ways in which the directors manage the team and communicate with them.*
- *Emotions cannot be ignored.*
- *It is necessary to assign tasks clearly and precisely, as well as to supervise them to their completion. The employees need to be in constant contact with their superiors.*
- *Remote work will be very useful in the future.*
- *Remote work is possible in a library; 50% of the staff may remote work on a permanent basis; only immediate service requires that the librarian is present. Purchases, cataloguing, base control, bibliometrics, scientific information – all these can be conducted online.*
- *1. Account for the development of a platform for remote work in future budget plans. 2. Plan a purchase of an outside drop-box. 3. Change the terms of the contract with PKN [Polish Committee for Standardization], giving the users the access to the subscribed content.*
- *The need to reorganize the collections in the open stacks – how they are accessed, to facilitate digital access, create an educational base founded on digital copies of documents, adjust the library's tasks to online teaching.*

4. Conclusions

Managing an organization under the conditions of VUCA – volatility, uncertainty, complexity and ambiguity requires a certain flair, but it is not impossible. Bob Johansen (2017) from The Institute for the Future established the "Vuca Prime" model, which recommends that the organizations responding to the conditions of VUCA counter them with Vision, Understanding, Clarity, and Agility. Johansen's model should replace a specific and rigid plan; a manager's responding to uncertainty should learn how to receive external feedback (from the employees, customers, suppliers). To cope with the complexity of the events, they should precisely define tasks and procedures, as well as collect information required to make a sound decision. Flexible and agile management of an organization under the VUCA conditions also involves experiments and tests combined with the capacity to adapt quickly and carry out reforms. Did the directors of Polish academic libraries acquire these skills?

The results of the study, and the following analysis, show that the COVID-19 pandemic, and the lockdown which the pandemic made necessary, forced the librarians to consider their organization from a new perspective. The directors coped well with certain challenges – they established a new model of work, where duties were performed rotationally, alternating between remote work and shifts at the library; they redefined the staff's tasks; they took a flexible and task-oriented approach to work; made plans based on the analysis of the ongoing situation; developed a system of remote control and supervision and smoothly organized the processes relying on IT (often with the use of free tools). These and other practices were successfully implemented during this difficult period. In many ways, they embody Bob Johansen's ideal. It is apparent that the managers sought a more flexible mode of work, appreciated the role of open communication and clearly defined tasks, attempted experiments and tests (assigning new duties and new tasks to those working remotely), and put more trust and responsibility in their staff.

The time of lockdown was also an opportunity for a critical re-evaluation of previous methods of management and organization of the information-library services, and inspired the directors to consider possible improvements. It turns out that the functioning of academic libraries, until now largely based on standard procedures, should be flexible, creative, and based on trust, too. It must use digital and IT solutions to a greater extent, even if this will require a purchase of a license. Many tasks can be successfully performed remotely, even if it seems that they would require the librarian to be physically present in the library. E-resources supplied by the distributors, or developed by the librarians collaborating with teachers might successfully replace the multi-thousand collections stored onsite. Inevitably, a question arises: after the libraries coped relatively well with the lockdown, is there any rationale behind their continued existence in their previous, "old" form? Is this not the moment where crisis creates an opportunity to permanently redefine the principles that shape the work of academic libraries?

Bibliography

Ali, M. Y., Gatiti, P. (2020). The COVID-19 (Coronavirus) Pandemic: Reflections On The Roles Of Librarians And Information Professionals. *Health Information and Libraries Journal*, 37 (2), 158–162, https://doi.org/10.1111/hir.12307

Johansen, B. (2017). *Leaders Make the Future: Ten New Leadership Skills for an Uncertain World*. San Francisco: Berrett-Koehler.

MNiSW (2020a). *Rozporządzenie Ministra Nauki i Szkolnictwa Wyższego z dnia 11 marca 2020 r. w sprawie czasowego ograniczenia funkcjonowania niektórych podmiotów systemu szkolnictwa wyższego i nauki w związku z zapobieganiem, przeciwdziałaniem i zwalczaniem COVID-19*. Dz.U. 2020 poz. 405 [online]. Ministerstwo Nauki i Szkolnictwa Wyższego, [20.08.2020], https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20200000405

MNiSW (2020b). *Środowiskowe wytyczne w związku z częściowym przywracaniem działalności uczelni* [online]. Ministerstwo Nauki i Szkolnictwa Wyższego, [20.08.2020], https://www.gov.pl/attachment/add97c72-cd87-425c-a346-945524e59e09

Mousumi, S. (2020). Library Access Policies Post COVID-19 Pandemic. *SSRN e-Library* [online], May, [22.08.2020], https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3610042

MR (2020). *Wytyczne dla funkcjonowania bibliotek w trakcie epidemii COVID-19 w Polsce*, [online] Ministerstwo Rozwoju; Główny Inspektorat Sanitarny, [20.08.2020], https://www.gov.pl/web/rozwoj/biblioteki

MZ (2020). *Rozporządzenie Ministra Zdrowia z dnia 20 marca 2020 r. w sprawie ogłoszenia na obszarze Rzeczypospolitej Polskiej stanu epidemii*. Dz.U. 2020 poz. 49 [online]. Ministerstwo Zdrowia, [20.08.2020], http://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20200000491

VSSE (2020). *The Hidden Danger Behind COVID-19. Disinformation Campaigns And The Protection Of The Scientific And Economic Potential* [online], La Sûreté de l'Etat (VSSE), [20.08.2020], https://vsse.be/sites/default/files/corona-uk-batpdf.pdf

Worley, C. G., Jules, C. (2020). COVID-19's Uncomfortable Revelations About Agile and Sustainable Organizations in a VUCA World. *The Journal of Applied Behavioral Science* [online], June, [20.08.2020], https://doi.org/10.1177/0021886320936263

Zarządzanie bibliotekami akademickimi w Polsce w okresie lockdownu spowodowanym epidemią COVID-19

Abstrakt

Cel/Teza: Celem artykułu jest bliższe przyjrzenie się strategiom zarządczym w polskich bibliotekach akademickich podczas sytuacji kryzysowej na przykładzie lockdownu, a także wskazanie największych problemów utrudniających sprawne funkcjonowanie w niepewnej rzeczywistości VUCA. Okres lockdownu, wprowadzony w związku z epidemią COVID-19, rozumiany jest jako czas od 12 marca do początku czerwca 2020 r.

Koncepcja/Metody badań: Przeprowadzono badania metodą socjologiczną wśród dyrektorów bibliotek akademickich w Polsce, wykorzystując jako narzędzie kwestionariusz ankiety on-line; zwrotność ankiet na poziomie 30%. W ankiecie pytano m. in. o sposoby organizacji usług informacyjnych i bibliotecznych w okresie lockdownu oraz o bariery utrudniające procesy zarządcze.

Wyniki i wnioski: Wyniki badań wskazują, że zarówno dyrektorzy bibliotek akademickich, jak i bibliotekarze stanęli na wysokości zadania w tej konkretnej sytuacji kryzysowej. Wprowadzono zmiany w procesach świadczenia usług biblioteczno-informacyjnych, starając się skutecznie organizować pracę zdalną oraz zarządzać rozproszonym środowiskiem pracy. Do najczęściej wymienianych barier i problemów utrudniających zarządzanie zaliczyć należy: konieczność szybkiego stworzenia nowych zasad i procedur działania, brak możliwości długofalowego planowania oraz zmiany zakresów obowiązków. Wdrożono szereg rozwiązań, które w przyszłości mogą być nadal praktykowane,

m. in.: rotacyjna praca zdalna, większa elastyczność organizacyjna oraz zadaniowe podejście do obowiązków zawodowych.

Zastosowania praktyczne: Opracowanie procedur działania na wypadek ponownego lockdownu, określenie „dobrych praktyk", zapoznanie się z doświadczeniami innych bibliotek akademickich w celu poprawy jakości własnych usług informacyjnych oraz optymalizacja procesów informacyjnych i bibliotecznych.

Oryginalność/Wartość poznawcza: To pierwsze tego typu badanie działalności polskich bibliotek akademickich w okresie lockdownu. Wyniki badań mogą być cennym głosem w dyskusji nad elastycznością organizacyjną bibliotek akademickich i umiejętnością dostosowywania się do zmian, a także nad przyszłością lub schyłkiem wybranych obszarów działania.

Słowa kluczowe

Biblioteki akademickie. Epidemia Covid-19. Lockdown. VUCA. Zarządzanie.

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The Use of Information and Communication Technologies in Academic Libraries in a Crisis Situation. Experiences of the University of Warsaw Library

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Abstract

Purpose/Thesis: This study investigates how the crisis situation caused by the spread of COVID-19 influenced the work of library information and IT systems, with the University of Warsaw Library (BUW) as a case study.
Approach/Methods: The case study method was applied as it seemed to be the most appropriate for the purpose of this research. Five main areas of investigation were defined and then analyzed.
Results and conclusions: The use of the library's ICTs changed as a result of the COVID-19 pandemic, which mostly involved intensified use of such technologies. The study demonstrated the success of the shift to online service provision which will most likely continue even after the library reopens. The study also showed that a well-organized academic library which may easily move its services online in the case of a lockdown, is indispensable to support teaching and research.
Practical implications: This study can serve other academic libraries in Poland and abroad seeking to compare the solutions they introduced with BUW's most successful practices, so that they will be better prepared in case of the expected second wave of coronavirus which may bring more lockdowns.
Originality/Value: This study adds to the existing literature on the phenomenon of COVID-19 and libraries-related issues. However, unlike the majority of studies, it focuses more on information systems, electronic resources, and services hubs rather than on the library perceived as a public space and store of printed publications.

Keywords

Academic library. COVID-19. Information systems. Information users. Pandemic.

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1. Introduction

The University of Warsaw Library (Pol. Biblioteka Uniwersytecka w Warszawie – BUW), established in 1817, is a leading academic library in Poland. Together with 40 faculty libraries, it constitutes a library and information system of the University of Warsaw (UW). Although BUW's priority patrons are the members of the UW community, it also functions as a public library. At the end of 2019, there were more than 112,000 patrons registered, including more than 69,000 fully authorized (i.e., the members of the UW community). The patrons from beyond the UW may use the library's resources onsite only; they have no borrowing rights and no remote access to electronic resources.

2. Context of the study

On March 10th, 2020, following the order of the Rector of The University of Warsaw, the director of BUW announced that from the following day (March 11th) the Library building would be closed until further notice. That day, the Library was operating until midnight; 3,318 people visited BUW and borrowed 8,137 items (to compare: the daily average of lent items is 1,500). This statistic received much attention from the media. The next day the library as it is traditionally understood (i.e., a building, book stacks, reading rooms) closed – it would not reopen for more than two months. However, the librarians, as well as other library systems and services, did not stop working. On the contrary, intensive "offstage" work, often organized over the "cloud," began, so that the library could continue to provide its services and to maintain contact with patrons. Although the pandemic forced the closure of physical spaces and limited social gatherings, research and teaching processes continued, and the objective of BUW was to provide the patrons with as much information and access to its collections as possible. On March 14th, the state of pandemic was introduced in Poland by the order of the Minister of Health. The announcements of the UW Rector, and the regulations he had been introducing since March 16, 2020, reflected the situation in the country and determined, among others, the mode of work at the Library.

This paper results from the study conducted while the pandemic was still on-going, but after lifting of the lockdown. The study investigated the effects of the crisis situation caused by the spread of COVID-19 on the work of the BUW information and IT systems. It considered the reactions and changes resulting from the crisis and how the patrons, the primary users of those systems, behaved in the face of BUW's rapid shift from a hybrid library to a fully online one. For the purposes of this study, we have identified five main areas of investigation, which will be discussed in the section "Methodology".

3. Literature review

3.1. Associations of information management professionals and librarians, national libraries, and governmental bodies, and their response to COVID-19 outbreak

Several guidelines and recommendations, as well as resources and tool hubs, were issued to help libraries and other public institutions in their everyday information and service provision. Following the objectives of this study, we analyzed them to find suggestions regarding information systems and services. We did not find any document dealing with these issues.

On state level, the guidelines and regulations introduced by the Ministry of Economic Development, Labour and Technology, The State Sanitary Inspection, and the National Library of Poland focused on the treatment and quarantining of books returned to libraries after the pandemic ended, on safety of the staff and procedures in case of a suspicion of infection, or on planning library events (BN, 2020a; 2020b; MRPiT, 2020).

On European level, LIBER (Ligue des Bibliothèques Européennes de Recherche – Association of European Research Libraries) highlighted the lack of appropriate copyright legislation and high costs of e-books which were particularly frustrating during the lockdown, when the libraries could provide only digitized versions of their materials or electronic resources (LIBER, 2020). EBLIDA (European Bureau of Library, Information and Documentation Associations) published a draft of a document titled *A European Library Agenda for the Post-Covid 19 Age* (EBLIDA, 2020), building on a survey conducted among library associations from 17 European countries, which sought answers to the "Checklist for Library Associations and Libraries in the Face of Covid-19 Crisis".

The International Federation of Library Associations and Institutions (IFLA) launched *COVID-19 and the Global Library Field* website, providing important resources for libraries responding to the coronavirus pandemic. However, the content covered resources and service provision rather than systems; the website gathers examples of good practices from libraries all over the world (IFLA, 2020). IFLA conducted a project named "National Libraries – Survey Impact COVID-19" (KB, 2020) in cooperation with Conference of Directors of National Libraries (CDNL) and the National Library of the Netherlands. Fifty-five national libraries in 53 countries all over the world have responded to the survey (19 NLs were located in Central and Eastern Europe, 11 in Western Europe). The survey concerned NLs' arrangements of their digital and online services; whether they enhanced their services, developed new online activities for their patrons, or provided an extra helpdesk for online questions.

In the USA, ALA (American Library Association) established a tool hub named COVID-19 Recovery (ALA, 2020), and a series of webinars on "pandemic preparedness". ACRL (Association of College and Research Libraries) offered a webinar titled "Making Remote Workers", focused on the management of library staff communication during the lockdown.

In general, we noticed that all above mentioned initiatives, surveys, or guidelines framed libraries as stores of printed publications and public spaces, rather than as information systems, electronic resources and services hubs.

3.2. Selected research projects

Although only a relatively short period has passed since the beginning of the pandemic, already a significant body of literature has been produced to describe the effect of the COVID-19 pandemic on academic libraries. Considering the specific scope of this study, the review examines the research concerned with ICTs used by academic libraries to work during the pandemic.

Some studies have discussed information technologies within the broader context of the impact of the pandemic lockdown on academic libraries. For instance, Janicke Hinchliffe and Wolff-Eisenberg (2020) with Ithaka S+R examined whether and how American academic libraries have changed their mode of work and service provision as a result of the COVID-19 pandemic. Until August 20th, 2020, 861 libraries responded to the survey. Among those, 603 libraries updated their answers later. Information technologies were mentioned in questions about reference services and library instruction programs. The answers to these questions showed that the majority of libraries moved their reference services online. Many libraries also ran their library instruction programs only online.

A similar research has been carried out in Italy, where Tammaro (2020) examined different types of Italian libraries. Regarding the use of ICTs in academic libraries during the lockdown, she focused on digital collections and noticed a significant increase in their use.

Several scholars have also studied particular aspects of ICTs used in academic libraries during the pandemic. Rysavyand Michalak (2020) described ICTs which allowed librarians of Hirons Library, Archives & Learning Center of Goldey-Beacom College (USA) to work from home. The authors described communication tools (Slack, Zoom and FlipGrid), a project planning tool (Notion), and a file sharing tool (SharePoint). Mehta and Wang (2020) discussed how the patrons of Clement C. Maxwell Library of Bridgewater State University (USA) used its digital services during the COVID-19 pandemic. Some information technologies were used to inform them about the changes in the library's services; these were the library's website, social media, email and public announcement platforms for students and faculty. These technologies were also used to share information about, and promote open educational resources and commercial electronic resources freely provided by the library. Librarians also created multimedia tutorials and guides showing the patrons how to connect to, and use electronic resources. Communication technologies such as Zoom, Microsoft Teams, LibChat, or LibAnswer were commonly used to provide reference services and bibliographic instruction sessions.

The response of academic medical/health sciences libraries to the COVID-19 pandemic has also elicited the interest of Library and Information Science (LIS) researchers. For instance, Yu and Mani (2020) examined 157 American academic medical/health sciences libraries to investigate whether and how they were providing information resources on COVID-19. The resources studied included COVID-19 search queries to retrieve publications from scientific databases, links to collections of publications relating to COVID-19, or guidance on fact-checking and evaluating information about COVID-19. The libraries mostly used the library's website to share information about the virus; some of them even created a separate webpage for the purpose. Webpages provided not only links to databases or collections of publications but also different types of multimedia e.g., videos, webinar records, or data visualizations. Mi, Zhang, L. Wu and W. Wu (2020), four

librarians from four American academic medical/health sciences libraries, shared their experience of work during the lockdown and listed information technologies they used. Most of these were chat software, videoconference or email to contact their patrons and to run online courses. They mentioned special websites or digital guides launched to share information and resources on COVID-19. One library prepared multimedia tutorials and videos on how to use relevant databases. Another used social media to promote the library's electronic resources.

To summarize our review of literature: we found that academic libraries applied diverse ICTs during the pandemic to meet their patrons' needs and to organize remote work for their staff. Communication technologies such as chat, videoconference or email were the most prominent. These technologies were intensively used to provide reference services, to run courses, and to answer patrons' queries. They were also used to maintain communication between librarians working remotely. Websites were another popular technology; the libraries' homepages were used to publish information about services during the lockdown, to provide guidelines on the use of electronic resources, or to share resources relating to the pandemic. Some libraries created dedicated websites with information and resources on COVID-19. Some libraries also used social media to inform patrons about the services offered, as well as to promote their electronic resources; some libraries also prepared multimedia tutorials on their electronic resources.

The majority of studies discussed here were conducted in American libraries (nine articles). There were also studies concerning the influence of COVID-19 on academic libraries in Canada, China, Italy, and Kuwait.

4. Methodology

We chose the case study method as it seemed the most appropriate for the purpose of our research. According to Yin (2003, 13),

> (...) a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.

Our research design comprises five components, as suggested by Yin (2003).

(1) Study questions. Did the use of ICTs in academic libraries change and how? Which of those technologies were used more often? Have any new technologies been used since the beginning of pandemic? Which of those technologies have worked well and which failed?
(2) Units of analysis. These are the ICTs used in academic libraries, particularly the technologies used in BUW: IT systems (computer networks, clusters of virtual and local servers, a Virtual Private Network (VPN), a Hidden Automatic Navigator (HAN), a temperature and humidity measurement system), library integrated system, electronic resources (fulltext databases, electronic books), social networks platforms (Facebook, Instagram, YouTube), communication technologies (email, chat, Messenger, Google Meet).
(3) Content and data to be analyzed. Statistical reports provided by diverse library units, social media content, YouTube videos, email correspondence, chat and Messenger

conversations, database statistics based on number of log-ins and downloads, and library website.

(4) The logic linking the content / data and the units of analysis.

(5) Interpretation of findings.

The time range for data analysis was March 11th – July 6th, 2020. On March 11th BUW was closed, and July 6th was the first day of summer holidays for the UW community as well as the end of the first cycle of exam sessions.

5. Data and content analysis

5.1. IT systems

The main objective of the BUW IT Department was to ensure that remote work would proceed safely during the pandemic, with special attention paid to cybersecurity and issues of data protection. To provide continuous operating of systems key IT infrastructure was identified and reconditioned, i.e., hardware, software, networks, and human resources; additionally, all IT systems management procedures were verified and modified if need arose. The new challenge was to establish IT procedures for remote work as before the lockdown there had been only 16 VPN accounts because the majority of BUW staff had not used it, working onsite in the library building.

Everyday tasks performed during the pandemic included ensuring the secure remote access to library OPAC and digital collections and managing local computer networks or clusters of virtual and local servers. The lockdown required configuring access to 37 new databases. During the pandemic, several international publishers opened their electronic collections and offered them for free to academic institutions. To be available for all members of the UW community, these resources needed HAN (Hidden Automatic Navigator) configuration.

As the library was closed to the staff as well as to the public, it was necessary to set up remote, safe home offices. For this purpose library laptops were configured and lent to those staff members who did not have their own hardware. The VPN was provided for all staff who needed to connect with BUW network or work in Virtua/VTLS integrated library system (ILS); in total, 80 new VPN accounts were set up. The new procedures for remote work followed the recommendations issued during the pandemic by the UW Data Protection Officer.

Within BUW's organizational structure, there are seven special collection departments. These are departments of prints, early printed books, maps, music, manuscripts, 19th century publications, and ephemera. Each department manages its own storage facility where a certain level of temperature and humidity must be maintained, depending on items' requirements. After the library was closed, it was particularly difficult to control storage conditions. IT systems proved useful in this case; a system controlling temperature and humidity was purchased and configured with email addresses of heads of relevant departments. Radio and ether net detectors, located in the rooms where the collections were stored, were generating reports that later were automatically sent by email, so that the managers could intervene if the need arose.

5.2. Library system

BUW and 38 branch libraries operate in VTLS/Virtua ILS. In practice, it means that there are more than one hundred so-called localizations in OPAC; almost every one of them has different settings in the system.

The pandemic situation and decisions made rapidly by the state and University authorities impacted the functioning of ILS during the lockdown and immediately after. We can distinguish three stages of its operation. The first stage, in early March, focused on preparing the libraries for the lockdown; it involved shutting down some of the ILS functionalities. The option to order items through OPAC was turned off; the due dates were prolonged; fees for overdue items were blocked. All of those maneuvers were complicated by the fact that the ILS system operates in several abovementioned localizations, and branch libraries often have different rules regulating circulation. The second stage, during the lockdown, mostly entailed the remote work of the library staff. Thanks to VPN, VTLS/Virtua was installed on several home computers (SSL – Secure Socket Layer protocol was used); it was particularly important for catalogers working in NUKAT, a Polish union catalog. Furthermore, all automatically generated notifications sent to patrons were turned off' and all the patrons' library accounts were automatically validated (previously, patrons had to come to the library in person to validate their accounts before the expiry date). The third stage encompassed after-lockdown activities, as the library circulation desk was reopened on May 18th in a temporary, outside location. Patrons could again return items and order new ones. As the library building remained closed to the patrons, they could access items from the open stacks only by using the new ordering functionality in OPAC and borrowing these items at the desk. Anew status, "quarantine" was set up in OPAC to describe the returned items that were put away and blocked from further circulation for five days. The fees for overdue items were restored; however, it was now possible to prolong the borrowed item five times, rather than only three. Again, all these solutions were difficult to implement and required cooperation between the BUW and branch libraries, as well as the IT Department; following the General Data Protection Regulation (GDPR) since ILS collects patrons' personal information.

5.3. Electronic resources

According to the BUW annual report (Wołodko et al., 2020), at the end of 2019 the library collection contained more than 797,000 of digital objects (e-books, e-journals, e-theses, and scanned objects in Crispa digital library).

For the purpose of this study, we analyzed the use of electronic resources available during the lockdown. We use the term "electronic resources" to refer to licensed databases, which UW subscribes to, and, due to copyright restrictions, available remotely only to UW community members. Login data analyzed below comes from HAN (Hidden Automatic Navigator) and refers only to database entries from outside the UW network; as when the library was closed, it was not possible to use the e-resources onsite. As mentioned earlier, the data shows the academic activity of UW students and staff because only this group is authorized for remote access. The report does not consider logging through VPN (Virtual Private Network), i.e. searches that could have been done by BUW librarians. Moreover,

the data collected for the period in question do not account for all databases due to delays in the provision of monthly statistics by the suppliers.

However, despite all these limitations, the results regarding the electronic resources usage during lockdown differ significantly from those for the same period in 2019. Total usage increased over 2.5 times from 41,062:38:24 hours (in 2019) to 126,656:20:12 hours (in 2020). The number of sessions (total calls) increased from 237,563 (in 2019) to 396,015 (in 2020), an increase of 67%. The scale of growth in the use of electronic resources is most evident in the summary of the number of data downloaded by users. In the examined period of 2020, 1.71 terabyte (TB) was downloaded, while in the same period last year only 0.48 TB. We therefore noticed an increase of almost 256%.

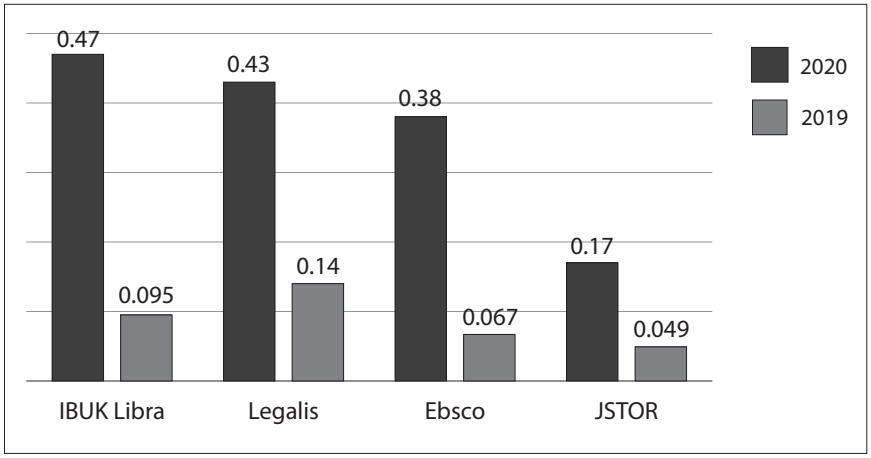

Fig. 1. The most popular electronic resources in 2020 and 2019 with the number of downloaded data in TB

The majority of data (in terabytes) was downloaded from two databases providing literature in Polish language (Fig. 1). The IBUK Libra database provides academic textbooks in various fields; and Legalis is a database containing legal acts, case law, and full texts of commentaries, monographs and articles from the journals of Polish branch of C.H. Beck Publishing House. Access to the Legalis database is limited to 50 simultaneous sessions. Compared to 2019, the use of IBUK grew more than four times (from 0.095 TB in 2019 to 0.43 in 2020). A similar increase was recorded for the Legalis database. In 2019, only 0.14 TB of data was downloaded from the database, whereas in 2020 it was 0.39 TB. Ebsco and JSTOR were also frequently used , according to the amount of downloaded data. These English language databases were also the most popular in 2019, but the users downloaded much less data from them (0.067 TB and 0.049 TB respectively).

Figures 2 and 3 compare the 2019 and 2020 percentage share of data collection from the analyzed databases. The temporary loss of access to printed collections increased the popularity of the Polish IBUK Libra database, but only by 5%. Legal databases were used at a similar level. An interesting case is LEX Omega; before March 2020 it was available onsite only, exclusively in the library building, with a limited access of five simultaneous sessions. After the lockdown began, the publisher decided to make the service available

remotely to the UW community. Therefore, the decline in popularity of Legalis might have been a result of LEX Omega service becoming available outside the library. The number of full texts downloaded from JSTOR and those found in Ebsco resources increased. This increase, however, was minimal, particularly in the case of JSTOR (1%). The decrease in the usage of other subscribed databases (by as much as 10%) might be confusing.

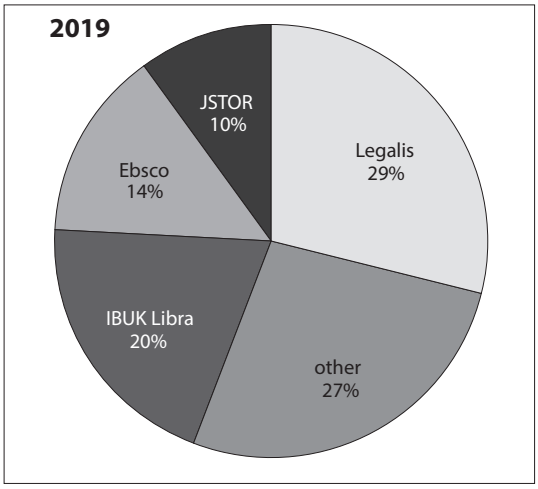

Fig. 2. Percentage share of databases in the amount of downloaded data in 2019

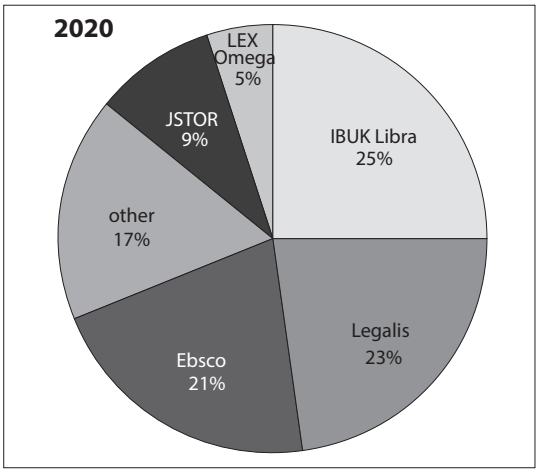

Fig. 3. Percentage share of databases in the amount of downloaded data in 2020

It can be concluded that during the lockdown, which resulted in the loss of access to printed collections, the patrons who had never done it before, started to use the electronic resources available on the UW network. The library closure directed the users' attention to previously undervalued or unknown e-resources. The previously indicated dominance of legal databases was not accidental. Statistical data on the use of printed collections in

previous years indicates that the legal book collection circulated in the BUW most frequently (128,524 books were shelved in 2018 and 121,903 in 2019).

The second most intensively used collection in the BUW is the collection of texts from the category of Social Sciences (118,576 shelving in 2018 and 111,081 in 2019). This collection includes literature on economics, finance, sociology, and anthropology. The statistics of IBUK Libra e-book readers indicate that among the fifty most frequently opened and longest-read books, titles in economics clearly dominate (see Fig. 4).

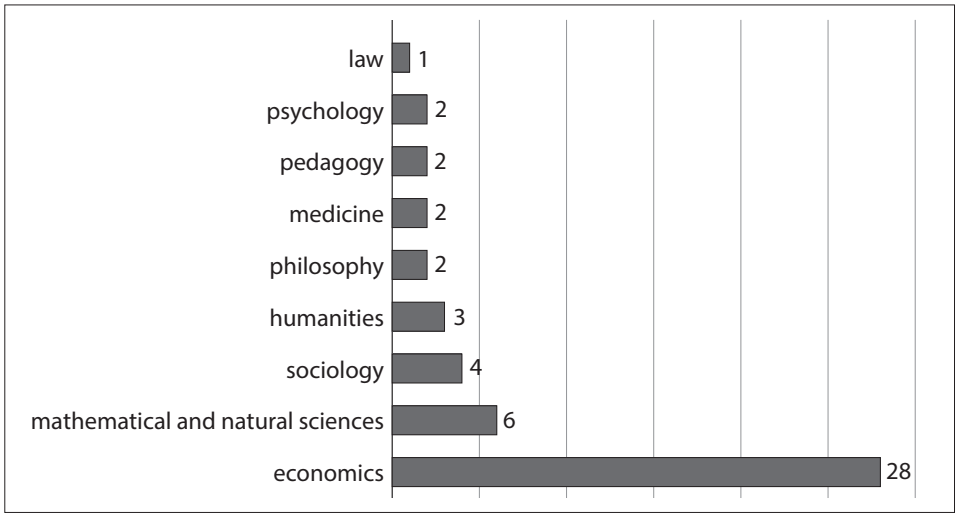

Fig. 4. IBUK Libra database, 50 most popular titles by field. Data from March 11th to July 6th, 2020

5.4. Social networks platforms

For more than a decade now, social media channels have been an indispensable communication platform for libraries of all types all over the world. To reach the patrons, libraries must be active on social media. Social media may serve as permanent reminders (Wrycza-Bekier, 2016, 8). This proved crucial during the pandemic lockdown. BUW maintains accounts on the following social media platforms: Facebook, Instagram, and YouTube.

During the pandemic, social media became one of the most important and immediate channels of information. However, they continued to function as marketing tools. Similarly to many businesses that had to be closed, BUW posted on Facebook and Instagram to maintain the contact with the patrons and to maintain its positive image. Additionally, BUW launched the series "#BUWdlaWas" (En. *BUW for You*) on Instagram, presenting the library units and staff involved in delivery of remote services. This is in line with "behind the scenes" Instagram stories, which institutions and companies use to promote their services and build a positive image (Wrycza-Bekier, 2016).

Sharing information remains the most important function of social media. Facebook posts informing about closure or re-opening of certain services, promotion of e-resources and guidelines on how to use e-books reached the biggest number of followers and were frequently liked, shared, and commented. The number of Facebook followers increased

during the pandemic by 778 and reached 18,599 (to compare: in the analogical period of 2019 it increased by 208).

The BUW YouTube channel added five video tutorials (prepared in the Active Presenter software) on solving diverse technical problems, for example changing the password to a library account, logging in to e-books collections, searching the electronic resources, or on the new lending rules, introduced in May 2020. These short, five-minute films reached an average of 277 views.

5.5. Communication technologies

Until the lockdown, a library chat, named *Ask a Librarian* (accessed directly from the library website), was a decreasingly popular means of communication between BUW and patrons who used to prefer to send their short online questions by Facebook Messenger account, or ask their question in person at the library reference desk. Surprisingly, in the year 2020, between March and July 885 chats were conducted with patrons; this makes *Ask a Librarian* the main and fastest online communication tool during the pandemic (together with Facebook Messenger, see below). To compare: in the whole year 2019 there were 352 chats and the number of chats was gradually decreasing each year; there were even suggestions of removing the chat from the BUW website (see Fig. 5).

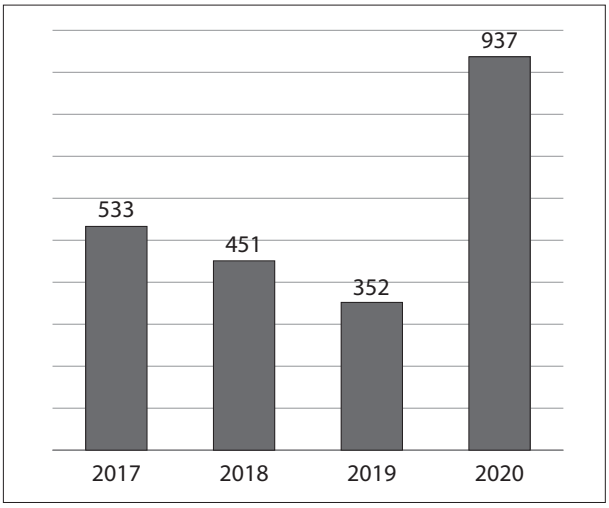

Fig. 5. Chats with patrons at Ask a Librarian in years 2017–2019 and from 1st January to 7th July 2020

Facebook Messenger was the other online communicator often used during lockdown. Many patrons use this application for their everyday communication, so it seems natural for them to use it to communicate with BUW too, at any time (also at nights and on weekends). There were 255 chats conducted (compared to 123 in the whole 2019). Messenger users usually expect a prompt reply, as they would in a chat with family or friends. This put BUW staff in a difficult position, as they have Messenger applications installed on their private phones and were non-stop notified of patrons' requests.

For some patrons, email still remains the first choice for offsite contact with the library. 1,607 electronic letters were sent to BUW, addressing all kinds of issues, related both to electronic and print collections, library services (e.g. interlibrary loans, scanning), as well as to the library building facilities (e.g. gardens, car parking).

The library website, which used to be a somewhat static means of information, was dynamically updated as the situation in the country and at the UW developed. The website was updated more than 400 times; all posts were published in two language versions (Polish and English). A pop-up window with information about BUW's functioning was set up on the main page so that everyone who entered the website could familiarize themselves with the summary of new rules without the need of in-depth research (see Fig. 6).

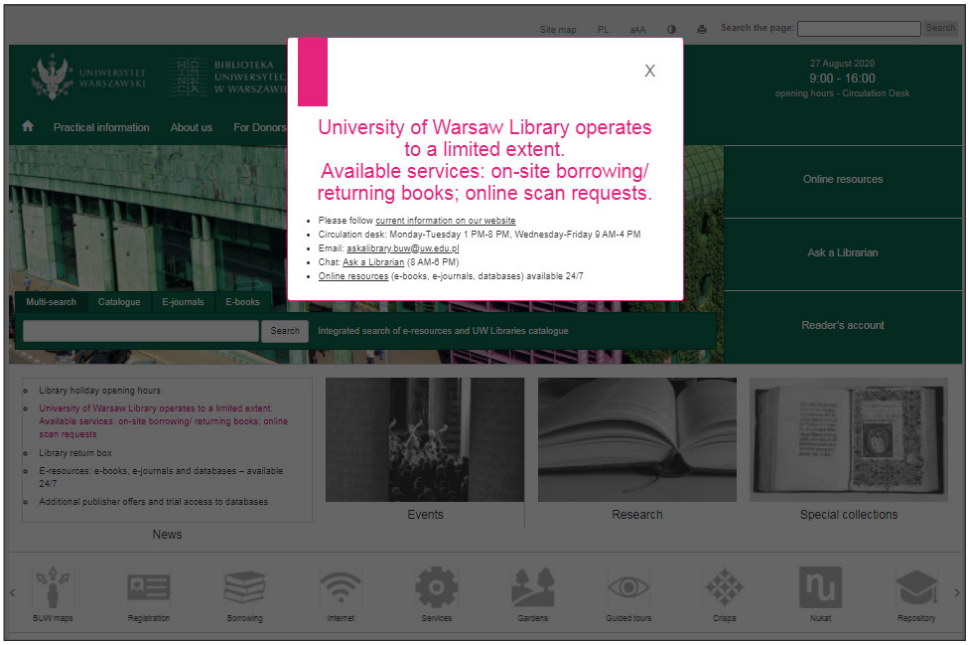

Fig. 6. BUW homepage during the pandemic period (English version)

Librarians, who had previously communicated mostly in person or via emails, started using Google Meet – a video conference application. The application facilitated efficient organization of team meetings to make important decisions, learn about the authorities' regulations, or cooperate within different projects; as well as to simply connect and maintain contact among staff members.

6. Conclusion

The use of the library's ICTs changed during the COVID-19 pandemic, which mostly involved more intensive use of technologies. Communication technologies such as Messenger and email were used much more often, which is understandable enough. The library chat

Ask a Librarian, which had hardly been used before, became the main communication channel between patrons and BUW, and, in some sense, it has survived thanks to the pandemic.

The other heavily used technology were the electronic resources, mostly e-books databases. This exposed a particularly interesting issue, which is that the library's patrons had preferred paper books to e-books while preparing their diploma theses and studying for exams, and they were forced to change their habits because of the pandemic.

We have also observed the increase in the use of the VPN by librarians to work from home, as well as the patrons' interest in library social media, particularly Facebook and YouTube, to get the news, learn about electronic resources, and in general to keep in touch with the library.

In the analyzed period, BUW benefited from library ICTs; furthermore, the librarians started to use new technologies, e.g. Google Meet to cooperate and connect during the lockdown, or the temperature and humidity measurement system for special collections, configured with email.

The study shows the success of the library's shift online which, most likely will continue in some form even after re-opening the onsite library. For example, the lockdown resulted in an increase of e-books and e-journals usage. The patrons had not been in the habit of using electronic collections every day before the pandemic, and despite BUW's regular promoting campaigns, before the lockdown these resources had been underused, particularly by the biggest group of the patrons, i.e., undergraduate students. This study might inspire a closer study of patrons' habits, and future research in that direction.

Whether the library user was a member of the UW community or not was a key factor determining which resources they could legally access or, since May, whether they could borrow the print items.

It is worth noticing that the operational programs and communication plans which BUW had to implement during the pandemic were mostly self-developed as there was not enough time, not many inspiring models of practices in analogous situations, or prior recommendations on how to operate. The rapidly changing situation forced dynamic reactions and adjustment of the services to the current needs and circumstances.

This study adds to the existing literature on the phenomenon of COVID-19 and issues related to libraries. Since the pandemic has not ended yet, and the situation is not stable, this study can serve other academic libraries in Poland and abroad, as they may compare the solutions they introduced with the best practices from BUW, so they will be better prepared in case of the expected second wave of coronavirus which may result in repeated lockdowns. The study proves that a well-organized academic library, which in case of lockdown can easily shift into online mode, is an indispensable source of support for teaching and research processes.

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References

ALA (2020). *Pandemic Preparedness. Resources for Libraries* [online]. American Library Association [24.05.2020], http://www.ala.org/tools/atoz/pandemic-preparedness

BN (2020a). *Rekomendacje Biblioteki Narodowej dla bibliotek po zniesieniu zakazu prowadzenia działalności bibliotecznej* [online]. Biblioteka Narodowa [24.08.2020], https://bn.org.pl/w-bibliotece/3961-rekomendacje-biblioteki-narodowej-dla-bibliotek-po-zniesieniu-zakazu-prowadzenia-dzialalnosci-bibliotecznej.html

BN (2020b). *Rekomendacje Biblioteki Narodowej dotyczące organizowania wydarzeń w bibliotekach* [online]. Biblioteka Narodowa [24.08.2020], https://bn.org.pl/aktualnosci/4007-rekomendacje-biblioteki-narodowej-dotyczace-organizowania-wydarzen-w-bibliotekach.html

Dar, M. (2020). Ramping up Remote Reference During COVID-19 Campus Shutdowns. *Library Journal* [online]. April 1, 2020 [21.08.2020], https://www.libraryjournal.com/?detailStory=ramping-up-remote-reference

EBLIDA (2020). *A European Library Agenda for the Post-Covid 19 Age* [online]. European Bureau of Library, Information and Documentation Associations [24.08.2020], http://www.eblida.org/Documents/EBLIDA-Preparing-a-European-library-agenda-for-the-post-Covid-19-age.pdf

Gerber, A. (2020). How Medical Librarians Are Handling the Coronavirus Crisis. *Library Journal* [online] March 25, 2020 [21.08.2020], https://www.libraryjournal.com/?detailStory=how-medical-librarians-are-handling-the-coronavirus-crisis

Guo, Y., Yang, Z., Yang, Z., Liu, Y. Q., Bielefield, A., Tharp, G. (2020). The Provision of Patron Services in Chinese Academic Libraries Responding to the COVID-19 Pandemic. *Library Hi Tech*, ahead-of-print, https://doi.org/10.1108/LHT-04-2020-0098

Hendal, B. A. (2020). Kuwait University Faculty's Use of Electronic Resources During the COVID-19 Pandemic. *Digital Library Perspectives*, ahead-of-print, https://doi.org/10.1108/dlp-04-2020-0023

IFLA (2020). *COVID-19 and the Global Library Field* [online]. International Federation of Library Associations and Institutions [24.05.2020], https://www.ifla.org/covid-19-and-libraries

Janicke Hinchliffe, L. J., Wolff-Eisenberg, C. (2020). *US Academic Library Response to COVID19 Survey* [online]. Public Document of Links, Google Drive [21.08.2020], https://docs.google.com/document/d/e/2PACX-1vTUm3ZmNwiYXG6ghLmYYSJ7FbB7vqYhQQaokqne18J68GSLufY6ZHguNi16zJMXl10a0HaiBgROR-R7/pub

KB (2020). *Survey Impact COVID-19* [online]. Koninklijke Bibliotheek, National Library of the Netherlands, on behalf of CDNL, in cooperation with IFLA CDNL – Conference of the Directors of National Libraries [24.08.2020], https://conferenceofdirectorsofnationallibraries.files.wordpress.com/2020/04/200415-survey-impact-covid-19-def-1.pdf

LIBER (2020). *Research Under Pressure: Impact of Covid-19 Through A Librarian's Eyes* [online]. Ligue des Bibliothèques Européennes de Recherche – Association of European Research Libraries [24.08.2020], https://libereurope.eu/blog/2020/07/17/research-under-pressure-impact-of-covid-19-through-a-librarians-eyes/

Mehta, D., Wang, X. (2020). COVID-19 and Digital Library Services – a Case Study of a University's Library. *Digital Library Perspectives*, ahead-of-print, https://doi.org/10.1108/DLP-05-2020-0030

Mi, M., Zhang, Y., Wu, L., Wu, W. (2020). Four Health Science Librarians' Experiences: How They Responded to the COVID-19 Pandemic Crisis. *College &Research Libraries News*, 81(7), 330–334, https://doi.org/10.5860/crln.81.7.330

MRPiT (2020). *Wytyczne dla funkcjonowania bibliotek w trakcie epidemii COVID-19 w Polsce* [online]. Ministerstwo Rozwoju, Pracy i Technologii [24.08.2020], https://www.gov.pl/web/rozwoj/biblioteki

Rysavy, M. D. T., Michalak, R. (2020). Working From Home: How We Managed Our Team Remotely With Technology. *Journal of Library Administration*, 60(5), 532–542, https://doi.org/10.1080/01930826.2020.1760569

Tammaro, A. M. (2020). COVID 19 and Libraries in Italy. *International Information & Library Review*, 1–5, https://doi.org/10.1080/10572317.2020.1785172

Tranfield, W. M., Worsham, D., Mody, N. (2020). When You Only Have a Week: Rapid-Response, Grassroots Public Services for Access, Wellness, and Student Success. *College & Research Libraries New*, 81(7), 326–336, https://doi.org/https://doi.org/10.5860/crln.81.7.326

Walsh, B., Rana, H. (2020). Continuity of Academic Library Services During the Pandemic: The University of Toronto Libraries' Response. *Journal of Scholarly Publishing*, 51(4), 237–245, https://doi.org/10.3138/jsp.51.4.04

Wołodko, A., Rowińska, M., Ślaska, K. (eds). (2020). *Biblioteka Uniwersytecka w Warszawie oraz biblioteki wydziałowe Uniwersytetu Warszawskiego w roku 2019. Sprawozdanie* [online]. Biblioteka Uniwersytecka w Warszawie [01.09.2020], https://www.buw.uw.edu.pl//wp-content/uploads/2020/06/BUW_sprawozdanie_2019_na_www.pdf

Wrycza-Bekier, J. (2016). *Jak zapowiadać wydarzenia kulturalne w Internecie, by przyciągnąć i zaangażować odbiorców. Webwriting w kulturze*. Warszawa: Wydaw. Wiedza i Praktyka.

Yin, R.K. (2003). *Case Study Research. Design and Methods*, 3rd ed. Thousand Oaks, London, New Delhi: SAGE Publications.

Yu, F., Mani, N. (2020). How American Academic Medical/Health Sciences Libraries Responded to the COVID-19 Health Crisis: An Observational Study. *Data and Information Management*, 4(3), 200–208, https://doi.org/10.2478/dim-2020–0013

Yuvaraj, M. (2020). Global Responses of Health Science Librarians to the COVID-19 (Coronavirus) Pandemic: A Desktop Analysis. *Health Information and Libraries Journal*, 7, https://doi.org/10.1111/hir.12321

Wykorzystanie technologii informacyjno-komunikacyjnych w bibliotekach akademickich w sytuacji kryzysowej. Doświadczenia Biblioteki Uniwersyteckiej w Warszawie (BUW)

Abstrakt

Cel/Teza: Celem badania opisanego w artykule było prześledzenie, jak kryzysowa sytuacja, spowodowana rozprzestrzenianiem się wirusa COVID-19 wpłynęła na pracę bibliotecznych systemów informacyjnych i informatycznych, na podstawie analizy danych z Biblioteki Uniwersyteckiej w Warszawie (BUW)

Koncepcja/Metody badań: Wykorzystano metodę pojedynczego studium przypadku, którą uznano za optymalną do celów tego badania. Zdefiniowano, a następnie przeanalizowano pięć głównych obszarów badania.

Wyniki i wnioski: W okresie pandemii COVID-19 dotychczasowe wykorzystanie w bibliotekach technologii informacyjno-komunikacyjnych uległo przekształceniom, co wiązało się głównie ze wzrostem intensywności ich wykorzystania. W badaniu dowiedziono pomyślnego przejścia BUW na funkcjonowanie online, które prawdopodobnie, do jakiegoś stopnia będzie obowiązywało także po ponownym otwarciu budynku biblioteki. Badanie dowiodło także, że dobrze zorganizowana biblioteka akademicka, która w przypadku wymuszonego zamknięcia może łatwo przejść na funkcjonowanie zdalne, jest niezbędna do zapewnienia wsparcia procesu badawczo-dydaktycznego uczelni.

Zastosowanie praktyczne: Opisane badanie może służyć innym bibliotekom akademickim w Polsce i zagranicą w celu porównania wprowadzonych rozwiązań oraz dobrych praktyk wypracowanych

w BUW. Może im także pomóc w przygotowaniu się do tzw. drugiej fali epidemii, która może skutkować powtórzeniem przymusowego zamknięcia.
Oryginalność/Wartość poznawcza: Niniejszy artykuł stanowi wkład do dotychczasowego zbioru piśmiennictwa poświęconego zagadnieniom funkcjonowania bibliotek w czasie pandemii COVID-19. Jednakże w odróżnieniu od większości publikacji, skupia się głównie na systemach i usługach informacyjnych oraz zasobach elektronicznych, a nie na bibliotece rozumianej jako przestrzeń publiczna i książnica udostępniająca drukowane kolekcje.

Słowa kluczowe

Biblioteka akademicka. COVID-19. Pandemia. Systemy informacyjne. Użytkownicy informacji.

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Information Behavior in Crisis Situations

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Abstract

Purpose/Thesis: The article presents the scholarship on information behavior during crises, conflicts and disasters. It includes theoretical reflection on the subject of identifying heterogeneous information activities and attempts to define and characterize various crisis situations.
Approach/Methods: The presented research employs qualitative approach, and methods/techniques: scoping literature review, conceptual analysis and thematic analysis. The data sample comprised selected, representative publications from 2001–2020.
Results and Conclusion: Research on information behavior in various crisis situations is an important research area of information science. However, it remains understudied; the field should be expanded to account for multifaceted issues of individual and collective informational behavior in contemporary crisis situations and disasters.
Originality/Value: The article is the first theoretical and conceptual analysis of information behavior in crisis situations. The article discusses various types of crises and information activities undertaken in crisis situations to develop a theoretical and practical foundation for future research on information behavior.

Keywords

Crisis. Crisis situation. Disaster. Information behavior. Qualitative analysis. Qualitative content analysis.

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1. Introduction

Various catastrophes, such as crises, conflicts, natural disasters, accidents, terrorist attacks, various problems of social, economic, political and psychological nature are an inevitable part of human life. They have an impact not only on the environment in which individuals function, but also on their physiological, affective and social well-being. Crisis situations drastically change the context of all individual and collective actions, including information activities. Crises and disasters disrupt our routines and, therefore, they condition our information behaviors, which become more dynamic, sometimes even chaotic, while they remain focused on eliminating the problem, in order to persevere through and eventually to overcome the crisis. Often, due to the sudden nature of a crisis or a catastrophe, information behavior becomes extremely varied, subject to many factors. It is usually anxious, determined by emotions, and time-sensitive (Allen, 2011). A crisis is an experience, but also an event or situation that is usually unexpected,

incidental, unacceptable and unprecedented, often impossible to control. In addition, it has a significant impact on social beliefs and may reduce trust; it may provoke dangerous reactions, such as riots and wars, that threaten life of the community (Rahmi et al., 2018). Crisis may also be a kind of stimulus, triggering specific information behaviors (Miller, 2011; Pisani et al., 2016). The crisis situation is the context for all possible activity, including solutions (Pang, 2014). A catastrophe is often defined by a disruptive impact it has on entire communities, countries, and the natural environment. This phenomenon is incredibly dangerous: it may even cause a fatal disturbance of social order and harmony, and a feeling of helplessness in the individuals who lose the sense of security as a result of damage to property, loss of health, or economic and environmental losses (Rahmi et al., 2018). Undoubtedly, crisis situations and disasters affect human information behavior. In a crisis situation, habits often change, as individuals adjust their active and passive gathering information processes, information seeking and searching, information use or dissemination activities. Research on behavior in a crisis situation in information science accounts for many aspects, for example finding information, responding to information, as well as the use of new technologies and social media to disseminate information, social and emotional responses to a specific event, information management in crisis situations, evaluation of various activities carried out in response to violence, terrorist attacks or natural disasters, such as hurricanes (Lopatovska & Smiley, 2014) or floods (Kellens et al., 2011).

In order to show the current state of knowledge on information behavior in crisis situations, the present study examines key issues related to this area. The research has two aims. Firstly, to establish and analyze the state of scholarship on information behavior in crisis situations or in disasters. This was achieved by an analysis of diverse articles. The second aim was to develop, define and categorize various crisis situations in order to establish a theoretical foundation for further research. Conceptual analysis was therefore carried out to identify the most important trends in the information science research on crisis situations. It accounted for factors that determine information behavior and its features. The study adopts a broad understanding of information behavior, which is interpreted as all activities relating to information carried out in a specific reality (Wilson, 2013). These activities may be conscious or unconscious, active or passive, intentional or unexpected, and are undertaken in a specific, multi-dimensional context (Cisek, 2017; Wilson, 2013). Information behavior accounts for the ways in which people need, gather, manage, use, disseminate and respond to information (Fisher & Julien, 2009; Krakowska, 2016) in specific contexts, which comprise action, time and situation, including also geographical space, and affective, social and cognitive dimensions in which sense is constructed (Case & Given, 2016; Krakowska, 2016; Savolainen, 2005;Vakkari, 1997).

The research presented here focuses on the recognition of various crises, which include both natural and human disasters. These circumstances shape human information activities. Therefore, understanding, interpreting, and precise analysis of information behaviors and factors introduced by crisis situations is a crucial aspect of information science.

2. Conceptual framework

2.1. Crisis definition and types

There is no uniform definition of a "crisis" (Shaluf et al., 2003; Perry, 2007); various terms are used to describe this phenomenon, such as crisis or catastrophe, critical incident, or crisis moment (Shaw, 2010). The term covers a wide range of meanings and its definition depends on the discipline. It is defined, similarly to the term *disaster*, as a concept, phenomenon or a research area. In philosophy, it suggests a breach, or a separation. It indicates finality, a certain turn, but also an understanding of the situation and its conditions (Tangija, 2014). It is therefore a breakthrough for the individual. Crisis is thus understood as a determinant of cognitive processes, which allows the individual to recognize the cause of the situation, enabling them to grasp and evaluate the phenomenon and its context, and gain insight that may cause qualitative changes in human life. It allows the individual to interpret and understand certain actions. It can reveal the weakness or non-adaptability of an object, subject or situation. It also implies that the phenomenon unsettles a structure or disturbs an equilibrium because of its suddenness and traumatizing quality. It is a subjective challenge, but it is also associated with negative emotions that trigger anxiety (Bundy et al., 2016). Nevertheless, crisis has some positive features. It is a temporary phenomenon that enables transformation and may result in the emergence of a new mode of activity (Tangija, 2014). Both internal causes, inherent to any phenomenon, process, and the external factors that affect the crisis situation, shape human activity and its environment. A crisis is often a turning point in an unfolding sequence of events and actions (Keown-McMullan, 1997). As a state of disorder, experienced as a difficulty, crisis may disturb the functioning of individuals and whole groups. It causes internal imbalance, emotional disturbance, and a sense of instability that always follows an unexpected event. Often it has a negative impact on individuals' mental well-being due to the lack of appropriate remedial measures, as well as their inability to react properly or to use the various previously available resources, which have thus far regulated the individual's life. Any specific crisis requires meaningful, constructive solutions intending to change the difficult conditions, state and eliminate the effects of any conflict, disaster, accident or other form of catastrophe. Moreover, crisis may be a result of human activities, such as economic and political operations. It may also be a consequence of natural disasters and human fault. As an unusual event, natural or man-made, or resulting from a failure of technological systems, crisis temporarily overwhelms the society's capacity for rehabilitation, as well as saving and preserving the natural environment. It causes enormous damage, economic loss, disruption, injury and possible loss of life. Generally, crises could be divided according to their causes into man-made or technological and natural. There are also hybrid disasters resulting from both human error and natural forces (Shaluf, 2007). Crises can be grouped into four types: (a) conventional (predictable – including those resulting from technological failures, e.g. power outages), (b) unexpected (unpredictable, for which no response has been prepared in advance, e.g. an explosion), (c) unsolvable (rather predictable, but difficult to control, resulting from faulty crisis management systems, e.g. a nuclear power plant accident), and (d) basic (the most dangerous, intense and long-lasting, e.g. a terrorist attack) (Gundel, 2005). Crises can be also classified as

community crises and non-community crises, which include transportation accidents, such as railway or airplane crashes. The community crises are further divided into non-industrial crises, industrial crises, which include socio-technical disasters, such as structural collapses, fires, explosions, and, finally, natural crises, which include natural disasters, e.g. tornados, earthquakes. Non-industrial crises are divided according to conflict type, e.g. political crises, which is further divided into internal and external. Non-conflict crises include social crises and economic crises, further divided into non-financial crises, caused by faults of the organization, miscalculation of business risk, or poor decision-making (Shaluf et al., 2003). We may also distinguish personal crises, which are influenced by many factors, relating to health as well as social, mental and economic (e.g. domestic violence, migration, crimes). Crisis may be understood as an event, a circumstance, a sudden incident, a disruption, but also as a process (Wooten & James, 2008). It refers to any situation with an emotional charge, characterized by complexity and uncertainty (Maitland & Sammartino, 2015). Cognitive processes, accumulation of knowledge, skills and experience are crucial to understand a crisis and to respond with appropriate and strategic and decisions (Combe et al., 2012; Samdanis & Lee, 2019). Crisis, when defined as a process, is characterized by an accumulation of problems, variance across different stages, and cyclicality. Often it is not a sudden incident, but time pressure and the dynamics of the reaction that have a significant impact on the activities undertaken in all stages of the crisis (Bakker & Sheperd, 2017; Meredino & Sarens, 2020). In economy, it is a multistage process, the stages include detection, preparation, containment and control, as well as business recovery, learning and reflection (Wooten & James, 2008). Crises result from internal and external episodes, such as inappropriate information behaviors, interpersonal conflicts, and macro-environment conditions (Meredino & Sarens, 2020). A "crisis situation" refers to conditions resulting from the development of certain unfavorable phenomena. The goal is to neutralize the risk and, at the same time, to maintain the safety and well-being of those affected (Hannigan & Hertig, 2010).

One of the many types of crises caused by economic or natural disasters is food crisis which occurs when the level of hunger and malnutrition increases rapidly at the local, national or global level. It is the result of poor development of agriculture and infrastructure, or of natural disasters such as drought (Timmer, 2010). It is affected by economic factors (e.g. increase of prices), political (e.g. tyrannical government) or demographic (population growth). Crisis and disaster management models suggest appropriate responses, which include theoretical two-dimensional schema that distinguish between the social and the individual level, and present the relations between the two (Asghar et al., 2006).The transfer of knowledge, investigation of learning processes, inquiry and reporting as well as the study of behavior patterns, including information behaviors, significantly improve crisis management and prevention (Herbane, 2014). The traditional process of disaster management consists of two phases, such as pre-disaster risk-reduction and post-disaster recovery phase. The process entails activities such as prevention, mitigation and preparedness, as well as response, recovery and rehabilitation. In the medical sector, mitigation, preparation, response and recovery are distinguished as four phases of disaster management (Kimberly, 2003). The crisis management process can be divided into stages: (a) the prodromal phase or the pre-crisis stage, when signals of a potential crisis appear, (b) the acute crisis phase, (c) the stage of a chronic crisis, when it is important to look for ways to

solve it, and (d) the stage of solving and ending the crisis, or the post-crisis stage (Coombs, 2019; Laugé et al., 2009). Crisis management may also include the stages of individual preparedness, mitigation, recovery and response, as well as various efforts by government organizations, volunteers and local organizations (Unlu et al., 2010).

A **disaster** occurs when various threats combine, e.g. a natural disaster or man-made disaster, caused by human activities (such as warfare), a difficult economic, medical, technical and social situation, or a lack of resources; its negative impact will be minimized by special measures, plans, coordination, and the use of appropriate resources (Alexander, 2013). It has only negative effects. Disasters are largely defined as sudden, unforeseen events that lead to the destruction, loss or damage. Usually they are single but large-scale events with a significant impact. They cannot be addressed without external assistance and involve various stakeholders; they require mechanisms to reduce their negative effects (Shaluf et al., 2003). Among the most common disasters that affect entire communities, as well as the wider economic and geopolitical situation, are natural and environmental disasters such as typhoons, volcanic eruptions, hurricanes, floods, and fires. It should be noted that a natural disaster is a cataclysm causing enormous destruction and havoc, which leads to a catastrophic situation in which everyday life is suddenly disrupted and people become helpless victims. Such catastrophes create the need for food, shelter, medical care, and protection against climatic conditions (WHO, 2020). A catastrophe is characterized by offensive activity; it is associated with human suffering or loss of life, a significant loss of economic and material resources, with which a specific community, affected by this negative situation, is unable to cope, unable to reduce its effects (Staupe-Delgado, 2019).

An **incident** is defined as an event caused by human error or a technological, information, economic or political failure that is limited in time. It may result in a state of emergency, catastrophe, disaster or crisis. Emergency is a dynamic condition, changing over time, while the so-called normal state is disrupted (Stoyanov, 2017). Incident has a local, regional or national character and prompts the actions of the authorities and administration. It is possible to use the community's own resources, knowledge and experience to cope with an emergency. The risk lies in the likelihood that the incident will cause a more serious crisis later on. There are potential losses in the life, health, livelihood, and property, of a specific community or of the entire population, both in the present and in the future (Staupe-Delgado, 2019).

Social crisis (or social conflict) is related to overlapping conflicts and social tensions, and affects many people simultaneously. It contributes to changes, reorientation, and disturbs the social order (Ardelt, 1998). It results in the weakening of social ties and disorganization. It involves many phenomena: class, racial, religious, and social tensions resulting in revolts, riots, and strikes. Long-term social conflicts may have a positive impact on the social, cultural and economic situation of a community. A social crisis may strengthen one group, but it may have a negative impact on another; it may also provoke uncontrollable emotions. One type of action resulting from an intense social and political conflict is terrorism, i.e. various ideologically motivated, planned and organized actions of individuals or groups violating the existing legal order. Usually, violent actions are undertaken in order to force the state authorities and the society to act in a certain way, usually against the interests of outsiders Terrorist attacks are carried out by various means (physical violence, weapons,

or explosives). Their intention is to create anxiety and to draw attention (UNDOC, 2020). Social conflict may also be a source of creativity, catalyzing change and innovation (De Dreu, 2010). A society's turning points are often associated with a political or economic (financial) crises.

A **political crisis** is a situation in which the state employs authoritarian measures in response to, a breakdown of order or a direct threat to the proper functioning of the state (McNair, 2018).

In **psychology**, a crisis is a reaction to a singular and extremely traumatic experience, which involves ineffective attempts to overcome difficulties, and results in abandoning previous behaviors and goals, disorganization, disordering of life cycle and negative moods or even a temporary breakdown (Brammer & Abrego, 1981; Miller, 2011). Various types of psychological crisis might be distinguished: (a) normative crisis (maturity, developmental), consisting in emotional and behavioral changes in relation to a significant event during human development that changes their life (e.g. marriage), which are typically expected and somewhat predictable (APA, 2020), (b) an existential crisis that is related to internal antagonisms, searching for the meaning of life, negative emotions related to the functioning as an individual in the society (e.g. anxiety, fear, phobia), (c) crises resulting from an unpredictable, intense event, which may be incidental, random or situational (e.g. accidents), (d) environmental crises resulting from natural or man-made disasters or from political actions (e.g. war), or a serious economic crisis (e.g. recession), which thus, by threatening life and influencing the sense of security, cause or intensify a mental crisis (Cardona, 2011), (e) chronic crises that involve long-term, permanent exposure to stress or trauma, e.g. domestic violence, which may lead to a mental illness, withdrawal, lack of sense of agency, or passivity (Gullslett et al., 2016). All these crises affect individuals. Psychology defines crisis as (a) a breakthrough and critical moment of change, (b) an abandonment, loss, or disruption of a coping mechanism, (c) lack of self-control, affective balance disorder, a threat to the identity of an individual, (d) loss of value system (Miller, 2011; Tedrick & Wachter Morris, 2011). The so-called **crisis paradigm** defines it as emotional decay, with a significant impact on affective, cognitive and behavioral responses to problems and changes. This transformation and destabilization is considered alongside the background, symptoms and effects of the crisis, and actions undertaken to overcome it: they all interact with each other as parts of an entire crisis situation (Hoff & Morgan, 2011).

In **medicine**, crisis is a turning point, a breakthrough, a climax of a disease followed by a change (recovery, or deterioration and death) (Hem, 2018). A health or a public health crisis refers to a difficult or dangerous situation affecting the health care system, affecting a given community. It has a significant impact on the health of the population; it often is sudden and intense. It may result from a disease that is difficult to control, industrial processes or incorrect policy, insufficient preparedness, or an extreme event. It can refer to the massive escalation of health care spending combined with its failure (Linsk, 1993). Health risks include outbreaks of infectious diseases, unsafe food, chemical contamination, radiation effects, effects of natural disasters, conflict and war (Nelson et al., 2007).

3. Information behavior in crisis situation

3.1. Research goals

The aim of the study, after characterizing crisis and presenting the most important related terms and concepts, was to present the state of scholarship on information behavior in crisis situations. Select publications were analyzed with the following questions in mind:

(1) What types of crisis situations are described in library and information science literature?; Does the research concern epidemics and disasters?
(2) What information behaviors are discussed in this context? Do researchers analyze the activities of searching, sharing, avoiding information or any other information activities? What aspects are highlighted? What kind of users do they research?
(3) What concepts, models, theories are referenced or created?
(4) Does the empirical analysis employed in research yield interesting results, or lead to formulating new theories?

3.2. Methodology

The article employed qualitative strategy (Nowell et al., 2017) and used methods of scoping literature review (Munn et al., 2018; Pham et al., 2014), and a conceptual analysis to establish the meaning of a given concept by identifying and defining the contexts in which it is classified (Furner, 2004). The scoping review method was used, which is a variant of the critical literature review and is

> (...) an ideal tool to determine the scope or coverage of a body of literature on a given topic and give clear indication of the volume of literature and studies available as well as an overview (broad or detailed) of its focus (Munn et al., 2018).

Thus, the aim of scoping review, as a precursor to a systematic review, is to identify a certain scope of the research field, explain key terms, concepts, characterize the method of research conducted in a given field, as well as to identify and map key assumptions, tendencies, features and conditions relating to a given concept, detecting gaps in current knowledge (Arksey & O'Malley, 2005; Munn et al., 2018; Rumrill et al., 2010). Additionally, the study also involved thematic content analysis applying inductive forms of reflexive analysis (Braun et al., 2019; Cisek, 2014).

In July 2020, a search was carried out in the LIST database, using the keywords and the search phrase ("information behavior" OR "information seeking" OR "information sharing") AND (crisis OR crises OR disaster). To refine the search, expanders: "apply equivalent subjects" were used. The results were narrowed down to scholarly (peer-reviewed) journals and papers published between 2001 and 2020, and to English-language publications. In the end, 81 publications matching these criteria were found.

Reports and reviews were rejected, as were publications which did not refer to any aspect of information behavior or described the issue only in general terms or mentioned crisis only as an emerging or coexisting element, e.g. in management processes. Ultimately, 56 studies explicitly characterizing human information behavior in crisis situations in relation to information science were selected for the final analysis.

Tab. 1. Thematic categories – number of terms referring to the categories of crises and disasters in scholarship published in 2010–2020

Categories and subcategories		Number of terms related to category
Category	**Crisis**	**115**
subcategories	health crisis	32
	crisis situation	27
	mental and personal crisis	23
	political crisis	11
	domestic violence	9
	social crisis	7
	economic crisis	4
	humanitarian	2
Category	**Natural disaster**	**52**
subcategories	natural disaster	24
	earthquake	16
	flood	3
	hurricane	3
	tsunami	2
	storm	2
	cyclone	2
Category	**Incidents**	**34**
subcategories	incidents	18
	shooting	6
	terroristic attack	5
	emergency	3
	attack	2
Category	**Health crisis**	**32**
subcategories	epidemic	14
	health crises	14
	pandemic	4
Category	**Accident**	**13**
Category	**Disaster**	**13**
subcategories	fires (man-made)	4
	pollution	6
	climate change	2
	construction disaster	1
Category	**Problem situation**	**3**

To conduct a conceptual analysis the most relevant sections of the text were selected that clearly related to crisis situations, and various activities related to widely understood informational behavior were identified, according to typologies of information behavior proposed by Wilson (2013), Case and Given (2016), Savolainen (2016), Godbold (2006). According to these typologies, information behaviors are divided into information use,

gathering and responding to information, which is divided further into searching, disseminating or avoiding information (Cisek, 2017). In addition, the research accounted for the distinction between states before, during, and after searching for information (Marcella et al., 2013) and between the different types of information activities typical for these stages. It should be noted that these theories were considered as a suggestion, rather than as a ruling principle.

Thematic analysis consisted of the following stages: (a) study of data, (b) inductive generation of codes, (c) deductive coding and theorization, if possible, according to the models considered, (d) identification of topics, (e) development of results (Braun et al., 2019). Inductively transmitted codes included types of crises, types of informational behaviors, contextual factors, theories and models of informational behavior, social and affective dimensions of these behaviors, information barriers, or information competencies.

4. Results

4.1. Types of described crisis situations

The analysis showed that researchers study information behaviors in relation to various types of crises and catastrophes. They examine multiple activities, such as obtaining information, searching for information, sharing information, and various factors determining these processes during a crisis. They also analyze the context of crisis management, actions undertaken both by individuals and entire populations or institutions responsible for responding to crises. Table 1 presents the categories of crises and their number of encodings, resulting from the analyzed texts. The total number of recognized terms in relation to the category and the name of the subcategory along with the number of mentions in the text are also given.

The crisis category includes studies concerned with health crises, with publications on epidemics of various types, such as HIV/AIDS (Kanyengo, 2010), highly pathogenic avian influenza (Keselman et al., 2010), foot-and-mouth disease (Hagar, 2010b) or enterohemorrhagic Escherichia coli, EHEC (van Velsen et al., 2012). The articles in the health crisis category discussed various aspects of such a crisis, as well as information behavior of individuals while seeking information, or of systems managing the crisis (Aedo et al., 2010). The vast majority of publications analyzed considered many different crises, such as threats to life (Lê, 2014), the closure of the Google Lively communication platform (Huvila, 2015), isolation (Hagar, 2010a), as well as long-term effects of terrorist attacks in Manchester (Mirbabaie & Marx, 2019); crises were also considered as a condition of the process of searching information (Eftekhar et al., 2019). This category also included publications on dispute or conflict situations discussed, for example, in relation to information dissemination involved in collaborative research projects (Palmer et al., 2007). The crisis category also includes studies on mental and personal crises, which may concern information behavior of victims of domestic violence or the effects of participating in various crisis situations, such as accidents, e.g. sinking of the Sewol ferry (Hong et al., 2018; Lee & Kang, 2018) or different college shooting (Heverin & Zach, 2011). In addition, information behavior was analyzed in relation to political, social, and economic crises, domestic violence, and

unemployment (Webber & Zhu, 2007) migration (Bronstein, 2017), humanitarian crisis, as well as conflict. Common information processes in crisis situations include, obtaining information in the event of a natural disaster, such as an earthquake, hurricane, storm, natural bushfire, tsunami, flood (e.g. Dabner, 2012; Kim, 2014; Shankar, 2008). The publications also considered incidents, such as arson, shootings, accidents on an oil platform, or the sinking of a ferry. The authors took into account political and social crises, analyzing the effect of riots or terrorist attacks on information behavior. The articles also included the analysis of information behavior of soldiers during military training (Sonnenwald, 2006). The research covered the dissemination and retrieval of information in the event of an explosion (Mirbabaie & Marx, 2019). Non-natural disasters, such as construction and industrial disasters, were not widely discussed. Only a single study of the destruction of the Yakushima nuclear power plant following a tsunami considered the impact of this disaster on later information behavior (Rahmi et al., 2018). Similarly, there were no studies on the impact of transport disasters, such as air crashes.

4.2. Types of information behavior under consideration

Firstly, the attention should be paid to the heterogeneity and imprecision of the terminology used to describe informational behavior. Many authors inaccurately defined various behaviors. They speak of information milling, intensification, processing, creating, capturing, promoting, and even of an information explosion (Cao et al., 2013). This may be caused by the unique qualities of information behavior in crisis situations: it is often uncoordinated, extremely intense, avalanche, chaotic, ambiguous and charged with strong, negative emotions. The publications were analyzed according to the typologies described in the section on methodology. The number of terms selected during encoding is given in Table 2.

The analysis showed that information use was the most often studied type of behavior. This category were divided into sub-categories, according to the adopted typology and relating to the categorization of such information behavior. The classification included: (a) broadly understood information use, including analysis, assessment, verification, updating, sense-making or recognition, (b) information sharing, (c) information dissemination, (d) information exchange, (e) information transfer, and (f) information responding.

The study shows that gathering was also the information behavior studied very often in relation to crisis situations. Various types of information behavior were distinguished according to the typology presented above, and ranked according to the frequency with which they were discussed in the sample: (a) information seeking, (b) information gathering, (c) information searching, (d) information overload, and (e) information browsing. Research often concerned generally understood information behavior, including mediation, organization or avoiding information, as well as cooperation. Scholars analyzed information behavior in a crisis from the perspective of information or knowledge management study, focusing on observation, analysis and evaluation of the effectiveness of emergency management systems (e.g. Etti at al., 2010). Information needs that arise in a crisis or in a disaster were also studied (e.g. Kavanaugh et al., 2017; Rahmi et al., 2018; Westbrook, 2008).

Tab. 2. Thematic categories – number of terms referring to information behavior studied in the data sample from 2010–2020

Categories		**Number of terms related to category**
Category	information use	142
subcategories	information use	47
	information sharing	35
	information dissemination	21
	information exchange	17
	information transfer	11
	information responding	11
Category	information gathering	85
subcategories	information seeking	45
	information gathering	25
	information searching	14
	information browsing	1
Category	information behavior	40
	information management	32
	information needs	15
	knowledge management	8
	information barriers	1

4.3. Aspects and contexts of informational behavior examined

The authors focused on the social and affective dimensions of information behaviors, the role of community, social and collective solidarity (Hong et al., 2018), the theory of social amplification of risk framework (Silver & Matthews, 2016), or the formation of information grounds in crisis situations (Bronstein, 2017; Pang et al., 2019). They analyzed the concept of common grounds, comprising common and conscious information, knowledge, and group beliefs, that are the foundation for information sharing (Sonnenwald, 2006); they also studied collaborative information behavior (Lee & Kang, 2018), transforming information worlds through dynamic processes of obtaining and using information. Scholars also discussed negative emotions, fear, uncertainty interfering with informational behavior. The affective response to risk has been examined in relation to information gathering (Choo & Nadarajah, 2014). The articles emphasized methods, efficiency and utility of social media, especially Facebook and Twitter, as well as the relation between microblogging and information gathering and dissemination, or exchange (e.g. Dabner, 2012; Heverin & Zach, 2011; Kim, 2014). They certainly foster communication and dissemination of information among people. The context of social media use and information behavior was considered through the lens of social amplification of risk (Silver & Matthews, 2016). Scholars referred to this concept in order to understand how institutional structures, various information

processes, the behavior of entire social groups and individual reactions shaped the social experience of risk and information flow. It is worth noting that

> (...) theoretical framework allows for the conceptualizing of risk as dynamic, constantly evolving, and reciprocal – in that risk information can influence perceptions, which can in turn influence the dissemination and consumption of risk information (Silver & Matthews, 2016, 2).

Research on compassion and community building following the catastrophe discussed affective responses to information and collective resilience. These activities and reactions support adaptation processes following a crisis or catastrophe, allowing persons, groups of people (or society) and organizations to experience the benefits of a catastrophe, as a result of sharing the affective response with the rest of the community (Hong et al., 2018). The scholars attended to various information sources, their availability, credibility and reliability, speed of access, lack of information, delay in delivering information and uncertainty, communication channels, information sufficiency (e.g. Choo & Nadarajah, 2014). The processes of obtaining information were analyzed, for example, in the context of epistemic trust in information gathering and use, and in relation the role and influence of expert and individual knowledge, belief, acceptance, verification and justification of information. The impact of the epistemic trust of individuals in crisis on their information seeking behavior was analyzed, with a focus on the role of professionals and government (Hagar, 2010b). It should mention the concept of crisis informatics, i.e. a multidisciplinary field combining computing and social science to study disasters. It enables assessment of mutual relations between people, organizations, information and technology. The research concerned the importance of individual elements of crisis informatics to the methods of transferring and disseminating information in crisis, especially during technical failures affecting available systems, equipment and procedures employed in responses to crisis (Dabner, 2012; Fu, 2011; Lopatovska & Smiley, 2014). Information behavior in crisis was also studied in relation to critical factors, critical crisis communication, as well as the issue of weak problem solving and critical incidents in research process (Palmer et al., 2007), the role of effective task implementation, and problem (Ibrahim & Allen, 2012). The scholars also considered searching for meaning and also significance of a crisis situation, information transmission during disasters and the role of social cues and understanding environmental signals (Pang et al., 2019), as well as the role of information competences, necessary to obtain information, the need for their development, overload and disinformation was analyzed. The research also considered the context of the information overload, resulting from the proliferation of means of obtaining information and of formal and informal channels and sources (Lopatovska & Smiley, 2014). It also analyzed information sufficiency while seeking and using information, as well as information-intensive creation in relation to transformation of information needs in dynamically changing conditions, especially during unfolding disasters situation, such as bushfires (Choo, 2013). The chances for eliminating information overload were assessed, especially in situations requiring quick provision of relevant and reliable information to support the processes of crisis management, e.g., in the case of foot-and-mouth epidemic (Hagar, 2010b). Scholars also considered the situational theory of publics, following which they analyzed various social groups, focusing on problem awareness and the range of activities related to eliminating crises. Thus, they studied the methods of collecting and processing information related to a crisis situation

(Aldoory et al., 2010). Westbrook's series of publications on information behavior of victims of domestic violence is noteworthy. The author has studied the processes of obtaining information at different stages of crisis. Each stage, i.e. awareness of the crisis, recovery from it, fleeing and living after leaving the offender was mapped onto the crisis of domestic violence (Westbrook, 2008). Other scholars focused on the role of libraries in supporting information behavior through sharing information, anonymity, assistance in obtaining information, searching for information and collaboration with local authorities, as well as implementation and development of joint social programs (Westbrook & Gonzalez, 2011). Single studies concerned evaluation of information processes of police departments, the quality of information provided by government services (as key information gatekeepers) and obtaining information from victims of violence by quickly responding to their information needs and creating reliable sources of information (Westbrook, 2008a).

4.4. Types of users studied

The research concerned various types of users in crisis situations. Different types of users were the focus in different analyzes, concerned with different information behaviors. The most common research objects were entire communities, e.g. residents, entire populations (Rahmi et al., 2018). Information behaviors occurring in organizations affecting entire crisis management systems, or the response of emergency services in the event of a disaster, e.g. by implementing action charts, were also studied (Aydin, 2016). The analyzes concerned online users, especially Twitter users who disseminate information during crises, as well as participants on forums launched for families of victims of Sewol ferry disaster (Hong et al., 2018) and microbloggers (Heverin & Zach, 2011). Many scholars studies victims of domestic violence, accident victims, students, employees, emergency workers, experts and professionals, including information professionals and librarians (Turoff & Hiltz, 2008), as well as autoethnographic researchers who themselves experienced natural disasters, such as Hurricane Sandy (Lopatovska & Smiley, 2014) or became a parent and encountered crisis situations, for example related to lactation (Montesi & Bornstein, 2017). Other participants included immigrants, domestic help, social workers, soldiers, farmers, and the elderly.

4.5. Concepts, models, theories – referenced

In their research, scholars most often referred to Savolainen's Everyday Life Information Seeking model and Dervin's sense-making concept to describe informational behaviors during nonroutine situations such as crises; they account for information gathering and information needs in everyday life, e.g. during a personal crisis (Westbrook, 2008). Research stressed time determinants, especially in relation to chaos, rapidity and urgency of crisis situations (Pang, 2014; Ryan, 2018). It has been shown that they have a significant impact on cognition, the processes of searching for and making sense of a troubling phenomena and situations and on activities undertaken in a crisis situation (Heverin & Zach, 2011). Active information seeking allows information users to understand crisis situations; it becomes a kind of problem-solving (Westbrook, 2009). A crisis disrupts the individual's sense-making processes, which makes exchanging and sharing information crucial (Heverin & Zach, 2011). Information seeking stems from a need to make sense of the crisis or disaster. The

desire for relationships with others in a community experiencing or a crisis situation is also a part of the process of searching for meaning. As in the case of information sharing, which is critical to sense-making process following a crisis, which triggers informational behaviors, individuals strive to cooperate and be a part of a larger community (Haverin & Zach, 2011). Eliminating uncertainty through gathering information and interacting with others is critical to sense-making during crises (Mirbabaie & Marx, 2019). The mutability of a crisis situation also prompts sense-breaking processes, which occur when a sense-making process is disrupted by contradictory evidence or information, preventing the individual from interpreting the situation. The sense-breaking results in the rejection of inconsistencies and allows for a reconstruction of reality. Often, this phenomenon is the first response to a disaster or accident (Mirbabaie & Marx, 2019). Scholars applied Ranganathan's model to analyze crisis management systems, which includes personality (stakeholders), matter (natural disaster), energy (stages of preparedness, response, and recovery), space (location, like hospital, epicenter or a house), and time (temporality of disaster management or time of disaster) (Yang & Wu, 2019). Studies of information behavior of the community with reference to concepts of information worlds, small world and information grounds also focused on the social aspect of the response to a crisis and the possible cooperation (Burnett, 2015; Fisher & Naumer, 2006). The scholars also analyzed social factors, the role of emotions and norms influencing the processes of obtaining and disseminating information, which determine information behaviors of small groups in crisis, e.g. social isolation and information poverty (Bronstein, 2017), as well as among the elderly (Pang et al., 2019). The nature of social relations in collaborative information behaviors in crisis situations was analyzed with reference to information bonding and bridging concepts. Social information bonding refers to building social and emotional relationships, creating strong bonds in small groups, which improves their responses to crisis, as they carry out information processes to fulfil their information needs. Information bridging refers to the efficient use of information, which facilitates separating nonredundant sources of information and accessing heterogeneous information (Cao et al., 2013). Scholars referred to the activity theory to analyze the relation between informational behaviors, information worlds, and information processes undertaken in them to assess and understand negative phenomena and group activity. According to the theory, people and the information processes they carry out are a part of their own and shared information worlds found during a crisis, creating a community that interprets the phenomenon and reacts to it. People act collectively, although at the same time. any single member of the community may engage in various information processes and adapt to the emerging crisis situation. A network of dependencies and activities emerges, shaped by rules and cultural norms (Pang et al., 2019). Scholars referred to the theory of Allen's person-in-progressive-situation (Allen, 1997) to discuss domestic violence, taking into account the interactions between personal limitations (e.g. limited knowledge), information needs, and limitations particular to a specific situation, such as a personal crisis (Westbrook, 2008). The research also used Johnson's comprehensive model of information seeking, comprising three categories of variables: antecedents, information carrier factors and information seeking actions. The model explains why people become information seekers, and characterizes their method of obtaining and retrieving information. The model prioritizes the knowledge regarding information needs, individual beliefs and coping mechanisms (Pang et al., 2019).

4.6. Concepts developed and research results

Analysis of results indicated that information use and information gathering remain the central aspects of information behavior in crisis situations. Researchers discussed many activities common in such an incidental, chaotic and often dangerous context. They vary not only in terms of the responses, which may be active or passive, but also change with the type of crisis situation (Ryan, 2018) and depend on the conscious, competent recognition of the conditions of the information behavior. In addition, the gradual nature of crises and disasters and their intensity affect the heterogeneity of information behavior. The socio-affective and cognitive dimensions of these activities become crucial, as does the general context of the crisis situation. Table 3 presents the most important terms that emerged during coding, referring to the most important types of information behavior researched in the analyzed publications.

Tab. 3. Thematic categories – number of terms referring to information behavior in the selected publications from 2010–2020

Categories		**Number of terms related to category**
Category	information use	246
subcategories	information use	106
	information sharing	42
	information dissemination	36
	information exchange	20
	reaction to information	18
	information provision	10
	information transfer	10
	information flow	4
Category	information behavior	132
Category	information gathering	96
subcategories	information gathering	29
	information seeking	49
	information browsing	1
	information searching	17
Category	social dimension	83
	information resources	46
	crisis & information management	45
	affective dimension	40
	information needs	32
	cognitive dimension	28
	variables (different context)	25
	Communication	22
	information competences	17
	information barriers	2

4.7. Information behavior in crisis models

The research showed that there is a need for a model of crisis information behavior, especially information seeking. This is necessary due to the temporal nature of crises and the instability of the conditions during the various stages of a crisis situation, from being aware of the danger to seeking shelter or help, and finding a safe place (Rahmi et al., 2018). Each stage of a crisis, preparing, responding and recovering (Pang et al., 2019) or warning, impact, inventory, survival, recovery (Lopatovska & Smiley, 2014), prompts specific information use and seeking processes, and gives rise to specific information needs (e.g. Choo & Nadarajah, 2014; Lopatovska & Smiley, 2014). An important framework for the analysis of everyday information behavior was proposed by Westbrook in relation to domestic violence. Westbrook identified attributes of information experiences, including needs, affective states, cognitive mastery, and available resources, and selected specific information needs, which emerge at four so-called turning points. These components determine the active information processes at the stages of perpetrator abandonment, post-abandon survival and long-term abandonment survival (Westbrook, 2008). Social media influence the patterns of obtaining and using information. Many scholars studied how Web environments and social media (like Facebook, Twitter, microblogs) are used as tools for information behavior in response to a crisis or a natural disaster, among them Heverin and Zach (2011), Lopatovska and Smiley (2014), Dabner (2012). However, face-to-face communication is more common and preferable, especially in the first phase of the crisis (e.g. Rahmi et al., 2018). A crisis situation, as a trigger of various information behaviors, allows an individual to understand a damaged inner world image and to repair it. Hence, the authors pay particular attention to cognitive sense-making processes. These are crucial, as through information sharing, information negotiation, and information seeking they make cooperation and understanding of the situation possible, as well as create certain benefits (social, emotional, organizational) (e.g. Heverin & Zach, 2011; Hong et al., 2018). In crises, especially in the initial stages, marked by intensity, chaos, emotions, the processes of sense-making, sense-giving and sense-breaking are essential. They allow the individuals to cope with the loss of a safe, rational and orderly world. Sense-breaking in particular has been recognized as a driving force for re-meaning; it involves incident reporting, crisis support efforts, as well as misinformation and fake news (Mirbabaie & Marx, 2019). Sharing information is the dominant activity in the first stages of crisis; it intensifies in the recovery stage (Heverin & Zach, 2011). There is an urgent need for collective sense-making, determining the interpretation of events, information exchange, active creation and dissemination of information with the intent to influence the process of sense-making of other individuals (Mirbabaie & Marx, 2019). Pang drew attention to varied styles of coping with a crisis situation when analyzing information behavior in relation to urban pollution and noticed that they are a significant variables, related to experience, age, beliefs, and information competences, i.e. the ability to effectively seek information in main information resources, social media, personal networks or from healthcare professionals (Pang, 2014). Affective and social determinants have a significant impact on various activities related to information use and gathering. Strong emotions, relationships with family, friends, neighbors and other participants of crises support the creation of information worlds or information grounds (e.g. Bronstein, 2017; Pang et al.,

2019). In these environments, people actively seek relevant, reliable, up-to-date information, or seek emotional support and confirmation of their own beliefs, share information (e.g. Hong et al., 2018; Lee & Kang, 2018). The study conducted by Aldoory, Kim and Tindall in reference to the situational theory of publics, made it possible to recognize the nature of the common experience of victims, which may influence the processes of problem recognition and obtaining related information. In their opinion, information behavior is also influenced by media messages that intensify (even emotionally) the problem. The importance of early warning messages to raise awareness, particularly for the public health officials, was stressed (Aldoory et al., 2010). On the other hand, Ryan claims that the model of communicating risk regarding natural hazards shows that following the first alert, individuals seek confirmation to understand their situation. When a disaster occurs, people feel a sense of "shared responsibility" (Ryan, 2018). In turn, Choo and Nadarajah, bringing together the concept of crisis informatics (Hagar, 2010a) and the information seeking in risk model (Griffin et al., 2008), focused on factors such as information sufficiency, perceived information, gathering capacity, relevant information resources and beliefs, and their impact on information seeking and gathering, which rely on routine and nonroutine communication channels (Choo & Nadarajah, 2014). The processes of sharing information about risks and information behavior in general are affected by social factors, i.e. subjective norms related to information seeking and social definitions of crisis; the affective response to risk is also determined by individual's unique characteristics (Choo & Nadarajah, 2014). Information behavior is also analyzed in relation to crisis management systems. For example, in their analysis of the emergency management model, Kurian and John (2017) identified various phases of the crisis, such as mitigation, proper planning, recovery phases, as well as various activities typical for these stages. They also drew distinctions between the processes and users of such systems (often victims of disasters), and between the dissemination of information by active participants and the acquisition of information by the passive participants. In their opinion, it is necessary to test alert systems, verify information, accept social media (Facebook) and include the content published on the websites of crisis management agencies in the collective action system (Kurian & John, 2017). Fan et al. (2019) discussed the joint effects of informational and task attributes of network embeddedness on collaborative emergency management capacity. The study confirmed the positive impact of workflow integration on collaborative and absorptive capability in emergency management, which supports information management at the organization level, through network embeddedness and organizational learning into crease the efficiency of the information flow. McNaughton and Rao (2018) studied to the role of effective management in the socio-technical system of crisis response, the role of ICT in crisis communication, and improvement of insufficient reporting methods; they also discussed the potential of combining the knowledge framework with Ostrom's Institutional Analysis and Development Framework strategy for information management during crises. To improve crisis management systems, Yang and Wu (2019) developed a seven-level earthquake disaster response and recovery model based on an analysis of information processes occurring during the earthquake. The framework shows how to manage and share knowledge by crossing complex boundaries in technical systems in risk management.

5. Conclusions and limitations

This study is a first step towards a descriptive, conceptual analysis of the current state of scholarship on information behavior in crisis situations. It has already made contributions to the research on information behavior. Firstly, it has gathered existing definitions and typologies of crisis situations, creating a compendium of knowledge, a collection of terminology for future research. Secondly, it provided insight into research on information behavior in crisis. Combined, the scholars' discussions, characterizations, and models present a comprehensive picture of information behavior in crisis response and management. Information behavior in crisis, often occurring under the pressure of time involves evaluation of, and immediate reaction to existing circumstances. The studies showed that new forms of communication and social media have become a key element of cognitive processes and knowledge creation. They may act as triggers or inhibitors; they also influence multiple social relations. These factors affect information gathering and use, as well as other activities, e.g. information avoidance, information manipulation; they also change the role of serendipity in gathering information. Not enough attention has been paid to information barriers that may arise in crises, as well as to the changes of information needs. More scholars should consider the affective and social dimension of information behavior in a crisis situation. As Aldoory, Kim and Tindall (2010) note, shared perception of a situation, cooperation, and shared emotions are the essence of man in a crisis situations. The long-term effects of disasters and their impact on the subsequent skill development should be studied further, with particular attention paid to the changes in information behavior between repeated crises. This paper made clear the absence of research on transport disasters (airplane crashes or car crashes), which are becoming increasingly frequent, wars and armed conflicts, crimes and terrorism, as well as on crisis situations associated with migrations, and diseases (cancer or any chronic illnesses) or death. Similarly, there has not been enough research on information behavior during economic crises. The analysis presented in the article is a foundation for further research of different information activities in crisis situations of different types. More research is needed. This paper discussed only select articles, providing a basis for further research. The literature review might be expanded by analysis of related scholarship produced in other disciplines in social sciences.

References

Aedo, I., Díaz, P., Carroll, J. M., Convertino, G., Rosson, M. B. (2010). End-User Oriented Strategies to Facilitate Multi-Organizational Adoption of Emergency Management Information Systems. *Information Processing & Management*, 46(1), 11–21, https://doi:10.1016/j.ipm.2009.07.002

Aldoory, L., Kim, J.-N., Tindall, N. (2010). The Influence of Perceived Shared Risk in Crisis Communication: Elaborating the Situational Theory of Publics. *Public Relations Review*, 36(2), 134–140, https://doi:10.1016/j.pubrev.2009.12.002

Alexander, D. E. (2013). Resilience and Disaster Risk Reduction: An Etymological Journey. *Natural Hazards and Earth System Sciences*, 13(11), 2707–2716, https://doi:10.5194/nhess-13-2707-2013

Allen, B. (1997). Information Needs: A Person-in-Situation Approach. In: P. Vakkari, R. Savolainen & B. Dervin (eds.), *Information Seeking in Context* (111–122). London: Taylor-Graham.

Allen, D. (2011). Information Behavior and Decision Making in Time Constrained Practice: A Dual--Processing Perspective. *Journal of the American Society for Information Science and Technology*, 62(11), 2165–2181, https://doi.org/10.1002/asi.21601

APA (2020). *Maturational Crisis* [online]. APA Dictionary of Psychology [08.12.2020], https://dictionary.apa.org/maturational-crisis

Ardelt, M. (1998). Social Crisis And Individual Growth: The Long-Term Effects of the Great. *Depression Journal of Aging Studies*, 12(3), 291–314.

Arksey, H., O'Malley, L. (2005) Scoping Studies: Towards a Methodological Framework. *International Journal of Social Research Methodology*, 8(1), 19–32, https://doi.org/10.1080/1364557032000119616

Asghar, S., Alahakoon D., Churilov L. (2006). A Comprehensive Conceptual Model for Disaster Management. *Journal of Humanitarian Assistance* [online], July, [08.12.2020], https://reliefweb.int/sites/reliefweb.int/files/resources/2ADF93A261C7CBFFC12571B200374A9E-jha-gen-2jul06.pdf

Aydin, A. M. (2016). Complexity of the Strategic Level and Tactical Level Disaster Management Tasks: Activity System Analysis Through the Lens of Information Behaviour. *Information World/ Bilgi Dunyasi*, 17(2), 135–164, https://doi.org/ 10.15612/BD.2016.519

Bakker, R. M., Shepherd, D. A. (2017). Pull the Plug or Take the Plunge: Multiple Opportunities and the Speed of Venturing Decisions in the Australian Mining Industry. *Academy of Management Journal*, 60(1), 130–155, https://doi:10.5465/amj.2013.1165

Brammer, L. M., Abrego, P. J. (1981). Intervention Strategies for Coping with Transitions. *The Counseling Psychologist*, 9(2), 19–36, https://doi.org/10.1177/001100008100900203

Braun, V., Clarke, V., Hayfield, N., Terry, G. (2019). Thematic Analysis. In: P. Liamputtong (ed.), *Handbook of Research Methods in Health Social Sciences* (843–860). Singapore: Springer, https://doi.org/10.1007/978–981-10-5251-4_103

Bronstein, J. (2017). Information Grounds as a Vehicle for Social Inclusion of Domestic Migrant Workers in Israel. *Journal of Documentation*, 73(5), 934–952, https://doi:10.1108/jd-02-2017-0023

Bundy, J., Pfarrer, M. D., Short, C. E., Coombs, W. T. (2016). Crises and Crisis Management: Integration, Interpretation, and Research Development. *Journal of Management*, 43(6), 1661–1692, https://doi:10.1177/0149206316680030

Burnett, G. (2015). Information Worlds and Interpretive Practices: Toward an Integration of Domains. *Journal of Information Science Theory and Practice*, 3(3), 6–16, https://doi: 10.1633/JISTaP.2015.3.3.1

Cao, Q., Lu, Y., Dong, D., Tang, Z., Li, Y. (2013). The Roles of Bridging and Bonding in Social Media Communities. *Journal of the American Society for Information Science and Technology*, 64(8), 1671–1681, https://doi:10.1002/asi.22866

Cardona, O.D. (2011) Disaster Risk and Vulnerability: Concepts and Measurement of Human and Environmental Insecurity. In: H. Brauch et al. (eds.), *Coping with Global Environmental Change, Disasters and Security. Hexagon Series on Human and Environmental Security and Peace*, vol. 5, (107–121). Berlin, Heidelberg: Springer, https://doi.org/10.1007/978-3-642-17776-7_3

Case, D. O., Given, L. M. (2016). *Looking for Information. A Survey of Research on Information Seeking, Needs and Behavior*. 4th edition. Bingley: Emerald Group Publishing Limited.

Choo, C. W., Nadarajah, I. (2014). Early Warning Information Seeking in the 2009 Victorian Bushfires. *Journal of the Association for Information Science and Technology*, 65(1), 84–97, https://doi:10.1002/asi.22952

Cisek, S. (2017). Zachowania informacyjne. In: A. Żbikowska-Migoń, M. Skalska-Zlat (eds.), *Encyklopedia książki* t. 2 (643–647). Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.

Cisek, S. (2014). Analiza danych jakościowych we współczesnej informatologii. In: B. Sosińska-Kalata, M. Przastek-Samokowa & Z. Wirogórska (eds.), *Nauka o informacji w okresie zmian* (79–88). Warszawa: Wydawnictwo SBP.

Combe, I. A., Rudd, J. M., Leeflang, P. S. H., Greenley, G. E. (2012). Antecedents to Strategic Flexibility. *European Journal of Marketing*, 46(10), 1320–1339, https://doi:10.1108/03090561211248053

Coombs, W. T. (2019). *Ongoing Crisis Communication: Planning, Managing, and Responding* (5th ed.). Los Angeles: Sage.

Dabner, N. (2012). "Breaking Ground" in the Use of Social Media: A Case Study of a University Earthquake Response to Inform Educational Design With Facebook. *The Internet and Higher Education*, 15(1), 69–78, https://doi:10.1016/j.iheduc.2011.06.001

De Dreu, C. K. W. (2010). Social Conflict: The Emergence and Consequences of Struggle and Negotiation. In: S. T. Fiske, D. T. Gilbert, G. Lindzey (eds), *Handbook of Social Psychology* 5th ed., vol. 2, (983–1023). Hoboken, NJ: Wiley. https://doi:10.1002/9780470561119.socpsy002027

Eftekhar, Z., Soraya, Z., Moghaddam, H.S. (2019). New Educational System and Information and Communication Technology's Influence on the Process of Information Seeking Behavior: Case of Students of Islamic Higher Education. *International Journal of Information Science & Management*, 17(1), 73–82.

Etti, S., Perkinton, K., Cheuk, B., Curtis, J. (2010). Growing the ERM Energy and Climate Change Practice Through Knowledge Sharing. *Journal of Information & Knowledge Management*, 9(3), 241–250, https://doi:10.1142/s0219649210002644

Fan, B., Liu, R., Huang, K., Zhu, Y. (2019). Embeddedness in Cross-Agency Collaboration and Emergency Management Capability: Evidence From Shanghai's Urban Contingency Plans. *Government Information Quarterly*, 101395, https://doi:10.1016/j.giq.2019.101395

Fisher, K. E., Julien, H. (2009). Information Behavior. *Annual Review of Information Science and Technology*, 43(1), 1–73, https://doi.org/10.1002/aris.2009.1440430114

Fisher, K. E., Naumer, C. M. (2006). Information Grounds: Theoretical Basis and Empirical Findings on Information Flow in Social Settings. In: A. Spink & C. Cole (eds.), *New directions in human information behavior* (93–111). Berlin: Springer.

Fu, L. (2011). The Government Response to 9/11: Communications Technology and the Media. *Library & Archival Security*, 24(2), 103–118, https://doi: 10.1080/01960075.2011.592034

Furner, J. (2004). Conceptual Analysis: A Method for Understanding Information as Evidence, and Evidence as Information. *Archival Science*, 4(3–4), 233–265, https://doi.org/10.1007/s10502-005-2594-8

Godbold, N. (2006). Beyond Information Seeking: Towards a General Model of Information Behaviour. *Information Research* [online], 11(4) paper 269, [08.12.2020], http://InformationR.net/ir/11-4/paper269.html

Griffin, R., Yang, Z., Huurne, E. T., Boerner, F., Ortiz, S., Dunwoody, S. (2008). After the Flood: Anger, Attribution, and the Seeking of Information. *Science Communication*, 29(3), 285–315, https://doi.org/10.1177/1075547007312309

Gullslett, M. K., Kim, H. S., Andersen, A. J. W., Borg, M. (2016). "Emotional Darkness Without Solutions": Subjective Experiences of Mental Health Crisis. *International Journal of Mental Health*, 45(3), 161–170, https://doi:10.1080/00207411.2016.1185875

Gundel, S. (2005). Towards a New Typology of Crises. *Journal of Contingencies and Crisis Management*, 13(3), 106–115, https://doi:10.1111/j.1468-5973.2005.00465.x

Hagar, C. (2010a). Introduction to Crisis Informatics. *Bulletin of the American Society for Information Science and Technology*, 36(5), 10–12, https://doi: 10.5771/0943-7444-2019-2-77

Hagar, C. (2010b). Whom Do You Trust? Information Seeking During the U.K. Foot and Mouth Crisis. *Library & Archival Security*, 23(1), 3–18, https://doi:10.1080/01960070903200417

Hannigan, M. A., Hertig, C. A. (2010). Crisis Intervention. In: S. J. Davies (ed). *The Professional Protection Officer. Practical Security Strategies and Emerging Trends*. (295–303). Burlington: Elsevier, Butterworth–Heinemann, https://doi.org/10.1016/B978-1-85617-746-7.00025-0

Hem, E. (2018). Den Medisinske Krise. *Tidsskrift for den Norske laegeforening : tidsskrift for praktisk medicin, ny raekke*, 138(1), https://doi.org/10.4045/tidsskr.17.0401

Herbane, B. (2014). Information Value Distance and Crisis Management Planning. *SAGE Open*, 4(2), https://doi.org/10.1177/2158244014532929

Heverin, T., Zach, L. (2011). Use of Microblogging for Collective Sense-Making During Violent Crises: A Study of Three Campus Shootings. *Journal of the American Society for Information Science and Technology*, 63(1), 34–47, https://doi:10.1002/asi.21685

Hoff, L. A., Morgan, B. D. (2011). *Psychiatric and Mental Health Essentials in Primary Care*. London, New York: Routledge.

Hong, J. Y. J, Kim, N., Lee, S., Kim, J. H. (2018). Community Disaster Resilience and Social Solidarity on Social Media: A Semantic Network Analysis on the Sewol Ferry Disaster *Information Research* [online], 23(3), paper 798, [08.12.2020], http://InformationR.net/ir/23-3/paper798.html

Huvila, I. (2015). "We've Got a Better Situation": The Life and Afterlife of Virtual Communities in Google Lively. *Journal of Documentation*, 71(3), 526–549, https://doi:10.1108/jd-09-2013-0116

Ibrahim, H. N., Allen, D. (2012). Information Sharing and Trust During Major Incidents: Findings From the Oil Industry. *Journal of the American Society for Information Science and Technology*, 63(10), 1916–1928, https://doi:10.1002/asi.22676

Kanyengo, C. W. (2010). Information and Communication: A Library's Local Response to HIV/Aids in Zambia. *Health Information & Libraries Journal*, 27(1), 57–65, https://doi:10.1111/j.1471--1842.2009.00855.x

Kavanaugh, A., Sheetz, S. D., Skandrani, H., Fox, E. A. (2017). Media Use by Young Tunisians During the 2011 Revolution vs 2014 Elections. *Information Polity*, 22(2–3), 137–158, https://doi:10.3233/ip-170412

Kellens, W., Zaalberg, R., De Maeyer, P. (2011). The Informed Society: An Analysis of the Public's Information-Seeking Behavior Regarding Coastal Flood Risks. *Risk Analysis*, 32(8), 1369–1381, https://doi:10.1111/j.1539-6924.2011.01743.x

Keown-McMullan, C. (1997). Crisis: When Does a Molehill Become a Mountain?. *Disaster Prevention and Management: An International Journal*, 6(1), 4–10, http://dx.doi.org/10.1108/09653569710162406

Keselman, A., Rosemblat, G., Kilicoglu, H., Fiszman, M., Jin, H., Shin, D., Rindflesch, T. C. (2010). Adapting Semantic Natural Language Processing Technology to Address Information Overload in Influenza Epidemic Management. *Journal of the American Society for Information Science and Technology*, 61(12), 2531–2543, https://doi:10.1002/asi.21414

Kim, T. (2014). Observation on Copying and Pasting Behavior During the Tohoku Earthquake: Retweet Pattern Changes. *International Journal of Information Management*, 34(4), 546–555, https://doi:10.1016/j.ijinfomgt.2014.03.001

Kimberly, A. (2003). Disaster Preparedness in Virginia Hospital Centre-Arlington After Sept 11, 2001. *Disaster Management Response* 1(3), 80–86, https://doi.org/10.1016/S1540–2487(03)00048–8

Krakowska, M. (2016). Zachowania informacyjne człowieka. In: W. Babik (ed.), *Nauka o informacji* (429–455). Warszawa: Wydawnictwo SBP.

Kurian, J. C., John, B. M. (2017). User-Generated Content on the Facebook Page of an Emergency Management Agency: A Thematic Analysis. *Online Information Review* 41(4), 558–579, https://doi.org/10.1108/OIR-09-2015-0295

Laugé, A., Sarriegi, J. M., Torres, J. M. (2009). *The Dynamics of Crisis Lifecycle for Emergency Management* [online] [08.12.2020], https://proceedings.systemdynamics.org/2009/proceed/papers/P1112.pdf

Lê, M. L. (2014). Information Needs of Public Health Staff in a Knowledge Translation Setting in Canada. *Journal of the Canadian Health Libraries Association*, 34(1), 3–11, https://doi:10.5596/c13-001

Lee, J., Kang, J. H. (2018). Crying Mothers Mobilise for a Collective Action: Collaborative Information Behaviour in an Online Community. *Information Research* [online], 23(2), paper 792, [08.12.2020], http://InformationR.net/ir/23-2/paper792.html

Lopatovska, I., Smiley, B (2014). Proposed Model of Information Behaviour in Crisis: The Case of Hurricane Sandy. *Information Research* [online], 19(1) paper 610, [08.12.2020], http://InformationR.net/ir/19-1/paper610.html

Linsk, J. A. (1993). American Medical Culture and the Health Care Crisis. *American Journal of Medical Quality*, 8(4), 174–180, https://doi:10.1177/0885713x9300800403

Maitland, E., Sammartino, A. (2015). Decision Making and Uncertainty: The Role of Heuristics and Experience in Assessing a Politically Hazardous Environment. *Strategic Management Journal*, 36(10), 1554–1578, https://doi.org/10.1002/smj.2297

Marcella, R., Pirie, T., Rowlands, H. (2013). The Information Seeking Behaviour of Oil and Gas Industry Workers in the Context of Health, Safety and Emergency Response: A Discussion of The Value of Models of Information Behaviour. *Information Research* [online], 18 (3), [08.12.2020], http://www.informationr.net/ir/183/paper583.html

McNair, B. (2018). *An Introduction to Political Communication*. New York: Routledge.

McNaughton, M., Rao, L. (2018). Governing Knowledge Commons in Caribbean Disaster Management: A Comparative Institutional Analysis. *Information Services & Use*, 37(4), 437–449, https://doi:10.3233/isu-170855

Merendino, A., Sarens, G. (2020). Crisis? What Crisis? Exploring the Cognitive Constraints on Boards of Directors in Times of Uncertainty. *Journal of Business Research*, 118, 415–430, https://doi:10.1016/j.jbusres.2020.07.005

Miller, G. (2011). *Fundamentals of Crisis Counseling*. Hoboken, New Jersey: John Wiley & Sons.

Mirbabaie, M., Marx, J. (2019). "Breaking" News: Uncovering Sense-Breaking Patterns in Social Media Crisis Communication During the 2017 Manchester Bombing. *Behaviour & Information Technology* 39(3), 1–15, https://doi:10.1080/0144929x.2019.1611924

Montesi, M., Bornstein, A. B. (2017). Defining a Theoretical Framework for Information Seeking and Parenting: Concepts and Themes From a Study With Mothers Supportive of Attachment Parenting. *Journal of Documentation*, 73(2), 186–209, https://doi.org/10.1108/JD-04-2016-0047

Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., Aromataris, E. (2018). Systematic Review or Scoping Review? Guidance for Authors When Choosing Between a Systematic or Scoping Review Approach. *BMC Medical Research Methodology*, 18(1), https://doi:10.1186/s12874-018-0611-x

Nelson, C., Lurie, N., Wasserman, J., Zakowski, S. (2007). Conceptualizing and Defining Public Health Emergency Preparedness. *American Journal of Public Health*, 97 (Suppl. 1), S9–S11, https://doi.org/10.2105/AJPH.2007.114496

Nowell, L. S., Norris, J. M., White, D. E., Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16, 1–13, https://doi.org/10.1177/1609406917733847

Palmer, C. L., Cragin, M. H., Hogan, T. P. (2007). Weak Information Work in Scientific Discovery. *Information Processing & Management*, 43(3), 808–820, https://doi:10.1016/j.ipm.2006.06.003

Pang, N., Karanasios, S., Anwar, M. (2019). Exploring the Information Worlds of Older Persons During Disasters. *Journal of the Association for Information Science and Technology* 71(6), 619–631, https://doi.org/10.1002/asi.24294

Pang, N. (2014). Crisis-Based Information Seeking: Monitoring Versus Blunting in the Information Seeking Behaviour of Working Students During the Southeast Asian Haze Crisis. *Information Research* [online], 19(4), 171–181, [08.12.2020], http://informationr.net/ir/19-4/isic/isic14.html#.X6RwmWhKhPY

Perry, R.W. (2007). What Is a Disaster?. In: H. Rodríguez et al. (eds.), *Handbook of Disaster Research. Handbooks of Sociology and Social Research* (1–15). New York, NY: Springer, https://doi.org/10.1007/978-0-387-32353-4_1

Pham, M. T., Rajić, A., Greig, J. D., Sargeant, J. M., Papadopoulos, A., McEwen, S. A. (2014). A Scoping Review of Scoping Reviews: Advancing the Approach and Enhancing the Consistency. *Research Synthesis Methods*, 5(4), 371–385, https://doi.org/10.1002/jrsm.1123

Pisani, A. R., Murrie, D. C., Silverman, M. M. (2016). Reformulating Suicide Risk Formulation: From Prediction to Prevention. *Academic Psychiatry: the Journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, 40(4), 623–629, https://doi.org/10.1007/s40596-015-0434-6

Rahmi, R., Joho, H., Shirai, T. (2018). An Analysis of Natural Disaster-Related Information-Seeking Behavior Using Temporal Stages. *Journal of the Association for Information Science and Technology* 70(7), 715–728, https://doi:10.1002/asi.24155

Rumrill, P. D., Fitzgerald, S. M., Merchant, W. R. (2010). Using Scoping Literature Reviews as a Means of Understanding and Interpreting Existing Literature. *Work (Reading, Mass.)*, 35(3), 399–404, https://doi.org/10.3233/WOR-2010-0998

Ryan, B. (2018). A Model to Explain Information Seeking Behaviour by Individuals in the Response Phase of a Disaster. *Library & Information Science Research*, 40(2), 73–85. https://doi.org/10.1016/j.lisr.2018.05.001

Samdanis, M., Lee, S. H. (2019). Uncertainty, Strategic Sensemaking and Organisational Failure in the Art Market: What Went Wrong With Lvmh's Investment in Phillips Auctioneers? *Journal of Business Research*, 98, 475–488, https://doi.org/10.1016/j.jbusres.2018.08.030

Savolainen, R. (2005). Everyday Life Information Seeking. In: K.E. Fisher, S. Erdelez, & L.E.F. McKechnie (eds), *Theories of Information Behavior* (143–148). Medford: Information Today.

Savolainen, R. (2016). Approaching the Affective Barriers to Information Seeking: The Viewpoint of Appraisal Theory. *Information Research* [online], 21(4), [08.09.2020], http://InformationR.net/ir/21-4/isic/isic1603.html

Shaluf, I. M., Ahmadun, F., Mat Said, A. (2003). A Review of Disaster and Crisis. *Disaster Prevention and Management: An International Journal*, 12(1), 24–32, https://doi:10.1108/09653560310463829

Shaluf, M. I. (2007). An Overview on Disasters. *Disaster Prevention and Management: An International Journal*, 16(5), 687–703, https://doi:10.1108/09653560710837000

Shankar, K. (2008). Wind, Water, and Wi-Fi: New Trends in Community Informatics and Disaster Management. *The Information Society*, 24(2), 116–120, https://doi.org/10.1080/01972240701883963

Shaw, P. (2010) Crisis moments. In: *Defining Moments* (70–79). London: Palgrave Macmillan, https://doi.org/10.1057/9780230303072_9

Silver, A., Matthews, L. (2016). The Use of Facebook for Information Seeking, Decision Support, and Self-Organization Following a Significant Disaster. *Information, Communication & Society*, 20(11), 1680–1697, https://doi:10.1080/1369118x.2016.1253762

Sonnenwald, D. H. (2006). Challenges in Sharing Information Effectively: Examples From Command and Control. *Information Research* [online], 11(4), paper 270, [08.12.2020], http://informationr.net/ir/11-4/paper270.html

Staupe-Delgado, R. (2019). Analysing Changes in Disaster Terminology Over the Last Decade. *International Journal of Disaster Risk Reduction*, 40, https://doi:10.1016/j.ijdrr.2019.101161

Stoyanov, S. (2017). Crisis and Disaster Management Terminology. *NATO Science for Peace and Security Series C: Environmental Security*, 3–10, https://doi:10.1007/978-94-024-1071-6_2

Tangjia, W. (2014). A Philosophical Analysis of the Concept of Crisis. *Frontiers of Philosophy in China*, 9(2), 254–267, https://doi:10.3868/s030-003-014–-0021-0

Tedrick, S., Wachter Morris, C. A. (2011). Integrating Individual Psychology and Crisis Theory: An application and case study. *The Journal of Individual Psychology*, 67(4), 364–379.

Timmer, C. P. (2010). Preventing Food Crises Using a Food Policy Approach. *The Journal of Nutrition*, 140(1), 224S–228S, https://doi.org/10.3945/jn.109.110379

Turoff, M., Hiltz, S. (2008). Assessing the Health Information Needs of the Emergency Preparedness and Management Community. *Information Services and Use*, 28, 269–280, https://doi:10.3233/ISU-2008-0588

UNDOC (2020). *Defining Terrorism* [online]. United Nations Office on Drugs and Crime, [08.12.2020], https://www.unodc.org/e4j/en/terrorism/module-4/key-issues/defining-terrorism.html
Unlu, A., Kapucu, N., Sahin, B. (2010). Disaster and Crisis Management in Turkey: A Need for a Unified Crisis Management System. *Disaster Prevention and Management*, 19(2), 155–174, https://doi:10.1108/09653561011037977
Vakkari, P. (1997). Information Seeking in Context: A Challenging Meta-Theory. In: P. Vakkari, R. Savolainen, B. Dervin, (eds.), *Information Seeking in Context: Proceedings of an International Conference on Research in Information Needs, Seeking and Use in Different Contexts* (451–646). London & Los Angeles, CA: Taylor Graham.
van Velsen, L., van Gemert-Pijnen, J. E., Beaujean, D. J., Wentzel, J., van Steenbergen, J. E. (2012). Should Health Organizations Use Web 2.0 Media in Times of an Infectious Disease Crisis? An In-depth Qualitative Study of Citizens' Information Behavior During an EHEC Outbreak. *Journal of Medical Internet Research* 14(6): e181, 1–14, https://doi. 10.2196/jmir.2123
Webber, S., Zhu. W. (2007). Employment Information Needs of Chinese Young Adults in Sheffield. *Journal of Librarianship and Information Science*, 39(4), 223–233, https://doi:10.1177/0961000607083214
Westbrook, L., Gonzalez, M. E. (2011). Information Support for Survivors of Intimate Partner Violence: Public Librarianship's Role. *Public Library Quarterly*, 30(2), 132–157, https://doi:10.1080/01616846.2011.575709
Westbrook, L. (2009). Crisis Information Concerns: Information Needs of Domestic Violence Survivors. *Information Processing & Management*, 45(1), 98–114, https://doi:10.1016/j.ipm.2008.05.005
Westbrook, L. (2008). Understanding Crisis Information Needs in Context: The Case of Intimate Partner Violence Survivors. *The Library Quarterly*, 78(3), 237–261, https://doi:10.1086/588443
Westbrook, L. (2008a). E-Government Support for People in Crisis: An Evaluation of Police Department Website Support for Domestic Violence Survivors Using "Person-in-Situation" Information Need Analysis. *Library & Information Science Research*, 30(1), 22–38, https://doi:10.1016/j.lisr.2007.07.004
WHO (2020). *Environmental Health in Emergencies* [online]. World Health Organization, [08.12.2020], https://www.who.int/environmental_health_emergencies/natural_events/en/
Wilson, T. (ed.). (2013). *Theory in Information Behaviour Research*. Sheffield, UK: Eiconics Ltd.
Wooten, L. P., James, E. H. (2008). Linking Crisis Management and Leadership Competencies: The Role of Human Resource Development. *Advances in Developing Human Resources*, 10(3), 352–379, https://doi.org/10.1177/1523422308316450
Yang, T. M., Wu, Y. J. (2014). Exploring the Determinants of Cross-Boundary Information Sharing in the Public Sector: An E-Government Case Study in Taiwan. *Journal of Information Science*, 40(5), 649–668, https://doi.org/10.1177/0165551514538742
Yang, L., Wu, Y. (2019). Creating a Taxonomy of Earthquake Disaster Response and Recovery for Online Earthquake Information Management. Knowledge Organization, 46(2), 77–89, https://doi.org/10.5771/0943-7444-2019-2-77

Zachowania informacyjne w sytuacjach kryzysowych

Abstrakt

Cel/Teza: Artykuł dotyczy problematyki badań nad zachowaniami informacyjnymi podczas kryzysów, konfliktów i katastrof. Zawiera teoretyczne rozważania dotyczące identyfikacji heterogenicznych aktywności informacyjnych oraz próbę zdefiniowania i charakterystyki zróżnicowanych sytuacji kryzysowych.

Koncepcja/Metody badań: Zastosowano podejście jakościowe, a także metody/techniki: krytyczny przegląd literatury określający zakres (scoping review), analizę pojęciową i analizę tematyczną. Jakościowa analiza treści dotyczyła wybranych, reprezentatywnych publikacji z lat 2001–2020.
Wyniki i wnioski: Badania zachowań informacyjnych w różnych sytuacjach kryzysowych stanowią istotny obszar badawczy nauki o informacji. Jednak eksploracje dotyczą ograniczonego pola poszukiwań, które należy rozszerzyć o wieloaspektowe zagadnienia związane z indywidualnymi i zbiorowymi zachowaniami informacyjnymi we współczesnych sytuacjach kryzysowych, a także w obliczu katastrof.
Oryginalność/Wartość poznawcza: Artykuł stanowi pierwszą próbę analizy pojęciowej i koncepcyjnej zachowań informacyjnych w sytuacjach kryzysowych. Omówiono różne rodzaje kryzysów i działań informacyjnych podejmowanych w sytuacjach kryzysowych, aby stworzyć teoretyczny i praktyczny fundament dla przyszłych badań zachowań informacyjnych.

Słowa kluczowe

Analiza jakościowa. Jakościowa analiza treści. Jakościowa analiza zawartości. Katastrofa. Kryzys. Sytuacje kryzysowe. Zachowania informacyjne.

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The Impact of COVID-19 on the Information Literacy of Business Sharing Group Users

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Abstract

Purpose/Thesis: The outbreak of the coronavirus pandemic made the digital space take a larger part in our everyday life. This article determines whether COVID-19 has in any way affected information literacy of users of a specific type, i.e. members of business sharing Facebook groups.
Approach/Methods: The research involved a literature review and an analysis of data collected by the means of a survey.
Results and conclusions: 104 people from eight groups from Lesser Poland, as well as Tri-City, Silesia, and Mazovia, took part in the pilot study. The survey covered the following themes: recognizing information needs and obtaining information, evaluating and using information, defining and self-assessing information literacy. The results showed that the participants did not think that COVID-19 had a significant impact on their information literacy, and they assessed their level of their own competences as adequate, or high.
Originality/Value: The article contributes a new study which may inspire further discussions on the subject of social media users.

Keywords

COVID-19. Information behavior. Information literacy. Information user. Social media.

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1. Introduction

The outbreak of the COVID-19 pandemic changed our everyday life. We witnessed systemic changes, regulated by authorized subjects, as well as changes on a smaller scale, in lives of individuals forced to increase their digital activity. The effect of the coronavirus on academia is obvious: we only have to consider the sheer number of publications on the subject. The Scopus database records over 48.5 thousand items (10% of which are papers in humanities and social sciences); Web of Science – over 28 thousand (the state for September 23, 2020).

This article aims to determine whether the COVID-19 pandemic had any impact on Internet users' information literacy. The study focused on Internet users with accounts on Facebook who joined business sharing groups launched during the pandemic.

The article responds to a certain gap in scientific research. Thus far, nobody analyzed the relationship between COVID-19 and information literacy of social media users, particularly

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members of businesses sharing groups operating on Facebook, launched to cope with the challenges posed by the pandemic. This article may therefore substantially extend the horizons of our research and initiate a new discussion.

While the terms such as "COVID-19," "information literacy," and "information users" have been given exhaustive explanations and their presence in scholarship is well-established, we should clarify what business sharing groups are. They have not been defined in scholarship, but we may intuit that they concern business information, which comprises business metainformation, information regarding firms, markets, products, services, and so on (Cisek, 2002). Business information is produced by economic agents (suppliers of goods and services, as well as consumers whose demands determine the production); consumption of business information affects the economy (Materska, 2007, 100). The persistent reference to the economic aspect indicates a close relationship between business information and economic information, which nevertheless should not be conflated (Januszko, 2001, 23).

Business sharing groups are online communities defined by following characteristics: 1) they were launched for a specific business-economic purpose, 2) they are two distinct groups of users: consumers (seeking information about goods and services they demand) and producers (sharing information and determining the supply); 3) the users share business information, which concerns good and services, particularly their properties, characteristics, and the manner of purchase. To define these communities, we need to bear in mind that the pandemic and the restrictions it imposed on the activity of economic agents gave rise to a specific type of business sharing groups, designed to reduce the need to leave the house, and to support local businesses (hence the name *I support local businesses*).

To increase information efficiency, suppliers had to post highly structured messages, including such information as the name of the firm, their online address (a website or a social media account), industry, hygiene procedures, prices, as well as details relating to orders and deliveries. In turn, consumers had to use a specific browser and categorize their searches according to its hashtag system.

2. Literature review

As mentioned above, COVID-19 has attracted interest of many academics. Relevant papers in information science concern the significance of information and the role of information systems (Ågerfalk et al., 2020), communication and sharing information (Adam et al., 2020; Yusof et al., 2020; Zhang & Wu, 2020), phenomena of infodemic, disinformation, and fake news (Leitner, 2020; Marin, 2020; Rodríguez et al., 2020), as well as the role of information professionals in combating these pathologies (Aleixandre-Benavent et al., 2020; Naem & Bhatti, 2020).

Regarding the subject literature, it would be difficult to miss the emphasis which the current research places on the relationship between the pandemic and information as well as information processes occurring on social media. Lavinia Marin (2020) discussed information disorders and the role of information context on social media. Pedro Lázaro-Rodríguez (2020) analyzed the evolution of the news on COVID-19 published on social media to determine which media outlets meet the users' information needs better. Cristina

Pulido Rodríguez and her colleagues (2020) focused on two networking services, Twitter and Sina Weibo, which they analyzed for the circulation of fake news on the coronavirus.

COVID-19 aside, it is clear that social media are a popular subject in scholarship. Studies of the contextual factors on social media discuss the types of shared information (Chia et al., 2015; Kümpel et al., 2015), as well as knowledge and information sharing (Das & Mahapatra, 2018), understood as "the process of sharing knowledge and information in order to make better use of existing resources (...) and to produce new knowledge and information on their basis" (Świgoń, 2015, 16).

The research shows that there is a strong relation between sharing personal information and establishing connections on social media (Steijn & Schouten, 2013). The mass-scale information sharing, initiated by individual users, created the so-called "Facebook effect" (Bąk, 2016, 142). The motivating factor behind the transmission of information and knowledge is social networking sharing culture, which values fairness, identification, and openness (Pi et al., 2013); individuals are prone to put more trust in groups that are smaller, closer and more exclusive (Ma et al., 2019), as well as moderated (Iyer et al., 2020). Trust is consolidated by social bonds and friendships (Ghaisani et al., 2017). They constitute the defining advantage of discussion groups (Nisar et al., 2018, 3). The *raison d'etre* of Facebook groups is to give their users access to varied resources addressing their needs (Filipek, 2016). We should remember that the mode of communication affects the users' attitude and shapes their needs, which is particularly important in business (Mazza & Palermo, 2018, 51).

Social media users function in a digital environment. The scope of their competences may change. Information literacy has been studied before; information literacy's relation to social media and e-information is the subject of Sandra Kerka's *Extending Information Literacy in Electronic Environments* (2000), a study concerned with the future of information literacy which inspired this paper. According to Kerka, electronic environments require an adjustment of information literacy which turns information literacy into capacity for critical thinking and assessing sources (Kerka, 2000, 31–32). This is particularly important for the digital natives, who are so accustomed to the virtual world that they may not realize that they need to verify information (Beheshti, 2012).

This line of thought was an inspiration for a study of COVID-19's impact on information literacy of members of select Facebook groups. Self-efficacy was an important concept for the study, as the belief in one's ability to successfully perform tasks is one of the factors affecting users' information activity (Kurbanoglu et al., 2006).

3. Methodology

The research had two distinct stages, and a different method was used in each. Literature review (above) constituted the first stage which allowed the author to determine the state of scholarship and identify the gaps therein. The second stage involved an online survey carried among members of select Facebook business sharing groups. This decision was determined by two factors. Firstly, digital environments play an increasingly major role in individuals' everyday life, while the Internet (including social media) became their basic tool for fulfilling various needs. Secondly, the newly-established business sharing groups enjoyed significant popularity, and rapidly acquired members. The number and activity

of these communities drew the author's attention: they suggested research potential and promised interesting results. This was a pilot study. It was conducted over three weeks (in August 2020); the responses to the survey were voluntary and anonymous. The participants came from eight different groups on Facebook (from Lesser Poland: Kraków, Nowy Sącz, Myślenice, Kalwaria Zebrzydowska; from other parts of Poland: Warsaw, Tri-City, Silesia – Gliwice, Dąbrowa Górnicza), which met the following criteria:

(1) they were launched 'as a result' of COVID-19;
(2) they used the name *I support local businesses*;
(3) they accepted the author's request to become a member;
(4) they allowed the author of this paper post a link to the survey.

The survey comprised two distinct parts and 32 questions (most of them closed-ended). The first part contained seven demographic questions about gender, age, education, employment, place of residence, industry, and role in the Facebook group. The second part contained 25 questions about information literacy. Each question pertained to one of three main themes: 1) recognizing and addressing information needs, 2) evaluating and using information, 3) defining information literacy and self-assessing its level. The results are presented below. For the reader's convenience, the Facebook groups' names were shortened: Support local businesses – KRAKÓW – SLBK; Support local businesses: MYŚLENICE – SLBM; Support local businesses: NOWY SĄCZ – SLBNS; Support local businesses: Kalwaria Zebrzydowska municipality – SLBKZ; Support local businesses: WARSZAWA – SLBW; Support local businesses: TRI-CITY – SLBT; I support local businesses: Dąbrowa Górnicza – SLBDG and Support local businesses: Gliwice and the surrounding areas – SLBG.

4. Results

4.1. The participants

In total, 104 business sharing group members responded to the survey. 66 participants belonged to 8 groups based in Lesser Poland, in Kraków (41), Nowy Sącz (12), Myślenice (9) and Kalwaria Zebrzydowska (4). The remaining (38) participants belonged to groups in Warsaw (13), Tri-City (13), Gliwice (7) and Dąbrowa Górnicza (4).

Over 70% (73) of the participants were women; the majority of women was based in Kraków and Kraków (30 in total), then in Nowy Sącz and Nowy Sącz poviat (10) and in Warsaw (10). The majority of men was also located in Kraków (see Table 1).

As far as the participants' age was concerned, majority (49%) said they were between 31 and 40 years old (51 participants). The second largest age group was 25–30 years olds – 26 participants (25%), then 41–50 years olds – 20 (19%). Only four participants were over 50 years old (4%). The least represented age group were the 18–24 years olds – there were only 3 (3%). The detailed age distribution by gender and Facebook group is presented in Table 2.

Over 65% of the participants had higher education (49 women and 19 men). The remaining 35% had secondary education (24 women and 12 men). As far as employment is concerned, majority of the participants was employed (79% – 82 people). The survey

also reached 21 employers (20% of the participants) and one student (from SLBW). The employed participants worked in various industries. As Figure 1 shows, majority of the employed worked in trade – 28 (27%), then food industry – 17 (16%), education – 13 (12.5%), and tourism – 11 (10.5%). The least represented industries were events, finance, and telecommunications.

Tab. 1. Participants' gender

No.	Group name	Place of residence	Number of participants	
			F	M
1	Support local businesses: KRAKÓW (SLBK)	Kraków	23	6
		Kraków poviat	7	5
2	Support local businesses: MYŚLENICE (SLBM)	Myślenice	2	1
		Myślenice poviat	3	3
3	Support local businesses: NOWY SĄCZ (SLBNS)	Nowy Sącz	8	0
		Nowy Sącz poviat	2	2
4	Support local businesses: Kalwaria Zebrzydowska municipality (SLBKZ)	Kalwaria Zebrzydowska	1	0
		elsewhere in the municipality	2	1
5	Support local businesses: WARSAW (SLBW)	Warsaw	10	4
		Legionowo poviat	0	0
		Mińsk poviat	0	0
		Otwock poviat	0	0
		Piaseczno poviat	0	0
		Pruszków poviat	0	0
		West Warsaw poviat	0	0
		Wołomin poviat	0	0
		Other poviat	0	0
6	Support local businesses: TRI-CITY (SLBT)	Gdańsk	3	1
		Gdynia	1	2
		Sopot	0	2
		Gdańsk poviat	3	1
		Other poviat	0	0
7	I support local businesses: Dąbrowa Górnicza (SLBDG)	Dąbrowa Górnicza	2	0
		The surrounding areas	2	0
8	Support local businesses: Gliwice i okolica (SLBG)	Gliwice	1	3
		Gliwice poviat	3	0
TOTAL			73	31

Tab. 2. Age of participants (F = female, M = male)

No.	Group name	Age of participants									
		18–24		25–30		31–40		41–50		50+	
		F	M	F	M	F	M	F	M	F	M
1	SLBK	2	0	7	4	13	4	6	2	2	1
2	SLBM	0	0	0	2	4	2	1	0	0	0
3	SLBNS	0	0	3	0	5	0	2	2	0	0
4	SLBKZ	0	0	1	0	1	1	1	0	0	0
5	SLBW	0	1	4	1	6	2	0	0	0	0
6	SLBT	0	0	2	1	4	5	1	0	0	0
7	SLBDG	0	0	0	0	1	0	2	0	1	0
8	SLBG	0	0	1	0	2	1	1	2	0	0
TOTAL		2	1	18	8	36	15	14	6	3	1

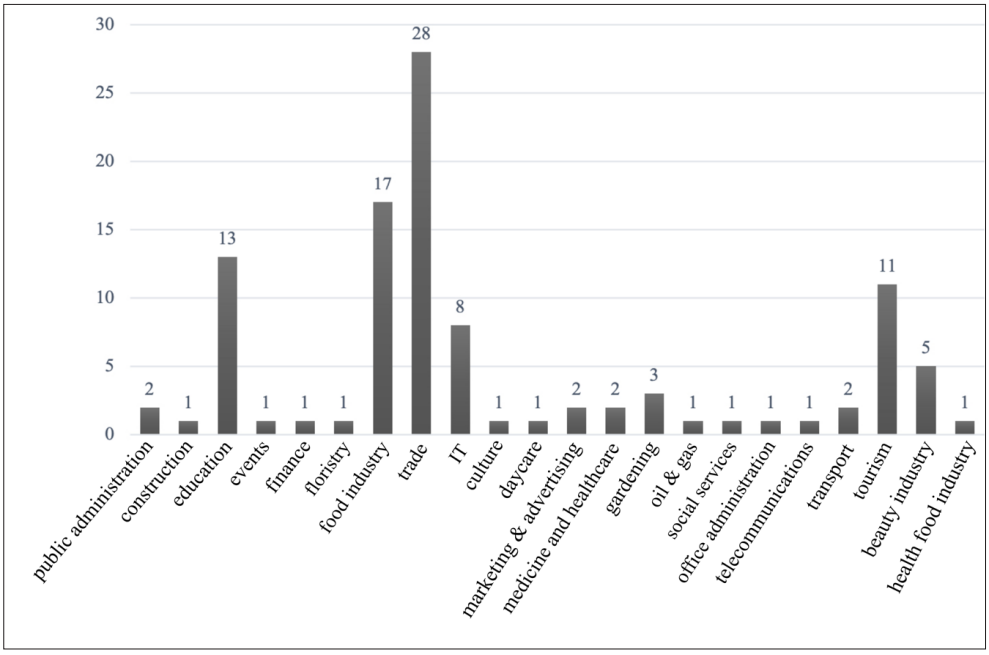

Fig. 1. Participants by industry

The last demographic question concerned participants' role in the *Support local business* Facebook group. Over 80 participants (77%) stated that they functioned in the group as consumers. Producers and service providers were the second largest group – 14 participants (13.5%). 10 participants (9.5%) stated they functioned in the group as both consumers and producers.

4.2. Recognizing and addressing information needs

The survey included 12 close-ended questions on the subject. The first two questions concerned the capacity to recognize an information need. Over 94% (97) of the participants claimed to have it. It seems significant that almost one third (31 participants) answered that their capacity to recognize and address information needs had not been as well developed before the pandemic. Only seven participants declared that they still struggle to recognize their information needs. These participants said that they had struggled with it before the pandemic. Three of these participants were members of SLBK, the remaining four belonged to SLBKZ, SLBDG, SLBG and SLBW.

When asked about their preferred source of information, the participants chose news websites – 55 (SLBK – 22, SLBT – 8, SLBNS – 7, SLBW – 6, SLBG – 5, SLBM – 4, SLBDG – 2, SLBKZ – 1), social media – 38 (13 – SLBK, 8 – SLBW, 5 – SLBM and SLBNS, 3 – SLBT, 2 – SLBKZ and SLBG), online radio/TV – 5 (4 – SLBK, 1 – SLBT), traditional TV – 5 (2 – SLBK and SLBDG, 1 – SLBKZ), print newspaper – 2 (SLBK) and radio – 1 (SLBG). 63 participants (60.5%) said that their preferred source of information was the same as before the pandemic.

The survey also included questions about the credibility of various sources of information. The participants identified news websites as the most trustworthy – 56 (54%) of the participants said they trusted them the most. Other sources were deemed to be much less trustworthy – only 16 (15%) of the participants preferred printed newspapers, 12 (11%) – experts, 11 (10.5%) –social media, 6 (6%) – online radio and TV, 2 (2%) – traditional TV, and 1 (1%) – radio. 68% of the participants (71) declared that they trusted the same sources before the pandemic.

The remaining questions in this section concerned information-seeking behavior. Asked about the process, 82 participants (79%) said that they intentionally searched for information. 22 participants (21%) came across information on accident. It turned out that 75% of the participants (78) had no articulated strategies for seeking information. Out of 26 participants who declared familiarity with certain strategies, over 80% (21) stated that they employed them to seek information (12 – SLBK, 3 – SLBW and SLBNS, 1 – SLBM, SLBT and SLBG).

The survey also accounted for the affective aspect of information-seeking. Asked if they experience emotions while seeking information, 53% of the participants (55) answered in the affirmative. 12 participants (11.5%) strongly denied, and 37 (35.5%) were not able to answer. The participants who claimed to experience emotions while seeking information were asked to select three options: 41 (74.5%) participants felt satisfied, 23 (42%) – hopeless, 13 (23.5%) – anxious, 10 (18%) – frustrated, 4 (7%) – angry, and 1 participant felt happy. The combinations of feelings experienced simultaneously were as follows: hopelessness-satisfaction (11 participants), then anxiety-satisfaction (3), frustration-hopelessness (2), anxiety-frustration/satisfaction (2), frustration-hopelessness-satisfaction (2), frustration-satisfaction (1), frustration-happiness-satisfaction (1). We see then that the participants experienced strong emotions while seeking information. Furthermore, 58% (32) of the participants declared that their emotional experience of information-seeking before the pandemic had been similar. 14 participants said that they did not remember the emotions they experienced while information-seeking before, and nine participants declared that they never experienced suggested emotions while information-seeking.

4.3. Evaluating and using information

The second theme of the survey was evaluating and using information. Asked how they use information, 66% (69) of the business sharing group users declared that they use information for personal purposes. Over 91% (63) of them said that this had been the case before the pandemic.

The study showed that before the pandemic, only 15% (16) of the participants had verified their information in other sources. However, since the outbreak of COVID-19, as many as 73 (70%) participants had been verifying their information. According to 81% of the participants, the most important quality of information was its credibility. The second most important quality was currency (only 7% of the participants considered it to be important) and accessibility (7%). The qualities considered least important were adequacy to the information need (2%), specificity (2%), and author (2%).

47 participants (45%) said that the same quality had been the most important to them before the pandemic. 38 participants (36.5%) were unable to give an unequivocal answer, and 19 participants (18.5%) said that their priorities regarding the qualities of information had changed during the pandemic.

The survey also touched on the legal aspect of information. Asked if legal and ethical considerations affected their use of the acquired information, the definite majority of the participants – 94 (90%) – answered in the affirmative. 45 participants (43%) said that these concerns had been important to them before the pandemic; 37 (35.5%) admitted that they had not been very important, and 22 (21.5%) could not give an unequivocal answer.

The last two questions regarding the use of information straddled information behavior and personal information management (PIM). Asked what they do with acquired information, 64 participants (67%) said that they processed and shared it with others, while 17 (16%) said they processed the information, but did not share it. A significantly lower number of the participants (7; 7%) declared that they did not process the acquired information: they either immediately used it, or dismissed it. The lowest number of the participants (6%) said that they saved acquired information for future reference. Asked how the abovementioned processes had changed over the pandemic, 76 participants (73%) answered that they had not changed at all.

4.4. Defining information literacy and self-assessment

The third theme of the survey was information literacy and the participants' assessment of their own level of it. The section comprised three questions. The first question was designed to gain insight into the participants' understanding of information literacy and its significance.

Nine participants (4 – SLBK, 2 – SLBT, 1 – SLBNS, SLBKZ and SLBDG) said that information literacy did not play a role in their life. Seven out of these nine had secondary education. Only two participants (one from SLBM and one from SLBDG) believed that information literacy was related to evaluating information (members of SLBK). Three times as many participants (6) answered that information literacy related only to the use of information. This group included four members of SLBK, one member of SLBM and one member of SLBDG. For 37 participants (slightly over 35%), information literacy was

synonymous with digital, media, and IT literacies. Majority of the participants (48; 46%) emphasized that information literacy involved the ability to find, evaluate, and use information.

When it came to assessing the level of their information literacy, only one participant assessed it as very low (a member of SLBK). 13 participants assessed their level as low (5 – SLBK, 3 – SLBM and SLBDG, 1 – SLBKZ and SLBG), 41 as adequate (16 – SLBK, 9 – SLBT, 5 – SLBW, 3 – SLBM, 2 – SLBKZ and SLBG and 1 – SLBDG), 40 as high (14 – SLBK, 8 – SLBW, 7 – SLBNS, 4 – SLBT, 3 – SLBM and SLBG and 1 – SLBKZ), and nine as very high (4 – SLBK, 2 – SLBNS, 1 – SLBG and SLBW).

Regarding the relation between their feelings relating to COVID-19 and their information literacy, only six participants (6%) unequivocally said that the pandemic had a significant impact on their information literacy and behaviors. This group included members of SLBK (3), SLBM (1), SLBG (1) and SLBW (1). A substantially larger group of participants – 49 (47%) – claimed that the pandemic did not affect their information literacy and behaviors. An equal number (47%) assessed the level of the pandemic's impact on their competencies and behavior as low.

5. Conclusions

The outbreak of the COVID-19 pandemic wrought many changes in the socio-economic order, as well as in the generally understood information world. This is witnessed in the scholarship, which has recently prioritized the impact of coronavirus, and its relation to information, nearly to the exclusion of other topics. A particularly visible and palpable effect of the pandemic is the increased prominence of technology and our "settling" in a digital world, which includes social media. As a result, digital communication became more intense, while Internet users developed new practices to fulfill their need for human interaction, as well as to support local businesses so that they may survive in this difficult time. It was in context of these developments that business sharing Facebook groups were launched: they facilitate communication, and support local business owners.

104 members of business sharing groups participated in the survey. They were based in places such as Kraków, Nowy Sącz, Myślenice, Kalwaria Zebrzydowska, Tri-City, Silesia, or Warsaw. The survey covered the issues of recognizing information needs and acquiring information, evaluating and using information, defining information literacy and assessing their level.

Majority of the participants were between 31 and 40 years old, and had higher education. A definite majority joined business sharing groups as consumers, employed in industries such as trade, food industry, tourism, or education. The results did not suggest that gender, age, employment, position, education, or place of residence determined participants' information literacy or information behaviors.

The most obvious effect of COVID-19 noted by the participants was that they began to verify their information in other sources. They also learned to recognize and define their information needs. A definite majority of the participants consciously sought out information, even if they did not know – and did not employ – any articulated strategies. They used thus acquired information primarily for personal purposes: most often, they processed and shared it. Furthermore, the pandemic made them more aware of the affective aspect of their information behavior and literacy.

The participants' opinions on information literacy itself were interesting as well. The results showed that majority of the participants realized that information literacy involved seeking, evaluating, and using information. However, it seems significant that many participants still associated it with IT, media, and digital literacy. This might be a result of Internet's pervasiveness: it has become almost impossible to live without it.

As the study shows, the impact of the pandemic was manifest to different degrees in different areas of information literacy. This suggests that the participants' answers did not always reflect their emotional experience. According to them, the pandemic did not have a significant impact on their information literacy, and they assessed the level of their competencies as adequate, or high. That their assessment does not correspond to reality seems to be the most interesting result of the study.

References

Adam, M., Werner, D., Wendt, C., Benlian, A. (2020). Containing COVID-19 Through Physical Distancing: The Impact of Real-Time Crowding Information. *European Journal of Information Systems*, 1–13, https://doi.org/10.1080/0960085X.2020.1814681

Ågerfalk, P. J., Conboy, K., Myers, M. D. (2020). Information Systems in the Age of Pandemics: COVID-19 and Beyond. *European Journal of Information Systems*, 29(3), 203–207, https://doi.org/10.1080/0960085X.2020.1771968

Aleixandre-Benavent, R., Castelló-Cogollos, L., Valderrama-Zurián, J. C. (2020). Información Y Comunicación Durante Los Primeros Meses de COVID-19. Infodemia, Desinformación Y Papel de Los Profesionales de la Información. *El Profesional de la Información (EPI)*, 29(4), 1–17, https://doi.org/10.3145/epi.2020.jul.08

Bąk, A. (2016). Serwisy społecznościowe – efekt Facebooka i nie tylko. *Media i Społeczeństwo*, 6, 134–146.

Beheshti, J. (2012). Teens, Virtual Environments and Information Literacy. *Bulletin of the American Society for Information Science and Technology*, 38(3), 54–57, https://doi.org/10.1002/bult.2012.1720380313

Chia, J., Geow, J. C. L., Khoo, C. S. (2015). Characteristics of Information Shared on Facebook: An Exploratory Study. In *6th International Conference on Asia-Pacific Library and Information Education and Practice*, Manila, Philippines, October 28–30, 2015. Quezon City: University of the Philippines, School of Library and Information Studies, 231–243.

Cisek, S. (2002). Szara literatura jako źródło informacji biznesowej. Zarys problematyki. *EBIB – Elektroniczny Biuletyn Informacyjny Bibliotekarzy* [online], 11(40), [12.08.2020], http://www.ebib.pl/2002/40/cisek.php

Das, K., Mahapatra, R. K. (2018). Collaboration and Knowledge Sharing via Facebook Groups: Analysis of Postings of Library and Information Science Community. *Desidoc Journal of Library & Information Technology*, 38(2), 95–101.

Filipek, K. (2016). Sharing Resources on Facebook Groups: Polish Immigrants in Germany, Norway and UK. *Konteksty Społeczne*, 1(7), 42–53.

Ghaisani, A. P., Handayani, P. W., Munajat, Q. (2017). Users' Motivation in Sharing Information on Social Media. *Procedia Computer Science*, 124, 530–535.

Iyer, S., Cheng, J., Brown, N., Wang, X. (2020). When Does Trust in Online Social Groups Grow? *Proceedings of the International AAAI Conference on Web and Social Media* [online], 14(1), 283–293, [14.12.2020], https://www.aaai.org/ojs/index.php/ICWSM/article/view/7299

Januszko, W. (2001). *Systemy informacji gospodarczej*. Warszawa: Wydaw. SBP.

Kerka, S. (2000). Extending Information Literacy in Electronic Environments. *New Directions for Adult and Continuing Education*, 2000(88), 27–38, https://doi.org/10.1002/ace.8803

Kümpel, A. S., Karnowski, V., Keyling, T. (2015). News Sharing in Social Media: A Review of Current Research on News Sharing Users, Content, and Networks. *Social Media + Society*, 1(2), https://doi.org/10.1177/2056305115610141

Kurbanoglu, S., Akkoyunlu, B., Umay, A. (2006). Developing the Information Literacy Self-Efficacy Scale. *Journal of Documentation*, 62(6), 730–743.

Lázaro-Rodríguez, P. (2020). Covid-19, medios digitales y Facebook: interacciones, tratamiento y análisis de contenido basado en palabras clave de noticias de okdiario. com y eldiario. *Profesional de la información*, 29(4), https://doi.org/10.3145/epi.2020.jul.09

Leitner, S. (2020). On the Dynamics Emerging From Pandemics and Infodemics. *Mind & Society*, https://doi.org/10.1007/s11299-020-00256-y

Ma, X., Cheng, J., Iyer, S., Naaman, M. (2019). When Do People Trust Their Social Groups? In *Chi Conference on Human Factors in Computing Systems Proceedings (CHI 2019)*, May 4–9, 2019, Glasgow, Scotland UK, ACM, New York, NY, USA, https://doi.org/10.1145/3290605.3300297

Marin, L. (2020). Three Contextual Dimensions of Information on Social Media: Lessons Learned From the COVID-19 Infodemic. *Ethics and Information Technology*, 1–8, https://doi.org/10.1007/s10676-020-09550–-2

Materska, K. (2007). *Informacja w organizacjach społeczeństwa wiedzy*. Warszawa: Wydaw. SBP.

Mazza, B., Palermo, A. (2018). Social Media Content for Business and User Engagement on Facebook. *Essachess – Journal for Communication Studies*, 11(1), 49–73.

Naeem, S. B., Bhatti, R. (2020). The COVID-19 'Infodemic': A New Front for Information Professionals. *Health Information & Libraries Journal*, 37, 233–239, https://doi.org/10.1111/hir.12311

Nisar, T., Prabhakar, G., Strakova, L. (2019). Social Media Information Benefits, Knowledge Management and Smart Organizations. *Journal of Business Research*, 94, 264–272, https://doi.org/10.1016/j.jbusres.2018.05.005

Pi, S. M., Chou, C. H., Liao, H. L. (2013). A Study of Facebook Groups Members' Knowledge Sharing. *Computers in Human Behavior*, 29(5), 1971–1979.

Rodríguez, C. P., Carballido, B. V., Redondo-Sama, G., Guo, M., Ramis, M., Flecha, R. (2020). False News Around COVID-19 Circulated Less on Sina Weibo Than on Twitter. How to Overcome False Information? *International and Multidisciplinary Journal of Social Sciences*, 1–22, http://dx.doi.org/10.17583/rimcis.2020.5386

Steijn, W. M. P., Schouten, A. P. (2013). Information Sharing and Relationships on Social Network Sites. Cyberpsychology. *Behaviour, & Social Networking*, 16(8), 582–587.

Świgoń, M. (2015). *Dzielenie się wiedzą i informacją Specyfika nieformalnej komunikacji w polskim środowisku akademickim*. Olsztyn: Wydaw. Uniwersytetu Warmińsko-Mazurskiego.

Yusof, A. N. M., Muuti, M. Z., Ariffin, L. A., Tan, M. K. M. (2020). Sharing Information on COVID-19: The Ethical Challenges in the Malaysian Setting. *Asian Bioethics Review*, 12(3), 349–361.

Zhang, J., Wu, Y. (2020). Providing Multilingual Logistics Communication in COVID-19 Disaster Relief. *Multilingua*, 39(5), 517–528.

Wpływ COVID-19 na kompetencje informacyjne użytkowników grup typu business sharing

Abstrakt

Cel/Teza: Wybuch pandemii koronawirusa „wymusił" wzmocnienie znaczenia przestrzeni cyfrowej w codziennym funkcjonowaniu jednostek. Celem artykułu jest próba odpowiedzi na pytanie o to, czy COVID-19 przyczynił się w jakikolwiek sposób do zmian w obrębie kompetencji informacyjnych określonego typu użytkownika informacji, jakim są członkowie grup internetowych z obszaru business sharing.
Koncepcja/Metody badań: Do rozwiązania powyższego problemu badawczego posłużyły przede wszystkim: ankieta oraz krytyczna analiza piśmiennictwa naukowego.
Wyniki i wnioski: W badaniach pilotażowych wzięły udział 104 osoby z ośmiu grup reprezentujących zarówno region małopolski, jak również Trójmiasto, Śląsk i Mazowsze. Ankieta dotyczyła takich zagadnień, jak: rozpoznawanie potrzeby informacyjnej i pozyskiwanie informacji, ewaluacja i wykorzystanie informacji, definiowanie i subiektywna ocena kompetencji informacyjnych. Jak wynika z przeprowadzonej analizy, w odczuciu użytkowników grup, epidemia COVID-19 nie wpłynęła w znaczący sposób na ich kompetencje informacyjne, a oni sami oceniają poziom swoich kompetencji dostatecznie lub wysoko.
Oryginalność/Wartość poznawcza: Artykuł uzupełnia dotychczasowe piśmiennictwo o nowe badania i może być inspiracją do dyskusji nad szerszą grupą użytkowników mediów społecznościowych.

Słowa kluczowe

COVID-19. Kompetencje informacyjne. Media społecznościowe. Użytkownik informacji. Zachowania informacyjne.

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Digital Wisdom in Research Work

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Abstract

Purpose/Thesis: The article focuses on digital wisdom, defined by Marc Prensky as the ability to use modern computer technology wisely to improve thinking and decision-making and to better share the results of research. The aim of this article is to present some of the digital tools that increase the efficiency of scientific research and facilitate conceptual work, information retrieval, note-taking and writing up of research.
Approach/Methods: The research process comprised several stages, each of which focused on a specific tool that directly increases work efficiency and performs functions beyond human capabilities.
Results and conclusions: The latest digital tools are equipped with features that increase efficiency at all stages of the research process. They speed up the completion of a task (e.g. searching for information) and illuminate the relationships between documents or individual concepts that researchers themselves would not register (e.g. through the visualization of data and information).
Originality/Value: The skillful use of modern digital tools is a fundamental element of digital wisdom as computer programs and Web applications significantly broaden human perception and cognitive capabilities.

Keywords

Digital tools. Digital wisdom. Information retrieval. Note-taking. Research work.

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> *The power of the unaided mind is highly overrated. Without external aids, memory, thought, and reasoning are all constrained. But human intelligence is highly flexible and adaptable, superb at inventing procedures and objects that overcome its own limits. The real powers come from devising external aids: it is things that make us smart* (Norman, 1993, 43)

1. Introduction

A hammer, an axe, a microscope, a computer, a spreadsheet – what do these things have in common? They are all tools: physical objects that help us accomplish a task. In a broader sense, all tools are a means to an end. We distinguish different types of tools, e.g. moving

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tools, cutting tools, perception tools, data and information manipulation tools, which serve different purposes. The purpose of a tool is to enhance its user's abilities to make them stronger, more precise, more efficient or wiser. Our ancestors used handheld tools mainly to exert physical force on objects. While the tools we use today are more developed, we still take advantage of other handheld tools, to increase not our physical strength but rather our intellectual power. They include books, mobile phones, tablets and computers. Although they are physical objects, their functions are not performed by the material they are made of nor by their outer structure. Their utility resides in their content (information) and its meaning, or in the processes they carry out (a computer). We also use digital tools, such as computer programs and mobile applications.

Tools and technology have played a crucial role in human development, altering our species' relationship with our environment. Increasingly advanced tools have been developed. Starting with digging sticks, wooden spears, fire, basic garments and shelter, later advancing to the development of arts, music and language, then the fabrication of ships, engines and vehicles, culminating in the recent creation of digital technologies. They have revolutionized the structure of our bodies, expanded the capabilities of our minds, and given birth to human societies of unparalleled size and power (Currier, 2017, xiv).

Information is one of the major forces that fueled both human and societal development. For thousands of years people stored information in their brains as evolutionary pressures adapted them to store large amounts of botanical, zoological, topographical and social information. However, with the emergence of complex societies, a completely new type of information emerged: numbers. Numerical data, which human brains were not adapted to store and process, started to be used to register information about people's incomes and possessions, taxes, payments, debts, fines, as well as about discounts and exemptions. Such immense quantities of abstract data were impossible to memorize, so if states were to grow and prosper, it was imperative to find a new method of registering all of these transactions. The first attempt to overcome the limits of human memory was made by the Sumerians (3500–3000 BC) who invented a system for storing and processing information outside our brains. The system was writing. It overcame the limitations of the human brain and paved the road for the establishment of cities, kingdoms and empires (Harari, 2015, 136–137). But in our digitally-driven world, the tool of writing itself needs to be enhanced in order to accommodate the growing needs of writers, researchers, and scientists.

The digital tools of today are designed to deal with huge amounts of information. Databases, spreadsheets, task and project managers, communications platforms, note-taking applications, reference managers are used in order to store, process and share data, to control information flow, and generally speaking, to increase users' productivity. Information is derived from data, organized and interpreted in a given context. However, sheer information is not enough. We want knowledge, which is a result of processing information through synthesis, internalization, analysis and reduction (Sosińska-Kalata, 2016, 9). What do we do with knowledge? We apply it to make decisions, solve problems or interpret events: "When knowledge is put into practice that's when wisdom is born within a person" (Mwanandeke, n.d.).

The current information age is characterized by pervasive technology and the use of information on an unprecedented scale, as we gather, represent, store, and retrieve unimaginable amounts of data. Efficient tools are needed to manage information and to turn

it into knowledge. Our computers are fast, our databases are voluminous, we can readily access information resources from any place through a range of devices, and yet something is still missing. More than ever, we need mechanisms to cope with the overabundance of content; we need more quality than quantity, more attention than distraction, and more wisdom than information. If we are to live in a digital era, we must attain digital wisdom.

Digital wisdom is a term coined by Marc Prensky to describe "integrating the technology of our times into our thinking and decision making, doing it wisely, and sharing the results" (Prensky, 2012a, 47). Digital wisdom refers to the ability to combine the activities of the mind with the operations of the computer to obtain the most intelligent answers to questions (Shaughnessy et al., 2010, 30). Human mind is able to reflect, see patterns, create categories and associations, and intuit. Machines excel at storing, processing and analyzing huge quantities of data. They can also be of great help in decision-making processes as human judgment is fallible when assessing risk in complex situations (Wilkinson-Ryan, 2020). Digital tools bridge these two worlds, the world of mankind and the world of computers. The expected result is extending human intellect and gaining digital wisdom:

> Digital wisdom arises from the combination of the mind and digital tools; what the unenhanced mind loses by outsourcing mundane tasks will be more than made up for by the wisdom gained. Wisdom, and particularly practical wisdom, must be understood in light of the digital enhancements that make it stronger (Prensky, 2012b, 211).

John M. Culkin's statement that "We shape our tools. And then our tools shape us." (Culkin, 1967, 70) suggests that there is a two-way relationship between people and tools. Tools are created to enhance our capabilities; with our capabilities enhanced, we may make better tools. We use and improve digital technology to become not only smarter but also genuinely wiser. This enables us to further improve our abilities, and help us craft more refined tools. Digital wisdom may be perceived as a two-fold concept. It refers to the wisdom which is obtained by using digital technology and to the wisdom in using (choosing) technology that can enhance our innate capabilities (Prensky, 2012b, 202).

The deft use of digital tools cannot be called digital wisdom. You are digitally wise when you take advantage of technology to make better judgements and decisions. Tools that help you organize your thoughts, improve your thinking and understanding, see phenomena from different perspectives, and connect seemingly unrelated ideas, truly enhance your digital wisdom. Digital wisdom involves allowing machines to carry out the tasks in which they outperform humans: calculation, visualization, and "memorization" of large quantities of data. Wisdom grows further when individual wisdom is shared and integrated with collective or organizational wisdom (wisdom of crowd) and machine wisdom (artificial intelligence) (Sadiku et al., 2017, 72).

Thoughtful application of tools is particularly important in research work where digital technology can enhance researchers' minds and lead to greater wisdom because it enhances:

(1) conceptual work;
(2) access to data and information sources;
(3) note-taking as way of building personal knowledge;
(4) ability to conduct deeper analysis (e.g. by visualizing data and relations between concepts);
(5) the process of writing up research.

Below we present selected tools which can be used at different stages of the research process. We focused on the applications and Web services that offer novel features. For example, we write about mind-mapping applications because, although mind-mapping software appeared a few decades ago, only recently did these applications allow their users to view the content of mind-maps hierarchically, just as outlining applications do. Outliners have also undergone major developments, to meet the needs of writers and project managers. Regarding information retrieval, we discuss search systems that offer new possibilities for searching, processing queries, and displaying results. As far as note-taking is concerned, we report on the apps that have introduced bi-directional references (backlinks), which is a breakthrough in the area of linked notes. The first prototype of application with bi-directional linking, Roam Research, was created in 2017 (Brunnbauer, 2020), and only this year started officially letting in users. The note-taking apps we describe also allow their users to visualize notes, based on links, backlinks, and tags. New features of writing software include integration with reference managers and search facilities, as well as non-linear forms of presenting information.

2. Conceptual work

The first step of a research process is identifying a problem or posing a research question. The problem is presented in a broader context, considered from different perspectives, and then broken down. Further analysis may focus on relevant concepts and relations between them. What is required at the stage is that we present the topic as a structure that shows connections between parts (subtopics and ideas). To enhance conceptual work, we can use mind-mapping software or outliners, i.e. hierarchical word processors. The key functionalities of such applications are a graphical, spatial presentation of even the most complex topics, practically limitless structuring (nesting) of ideas in a hierarchy or a network, rearranging, searching and sorting; additionally, they may be used on different devices. We can create mind maps in many desktop or Web applications, for example: Coggle[1], MindMeister[2] or MindMup[3] presented in Figure 1.

The most popular outliners are: Dynalist[4] (Fig. 2), Workflowy[5] and Checkvist[6].

Other applications allow users to switch the view of the mind map and the outliner, e.g. XMind[7]. Figure 3 shows a mind map, Figure 4 shows the same information as an outline.

[1] https://coggle.it
[2] https://www.mindmeister.com
[3] https://www.mindmup.com/
[4] https://dynalist.io
[5] https://workflowy.com
[6] https://checkvist.com
[7] https://www.xmind.net/

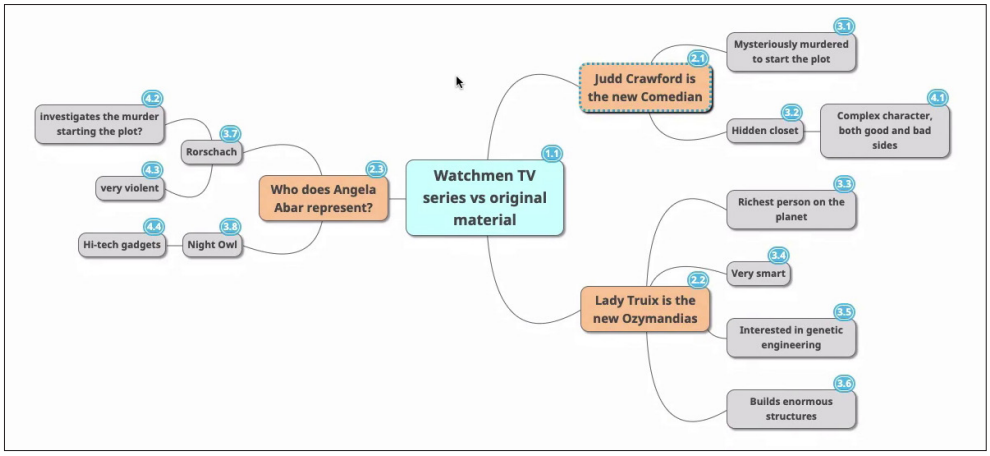

Fig. 1. Mind map created in Mind Mup. Source: MindMup [30.09.2020], https://www.mindmup.com/assets/tips-labels-hierarchy.png

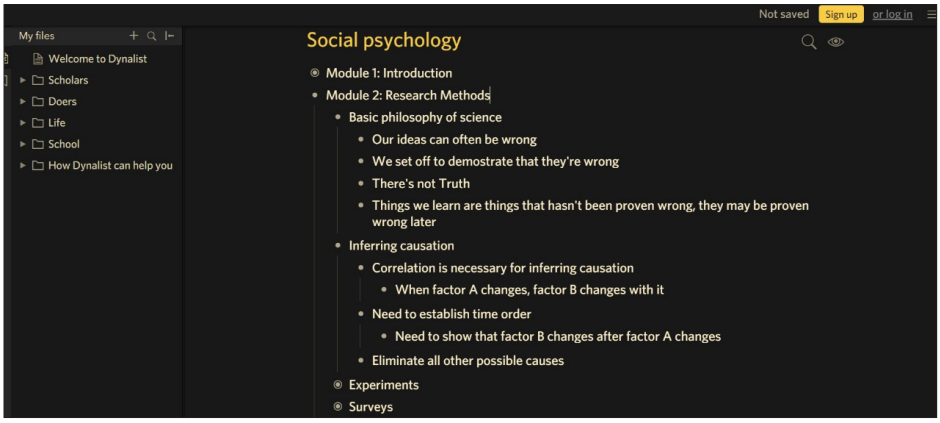

Fig. 2. Outlining in Dynalist. Source: Dynalist [30.09.2020], https://dynalist.io/demo/yuL_ntzcbeRmDSmiMzmFq5NJ

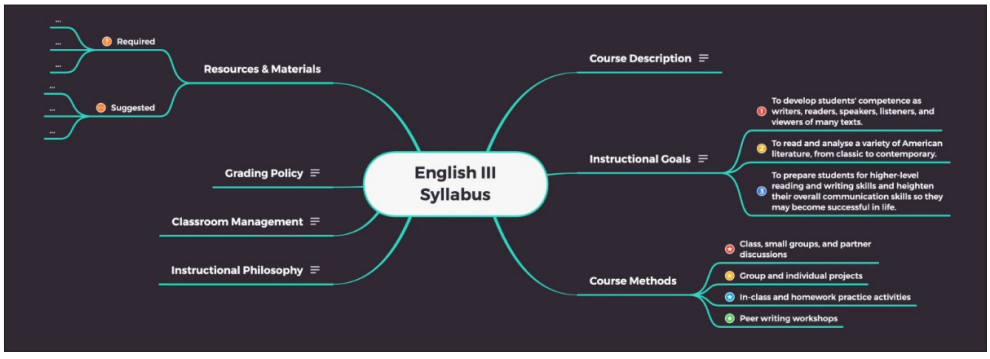

Fig. 3. A mind map in XMind. Source: XMind [30.09.2020], https://www.xmind.net/xmind2020/

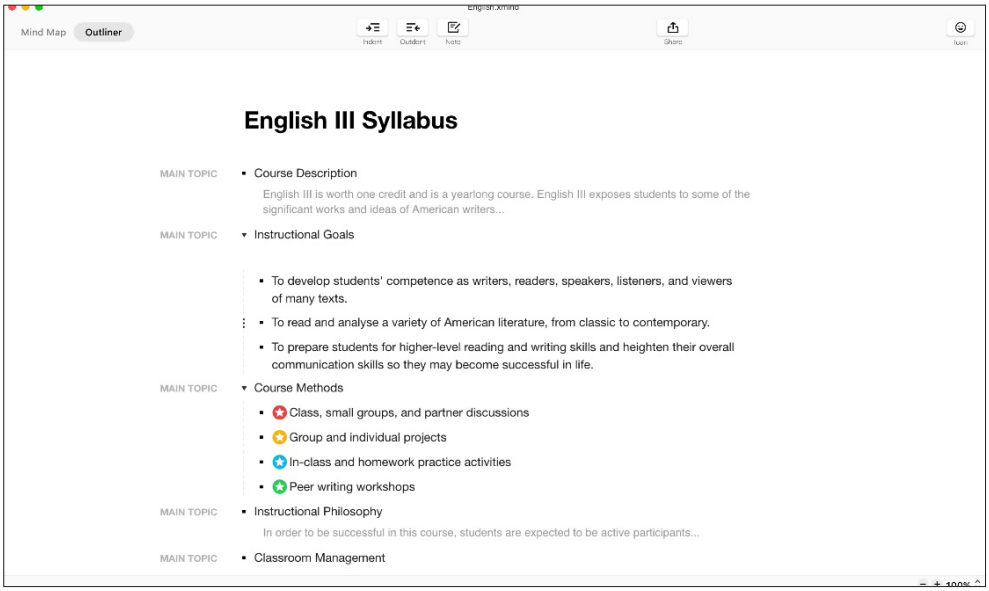

Fig. 4. An outline in XMind. Source: XMind [30.09.2020], https://www.xmind.net/xmind2020/

3. Information retrieval

Once the research problem is identified, the researcher must learn more about the topic under investigation. A literature review is necessary for the researcher to find out what is the state of scholarship, what methods have been applied and what conclusions formulated, and what implications this has for the examined problem or research area. There are many types of information sources to consider: general and academic Web search engines, library discovery services, bibliographic and citation databases, digital library aggregation services, academic social networks, and reference management software[8].

Over the years, information finding systems have evolved, offering new methods of searching, processing queries, and displaying results. Thanks to the development of artificial intelligence and the semantic Web, users can formulate search queries in a natural language. Algorithms not only find keyword matches of the components of a query but also understand the problem and its context. The query is easier to formulate as bases suggest popular queries (see Fig. 5) and underline errors.

Library discovery services allow us to browse all the library resources in one place. If full texts are not available, users can find them with an OpenURL link resolver (e.g. Full-Text Finder in EBSCO), where they will be redirected to e-journals, publishers' sites and online catalogs.

[8] More about these sources and their search functions can be found in the book by Matysek & Tomaszczyk (2020).

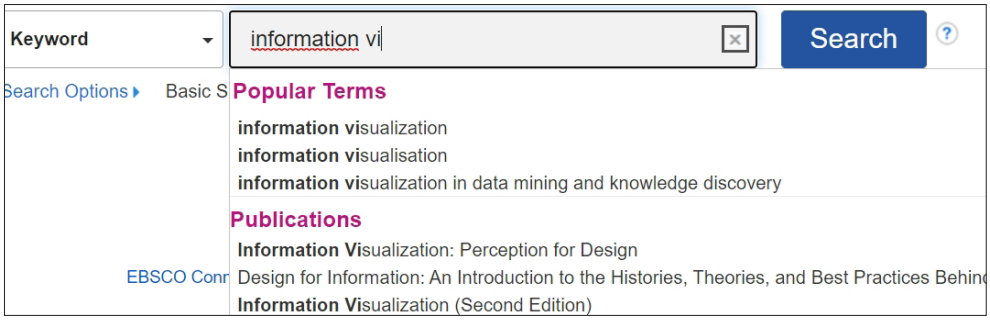

Fig. 5. Query suggestions in EBSCO Discovery Service.
Source: Screenshot from EBSCO Discovery Service

Users may also reformulate their search terms when phrases with similar queries are displayed in the results list (e.g. in Google). Scientific search engines (like Google Scholar, Microsoft Academic, Semantic Scholar) and academic social networks provide links to related papers for each document. Furthermore, researchers do not have to keep track of new articles in their area of expertise by themselves thanks to the alerts and automatic email notifications.

Semantic search engines not only yield a list of relevant publications but also provide related information about the most relevant authors, institutions, and research areas (see Fig. 6). They extract information from scientific papers (abstracts, citations, tables), show their impact (rank), and suggest both broader and narrower topics. These engines are tools that allow for both searching and exploring knowledge.

Search tools are in constant development. For example, Semantic Scholar recently introduced TLDR (Too Long; Didn't Read) feature, which puts single-sentence, automatically-generated paper summaries of a scientific paper on the search results page.

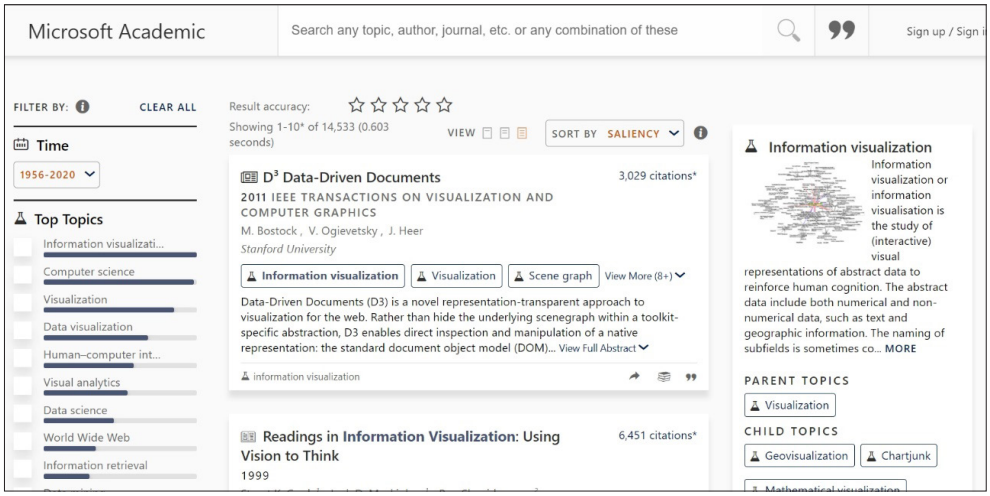

Fig. 6. Search results list in Microsoft Academic.
Source: Microsoft Academic [30.09.2020], https://academic.microsoft.com/

4. Note-taking

If we agree that knowledge is the end product of information processing (categorizing, analyzing, synthesizing, internalizing), the notes we take from literature should be considered as chunks of knowledge. To be fully functional, these notes should include:

(1) the source (bibliographic reference);
(2) quotes and deeply processed information written in our own words (together with the page number where the original quote or idea comes from);
(3) own thoughts (clearly differentiated from those of the author);
(4) connections to prior information (whole notes or individual ideas).

In the note-taking process, knowledge emerges when we write down our thoughts and connect them with other pieces of information. Is digital technology really needed to enhance this process? We can organize our notes on paper (index cards, note cards), following the idea of Niklas Luhmann's Zettelkasten (Ahrens, 2017, 12–20). He developed a system that allowed him to order notes into broader topics and discover relationships between individual pieces of information that is not always openly visible in isolation. This involved writing each note on a separate card, numbering the cards hierarchically so that new notes could be inserted where appropriate, and keeping record of associations between the notes. Although such a system can be very effective, it is time-consuming and quite difficult to maintain. The same information, processed by an application, opens far more possibilities for the researcher than Luhmann's system. Apart from live searching and grouping similar ideas by tags, it is possible to use bi-directional references (backlinks) to simultaneously display the content of different notes on the same subject. In other words, all notes referring to the note that we are viewing might be seen. We do not see the entire note but only single paragraphs (blocks) from different notes where the idea is mentioned, even as, at the same time, we have access to the context (source). Backlinks are created automatically after the user makes a regular link. The note-taking application also indicates which notes have not been interlinked so that the researcher may decide if establishing a connection between these and other notes would be worthwhile. This functionality supports serendipity and creativity. It should be pointed out that applications featuring bi-directional references not only facilitate personal information management, but also shape the way in which researchers take and link notes. The main cognitive work is done at the level of ideas, when the researcher describes ideas and attempts to connect them.

We may use different paid and free note-taking apps, that allow us to add backlinks: Roam Research[9], Obsidian[10], TiddlyWiki[11], Logseq[12]. Figure 7 shows a Roam Research note on query reformulation and four related paragraphs from other notes. These bi-directionally linked notes appear under the section Linked References. The advantage of bi-directional references is that the researcher can always see the notes, or the paragraphs, relating to the idea highlighted in the viewed note. It is not necessary to submit any queries or to browse the notes one by one. Backlinks are also used for transclusion, which is the inclusion of

[9] https://roamresearch.com/
[10] https://obsidian.md/
[11] https://tiddlywiki.com/
[12] https://logseq.com/

a part or the entirety of an electronic document into one or more documents by hypertext reference. Roam Research allows the user to display a single integrated document made up of parts assembled dynamically from different notes. Transclusion facilitates collation and integration of ideas; it also speeds up the writing process.

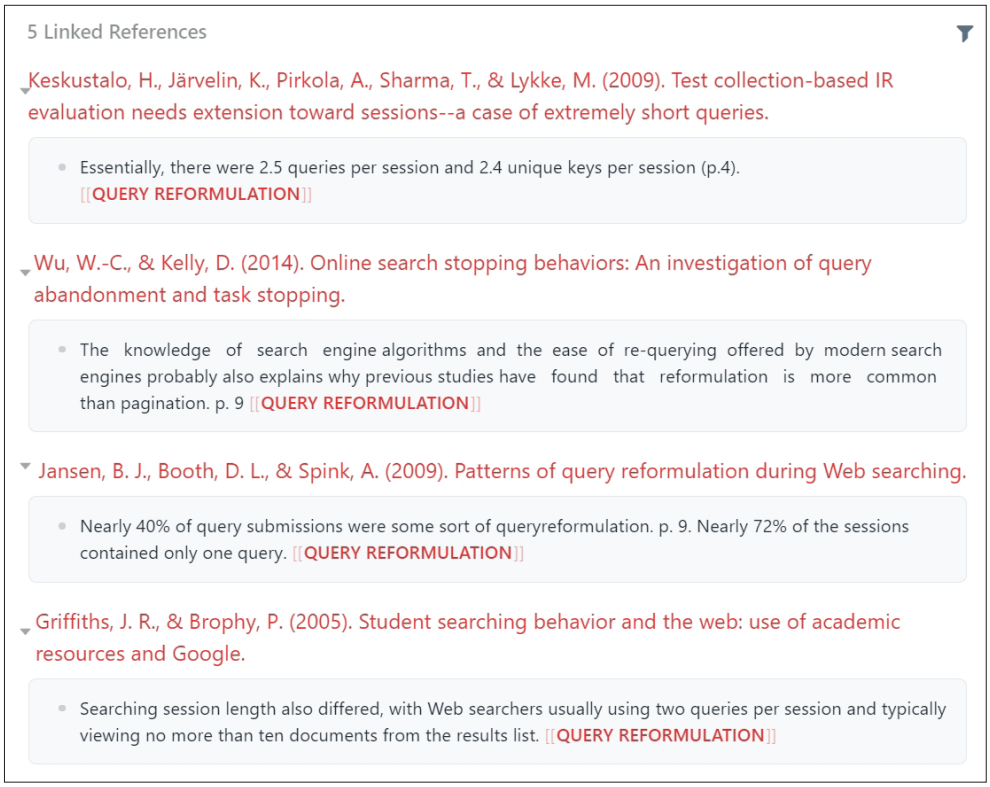

Fig. 7. Bi-directionally linked notes in Roam Research. Source: Screenshot from Roam Research

5. Visualization

Visualization is an established computer-supported technique for the presentation of complex, unstructured information. Presenting data in a visual form provides additional insights, allowing users to interact with the data, manipulate or process them, and arrive at conclusions more quickly. Visual representation of data may reveal structures registered as patterns by human vision (Fekete et al., 2008; Keim, 2002, 1).

Statistical data, or other complex information, are visualized most often. But visualization may also uncover knowledge residing in notes. Graphs generated by note-taking applications or other software dedicated to mapping the relations and patterns in data (e.g. InfraNodus) greatly enhance human capacity to draw connections between different pieces of information. The applications mentioned in the previous section (Roam Research,

Obsidian) allow for a visual representation of the network established by the links in the notes (Fig. 8). It is possible to filter or exclude notes from the set to be visualized, as well as to zoom in and out of the graph to focus on the details or on the bigger picture.

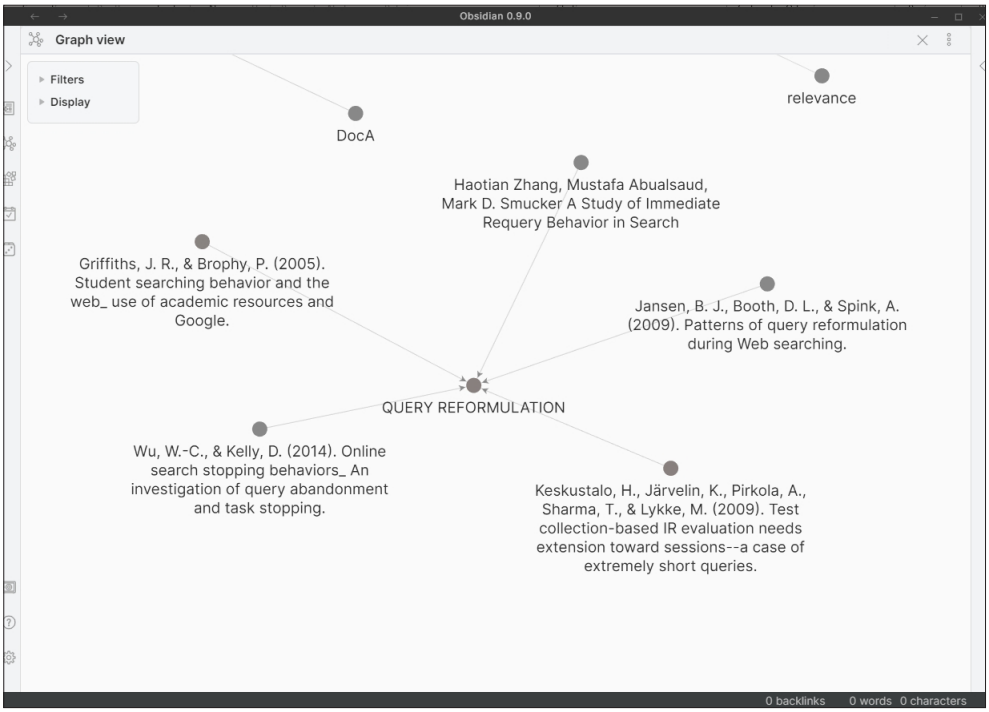

Fig. 8. Graph view in Obsidian. Source: Screenshot from Obsidian

6. Writing up research

How may the process of writing become wiser? Let us start with a very simple feature of certain computer programs. We live in the most distracted time in human history and, as a result, it is extremely difficult for us to stay focused on a single-task for longer. This is especially the case takes a lot of time being intensely focused. To help users to avoid distractions, many software developers included a distraction-free mode in their note-taking applications and word processors, which hides other menus, toolbars and boxes, showing the writer nothing but the text in the center of the screen. This allows authors to focus entirely on writing. Applications with the distraction-free mode include Calmly Writer[13] presented in Figure 9, Ommwriter[14], iA Writer[15]. This simple functionality enables better concentration, which may improve thinking. Distraction-free writing tools have become

[13] https://www.calmlywriter.com/
[14] https://ommwriter.com/
[15] https://ia.net/writer

more and more popular (Johannsen & Sun, 2017) because of such advantages (Battershill & Ross, 2017; Neidlinger, 2014).

Fig. 9. Workspace of Calmly Writer. Source: Screenshot from Calmly Writer [30.09.2020], https://www.calmlywriter.com/online/

The writing process is enhanced further thanks to the integration of the word processor and the reference manager. Gathering bibliographic references is a tedious task, particularly as different editors and journals use different bibliography styles. Reference managers not only help to format their citations correctly but also allow them to organize literature, mark connections between papers, tag content, make notes and annotate PDF files. Some also give the users to option to search for information online. For example, PaperPile or Mendeley allow their users to browse new literature without exiting the program. PaperPile saves the users even more time. While viewing the results list in Google Scholar or BASE[16], they see which documents are already indexed in their database (presented in Fig. 10).

Other writing applications are designed for longer projects, allowing to compose their texts in non-linear order. For example, Scrivener[17] "banishes page fright by allowing you to compose your text in any order, in sections as large or small as you like", as presented in Figure 11. "Got a great idea but don't know where it fits? Write when inspiration strikes and find its place later, you can put them on the corkboard. Grow your manuscript organically, idea by idea" (*Scrivener | Literature & Latte*, n.d., Fig. 12). For some users, this mode writing may be liberating as it allows them to write outside a rigid structure.

Another interesting tool facilitating the writing process is Gingko[18]. It is unique in that it allows users to write outlines and the body of the text at the same time, so that they

[16] https://www.base-search.net/
[17] https://www.literatureandlatte.com/
[18] https://gingkoapp.com/

may work simultaneously at different levels of detail (Fig. 13). Thus, "you can easily see your whole thesis and one small part of it, and see how they relate" (*Painless Dissertation Writing – Gingko App*, n.d.).

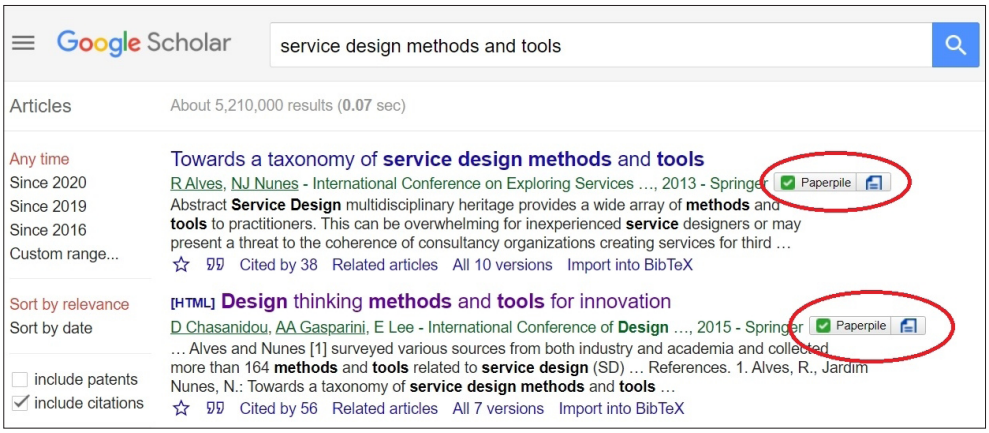

Fig. 10. Active button of indexed documents in Paperpile.
Source: Screenshot from Google Scholar [30.09.2020], https://scholar.google.pl/

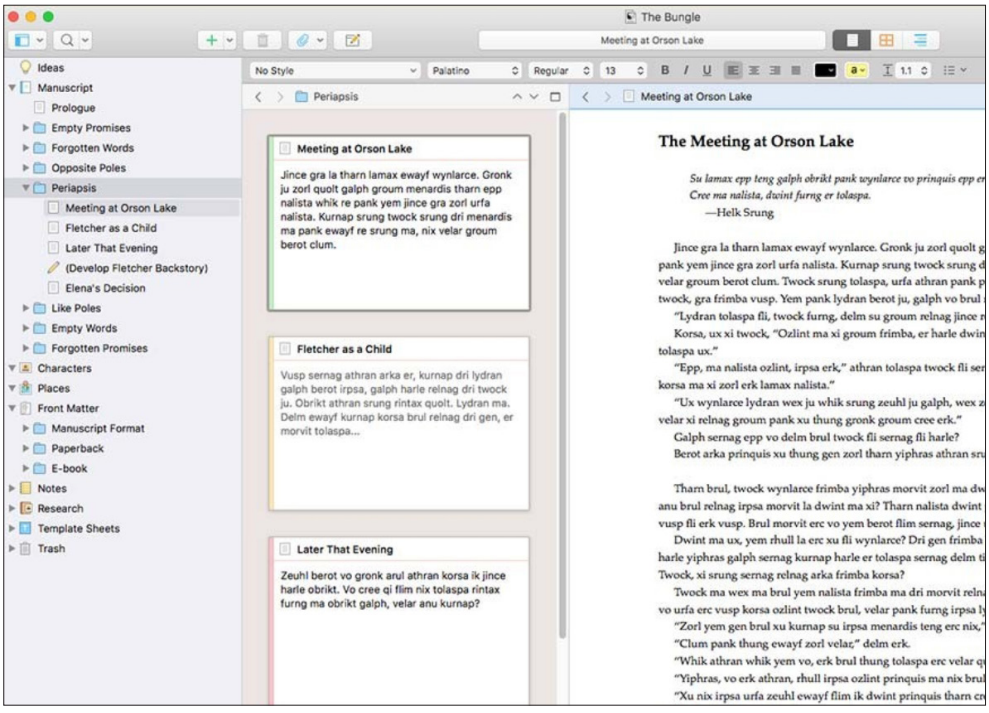

Fig. 11. Scrivener workspace.
Source: Scrivener [30.09.2020], https://www.literatureandlatte.com/scrivener/overview

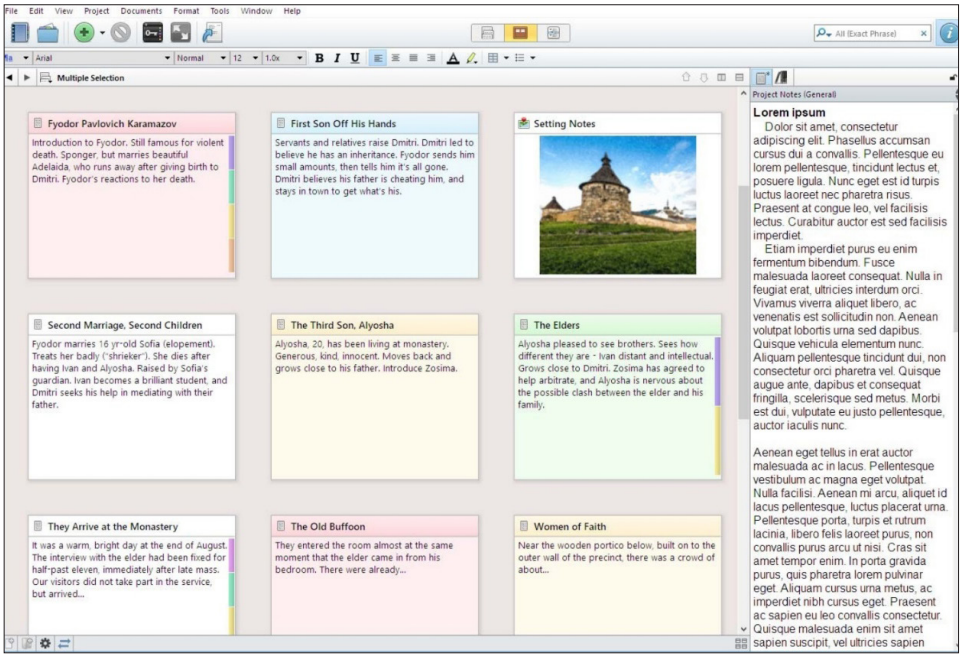

Fig. 12. Corkboard in Scrivener. Source: Scrivener [30.09.2020], https://www.literatureandlatte.com/scrivener/features?os=Windows

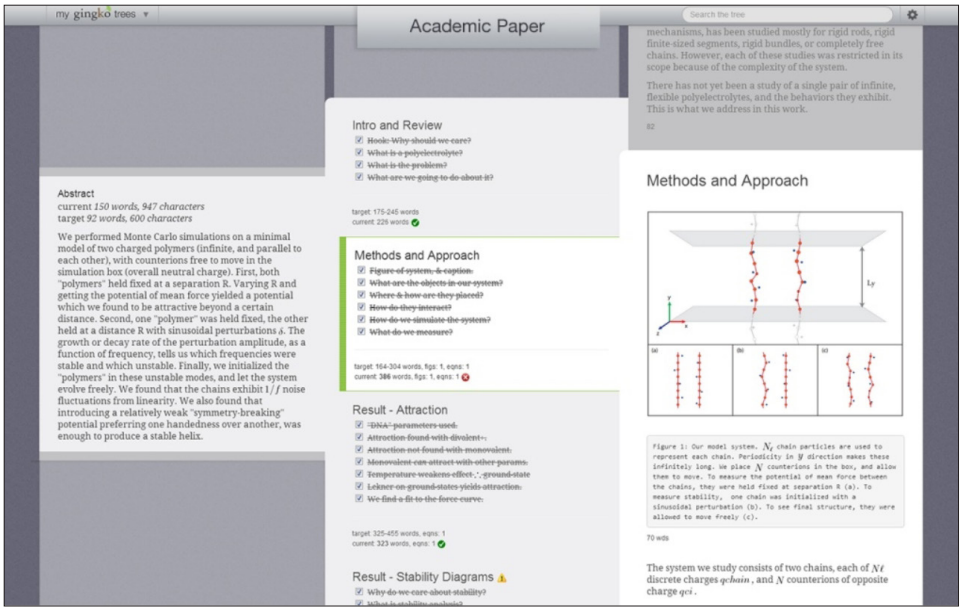

Fig. 13. Writing research paper in Gingkoapp.
Source: Ginkgo [30.09.2020], https://gingkoapp.com/p/academic-writing-software/

7. Conclusion

The pervasion of digital technologies, fast development of information systems, and tense competition in the world of science instill in researchers an urge to be more productive and wiser through the use of effective tools. Technology alone will not replace human thinking, good judgment, problem-solving abilities, or intuition. But, as Prensky says "in an unimaginably complex future the unenhanced person, however wise, will no longer be able to keep up with an enhanced person" (Prensky, 2012b, 212). The tools presented in this paper not only speed up the research work, but also considerably improve researchers' thinking and understanding. Access to modern tools and building digital wisdom has become even more crucial during the COVID-19 pandemic. We have begun using ICT more intensively in our daily work and communication as we were forced to master technology on a global scale. Restrictions on mobility and limited access to traditional library resources have caused the search for literature to move to electronic systems and have induced an increased usage of digital documents. Additionally, a computer or another mobile device is always at hand, which encourages people to utilize various programs and applications.

References

Ahrens, S. (2017). *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking: For Students, Academics and Nonfiction Book Writers*. Columbia, SC: CreateSpace.

Battershill, C., Ross, S. (2017). *Using Digital Humanities in the Classroom: A Practical Introduction for Teachers, Lecturers and Students*. London, New York: Bloomsbury Academic.

Brunnbauer, T. (2020). *The History of Roam Research and the Roamcult*. Medium [online]. Medium, September 3 [16.11.2020], https://medium.com/@hasenweg.tobi/the-history-of-roam-research-and-the-roamcult-4c1e1897633d

Culkin, J. M. (1967, March 18). *A Schoolman's Guide to Marshall McLuhan*. *Saturday Review*, 51–53, 70–72.

Currier, R. L. (2017). *Unbound: How Eight Technologies Made Us Human and Brought Our World to the Brink*. New York: Arcade Publishing.

Fekete, J.-D., Van Wijk, J. J., Stasko, J. T., North, C. (2008). The Value of Information Visualization. In: A. Kerren (ed.), *Information visualization*. Berlin, Heidelberg : Springer, 1–18.

Harari, Y. N. (2015). *Sapiens: A Brief History of Humankind*. New York: Harper.

Johannsen, J., Sun, Y. (2017). An Intelligent and Semantics-Aware Distraction-Free Writing System. *2017 IEEE 11th International Conference on Semantic Computing (ICSC)*, 465–468, https://doi.org/10.1109/ICSC.2017.23

Keim, D. A. (2002). Information Visualization and Visual Data Mining. *IEEE Transactions on Visualization and Computer Graphics*, 8(1), 1–8.

Matysek, A., Tomaszczyk, J. (2020). *Cyfrowy warsztat humanisty*. Warszawa: PWN.

Mwanandeke, K. (n.d.). When Knowledge Is Put Into Practice That's When Wisdom Is Born Within a Person [online]. Quotes [30.09.2020], https://www.quotes.net/quote/79816

Neidlinger, J. (2014). *How To Stop Being So Distracted While You Write In WordPress* [online]. CoSchedule Blog [30.09.2020], https://coschedule.com/blog/distraction-free-writing/

Painless Dissertation Writing–Gingko App. (n.d.) [online]. [30.09.2020], https://gingkoapp.com/p/academic-writing-software/

Prensky, M. (2012a). *Brain Gain: Technology and the Quest for Digital Wisdom*. New York: Palgrave Macmillan.

Prensky, M. (2012b). *From Digital Natives to Digital Wisdom: Hopeful Essays for 21st Century Learning*. California, London: Corwin.
Sadiku, M. N. O., Shadare, A. E., Musa, S. M. (2017). Digital Wisdom. *International Journal of Advanced Research in Computer Science and Software Engineering*, 7(8), 72,7. https://doi.org/10.23956/ijarcsse.v7i8.25
Scrivener (n.d.). Literature & Latte [online][30.09.2020], https://www.literatureandlatte.com/scrivener/overview
Shaughnessy, M. F., Fulgham, S. M., Prensky, M. (2010). Interview with Marc Prensky. *Educational Technology*, 50(2), 28–33.
Sosińska-Kalata, B. (2016). Indywidualna organizacja wiedzy: Pojęcia, problemy badawcze, stan badań i ich perspektywy. *PTINT Praktyka i Teoria Informacji Naukowej i Technicznej*, 24(4), 3–21.
Wilkinson-Ryan, T. (2020). *Our Minds Aren't Equipped for This Kind of Reopening* [online]. The Atlantic [30.09.2020], https://www.theatlantic.com/ideas/archive/2020/07/reopening-psychological-morass/613858/

Cyfrowa mądrość w pracy badawczej

Abstrakt

Cel/Teza: Pod pojęciem cyfrowej mądrości, za Markiem Prenskym, rozumie się umiejętność racjonalnego wykorzystywania współczesnej technologii komputerowej w celu usprawnienia myślenia i podejmowania lepszych decyzji oraz dzielenia się uzyskanymi rezultatami. Celem artykułu jest przedstawienie wybranych narzędzi cyfrowych, które przyczyniają się do zwiększenia efektywności prowadzenia badań naukowych, ułatwiając pracę koncepcyjną, wyszukiwanie informacji, tworzenie notatek oraz proces pisania tekstu.
Koncepcja/Metody badań: Wyróżniono podstawowe etapy procesu badawczego i do każdego z nich wybrano narzędzie (program komputerowy), które bezpośrednio wpływa na wzrost efektywności pracy, pokazując jednocześnie, w jaki sposób funkcje realizowane przez aplikacje komputerowe przewyższają możliwości człowieka.
Wyniki i wnioski: Najnowsze narzędzia cyfrowe wyposażone są w funkcje, które usprawniają prace na wszystkich etapach procesu badawczego. Usprawnienie to obejmuje zarówno przyspieszenie realizacji zadań (np. wyszukiwania informacji), jak i ukazywanie trudno dostrzegalnych związków między dokumentami czy indywidualnymi pojęciami (np. wizualizacja danych i informacji).
Oryginalność/Wartość poznawcza: Umiejętne korzystanie z nowoczesnych narzędzi cyfrowych jest podstawowym wykładnikiem cyfrowej mądrości, ponieważ programy komputerowe i aplikacje internetowe w istotny sposób poszerzają możliwości percepcyjne i kognitywne człowieka.

Słowa kluczowe

Cyfrowa mądrość. Narzędzia cyfrowe. Notowanie. Praca badawcza. Wyszukiwanie informacji.

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Jakub J. Czarkowski, Mariusz Malinowski, Marcin Strzelec, Maciej Tanaś (Eds.) (2020). *Zdalne kształcenie akademickie dorosłych w czasie pandemii.* [Distance Academic Adult Education During the Pandemic]. Warszawa: Wydawnictwo DiG, pp. 311. ISBN 978-83-286-0120-8

The epidemiological threat connected to the spread of COVID-19, disrupting our work and social life in spring 2020, has disrupted the system of education and university instruction as well. It forced lecturers to take immediate action to ensure the continuity of teaching. Students could not be left without academic support and supervision. However, we were not properly prepared for the situation, which was rapidly changing. The experiences of the lecturers from various Polish universities who faced unprecedented challenges when conducting research and providing instruction to university students during the pandemic, were gathered in the volume published by the DiG Publishing House entitled *Zdalne kształcenie akademickie dorosłych w czasie pandemii* [*Distance Academic Adult Education During the Pandemic*].

The main problems in continuing university instruction in the new form, indicated by the editors of the volume, are primarily: the information technology gap (lack of appropriate equipment or technical support); situational information gap (lack of preparation and competences necessary to ensure effective organization of education in crisis); fear of the new problems, which the situation presents us with; lack of appropriate organizational and legal solutions; and, finally, lack of knowledge on how to support students in crisis. In recent months, we have all faced such challenges. The authors of the texts published in the reviewed volume analyze this situation.

This publication is a result of a joint project, carried out under the direction of the scientific editors of this volume. It was completed thanks to the cooperation of virtual teams, communicating with each other and exchanging their experiences. Close collaboration of the authors and the editors made the book more cohesive and ensured that its analysis of the impact of the pandemic on higher education would be comprehensive.

The book is divided into four parts. First part (*Uwarunkowania edukacji zdalnej* [*Conditions of distance education*]) discusses the reality of learning and teaching under the conditions of social distancing (distance learning), taking into account the multifaceted nature of this phenomenon. The articles in this part primarily focus on the sociology and psychology of the Internet.

The opening text of the volume, describing university instruction in the first days after the suspension of regular stationary teaching classes, resembles a battlefield report. Many of us shared the author's feelings. The first weeks of the pandemic were a period of transition from disorientation to mobilization.

The second article does not discuss distance learning in the time of pandemic directly; rather, it concerns the changes in the information society resulting from the technological development which accompanied the introduction of distance learning as the new norm. The following article, devoted to adult learning, including distance learning, is equally general. The authors stress the importance of the fit between a student's personality and the teaching methods. To teach effectively, the lecturer should choose right incentives, taking into account each student's characteristics. The conditions of distance learning make it virtually impossible for the lecturer to get a sense of their students' personalities required for a close match of learning methods – it seems like an important issue, but the authors do not mention it. However, they discuss another challenge of distance learning, i.e., the integration of the virtual group. It would require so much preparation, work and time that in practice, that in current circumstances it cannot be accomplished.

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Another author, focusing on the sociology of online education, directs our attention to the fact that distance learning, which until recently was a complementary method, has out of necessity suddenly become the dominant method. The consequences of the (so far, temporary) virtualization of many social phenomena (including work and education) may be irreversible. The last text of this section studies distance learning in the context of the evolution of media (traditional and digital).

The second part (*Okruchy dydaktyki* [*The crumbs of didactics*]) is more theoretical. The first text in this section presents theoretical models of distance learning for adults. The aim of this theoretical review is to give the teachers a choice of methods suited to the needs of particular classes and groups of students to achieve the best possible learning outcomes. An important aspect of the crisis situation are the greater expectations from students to self-educate. In order for self-education to be effective, it is necessary to activate mindsets other than those important in the process of traditional education, such as motivation, discipline, ability to organize one's work, commitment, activity, etc. This is an important issue for lecturers, who should know how to encourage their students to study by themselves. Finally, the last article in this section is a synthetic summary of e-learning as a form and way of adult education.

The third part (*Narzędzia i metody* [*Tools and methods*]) is devoted to the practical aspects of distance education, i.e., the methods and tools of education. The first text in this section presents various didactic methods that can be used in distance learning. The following article discusses specific IT tools to be used in this process. The third text includes practical advice on preparing webinars and video lectures. The fourth and fifth articles are devoted to the use of social networks in education. The sixth text presents programs suited to preparing educational materials (e.g. creating graphic, audio and video files). The title of the seventh article (*Tablet i telefon w kształceniu zdalnym* [*Tablet and phone in distance learning*]) suggests that it will discuss the use of mobile devices in distance learning. However, this is not the case. In fact, the author, who is very critical of academic lecturers, focuses on the psychology of contacts between lecturers and students, and their mutual (usually negative) perception and generational differences. Finally, the last text of this section is devoted to quality control of distance education.

The fourth part (*Kilka kwestii na zakończenie tomu* [*Several issues to conclude the volume*]) is a collection of various texts, which are not directly related to the main theme, but, according to the publishers, speak to the issues related to distance learning using modern digital technologies. The section comprises an article titled *Niektóre prawne uwarunkowania organizacji i prowadzenia zajęć zdalnych z zastosowaniem technologii informatycznych* [*Certain legal conditions for the organization and conducting of distance learning with the use of information technologies*], and texts on academic education of seniors, and on the issue of complementary education, which close the volume.

It is still too early to formulate a satisfying summary of the phenomena associated with the pandemic. We remain stuck struggling with the challenges of this new normal. All we can do right now is describe the processes that are currently taking place, the ways in which we adapt and manage the crisis, and, finally, the methods and tools we currently use. More in-depth analyses can only be made retrospectively. However, it already seems obvious that one of the most lasting effects of the pandemic will be the development of distance learning and the associated technologies. Nevertheless, we have to be aware that, as research indicates, "the social experience gained through the distance education process seems many times poorer than that available through direct education" (p. 289). E-learning therefore will not be able to completely replace personal contacts and traditional meetings in the lecture theatre.

The texts collected in reviewed volume have been thoughtfully selected and arranged; they constitute a coherent and logical whole, complementing and explaining each other. They are written by scholars representing different scientific disciplines. They discuss practical experiences, outline methodological frameworks, and present theoretical and historical reflections (the development of certain phenomena related to education, including e-learning, and media).

This book is an important and interesting publication, serving primarily as a witness to the first period of the pandemic, when we were confronted with a new reality and forced to adapt quickly to it. The lecturers, who have not yet managed to adjust to the new situation for various reasons, may find here potential solutions, techniques, methods and tools to use in the future. Surely everyone will find something for themselves. Finally, this volume systematizes our initial experience of lockdown. It should attract the attention of the university lecturers, educators and people interested in the issues of education, especially distance education.

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Guidelines for Authors

ZIN – *Studia Informacyjne* (ZIN – *Information Studies*) accepts only manuscripts that have not been published before and are not under consideration for publication anywhere else. Following types of paper may be submitted for publication: original papers, book reviews, conference (and other events) reports.

Each manuscript is reviewed under a double-blind peer review process. In order to ensure the anonymity of the review process, please do not place any information in the text that could be used to identify the author.

Each manuscript is reviewed by two referees, selected on the basis of necessary expertise in the subject area under review. The review report is based on standard form containing a statement whether the manuscript is recommended for publication. Criteria for acceptance include appropriateness to the field of the Journal, scientific merit, proper text organization and correct language use.

The final decision about publication of manuscript will be sent to Author within 10 weeks after text submission. Manuscript should be formatted according to guidelines listed below and submitted via the OJS platform: ojs.sbp.pl/index.php/zin

1. General guidelines

1.1. Format

All files should be submitted in RTF (Rich Text Format) files, including text and illustrative content. All pages must be typed and 1.5 spaced using 12-point Times New Roman font. The title of the manuscript should be typed 14-point font. Please do not use any preformatted styles.

Illustrative content inserted in the article, should be send also in JPG format. Attachments should be numbered in order of occurrence and include the title, for example: *1. Tab. 1. List...* or *3. Fig. 1. System....*

1.2. Extent

Manuscript should be no longer than 40,000 characters (including spaces), review and report no longer than 14,000 characters.

1.3. Title page

Authors should prepare **separate title page**, which include:

- **title of the paper,**
- **the name(s) of the author(s) with appropriate affiliations and the ORCID numbers,**
- **the e-mail address of the corresponding author,**
- **address for correspondence,**
- **biographic note (see below),**
- **structured abstract (see below),**
- **keywords (see below),**
- **statement of originality (see below).**

According to the Journal policy against *ghostwriting* and *guest authorship*, authors are requested to list on title page names and affiliations of each person that contributed to the text (author of the idea, methods, etc. used in the submitted manuscript; percentage of contribution to the research process and text compilation). Authors are also requested to describe sources of founding that have supported the work and the financial involvement of research institutes, associations and other entities (*financial disclosure*).

1.4. Author(s) biographic note

Title page should include concise biographic notes (about 70 words) of each author : academic degree or professional position, current place of work and position, area of interest, the most important publications (max. 3).

1.5. Structured abstract

An abstract (about 100 words or 1000 characters) should be included with each submission and placed on the title page. Abstract should be formatted according to categories listed below. Author should identify at least four mandatory sections:

- **Purpose/Thesis** *(mandatory)*
- **Approach/Methods** *(mandatory)*
- **Results and conclusions** *(mandatory)*
- **Research limitations** *(optional)*
- **Practical implications** *(optional)*
- **Originality/Value** *(mandatory)*

1.6. Keywords

Title page should include keywords (4 to 10) as a noun phrases in singular form, where first element is capitalized. Keywords in alphabetical order should be delimited by full stop.

1.7. Statement of originality

Author(s) should include on title page statement that submitted text has not been published before and is not under consideration for publication anywhere else. If the paper was presented at a scientific meeting, provide detailed information about the event and the conference proceedings. If the paper will be the part of the author's book, provide its details and planned publishing date.

2. Manuscript format and preparation

2.1. Body of the paper

The text should be organized into entitled sections and subsections. Text should start with **Introduction**, giving an overview and stating the purpose and end with **Conclusion**, giving the summary of the author contributions to the study.

Author may use three levels of headings. Each heading should have its own title and number according to the following pattern:

1. First-level heading
1.1. Second-level heading
1.1.1 Third-level heading

2.2. References

Bibliographic citations are not allowed in footnotes. The reference list should be prepared according to APA 6-th Edition citation style (see below). Footnotes can be used only to give additional information or commentary. Footnotes to the text are numbered consecutively with Arabic numerals. It is recommended to limit the amount of footnotes per page.

2.3. Titles in the body of the text

Titles of exhibitions, conferences, programmes, etc should be written within double quotation marks. Use italics for publication titles (books, journals, papers, etc.).

2.4. Emphasis

Bold face should be used to emphasize certain words or passages.

2.5. Illustrative content

All illustrations (tables, charts, figures etc.) should be converted to greyscale. All illustrations should be cited in the text properly to their form (Table, Figure, Photograph, etc.) and have title and consecutive number (e.g. Tab. 1. Metadata levels). Use abbreviation in the text when refereeing to the illustrative content (e.g. see Tab. 1, see Fig. 5).

2.6. Citations and reference list

Use APA 6-th Edition as a citation and reference list format. The references list should only include works that are cited in the text.

Cite references in the text by name of the author(s) and year of publication in parentheses: (Name, Year of publication), eg. (Dembowska, 1991). If there are two authors, put their names with ampersand (&) mark

between: (Name & Name, Year of publication), eg. (Cisek & Sapa, 2007). If there are more than two authors, put the name of the first one followed by abbreviation *et al.*: (Name et al., Year of publication), eg. (Berners-Lee et al., 2001). Edited books are cited by the name(s) of the editor(s) followed by abbreviation *ed(s).*: (Name, ed., Year of publication), eg. (Bellardo Hahn & Buckland, eds., 1998). If there is no author or editor information, put the first word from the title and the year of publication : (Word, Year of publication), eg. (Biblioteki, 1976). Use the following pattern when referring to specific pages in the cited publications: (Dembowska, 1991, 15) or (Cisek & Sapa, 2007, 40–42) or (Bellardo Hahn & Buckland, eds., 1998, 18).

Place the reference list at the end of the text under the heading **References**. Reference list should be in alphabetical order without numbering.

List the references (books and journal articles) in alphabetical order by authors' last names. Citations of edited books list under the name of editor followed by abbreviation Ed.. If there is no author or editor information, list the publication under the first word from the title.

Use italics for book titles and regular font for titles of papers and book chapters. Use abbreviation In: when referring to book chapters in citations.

If there are two or more items by the same author(s), list them in order of year of publication (reverse date order). If two or more works are by the same author(s) within the same year, list them in alphabetical order by title and distinguish them by adding the letters a, b, c, … to the year of publication:

Dembowska, M. (1976a) ....

Dembowska, M. (1976b) ...., etc.

2.6.1 References List Examples

BOOK

Breslin, J.G., Passant, A., Decker, S. (2009). *The Social Semantic Web*. Berlin: Heidelberg: Springer Verlag.

Dembowska, M. (1991). *Nauka o informacji naukowej: organizacja i problematyka badań w Polsce.* Warszawa: IINTE.

BOOK (EDITED)

Bellardo Hahn, T., Buckland, M., eds. (1998). *Historical Studies in Information Science*. Medford, NJ: Information Today.

Biblioteki (1976). *Biblioteki publiczne województwa toruńskiego: informator*. Toruń: Wojewódzka Biblioteka Publiczna i Książnica Miejska im. M. Kopernika.

JOURNAL ARTICLE

Osińska, V. (2010). Rozwój metod mapowania domen naukowych i potencjał analityczny w nim zawarty. *Zagadnienia Informacji Naukowej*, 96(2), 41–51.

Dervin, B., Nilan, M. (1986). Information Needs. *Annual Review of Information Science and Technology*, 21, 3–31.

BOOK CHAPTER

Rayward, W.B. (1998). Visions of Xanadu: Paul Otlet (1868-1944) and Hypertext. In: T. Bellardo Hahn & M. Buckland (eds.). *Historical Studies in Information Science* (65–80). Medford, NJ: Information Today.

ELECTRONIC JOURNAL ARTICLE

Berners-Lee, T., Hendler, J., Lassila, O. (2001). The Semantic Web. *Scientific American* [online], May, [30.06.2013], http://www.scientificamerican.com/article.cfm?id=the-semantic-web

Bartalesi, V., Meghini, C. (2016). Using an Ontology for Representing the Knowledge on Literary Texts: The Dante Alighieri Case Study. *Semantic Web* [online], 8(3), 385–394, http://doi.org/10.3233/SW-150198

Miller, H. (2013). Big-Data in Cloud Computing: A Taxonomy of Risks. *Information Research* [online], 18(1), [15.07.2013], http://informationr.net/ir/18-1/paper571.html

ARTICLE IN ENCYCLOPEDIA

Psychology of Culture Contact (1926). *Encyclopaedia Britannica*, Vol. 1, 13th ed. (765–771). London and New York, NY: Encyclopaedia Britannica.

Iluminatorstwo (1971). *Encyklopedia Wiedzy o Książce* (911–952). Wrocław – Warszawa – Kraków: Zakł. Narod. im. Ossolińskich.
Big Data (2013, November 12). *Wikipedia, The Free Encyclopedia* [online] [12.11.2013], http://en.wikipedia.org/w/index.php?title=Big_data&oldid=581347727

Article in encyclopedia with author information describe as book chapter.

ELECTRONIC DOCUMENT FROM WEBSITE

MNiSW (2011). *Narodowe Centrum Nauki w Krakowie. Nadchodzi czas nauki* [online]. Ministerstwo Nauki i Szkolnictwa Wyższego, [15.07.2013], http://www.nauka.gov.pl/?id=2268
Smith, B. (2004). *Ontology and Information Systems* [online]. The Buffalo University, Department of Philosophy, [15.07.2013], http://ontology.buffalo.edu/ontology.doc
US NLM (2004). *Medical Subject Headings* [online]. US National Library of Medicine. National Institutes of Health, [15.07.2013], http://www.nlm.nih.gov/mesh/meshhome.html

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