# Scientific and research work and academic periodicals

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## Abstract

The revolution in information-communication technologies has led to the appearance of a "real tide" of different types of information sources that are offered in digital form. These new resources, far more than it was the case with traditional sources (books - handwritten and printed, contributions in scientific periodicals, archives and museums' holdings, etc.), placed members of the scientific and research community at a serious dilemma: *"Which sources to choose, how to evaluate and use them in a useful manner in scientific research?"*

This paper discusses aspects of the influence of modern information technology in scientific research. It also provides a review of the most important *products* and *sources* of knowledge necessary for scientific research, issues of information preservation, digital libraries, e-books, and information resources in the digital environment, databases and the use of sources of scientific information. Finally, it discusses how to validate the results of professional scientific work through the procedures of statistical processing, analysis, interpretation, technical and linguistic preparation and review, evaluation and impact of the dissemination of knowledge in various scientific publications.

**Keywords:** ICT, IMRAD, publications, quoting literature, review of the articles.

## 1. Introduction

Science and technology have a crucial role in the development of modern societies and scientific research and, if based on ethical principles, they can certainly provide answers to many questions that modern humankind faces in daily life (1-3). Production and exchange of knowledge about most current issues of human existence are determined by the relevant scientific communication that is established and implemented by the relevant scientific publications which, in addition to the books, are usually represented by scientific journals and contributions to the scientific meetings (4-6).

Reliability and soundness of scientific knowledge of scientists/ researchers should be important to them, to their professional community and, of course, to the society where they belong. Communicating within the communities, the authors/ researchers describe the results which they reached by their research activities, and submit their scientific and professional articles for publication in peer-reviewed scientific journals. In this way, they are opening the door for a potentially successful scientific, or possible academic career. In doing so, individual contributions to the scientific knowledge constitute a subject of interest and evaluation by peers in the context of their scientific work. Authors of scientific achievements should be able to convince the institutions in which they work and the members of their professional community, especially those who are otherwise referred to as reviewers *(peer reviewers)*, about the quality and, in some cases, verifiability of these practical achievements (7-10).

Options for objective authentication of one's original contribution to science are nowhere more obvious, nor have larger implications, as in the types and extent of the sources used by other authors. This conclusion is equally valid in specific scientific fields such as literary criticism, but also the latest scientific achievements in the field of e.g. biomedical research. Hence, the knowledge of sources of scientific information, methods of their evaluation and methodology of their use is crucial for any serious scientific research and publication of its results. Scientists are of course aware that science is going on and exist within a broader social environment, although undoubtedly influenced by the inherited historical context. The social environment determines its substance, the orientation and the appropriate ranking of methods of each individual's scientific achievement.

Traditionally, societies have imposed "canons of conduct" and "rules of the game" to the scientific activities. Specifically, scientific knowledge is still largely generated from processes that are, at least in the initial phase, mainly individual. Thus, research and scientific work is commonly performed and is largely dependent on the creativity and skills of talented individuals. From this point of view, some of the basic characteristics that differentiate professionals with scientific ambitions should be identified and acknowledged. A distinction should be made between professional papers/ reports and scientific articles. Professional papers commonly refer to pieces of work that do not have obvious pretense of research and do not deal with scientific problems. The primary goal of a professional paper is to familiarize the readers with facts and findings that are not new to science, but nevertheless transfer knowledge and enable the acquisition of knowledge to certain professional communities. Conversely, scientific papers/ articles basically aim to solve a scientific question, with the use of scientific apparatus, style of expression and argument, and their manner of presentation provides a solid basis for ensuring that they are treated as scientific contributions to a certain scientific field.

According to the complexity of the topic and the time required for its development, scientific papers can be classified into several categories: one can speak about the debates - or studies, monographs, contributions in journals, papers at scientific conferences, critical reviews, or peer reviews. Infrequently, journalistic contributions communicate also some important innovations in science and technology, especially if published in reputable journals such as *Science*, or *Nature*.

Scientific activity during the last couple of decades received additional incentives by the progress made in information science and technology which offered a series of many innovative opportunities to scientists, researchers and scholars in general for new areas of activity, particularly in synergic interpenetration of science, culture and art. Information technology, particularly through various digital resources enables implementation of creative

industry ideas that involves combining text, images, sound and performance.

## 2. Journals and other forms of publications for presentation of the scientific research results

Journals are among the most important *products* and *sources* of information necessary for scientific research and represent an important link for progress in science (1,2). Communication of knowledge that occurs as a result of the latest scientific research is achieved mainly through reputable scientific journals in printed or electronic form. In order to ensure adherence to quality standards and scientific validity, scientific journals contain articles that are in the process of acceptance for printing after having undergone a strict review process. Careers of many university professors and researchers in academic institutions largely depend on a positive outcome of the evaluation of their published articles. This evaluation is an important part performed on the basis of the assumption that these papers were published in reputable periodicals, especially those referenced and indexed in international databases.

Contributions to the journals are usually in a format according to the general scheme IMRAD (I-Introduction; M-Methods or Material and Methods; R-Results; A-and; D-Discussion and Conclusion), recommended by the *International Commission of Medical Journal Editors* (ICMJE) (11). These articles begin with an abstract, which is a summary of the paper. The introduction describes the previous research as a basis for writing the text, including consideration of similar studies by other authors. Materials and methods used, or the part that relates to experimentation, contains specific details on how the survey was carried out. Results and discussion describe the outcome and implications of the research work, while concluding remarks are placed in the context of the current work and suggest potential future research directions.

The starting point for determining the relevance of a published paper and material for evaluation and bibliometric analysis often is the assumption that the article was published in a respectable scientific journal. However, recent studies of several authors drew attention to the fact that other forms of literature are subject to evaluation and citation too. In the case of social and humanistic sciences, it has been demonstrated that contributions to periodicals represent 50% of the most cited documents. Important content, including scientific discoveries of the first order, may be published in other kinds of formats, such as contributions to scientific meetings, not only in journals or monographic publications (6). Although important, especially for computer science and technology, the problem with this kind of literature involves its relatively rapid "aging" compared to other types of scientific sources. Methodological frameworks and processes of scientific research and in particular the results disclosed to undergo evolutionary criteria, including the determination of the *impact factor*, are usually applied.

## 3. Digital libraries and their establishment

At the end of the second and beginning of the third millennium, new media for the exchange of knowledge and its storage in the database appeared which become possible by the advent of digital libraries in the areas of science and business, in the social and humanistic sciences, biomedicine, as well as several other areas. These new circumstances imply also necessary obligations for precise understanding of the role of heritage institutions (libraries, museums, archives, galleries) in creating conditions (normative, technological and financial) for the development and growth of digital depository of knowledge.

Even during the last months of the Second World War, there have been indications of what would later gain worldwide promotion and importance under the name of the *digital library*. Specifically, Vannever Bush, a professor at the Massachusetts-Institute of Technology (MIT), in the *Atlantic Monthly* journal in July 1945 published an article titled "As We May Think" in which he outlined the basic idea of the need for fresh innovative methods in the use of technology to organize and made available knowledge and information at a much more efficient and more cost-effective way than before. As a support to this effort, he planned a system, which he called the *Memex*. This idea was relying solely on barcode microfilm and preceded the

earliest example of an electronic computer and forerunner of the later of such devices in the form of machines constructed in the UK 1943 under the name "Colossus" to be used during war time to *break* the coded messages.

Later, the need for relevant information, particularly about the scientific content, was one of the main driving motives for building the global information infrastructure. Technology for creation, distribution and storage in a digital environment eventually underwent profound changes including status and activity, not just a library but also institutions such as archives, galleries, museums and *mediathek*. All this had a strong influence on the acceleration of the process of acquisition and distribution of knowledge which is mainly taking place nowadays in schools and universities. This is inspired by the transformation of scientific institutions and types of academies of science, other scientific institutions and international professional associations, whose normative and professional activities are focused on research and development. The convergence point of these changes is currently referred to as *digital library* - a term commonly used to describe *"…the advancement of information technology enabling insight into memory organization"*.

The first phase in this process, one can safely say, involved a revolutionary change in the field of information science during the Nineties of the Twentieth Century, characterized by rapid information-technology innovations that have enabled *online* access to the catalogs of library collections, although it also has not led to a solution for the issue of access to their contents as well as traditional memory depositories.

The earliest project of Virtual Library (12) which, in fact, is the oldest catalog of the World Wide Web, was invented in 1991 by Tim Barnes-Lee, working at the European Organization for Nuclear Research - CERN in Geneva. Currently, Tim Berners-Lee is the Director of Consortium of worldwide network - W3C (13). W3C achieves its mission primarily by creating Web standards and guidelines and most directly assists in the implementation of a virtual library, striving to survive all the hardships that accompany these kinds of innovative ideas. Unlike commercial actors, this work is done by a loosely bound group of professionals - volunteers, who compile pages of key links for particular areas of human knowledge. Eventually, this initiative gained considerable reputation as a relevant guide in each segment of the network. The subject areas with narrower thematic units available through this service include: agronomy, business and economics, information technology, communications and media, education, engineering, humanities, library science, international relations, law, recreation, regional studies, natural science, social science and religion. Shortly after the appearance of a virtual library, there were numerous initiatives whose primary goal was just publishing the original texts in electronic form and ensuring their availability in the form of *full text*. Until now, there have been implemented such pursuits, in addition to valuable critical editions of medieval sources, old and rare books and manuscripts, cabinets and contemporary authors in various languages, books, referential works, journals and training materials. For the preparation of this kind of materials, publishers combine the expertise of distinguished scholars in specific subject areas of knowledge, including experts in copyright, librarians and information consultants. Thanks to such archives, a far larger number of members of the academic community and interested members of the public in general can effectively access collections of texts which, until recently, was very hard to reach.

To the experts engaged in these tasks, computers serve in at least five different categories of activities to provide access to information resources of general type, such as online library catalogs, bibliographies, dictionaries, and encyclopedias such as Wikipedia (14). These machines offer the possibility of retrospective conversion of manuscripts or printed sources, in a machine-readable format, opening up space for publication of the results of these authors in the Internet. They make possible the creation of specific tools such as databases, special browsers, enabling the extraction of summaries - a part from much more comprehensive sources, as well as creating conditions for computer-based research and testing of a given model.

Using computers to test scientific hypotheses based on the availability of complex and voluminous databases has led to new discoveries and improvements, not only in the natural and technical

sciences. The Internet is to researchers a discipline such as the study of language, literature, history, legal theory, philosophy, comparative religion, ethics, art criticism, archeology and those aspects of social sciences which have humanistic content have opened a number of opportunities to access new knowledge in areas that until recently were thought to be quite resistant to any form of technology-based innovations (3,4).

With the arrival of a tide of new digital media and services, in addition to their classic role as depository memory stored primarily on paper, libraries are reformed in order to become more able to accommodate the new system that is the digital formats in which the content is currently stored.

The term digital library serves as a convenient and clearly catchword to indicate the *electronic collection* - which includes a richer content and provides a greater access for concepts such as databases or information system retrieval. Just starting from the standpoint of one librarian, an American researcher namely Donald I. Waters has made a working version of the definition of digital libraries: *"Digital libraries are organizations that provide the use of resources, including professional staff that selects, organizes, provides an intellectual approach, explains, distributes, preserves its integrity and ensures durability of collections of digital articles so that they are ready and economically available for use of one or more communities"* (3).

Teufik-Tefko Saracevic from Rutgers University has stated that *"The digital library deals with documents of human knowledge in the form of electronic and networked environment"*. At the same time, Saracevic reminded that this technological innovation has induced the need for clarification of a number of issues including an understanding of objects in digital libraries in various formats, including non-text material and its presentation: the metadata, cataloging, indexing, conversion, digitizing, organizing voluminous collections, collections' management, compression, security, archiving, interoperability, standardization, computer-human interaction, the discovery of information, searching, retrieval, reading, natural language processing, reliability, metrics, performance, evaluation, social, legal and economic issues, the impact on scientific research, education and other areas, and the impact on diverse beneficiary populations (4).

Under these new conditions and new technological possibilities, the idea of continuity and maintenance of information sources which is often accumulated for centuries, with special care for what we call cultural heritage, is preserved despite the technology, or perhaps thanks to it. Thanks to innovations occurring in the wake of new digital media, there has been a revitalization of certain subject areas in the social sciences and in the humanities, not to speak of medicine and engineering, and the like. On the other hand, despite a relatively painless *landing* to the world of chips and bytes, members of the IT professional community in the new library environment now use the database orientation with an emphasis on the organization of resources and access to online resources rather than the shelving the books and binding the journals published over the years.

Digital library, as a collection of information that is digitalized and organized to customer preferences, offers tools and features that traditional libraries could not provide. Resources of digital libraries provide browsing options by different keywords, can be accessed from any geographical point on the planet and the respective sources can be copied without any errors. However, these types of libraries inevitably draw the attention of its customers on the regular problems that normally accompany the process of finding information, their delivery and their preservation for the future. Nevertheless, digital information certainly occupies less space than paper-based information, which greatly helps libraries to reduce the price of their services. They can supply information on the reader's desk, their contents can be searched by keywords, without physically going to the library and can provide access to information that is not degraded on the way from rotting material on which is written, whether it is about words, sounds or images, movies, or still pictures.

Another important fact that should be mentioned in connection with the digital technology consists of an easier access to different parts of the textbook, its use simplifies writing, the book facilitates archiving its content - in fact, archiving is greatly facilitated in terms of the letter, image, and sound. At the same time, one gets a lighter and more efficient way of preparing and publishing the final book in printed form (hard copy). There is a frequently asked

question in professional circles: *"What is the purpose of a book, if nobody reads it, and what is the purpose of a library including its contents if no one uses it?!"*. Even the emotional reasons based motivation keeping documentary evidence for the future may give way to the harsh logic contained in the question: *"Who is actually using this kind of materials nowadays?"*. Remaining free readers, we will have even fewer reasons in the future to deal with traditional libraries leading to even more justifications for "ignoring" their existence.

On the other hand, the buzz word from time to time in public places on the information saturation can be justified only if we are talking about mass production of information on new media that has no goals. The owner of the information certainly gave it a role: either it educates, makes one aware of, or informs. Therefore, the issue of digital library should be approached with due respect, but also with caution and concerns about its usefulness and its added value or, as pointed out by Teufik-Tefko Saracevic, one should *"take care on its relevance"* (5).

An additional argument by this author states that *"In evaluating digital libraries, as, after all, in the evaluation of any system or process, sets the following serious questions, which obviously affect the final result: Where to begin to evaluate the digital library, which is valued? Where is the end? Where are the limits? What is involved? What is excluded? To what environment or context to concentrate on? These questions define the construct of a digital library ..."*

Michael Leske quite whimsy lists the conditions that are required to build a digital library stating that: *"You need to enter content into it, you need to be able to take content out of it, and you have to be able to pay for it"* (6).

As for the software for building of digital libraries, especially bearing in mind the cost of its creation and technological accessibility, here is an opportunity to draw attention to two early examples of freely available software like *Greenstone* (15) and *DSpace* (16). The purpose of the Greenstone software was to allow especially university institutions and other public institutions to build their own digital library without much cost. Complete Greenstone interface is available in English, French, Spanish, Russian and Kazakh language and it is possible for volunteers to provide translations into other languages.

The *DSpace* project, about which much more can be found at: www.dspace.org (17), is also a freely accessible digital depositary system that is used for different purposes of digitization. It is developed by a common effort of experts from libraries of MIT (Massachusetts Institute of Technology) in Boston and specialists of Hewlett-Packard Laboratories. DSpace is adaptable for the processing of different types of digital material, including text, images, videos, and other formats. This initiative provided support to the community of intellectual property in the digital environment and in 1998 it was founded the International DOI Foundation (18) and through the development and promotion systems it was materialized the DOI system (Digital Object Identifier - identifier for digital objects as a common infrastructure for managing digital content). The Foundation was registered in Washington as a non-profit organization and is currently managed by an Executive Committee which includes elected members of the Foundation. DOI system is processed as a formal standard by the International Organization for Standardization (19).

## 4. Electronic books

An electronic book (*e-book, eBook, digital book,* or even*: e-edition*) is a book published in digital form, consisting of text, images, or both, and that is readable by computers or different electronic devices (e-reader) like Amazon Kindle, Apple iPad, Nook, or Sony eBook Reader. This innovation is the product of the first order information revolution of the late Twentieth and early Twenty-first Century. Form and manner of usage resembles the classical books, but its text is not printed on paper, but in digital form written in the memory of computer equipment belonging to a networked world. This new kind of books are usually ordered online and delivered electronically into the memory of e-reader on customer order.

Access to e-book is available via the Internet for whose profile and functioning is particularly interested the *Internet Society*. It is a non-for-profit international professional organization with more than 150 organizations and 16,000 individual members and it truly represents *"Who's who"* of the international Internet community. Basic guidelines for which the organization is committed include the following principles: standards, public policy,

education and training, and membership. It is active in the field of freedom of expression and censorship, taxation, government policy towards the Internet and across the spectrum of intellectual property rights (20).

On the path of a new application of digital technology in publishing particularly illustrative example is the *Guttenberg* project, which was launched in 1992 by Michael Hart, representing the earliest publisher of electronic books freely available on the internet. Implementation of the project is carried out based on the efforts of many volunteers (21). On the other hand, *ibiblio* (22) claims to be a *"collection of all collections"* in the Internet that is the depository of freely available information including software, music, literature, linguistics, art, history, geography, biography, science, political science, cultural studies and the like. *Google* pack (23) provides the ability to access online books that are in the public domain - that is not under copyright protection. In the case of the United States, usually it involves books printed before the year 1923.

With the numerous advantages of this form of books, there are also some disadvantages which induce also resistance, because a fair number of readers of a new medium find it clumsier the e-reading compared with the classic books and even the quality of the screen to read text does not provide the satisfaction that is actually obtained by flipping paper pages. However, a number of publishers in this field are growing and, currently, there are more and more companies dealing specifically with the issue of the scientific literature (such as Elsevier, Springer, IOS Press, or John Willey).

Collection and archiving of digital material through a system of *compulsory copies* (*legal deposit*) has been the subject of legal regulation especially in the more developed parts of the world because, when such materials cannot be collected, a significant part of the national scientific, technical and artistic production would be lost. Collecting these items, however, delivers a range of complex problems including a significant number relating to the status, integrity and durability of the recorded text, images, audio, and movies. Such publications appear in two basic forms. The first is a static electronic publication in the form of a CD-ROM that is distributed as a separate unit and fixed and, generally, their manufacturers can no longer change the content. On the other hand, there are dynamic electronic publications such as online databases and electronic journals and books that are not distributed separately in form and substance, fixed units. In this case, the distribution is done through a subscription or a contractual arrangement that allows access to the manufacturer or publisher at any time to change the contents of its database for updating, adding or deleting existing records. Keeping this in mind, the following question arises: *"Should such a publication store copy the entire database at regular intervals or meet the requirement for mandatory deposit copies (legal deposit)? What happens, for example, if the database update stops – that is, the publisher ceases its activity and the like?"*.

From the standpoint of the Council of Europe, electronic publishing is practically bridging the difference between publication in the traditional sense and archival materials as such. The publication: *Electronic Publishing, Books and Archives* (Strasbourg, Council of Europe, 1999) contains an overview of activities with a focus on making connections and opportunities for cooperation in this field between institutions and organizations within member states. It points to joint work and cooperation with other international professional organizations such as the IPA *(International Publishers Association),* IFLA *(International Federation of Library Associations),* EBLIDA *(European Board for Libraries, Information, Documentation and Archives Association),* and ICA *(International Council of Archives)*. Based on the rules of this document, it is not difficult to conclude that the national libraries or other institutions are responsible for preserving the memory of a society - ignoring the audiovisual and electronic publications, in fact, neglecting their responsibility to collect and preserve the national heritage in the field of information materials. As the time passes, this failure will be difficult to catch up hence, there is an urgent obligation of libraries to establish an effective and prompt communication with the database creators, publishers, and storages of such materials and develop a strategy and effective practices of collecting, storing and facilitating the availability of such materials.

Electronic publishing has significant consequences for bibliographic work when processing this type

of material. Hence, there was an emergence of the *International Standard Bibliographic Description for Electronic Resources-ISBD (ER) (Munich, KG Saur, IFLA, UBCIM Publications, 1997*), which of course is available in electronic form. Other institutions include the *International Association of Scientific, Technical + Medical publishers - STM* (24), the *International Council for Scientific and Technical Information (International Council for Scientific and Technical information - ICST* (25), the *International Federation of publishers in the field of science (IFSP)* and the *International DOI Foundation*, whose DOI system provides support for identifying content objects in the digital environment (26).

However, information and technological innovations that have contributed to the revitalization of publishing in the modern world also sparked a number of complex issues, not only on the technical aspects of digitization, archiving and dissemination of this kind of material, but also on the legal regulation of issues of copyright protection. In his book *Understanding Digital Library*, the American author Michael Leske stated that *"Legal issues arising out of intellectual property are the most serious problem faced by designers of digital libraries"* (1).

Implementation of the Google company library project (27) put to the test many actors involved in the creation and publication of a book, especially from the standpoint of copyright protection. As a response to this dilemma, several Company representatives have publicly expressed their opinion that their ultimate goal is as follows: *"In cooperation with publishers and libraries, to create a comprehensive, searchable, virtual catalog of all books in all languages that will help users discover new books and publishers new readers"*.

In 2008, the Amazon has marketed a new product called the *Kindle*, which is even a more expanded horizon of possibilities of reading digitized books, newspapers, blogs and similar. Basically, the *Kindle* is a compact electronic device that provides access to content of about 115,000 books that are otherwise in paper format available to customers through Amazon's sales network.

In connection with the emergence of e-books, the inevitable question certainly involves the intellectual property rights, which touches upon two major groups of rights: the first consists of copyright and its related rights. It is basically a set of legal norms regulating relations in respect to the copyright of products, which are legally protected intellectual creations in the field of literature, science and art. The second group consists of industrial property rights that govern and protect intellectual creativity in the field of technology (2).

The *World Intellectual Property Organization - WIPO*, based in Geneva, focuses its activities on promoting the use and protection of works of the human spirit. These works consist of intellectual properties, beyond the boundaries of science and technology and enrich the world of art. Standards, recommendations and guidelines of the organization can be found at the following web address: www.wipo.int/ Scite/ standrads/ standards.htm/ (28), whereas further information on the issue of copyright law can be found at: www.wipo.int/ copyright/ en/ (29).

## 5. Classification of recorded knowledge

Since knowledge outside the human brain is stored in organized manner in libraries, archives, galleries, museums and most recently in various digital depositories. Obviously, these diverse resources should be organized with the help of a system of classification. Thus, in addition to the long-established institutions for storing the knowledge of the traditional type, there have been developed different means of accessibility of their content through databases to which people have online access (4). This approach can be free-of-charge and may be conditional on the completion of previous clauses such as subscription, for example. Organizations that integrate these activities and make them actually possible are commonly referred to as *digital libraries*, whose activities are based on elements such as: terminology, structure and complexity, a common function that is the one usually performed by traditional libraries.

As a form of classification and structure in e.g. Bosnia and Herzegovina, in most libraries it is used just the *Universal Decimal Classification* (UDC), which covers the whole domain of human knowledge - the universe of information, or perhaps some part of it.

### *5.1. Classification of scientific research in Frascati guide*

For the classification of scientific research, for more

than four decades, it is used the *Frascati Manual* of the Organization for Economic Cooperation and Development (OECD), based in Paris. This document established a general methodology for collecting statistical data on research and development. The first version of the manual, from 1963, was created on the basis of agreed conclusions of the expert group of the OECD and the NESTI group of national experts on scientific and technological indicators, relying on the basic document prepared by Christopher Freeman. The sixth edition of the manual was published in Paris in 2002 (1).

### *5.2. Information resources in the digital environment*

To accomplish their scientific goals, scientists and researchers today, including applied researches that also need laboratories, there are essential information resources whose convergence point is no longer just a library, because this type of work can be performed at home or from the office. Intellectual resources used by researchers in the information and documentation process consist of units that make the media, the data on these media and the meaning attributed to these units (1,4).

These resources are usually divided into primary, secondary and tertiary resources. Primary information includes direct (original) research results of scientific work, i.e. new knowledge and new interpretations of familiar ideas and facts. They comprise also artistic (literary, musical, artistic) works, the scientific method, the value-based interpretation and evaluation.

The documents with the primary information include: articles in journals, doctoral dissertations, master's theses and other papers of a similar kind, patent documents, technical reports, papers presented at scientific and professional meetings, works of art, photographs, movies, musical performances of various kinds, museum objects, autobiographies, letters, correspondences, conversations and interviews, original news, official publications, archives, and so on. Secondary information consists of resources that provide content description and/ or location of information sources (2,3). They can appoint brief informational tools for finding relevant information. Scientifically relevant information is a set of data that have passed, based on the scientific method, practical authentication of the offered facts. In an environment in which the availability of the results of scientific and technical research by different thematic profiles is more global and less local, members of the academic community are increasingly accepting the necessity for a selective approach in the selection of different types of information sources, which can bypass the need to determine their relevance to the theme that would ultimately allow the growth process of knowledge without which social progress is hardly achievable. Experts of the Library of the University of Illinois have prepared a series of instructions for their users on how to critically evaluate their sources. In these hypothetical questions there are provided adequate details as follows (5):

· *What is the scientific source?*

Scientific sources (also known as academic or reviewed sources) are written by authors/ experts in a specific field of science and serve to other users interested in a specific area providing the most updated knowledge, discoveries and news on a particular scientific area.

· *What is a review?*

When the source is reviewed it means that it is being examined by a group of experts (usually two) of a given field of knowledge to give their professional opinion and suggest possible corrections before the manuscript is submitted for publication in the journal or proposed for presentation in a scientific conference (7).

The question *"How do I know whether the source is of a scientific nature?"* seeks to clarify the following facts:

· *Authorship:* Involves the list of authors, whether the authors' references are clearly displayed and whether they are relevant to the topic in question.

· *Publishers*: Concerns the publisher of information, whether it is an academic institution or a publisher, scientific or professional association, and the purpose of the publication.

· *Content:* What is the reason for dissemination of the information and hence publication of the article at hand? Does it have quoted sources? Does the quoted sources include reliable resources in a given subject area? Are there (in the case of natural sciences, or technology) maps, charts, tables or

bibliographic entries? Are the authors' claims supported by the evidence? Are the conclusions based on the presented evidence, and the scope offered by the information source?

· *Timeliness and freshness of the information:* Is the date of publication clearly indicated? Is the reliability of the offered data and information crucial to the investigation in question? (1).

On the other hand, the *Modern Language Association*, headquartered in New York, in its instructions for evaluation of the contributions on the topic of digital humanities and digital media puts emphasis on the following: *"Digital media is transforming literacy, science, education and services, while also opening up new avenues for research and communication and creating something that can be called networked academic community. Today, information technology is an integral part of the intellectual environment for a significant number of trainers in the field of humanities, but for those who are directly taking part in the implementation and development of new media. This creates new challenges and opens the door to new possibilities. Digital media have expanded and forms and ways to document the contents of humanities and thus includes images, audio, statistics, kinetic attributes as animation and many other forms of preservation and presentation of content that is collectively called multimedia".*

## 6. Terminology standards

In the area of terminology, there are two types of standards: technical standards and terminology standards. The technical standards are also known as specification and terminology standards in the strictest sense. Technical standards define the characteristics of agreed specification for terminological products, services, processes, or systems. Unlike these, the terminology standards as well as standards for the measurement are considered to be fundamental norms. They specify a common set of vocabulary that will be used in a particular standard, or a related group of standards (5).

### *6.1. Thesauruses*

*Thesaurus* is commonly defined as a vocabulary that includes systematically distributed approved terms (controlled vocabulary) of a subject area, or a scientific discipline in the treasury of human knowledge or experience. This list of terms is very useful for indexing and search procedures in information sources. Thesauruses are now often used online and CD-ROM databases search, therefore, in the activities of access to knowledge. They are used most often for a specific subject area, for example, in education, social sciences, and the like (4).

### *6.2. Indexes*

The definition of "indexes" by the *Society of Indexers* (30) corresponds to the description published by the British Standards Institute stating the following: *"The index is a systematic arrangement of entries made available to help the user find the information in the document"* (British Standard, ISO 99: 1996). This document can be a book, a copy of a journal, newspapers, video, film, computer disk, or any other source of information. In the area of natural sciences and medicine, a popular example includes the *Index Medicus*, probably the best known and most comprehensive index of medicine in the world. A similar thematic orientation has the *Excerpta Medica,* or the *Index to Dental Literature and International Nursing* and they make a collective database known as MEDLINE which contains more than 5000 indexed and abstracted journals. A comprehensive description of approximately 20 online biomedical databases has been already provided by Izet Masic and was published in the journal: *Acta Informatica Medica* (1).

### *6.3. Abstracts*

Formally, the abstract is generally a summary of the paper in a scientific journal or other periodical publications and is placed at the beginning or at the end of the text. This summary is usually without valuable judgment, interpretation or criticism and may also contain bibliographic references that refer to the original document. Abstracts which can be descriptive or informative, otherwise, help the reader (before reading the entire article) to decide whether it is useful or not, and allows it to become familiar with the key elements of the text without going into too much detail. Abstract collections can be used to search and select the source for the preparation of professional or scientific research (1).

*Introductory remarks*, whose title is usually a *preface* which precedes the main body of the document, mainly help users to get acquainted about the origins, purpose and use of the part contained in the

document, as well as facts on the recognition by others who have helped the author. This part of the document can be written by someone other than the author. Introduction has a similar purpose, except that it takes place in a concise way more concerned with the content of the work itself, but the circumstances under which it was composed. Access to materials is possible, depending on the interests of users also through a list of illustrations, tables, maps and other illustrative materials with the indicator of the material on which the document is located. A list of these materials usually comes after the main text in the form of a *"table of contents"*.
Access to a specific part of the document can be obtained through *key words* or key phrases, which is now a common practice thanks to computer technology. This type of approach is possible, of course, in the case of texts which are stored in the Internet in digital form.

#### *6.4. Methodology for the preparation, writing and publishing of scientific papers*

There are opinions that the fluent expression and writing in general creates a natural talent and that literacy as such cannot be learned, as there are people who believe that literacy is a matter of respect for the rules of grammar. However, in addition to natural talent and knowledge of spelling rules, for a good literacy it is also essential to master a line of patience and hard work in order to develop a sense of meticulousness. It involves the art in the first place of thinking clearly and logically and the ability to experience and materialize this kind of intellectuality into a proper written form. The writing should be intrinsically easy for a good author. Autonomy in creating sentences and construction of own ability is one of the prerequisites of good literacy. Ability to correctly read and thorough understanding of reading, especially reading of well-known authors, regardless of the time in which they have published, is precious to enrich one's own written expression. Existing examples of scientific writing should be followed and researchers should record their own mental development through tracking every thought that is considered even remotely creative and highly innovative (4).
Results of reports and essay writing usually consist of a description, a form of written composition that can occur even in elementary school, so they should be differentiated from the literary and artistic works. For this kind of written work, it is important to note the characteristics and details that are essential building blocks of every description. Narration or storytelling is also one of the common themes in educational institutions where writing is particularly important to emphasize, in addition to the chronological display of events and the vitality of the story while the narrative literature papers represent only one aspect of artistic creation of the content.
It should be distinguished the presentation of a work, or activities of a person, a description of an event, or a representation of a set of reports about it, display of some social phenomena, or emotional expression or discussion of a particular topic.
Discussion is the most common form of written composition. It is generally subordinated to all knowledge, logical reasoning and rational distribution of the content in question. Essay is a written form of creative expression usually in a discourse that often goes beyond purely scientific types and in many ways there are artistic and literary approaches to the creation emphasized by a subjective position on a given topic. Subject of interest of essayists may be a current issue of spiritual or cultural life in which the author points out emphatically a personal position on a particular issue that may be of broader social significance.
The earliest stage of research in an academic setting, however, usually starts by creating not too demanding seminar work (essay) in high school, or at the beginning of university studies.
*Seminar paper*, presents a sort of didactic resources on the basis of which students must demonstrate that they have mastered the technique of applying the basics of research methodology, the proper use of resources, a solid implementation of the rules of spelling and grammar, logical reasoning skills, analytical ability to read written sources and writing text on a given topic.
*Research papers* that are written during undergraduate studies are certainly more demanding than the previous ones and as such should show a high degree of skill to master the basics of expression and professional research methodology. After all, it is the individual author who is being prepared for

scientific and professional work.

*Graduate paper* at the end of undergraduate studies, as a rule, defended in front of a commission and represents something more complex and demanding creation in which the final version should meet both formally and substantively demands of the candidates – the author of such work – set by its educational institutions.

*Specialist and master thesis* are prepared and defended by a special procedure, which is prescribed by the statute of the university at which the student becomes a candidate. The aim of developing such work is to show that the candidate is qualified for scientific research in a particular scientific field and is able to contribute for solving a set of research tasks whether by presenting completely new facts, any newer higher quality presentation of familiar names in science before this present knowledge.

*Doctoral dissertation*, which is approved and defended by the prescribed complex procedure, as a rule need to be independent and original scientific work, which should represent a contribution to the attained level of solving certain scientific questions in a specific scientific field and the rigorous application of scientific methodology.

## 7. Steps for preparation and publication of the scientific research results

In order for a man to devote himself to science and research, it is necessary to have the following qualities: intelligence, skill of analysis and synthesis, the power of observation, perseverance, creativity, ethics and responsibility (2). After the selection of a research topic, choosing a mentor, associates and conducting the research, it follows the writing of the articles. The concept of scientific research is based on the division into specific sections. Each article should contain the title, abstract, introduction, materials and methods, results, discussion, conclusion and the list of references (2-5).

**Title:** Title should be as short as possible, as well as concise as possible in describing the content. One can say that the title is a summary of an abstract (2).

**Abstract:** Is a summary of the work and is placed at the beginning of the text. This summary is usually without judgment, interpretation or criticism, while it may also contain bibliographic references that refer to the original document. The abstract can be descriptive or informative, otherwise, it helps the reader before reading the entire article to decide whether it is valuable to him/her or not. In addition, the abstract allows the reader to become familiar with the key elements of the text without going into too much detail.

**Introduction:** The introduction should provide information that will help the reader to understand the methods and results of the research. The introductory section should contain a definition and a formulation of the problem being investigated. In experimental and clinical research it is necessary to specify the goal(s) of the research and hypotheses (assumptions) which are included in the study. There are a few rules to comply in writing the introduction: a) Clearly describe the problem for which the research should give an answer; b) Indicate why something is investigated; c) Avoid stating facts from standard textbooks; and d) Do not clarify the title of the publication.

**Material/ Subjects and Methods:** In the description of the methods used in the research work, the study design employed should be emphasized in the first place. It is necessary to describe the main features of the study, describe the tested sample, standard values for the tests, and so on. In this section, it is necessary to explicitly specify the parameters that are evaluated and controlled during the study. This part should contain complete description of the statistical methods used.

**Results:** The section in which are presented the results of research begins with a description of the tested population and clearly identifies the size of the sample and its demographic characteristics. The results obtained by statistical analysis should be presented in tables and/ or charts. When presenting the results it is necessary to mark the interval of its deviation and their levels of statistical significance. In a comparative study the interval of deviation must relate to the differences between the groups.

**Discussion and Conclusion:** The discussion is the most important part of the article and it begins by summarizing the key findings obtained during the study. Promoted are the most important results and compared with those obtained in previously conducted studies. If they are significantly different,

it is necessary to give a possible explanation for these differences. Finally, the discussion should provide confirmation of reaching required objectives (goals) and confirm or reject the hypotheses. In the conclusion, there should be presented the most important facts that were obtained during the research.

**References:** In scientific circles, references present information that is necessary for the readers to identify and find out the sources employed. The basic rule when listing the sources used is that references must be accurate, complete and should be consistently applied. On the other hand, citation implies an exact written or verbal reference to parts of the text or words of others that can be checked in the original source.

#### *7.1. Using scientific information sources and citation of the scientific literature*

An organized list of sources cited at the end of journal articles or book chapters plays an important role, not only to be acknowledged as a "debt" to the sources the author used, but it also provides an opportunity for anyone who is interested to verify the methods and the relevance of the sources to which the author referred to. Also, from the quoted material, without great difficulty, it can be determined by the subject of the author's research interests, as well as how factually substantiate their views are. Bibliographical list contains all the sources that are individually cited in the text. The list can be arranged in alphabetical order by the authors. If there are more papers from one author, it is in the list chronologically arranged: from the earliest to the latest. The first element in the list of bibliographic references is the author's last name, followed by the name or initial of the first name. When there is more than one author, their names are listed in the order in which they appear in the source and are separated by a coma (2,3,5).

Regarding the citation of references from published articles in the biomedical journals, authors usually use Vancouver style, PubMed style, Harvard style, and so on.

The Harvard method of quoting sources (www.makecitation.com) is used especially in exact sciences, such as the case with natural-mathematical, technical sciences and in some social science disciplines (information science, education, education, demography, political science, sociology, or economics) (1).

The method of citation, therefore, implies that whenever an author is cited in the main part of the paper, essays, reports and publications, in general, the author must be mentioned stating: last name and year of publication in a closed parenthesis, and this is followed by a reference to complete description of the elements appearing in the alphabetical list of sources at the end of the text. In the case of citing a specific piece of text after the tag name of the author and date of publication should include the page, chapter, table, etc.

The purpose of the list of references is to enable readers to easily locate and track the source that the authors relied on for their work. Different types of resources require different volumes of information, but it can be said that there are some common elements to all of them including: author, title, place of publication, year of publication, publisher, and possibly extended. All units of this list should be cited in the alphabetical order by the author or authorship, regardless of the format in which they occur (books, articles in magazines, Web sites, or e-mails). In the event that there are more papers by one author it is needed to cite them chronologically, with the first originally published article in the first place.

Citing references can be conducted in two ways (1):

· In the text when is given a brief description of the information source;

· At the end of the document where are provided detailed bibliography information for each source.

References are often cited according to the Vancouver nomenclature or alternatively the so-called ICMJE style (International Committee of Medical Journal Editors). In the literature review, there should be used only those references that are directly related to the topic of the current study.

Publication of the article: At the end, the article should be prepared for its publication, and there are numerous reasons why researchers should publish their work. Some of them include the following (1):

· The possibility of conducting scientific dialogue;
· Receiving critical review;
· Showing respect for the participants and partners;
· Facilitation of future research;
· Personal satisfaction.

### *7.2. Scientific assessment of published articles in biomedical journals*

Measuring the scientific validity and relevance of articles is made by appropriate scientific methods. This is an area of a scientific discipline - scientometrics. Scientometrics is a part of scientology (the science of science) that analyzes scientific papers and their citation in the selected sample of scientific journals (5). The name bibliometrics was introduced during the 1970s to denote a quantitative study of the communication process using mathematical and statistical methods for books and other media of communication. Almost simultaneously, in the former communist countries in Europe, the name scientometrics was derived from the Russian word. More specifically, in 1969 it was introduced the name scientometrics relating to a scientific field that deals with the study of science as an information process by applying quantitative (statistical) methods. Later on, in 1977, Tibor Braun established an international journal namely *Scientometrics*, introducing thus the name scientometrics (6).

Some of the indicators used in the evaluation of the scientific research include the following:

- Impact factor;
- Number of article citations;
- Number of journal citations;
- The number and order of the authors.

Impact Factor is the number of citations of articles published in a given journal during the previous two years divided by the total number of articles published in that journal during the same period. The impact factor depends on: the quality of the journal, the language in which the journal is published, the area it covers, the magazine distribution system, and so on (1,5).

Scientometrics is the science of measuring and analyzing science. In practice, scientometrics often uses bibliometric methods to measure the impact of scientific publications. Modern scientometrics is largely based on the work of Derek J. de Solla, Price and Eugene Garfield. Garfield founded the ISI - *Institute for Scientific Information* and is considered to be the father of scientometrics and methods for evaluation of scientific publications. Research methods of publication's scientific importance include qualitative and quantitative methods, as well as computer analysis (5,6).

Trying to establish a mathematical representation, Garfield developed a number of factors that allow the assessment of the value and importance of the scientific publications, among which the most factors include the Impact Factor (IF) and the H-index.

The Impact Factor (IF) of an academic journal is a measure that reflects the average number of citations of articles published in the journal. For a given year, the Impact Factor (IF) of a journal is the average number of citations per article published in that journal during the previous two years. For example, if a journal had an IF=3 in 2008, then the papers that were published in 2006 and 2007 were cited on average three times in 2008.

In general, the IF for the year 2008 of a given journal would be calculated as follows: A/ B, where the letter A represents the number of cited articles published in 2006 and 2007 in the journal during 2008, while letter B is the total number of articles published in the journal in 2006 and 2007 (thus, IF for 2008 is: A/ B). The impact factor is used to compare different journals within a certain field.

H-index is an index that attempts to measure the productivity and impact of published scientific articles. The index is based on the most cited articles and the number of citations that the articles received in other publications. This index can also be applied to the productivity and impact of a group of scientists, such as a department or a faculty, as well as to a scientific journal. As a useful tool for determining the relative quality, the H-index was proposed by Jorge E. Hirsch, a physicist at the UCSD (7).

**Table 1. Review of biomedical journals in Bosnia and Herzegovina ranked by the h-index values**

| | Title | SJR | H index | Total Docs. (2011) | Total Docs. (3years) | Total Refs. | Total Cites (3years) | Citable Docs. (3years) | Cites / Doc. (2years) | Ref. / Doc. | Country |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Medicinski Arhiv | 0,121 | 10 | 101 | 281 | 0 | 69 | 277 | 0,29 | 0,00 | |
| 2 | Bosnian Journal of Basic Medical Sciences | 0,204 | 7 | 53 | 221 | 1.120 | 108 | 212 | 0,56 | 21,13 | |
| 3 | HealthMED | 0,190 | 5 | 260 | 280 | 6.329 | 114 | 279 | 0,44 | 24,34 | |
| 4 | International Journal of Collaborative Research on Internal Medicine and Public Health | 0,196 | 3 | 43 | 47 | 1.061 | 21 | 46 | 0,46 | 24,67 | |
| 5 | Sport Science | 0,186 | 2 | 36 | 87 | 680 | 14 | 87 | 0,17 | 18,89 | |
| 6 | Acta Medica Saliniana | 0,101 | 1 | 34 | 32 | 580 | 1 | 27 | 0,04 | 17,06 | |

1 - 6

Scimago Lab, Copyright 2007-2013. Data Source: Scopus®

From Table 1 it is clear that the h-index of the oldest biomedical journal namely Medical Archives *(Medicinski Arhiv)* is significantly higher (with an H-index of 10), which means that scientists who have published in this journal 10 papers have, on average, at least 10 citations for each article in other journals. Citation provides guidance for scientific work because it encourages scientists to deal with the most current research areas. So actually "terror from scientometrics indicators" is organizing scientific work at the global level, it shapes and directs it (7). The citation is impacted by: quality of the articles, understanding of the articles, the language in which the work was written, the loyalty of a group of researchers, type of work, the benefit in terms of "I quote you, and you quote me", benefit in terms of "I will not quote it because he/ she is my competitor", and the like. Most of the scientific articles are cited by "inertia", because every scientist has a collection of articles cited whenever he/ she writes about a certain topic. Other articles are quoted so the researcher gains citations, others because of reviewers' or editors' requests. Only a small portion, perhaps only every fifth or tenth paper, is cited properly. This includes those articles whose data the author uses directly and/ or those articles the author directly relates to in his/her article. All persons listed as authors of the article must meet the following criteria: they should have significantly contributed to the planning and preparation of the article or the analysis and interpretation of results and participated in writing and editing of the article, and that they agree with the final version of the text. Persons who are involved in data collection or other field work duties, but are not actively involved in the development of the article, cannot be listed as authors. The editor has the right to ask the author to explain the contribution of each author listed. The contribution of one author is "1" and if the work was written by several authors ("n") their contribution is: 1/ n. In doing so, the contribution of each of the following authors is half in size of the previous one. Sequence is determined by the author's agreement.

### *7.3. The role of the International Committee of the Biomedical Journal Editors*

The International Committee of the Biomedical Journal Editors has developed detailed guidelines for the preparation of articles in biomedical journals and related disciplines. How was this reached? A small group of editors of general medical journals met in Vancouver, Canada, in 1978, with the aim of establishing guidelines for publications in biomedical journals. This group subsequently became known as the "Vancouver group". Their recommendations for manuscripts submission related to bibliographic citation which was published in 1979 by the National Library of Medicine in Bethesda, USA. With time, the "Vancouver group" expanded and evolved into the *International Committee of Medical Journal Editors (ICMJE)* (11), which meets once a year and, in the meantime, the domain of its interests has expanded. Thanks to the work of this committee, there have

been established clear instructions referred to as *"The uniform requirements for manuscripts submitted to biomedical journals"*. This document has been revised several times and has been recommended to be used in the published version starting from the year 1997. These instructions may be reproduced and used for non-for-profit educational purposes. Furthermore, the committee encourages potential users to distribute these instructions widely.

The group of publishers who met in Vancouver in 1978 decided to create uniform technical propositions for publications. These were adopted in 1979 by the National Library of Medicine and subsequently by the SCMJE which, starting from 1982, performs audits with the official application in approximately 300 international journals.

Articles for publication in biomedical journals involve predominantly the following citation styles: Spruce, PubMed style, ICMJE, Web style, APA style, and so on. In this article we provide examples of all of these styles of citing in order to facilitate their proper use. Also, in this article, as a form of review, it is presented the problem of plagiarism, which is becoming more common in the writing of scientific and professional articles in biomedicine.

There are several systems of citation and referencing and the most commonly used systems include the "author-date" (such as the Harvard system, or APA) and numerical systems (such as CSA, IEEE, Vancouver, and a few other systems). Often, the preferred system of citation and referencing depends on the scientific discipline in which the author writes. Thus, the way of referencing in a paper in mathematics differs from a biomedical article. Also, the authors are sometimes faced to respect pre-set requirements for citing sources from the institutions, journals and book publishers (1,4).

For example, there are different requirements of higher education institutions in terms of references in the master thesis from the publisher demands (e.g. a journal) that are indexed in the international databases (e.g., Web of Knowledge, PubMed, or Scopus). Each of the systems implies precisely a defined set of rules for citation of sources in the text of scientific or professional articles and their way of quotation. The goal is to ensure that in the text it can be recognized what belongs to the author and what is taken from other authors/sources. Once adopted a certain style of quotation, it must be applied consistently throughout the text of the article.

#### *7.4. Citation of references in scientific publications: Harvard system of citation*

The Harvard system of references represents the most common way of quoting in the natural and social sciences. This system is often referred to as the "author-date" system. In the same category relies the APA system of references which differs from the Harvard system basically in the use of punctuations and conjunctions. A characteristic of the Harvard system is to specify only the basic information in the text (author's name, and year of publication), while the complete data of the article cited are listed at the end of the text in the reference list. In medical sciences, it is common to found in the literature only pieces of work that are directly used (cited) in the text. Authors may read and scrutinize many more articles, however, these sources are not cited in the literature unless they are directly used. Robert Harris has designed simplified diagrams to indicate what needs to be cited (Harris, 2001, quoted by Central Queensland University, 2007).

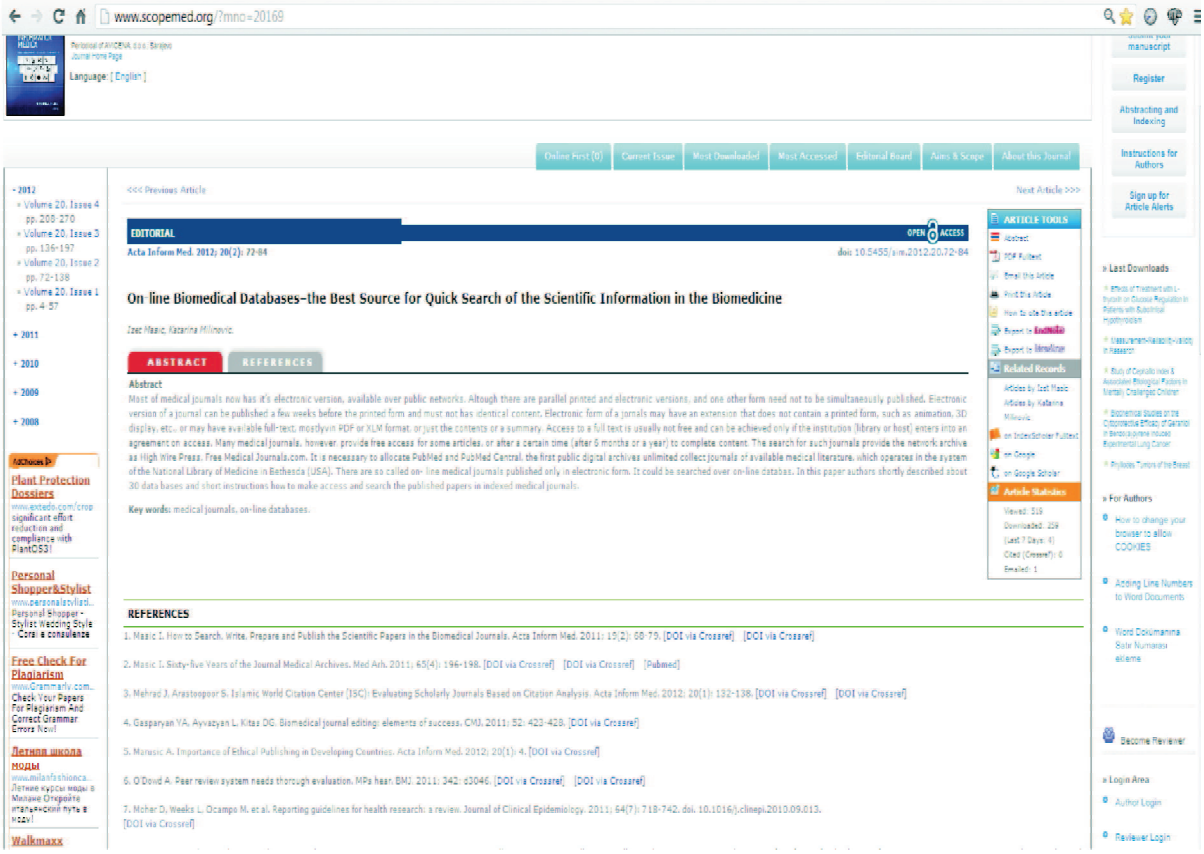
**Citing references in the text**

Authors in preparation for creating specific research works, face with different kinds of secondary data. For example, the publication can be written by one or by a number of authors, but also that the authors are not listed anywhere but only organization that has published the article. Bearing this in mind, in citing sources, publications are marked differently in the text. During the writing, authors may refer to different sources. The section below provides examples of proper citations.

Citing references in the text is presented on the example of abstract available at webpage www.scopemed.org (Figure 1).

Masic I, Milinovic K. On-line Biomedical Databases–the Best Source for Quick Search of the Scientific Information in the Biomedicine. Acta Inform Med. (2012), [cited January 25, 2013]; 20(2): 72-84. doi:10.5455/aim.2012.20.72-84.

**Figure 1. On-line Biomedical Databases - the Best Source for Quick Search of the Scientific Information in Biomedicine at the SCOPEMED (www.scopemed.org)**




When we want to quote scientific articles in our text (biomedical disciplines), there are several recognized ways to quote the text.
In SCOPEMED, there is specified a manner in which we will quote this text, in all styles, as presented in Figure 2:

**Figure 2. Examples for citation of articles in biomedical journals**

Citation employing PubMed Style is presented in Box 1:

**Box 1. The PubMed Style citation rules**

Masic I, Milinovic K. On-line Biomedical Databases–the Best Source for Quick Search of the Scientific Information in the Biomedicine. Acta Inform Med. 2012; 20(2): 72-84. doi:10.5455/aim.2012.20.72-84

National Library of Medicine (NLM) uses the ANSI/NISO Z39.29-2005 (R2010) Bibliographic References standard as the basic format of Pubmed/ MEDLINE citation.
The last item in the above quotation is the unique identification number in the PubMed database and the status of citations indexed in MEDLINE.
In November 2008, the NLM changed the way of quotation so that the first to be cited is the author and then the title of the work.
Characteristics of citations by applying the Vancouver/ ICMJE Style (the most common citation in articles published in biomedical journals) are presented in Box 2:

**Box 2. The Vancouver/ ICMJE Style citation rules**

**Vancouver/ICMJE Style**
Masic I, Milinovic K. On-line Biomedical Databases–the Best Source for Quick Search of the Scientific Information in the Biomedicine. Acta Inform Med. (2012), [cited January 27, 2013]; 20(2): 72-84. doi:10.5455/aim.2012.20.72-84

Authors: The initials of the first and second name should be used, include up to five co-authors. If there are more than six authors, the names of the first three authors should be stated followed by "et al".
Characteristics of citations by applying the AMA (American Medical Association) Style are presented in Box 3:

**Box 3. The AMA/ American Medical Association Style citation rules**

**AMA (American Medical Association) Style**
Masic I, Milinovic K. On-line Biomedical Databases–the Best Source for Quick Search of the Scientific Information in the Biomedicine. *Acta Inform Med*. 2012; 20(2): 72-84. doi:10.5455/aim.2012.20.72-84

AMA citation rules are presented in Box 4:

**Box 4. The AMA Style citation rules**

**AMA Citation Style**
American Medical Association Manual of Style, 9th edition

| Follow these color codes: | | | | |
|---|---|---|---|---|
| Author(s) | Date | Title of Book | Title of Article | Title of Periodical |
| Volume | Pages | Place of Publication | Publisher | Other Information |

Characteristics of citations by applying Web Style manner are presented in Box 5:

**Box 5. The Web Style citation rules**

**Web Style**
Masic I, Milinovic K. On-line Biomedical Databases–the Best Source for Quick Search of the Scientific Information in the Biomedicine. www.scopemed.org/?mno=20169 [Access: January 25, 2013]. doi:10.5455/aim.2012.20.72-84

It differs from the other systems in that, after the basic information about the author, the article contains the web address. It is usually used in online portals, or different websites.

Basic bibliographic elements are: author/ s, title, journal title, numerical data on the journal, city, publisher, year of publication. Data on the quoted unit (reference), in the text should appear twice: first in the text, and subsequently in the list of references. References in the text are labeled by Arabic numerals starting with number "1" and a list of references is sorted by the order as they appear in the text. Certain types of data are separated by the original *punctuation symbols* which are in standard references structure accented with red. From this structure we are using bibliographic elements which occur in described publication, and skip all the others. When skipping some elements of the bibliographic description there are not used any preceding punctuation symbols.

For example, if the publication has no subtitle, semicolons preceding the subtitle of the article should not be used; instead, a full stop should be employed indicating the end of each group of data.

#### *7.5. Plagiarism*

A particularly important problem in publishing and generally in scientific research is plagiarizing of others ideas, articles, or research work. Plagiarism (form Latin: plagium - kidnapping) is copying from others' works and illegal taking of spiritual ownership (3). Plagiarism (from Latin: Plagiarius - a thief, a kidnapper) is an illegal use of spiritual ownership, or any use of other people's ideas, opinions or theories, either literally or paraphrased, when the author or the source of information is not cited and listed.

Such a "copy-paste" act constitutes theft of authorship, which is completely unacceptable in scientific, professional and student works.

In the wider academic community, plagiarism is a serious breach of ethical standards and implies accountability with a disciplinary sanction.

The biggest problem that the participants in the academic process meet is plagiarism. This is one of the most common ways of compromising the academic integrity of the author and cause of constant conflict in the students – teacher relationship. Copy, use or other exploitation of other people's ideas, words, or creations, without quoting sources in the appropriate form is strictly forbidden. It is not enough to change a few words in a phrase from the source material into "own words". Changing the order of words in a sentence is also not acceptable, as well as the use of synonyms, such as e.g. the change from "air" to "atmosphere".

When writing papers, it is possible to use other people's words and ideas, but with mandatory labeling and listing the sources from which these words and ideas are taken. People who read the article can easily recognize the very sentences written as original work which are actually taken from different parts of articles from other authors. The references, as an essential part of any scientific and technical article, contribute to the quality and the sources and thus the depth of information on the subject to which the article is dedicated. The process of preparation of each article should start by consulting existing sources, possible research and then writing the article by giving its own personal signature.

## 8. The process of article review

Publication of the results of scientific research is a key phase of scientific activity, and the standard way for this is by publishing a book or an article in renowned scientific journals, either domestic or foreign periodicals. Of course, it is preceded by the evaluation and review of such contributions,

regardless of the topic area to which it applies.
*"Review means that the manuscript or a research proposal is read and evaluated by experts in a certain period of time, subject area, language and a document that deals with the author. As prominent experts in the field of knowledge that deals with the author, reviewers are preparing an analysis for the committee of experts on the scientific significance of institutions articles in question: Does the author demonstrates knowledge of current developments in the area? Are the research procedure, processes and methodologies, for example, in accordance with professional standards? Does the author offers an original argument and provides valid facts to support their work? If certain statements are weak or absent in the presented contribution, the reviewers suggest the revision that will correct the article offered and ask it again for review before approval of financing a project or to be accepted for publication"* (1,4).
Reviews are used in many professional areas, such as academic and scientific research, in medicine, engineering, law, and so on. In other cases, it is particularly relevant to government institutions when selecting projects to be financed by public funds.

## 9. Evaluation and impact of articles in scientific publications

Evaluation of the quality and relevance of the papers after they are accepted and published in scientific publications, which should be the result of serious scientific research activities, relies mainly on the reception by individual experiences - first round by an identical professional direction and then in the wider plan within reference publications in which such work is shown, quoted, criticized, or praised. In the circles of members of the academic community involved around use, collaborate and edit the scientific and technical publications, there are frequently encountered such terms as indexing, referencing, or citing. According to Tibor Toth, which wrote in an article published on the pages of Open Encyclopedia of Information: "*Indexing is a term that is derived from the concept of indexing publications such as Index Medicus, Science Citation Index, and Current Contents, as has been customary, for example, for the Chemical Abstracts or Biological Abstracts called abstract journals, not indexed publications. These are, in fact, along the secondary referral or periodicals, or, more recently, the bibliographic database*". Thus, according to Toth, the notion of *reference* should be more correctly referred to as *indexing*. It points to the fact that some secondary information services (Abstracting and Indexing Services) are selected, edited and ranked by bibliographic recording in escalator concepts and/ or summaries of the referral publication, or bibliographic databases.
Evaluation of the scientific performance of each scholar, and thus indirectly determining the reputation in the scientific community of the authors - associates of these publications, especially journals, as previously reviewed in this paper, is done through the so-called Impact Factor and the H-index. Currently, journal impact factors are extracted from the publication: *Journal Citation Reports* (JCR), which is produced by the publisher Thomson Reuters.

## 10. Selective databases distributed on the basis of Frascati manual

### *10.1. Databases*

The answer to the question of what a database is and its relevance to the scientific research is not easy to address. We may not be wrong if we say that it is, basically, a kind of information resource, often incomparably richer than it is, for example, a single book or magazine (1).
It is a form of storing and retrieval of the knowledge, appearing in the information age, which we have just participated and witnessed. Thanks to the technical possibilities of information networks, databases can be searched for a number of more or less relevant information, and scientific and profound contents.
The contents of the databases typically include such basic information as authorship, title of the article, place of publication, year of publication and, possibly, the volume of content. When it comes to the type of stored records, most of them relate to articles published in the journals. However, in a significant number of cases, there are also records relating to the announcements of scientific meetings published in proceedings, as well as other types of publications such as books, master's theses, doctoral dissertations, technical reports, patents, and, more recently, audio and video records.
The creation of databases involves several types of professionals. Among them are librarians, computer specialists and indexers. Users of the information

sources search on topics that are the subject of their research and academic interest.

According to their structure and content, databases can be divided into the following categories (4):
- Bibliographic databases;
- Citation databases, and;
- Databases containing full-text.

#### *10.1.1. Bibliographic databases*

Bibliographic databases usually contain bibliographic records proficiently prepared with the structure of the description consisting of the following elements: authorship, title of the article, source, summary, year of publication, publisher, publication type and information about the original language in which the paper was written. These databases differ, particularly in terms of volume of data that present themselves and can contain abstract and index terms as keywords or descriptors. Their topics may include scientific, or commercial resources, as well as daily news. They are usually used to search and locate relevant sources of information and provide a pathway to the original documents referenced in the database. Currently, there is a growing phenomenon of the records in these databases associated with records in other databases, especially full versions that are located somewhere else on the World Wide Web. In addition, such databases may contain electronic addresses of the authors, web-page of the documents, the holder of the copyright, and the like. These databases are, in short, used to get acquainted with the scope and level of research literature in a particular scientific field.

#### *10.1.2. Citation databases*

Unlike bibliographic databases, with which they are in close affinity, citation databases process also references and citations that the authors present at the end of the articles. Citation databases, important to mention, offer an answer to the question: *"Which are the most cited papers and how relevant are they within a particular scientific field?"*. Thus, they play a special role in the citation indexing options, with is the most recently quoted from some platforms such as Scopus, for example, which could result in self-quotation. This platform is normally used to gain insight into the relevance of a work within a particular scientific field.

#### *10.1.3. Full-text databases*

After bibliographic searches and insight into the extent of the scientific literature from each area of interest of a certain scholar, experts may want to access databases containing full-text articles. Most often this term refers to the complete recordings of a scientific paper that was published in the form of a journal, book, or proceedings of a symposium. Complete record is usually offered in a truly convenient HTML format (which can be displayed in a Web browser such as Internet Explorer, Mozilla Firefox, Opera, etc., or a PDF format using Acrobat Reader). This resource is used to get familiar with the research work within a particular scientific field.

## 11. Instruments to access recorded content

Thanks to the digital resources available through access to databases and Internet dissemination of information, including those of a scientific nature, it is much easier and the methodology of access to knowledge has acquired new forms and contents. For a wise search and use of resources in the Internet, there are different types of subject directories (such as About.com, Dmoz.org, Google Directory, Yahoo Directory, Infomine, Librarian's Internet Index, ipl.org, Academicinfo, Bubl.com, and so on).

To this type of instruments, there should be added searching engines such as Scirus, Scitopia, Google Scholar, The Internet Archive, Science Research.com, WorldWideScience, Scitation, TechXtra, Yippi. As for metacrawlers, there should be mentioned the following: www.metacrawler.com, Dogpile, Mamma, and the like.

Back in 1967, Eugene Garfield's drew attention about the fact that the majority of scientific papers published in the world see their public promotion in the English language. In some areas, more than 50% of professional papers are published in the English language, as a means of *lingua franca* of the global academic community (1). Besides this, languages of small nations remain an important medium for the preservation of the collective memory and the papers in such languages, in the tide

of history, contribute to the preservation of national identities. Unfortunately, a number of languages, preserved in communication between members of small ethnic groups in some areas of Asia, Africa and South America are "sentenced to death" (2).
On the other hand, increasing specialization in different segments of the scientific research and, consequently, intensive development of technology with international communications, were one of the main reasons that the global exchange of goods and knowledge and language as the medium starts to have more attention. This especially applies to the fact that intensive international exchange follows a growing number of sophisticated goods with them and a growing number of technical terms, a glossary, and concepts that are at the same time used in the documentation. This process inevitably led to the need for terminology corpus which is used in this process to adequately transmit content from one language to another (3).
The need for harmonization of terminology has led to its standardization, which is illustrated in a series of published bilingual and multilingual dictionaries especially in the field of international trade including ideas and goods (statistical multilingual dictionary is already present on the internet, customs too).

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