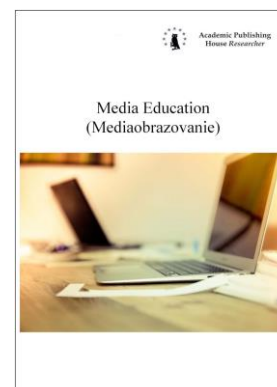




Published in the Slovak Republic  
Media Education (Mediaobrazovanie)  
Has been issued since 2005  
ISSN 1994-4160  
E-ISSN 2729-8132  
2021. 17(3): 553-570

DOI: 10.13187/me.2021.3.553  
[www.ejournal53.com](http://www.ejournal53.com)



## Digital Internet Resources in Learning and Development in Future Educators' Opinion – A Case Study

Eugenia Smyrnova–Trybulska <sup>a, \*</sup>, Dominika Zegzuła <sup>a</sup>

<sup>a</sup> University of Silesia in Katowice, Poland

### Abstract

This article describes selected results of research referred to as "Digital Internet resources in learning and development in future educators' opinion – a case study", conducted in the years 2018–2019 at the University of Silesia. This research project was one of the many components of long–term research called "The Role of the Faculty Distance Learning Platform in Increasing the Quality of the Development of Future and In–service Teachers' Competences", conducted at the Faculty of Arts and Sciences of Education at the University of Silesia. The long–term research was intended to provide an initial description of two issues: how do students themselves rate their own knowledge, and what is the actual level of students' knowledge in the field of the Copyright Act and licenses, necessary for searching for and properly using Internet content as well as students' awareness of information and search competences that determine the education process. The research also looked at students' ability to search for and verify information necessary for them to prepare for class and the awareness of the opportunities offered by the use of resources and websites as well as applications and programs determining how leisure time is spent. The text certain theoretical aspects of ICT and media competence and looks at soft competences, including the use of IT tools to search for information, critical thinking. Finally, the conclusions are presented.

**Keywords:** information search, digital resources, teacher's education, digital competences, media competences, critical thinking, ICT tools, Internet, libraries.

### 1. Introduction

The task of forming IT competences of a modern specialist, in particular those of a teacher, is current and important. It is associated with the turbulent development of information and communication technologies, with the formation of a digital society in which most professions are related to the search, storage, processing, presentation, use and transmission of various data. In the English–language literature, the term information literacy (IL) is used to describe the ability to use information effectively in achieving tasks and goals. According to Christine Bruce, although the idea of information literacy dates back to the seventies of the last century, it was only in the 21st century that it strengthened as a key competence. Although many organizations, researchers and scientists have attempted to describe information literacy, there is currently no commonly agreed one common definition of this term. Definitions included in the literature most often refer to this concept as a set of skills related to obtaining information, from identifying information needs to their effective use (Borawska–Kalbarczyk, 2015: 131). This term was first used by the American educator Paul Zurkowski, the then president of the US Information Industry Association,

---

\* Corresponding author

E-mail addresses: [esmyrnova@us.edu.pl](mailto:esmyrnova@us.edu.pl) (E. Smyrnova–Trybulska)

in 1974 in the report *The Information Service Environment, Relationships and Priorities* (Zurkowski, 1974). As B. Torlińska (Torlińska, 2005: 369) points out in her study, some "other definitions of the term Information Literacy approach the problem in a similar way, only slightly changing the scope of skills covered. And so, for example, Doyle defines a person who efficiently uses information as someone who – recognizes the need for information, – is aware that proper and complete information is the basis for intelligent decision making, – identifies potential sources of information, – uses effective search strategies, – uses information sources, both computer and other, – evaluates information, systematizes information for practical application, – integrates new information with existing knowledge and uses information to think critically and solve problems" (Doyle, 1992). The concept of information literacy in Polish literature on the subject can be translated, among others, as information skills, information skills, information fluency, information awareness, information literacy or information competence.

The concept of information literacy in Polish literature on the subject can be translated, among others, as information skills, information skills, information fluency, information awareness, information literacy or information competence. The world is changing, becoming digital. People are changing too, and they are supposed to have the competence to function successfully in new conditions, especially young people, future specialists, in particular teachers. New competences are identified, among others, in a number of national and international documents, including "UNESCO Teachers ICT Competence Framework" (UNESCO..., 2011), "European Digital Teachers Competence Framework – DigCompEdu" (Redecker, 2017), which respond to growing awareness in many Member States. The EU has found that teachers need digital competences for their profession to be able to use the potential of digital technologies to improve and innovate education including in the field of media and digital education. In particular, in Area 2 of the document, the competences needed for the effective and responsible use, creation and sharing of digital resources for educational purposes are analyzed.

The purpose of this paper is to present and analyze selected research results in the field of digital Internet resources in science and development in the opinion of future educators, conducted in the years 2018–2019 at the University of Silesia. The research was one of the many components of long-term research called "Faculty of Distance Learning Platform in improving the quality in shaping the competences of future and active teachers" (<http://el.us.edu.pl/weinoe>) conducted at the Faculty of Arts and Educational Sciences of the University of Silesia. It was intended to pre-illustrate two positions: how do students themselves rate their own knowledge and what is the actual level of knowledge of students in terms of: the level of knowledge of the Copyright Act and necessary for searching for and properly using Internet content, as well as students' awareness of information and search competences that determine the education process. The research also looked at students' ability to search for and verify information necessary for them to prepare for class and the awareness of the opportunities offered by the use of resources and websites as well as applications and programs determining how leisure time is spent. The article describes some theoretical aspects of ICT competence and touches on the subject of soft competences, including the use of IT tools for searching information. Finally, the conclusions presented.

## 2. Materials and methods

The growing amount of information available, accompanied by a wide selection of tools for searching for it both require and allow you to provide a balanced, balanced, critical approach, which, however, requires continuous training and improvement of habits. Based on the above assumptions, in 2015 a wide range of initiatives were adopted as part of the Digital Single Market Strategy for Europe, targeted at enterprises and individuals. These initiatives are aimed at:

- building an innovation-friendly society;
- shaping a fair, open and secure digital environment;
- solving cyber security problems;
- adopting new regulations on the digital single market, European data economy and online market;
- developing digital skills and opportunities for all (A Digital Single Market Strategy for Europe) (Smyrnova–Trybulska, Morze, 2018).

Among other initiatives in the field of digital teaching and learning and development the "Strategic framework – Education & Training 2020" is worth mentioning.

The skills of the 21st century include, among others: critical thinking skills, problem solving, logical thinking, analysis, interpretation, information synthesis; research and practical skills, wording questions and listening skills; creativity, artistry, imagination, innovation, personal expression, epistativity; entrepreneurship, other (Suto, 2013) as well as persistence, focus, planning, self-discipline, the ability to show adequate initiative; oral and written communication, public speaking and presentations, listening; leadership, teamwork, cooperation, cooperation; ability to use information and communication technologies (ICT) in education and (future) work, media and Internet literacy, data interpretation and analysis, computer programming (Suto, 2013).

In 2011, UNESCO, which is responsible for the official and worldwide dissemination of the term 'media education' since the 1970s, introduced an important change.

Due to progress in telecommunications and intensive dissemination of information developed and made available by children and young people on a daily basis, the challenge of searching, choosing and assessing the relationship between media literacy and digital literacy is ambiguous. There is no agreement regarding this matter among researchers. There are two approaches – an exclusive one and an inclusive one (Smyrnova-Trybulska, 2019: 80).

Critical thinking is one of the priority subcategories of media and digital competence. As stressed by prof. A. Fedorov „it is of key importance to develop personality media competence. So, of course, we need to develop critical thinking and media competency across the whole spectrum from young people to the elderly” (Vrabec, 2016).

D. Buckingham in the research argues „that the well-established conceptual framework and pedagogical strategies of media education can and should be extended so that they can face new challenges posed by digital and social media” (Buckingham, 2020: 230).

Polizzi emphasized the validity of “digital literacy ... in England’s national curriculum. It is claimed that the ability to evaluate online content involves not only reflections on the nature and origin of information, contextual knowledge and the use of multiple sources, but also critical digital skills and knowledge about the internet and the digital environment. That is why it is argued that the Citizenship and Computing curricula should be revised to promote digital literacy as a cross-curricular subject” (Polizzi, 2020).

Leaning “looks into two of these practices, information literacy and media literacy and through an examination of their histories and practices puts forward a proposed future direction for digital literacy.... It is held that integrating and strategically revisiting both approaches offers a digitally aware and critically nuanced direction for digital literacy” (Leaning, 2019).

In their research the experts note that "while contemporary uses of digital literacy are broadly associated with access, evaluation, curation, and production of information in digital environments, we trace the concept’s genealogy to a time before this tentative agreement was reached – when diverse scholarly lineages (e.g., computer literacy, information literacy, media literacy) were competing to shape the educational agenda for emerging communication technologies." In a study "using assemblage theory, they map those meanings that have persisted in their present articulations of digital literacy, as well as" some other actual and important (Nichols, Stornaiuolo, 2019).

‘Transmedia’ as a new concept has recently been described in certain publications. One of the newest studies “through a systematic literature review” analyse a contemporary “ransmedia concept in three meanings: transmedia as an ability or literacy necessary to actively evolve in the movement of participatory culture; transmedia as a product resulting from that sequential jump between different analogical and digital media, conveyed by a narrative; and, lastly, transmedia as a didactic strategy that explores the narrative that is developed by different means to accomplish specific didactic objectives” (González-Martínez et al., 2019).

Interesting research was conducted by team of authors I. Kazanidis, N. Pellas, P. Fotaris, A. Tsinakos devoted to analyzing how the flipped classroom model can improve students’ academic performance and training satisfaction in Higher Education instructional media design courses (Kazanidis et al., 2018).

Other experts assess research in the field of Learner-Generated Digital Media (LGDM) in tertiary science education. "The literature review had four stages – identification, screening, filtering, and selection of relevant scholarly research. The results showed that research in the field of LGDM assignments had been conducted without a systematic approach to designing, implementing, and evaluating the assessment task." Concluding, the authors stressed that

“the gaps in the literature create a need to develop theoretical models for the design, implementation, and evaluation of LGDM in the classroom” (Reyna, Meier, 2018).

In the next issue the authors analyze folk theories of news consumption. They “show that the notion of folk theories help unpack the different, complementary, sometimes contradictory cultural resources people rely on as they navigate digital media” (Toff, Nielsen, 2018).

A study of students’ educational and extracurricular activities in the information environment as well as development of the digital competences and soft skills was described by T. Noskova, O. Yakovleva T. Pavlova, E. Smyrnova–Trybulska (Noskova et al., 2015).

Gamification as one of the popular and effective method, in particular using Minecraft and children’s digital making: implications for media literacy education was described in (Dezuanni, 2018).

Critical thinking and decision making are conditioned by behavioral categories (Baron, 2007). Many of these orientations determine business and economic, scientific and cognitive decisions, and human behavior in general. They arise as a response to the result in specific conditions: in confrontation with a specific situation, a deviation from what is normally expected can be characterized by cognitive issues (Bar–Haim et al., 2007; Goddard et al., 2011; Jansen, Rieh 2010; Zhang et al., 2007). Critical thinking, leadership, teamwork, cooperation is considered an integral part of the 21st century skills sought after in the market (Morze et al., 2016).

### 3. Discussion

There are two main phases to the information search process on the Internet:

1. Query specification phase.
2. Retrieval phase (Gawrysiak, 2006).

“After specifying the information needs, i.e. defining the problem to be solved by using information obtained from the Internet, one should make a choice: – tools for finding them, – sources among which they will be searched” (Pondel, 2008: 136). Selected aspects of information retrieval. “The inseparable element of the knowledge acquisition process must be its verification. In the process of obtaining information from the Internet, the problem may often be insufficient quality due to:

1. Errors in published content. The process of publishing information on the Internet is extremely simple, often it does not require checking or reviewing.
2. The difficulty of determining the intentions behind published information or ratings posted on the Internet. There is a group of recognized websites for which serious organizations, news agencies or the media are responsible, which guarantees certainty or objectivity of the information presented.

There are also websites that can be described as “biased” in experience, i.e. non–objective, biased, sometimes unreliable; they publish articles on “order” and the information contained therein should be approached with appropriate distance” (Pondel, 2008: 140).

The concept, possibilities and role of modern libraries are changing. In their study, Gul and Bano (2019), among others, present and describe examples of Intelligent libraries that can be defined as the emerging and innovative technological environment of the 21st century, providing individual effective support in accessing digital resources (Gul, Bano, 2019).

The study (Chunyan Xu, 2017) based on the analysis carried out concludes that in recent years university libraries in China have acquired more and more electronic resources. Based on the research on the analysis of book lending, favorite collections, comments and social relations of students, the author proposes personalized student interests and design and implementation of a personalized recommendation system. In particular, the general framework recommending the system was created on the basis of library data services. The modules in the system were also developed and the results of the recommendations were verified by an offline test (Chunyan Xu, 2017). Cooperation of educational institutions with public libraries in the context of ict–supported media and reading education comprehensive analyzed in (Smyrnova–Trybulska, Zegzuła, 2018).

“Currently, the main directions of research in the field of media education are already generally defined. The methodology for the organization of this process in school and training institutions is preliminary developed. The formation of media competence of future teachers has become the subject of individual and collective research (Hazanov, 2018). The author conducted the study “Tools of media education in my profession” among students and analyzed the results.



The article indicated the perspectives of studies of formation of media competence of future teachers in the process of learning pedagogy (Hazanov, 2018; Smyrnova-Trybulska, Zrgzula, 2018).

From otherwise as some experts stressed that „with the increasing evolution and complexity of information technologies, there has emerged a multiplicity of applications for information systems (IS), ... , they support users in the architecture of strategy. The complexity of their nature and objectives requires the harnessing of technology and user experience to create systems that meet their expected purpose” (Iasias, Issa, 2015).

Through the findings Tucker identified four threshold concepts in the acquisition of search expertise that provide new perspectives on the information experience of the expert searcher (Tucker, 2014). Author analyzed about experiences contribute to wider understanding about information experience.

Kammerer and Gerjets explore how the development and use of alternative search engine interfaces might affect Web users' search and evaluation strategies during Web search. Additionally experts analyzed how it can to impact on their search outcomes in terms of retrieving high-quality, credible information (Kammerer, Gerjets, 2012).

"Digital Internet resources in the learning and development of future educators – case study" was one of many components of long-term research starting in 2008 from statutory research under the name "Faculty of Distance Learning Platform in improving the quality in shaping the competences of future and active teachers" conducted at the Faculty Of Arts (Ethnology (before 2019)) and Sciences on Education at the University of Silesia. The aim was to pre-illustrate two positions: how students assess themselves and declare their competences, and what is the actual level of knowledge of students in the field of: A. Degree of knowledge of the Copyright Act necessary for searching for and properly using Internet content and the level of awareness of information and search competences that determine the education process. B. The degree of ability to search for and verify information necessary for them to prepare for class. C. The degree of awareness of the opportunities offered by the use of resources and websites as well as applications and programs determining how leisure time is spent. By way of reconnaissance a case study was conducted of 51 first and second year students of Pedagogy specializing in the following fields: Integrated Early Childhood Education and Pre-school Education, Oligophrenopedagogy with Art Therapy and Care and Educational Pedagogy. Surveys were conducted in the summer semester of 2019, using the Google Form online survey form. Ca. 80 % of students completed an anonymous questionnaire, and were invited to complete the Information Technology module at the end of the 2nd semester for the first year of study.

The survey questionnaire contained 15 questions, including two open questions, three questions as a rating scale, and five multiple and one-choice closed questions.

The questions were divided into three sets relevant to the purposefulness of the group's research: in the first set of questions "Library databases", attempts were made to obtain answers relating to knowledge about library databases as sources of information about information and the ability to use it, and also to determine the students' declared awareness about their skills. This group also included a question on participation in classes developing students' information and search skills at an earlier stage of education, and a question about the students' knowledge of the Copyright and Related Rights Act in terms of using Internet resources in the educational process. So this group of questions was oriented strictly on the overall competence of the study group.

The second group of questions "Digital literature and scientific publications" included seven questions oriented to determine the actual state of the skills in the acquisition, selection and use of scientific resources of the Internet in the process of both student education and future implementation of tasks. The questions were designed to determine the frequency of using literature in electronic form compared to traditional forms, knowledge of scientific resource databases and the ability to distinguish them from non-scientific resource bases, taking into account the legitimacy of sources and respect for copyright. The next questions were to determine the criteria for the selection of literature and the method / level of search and selection of available material using advanced search engine functions.

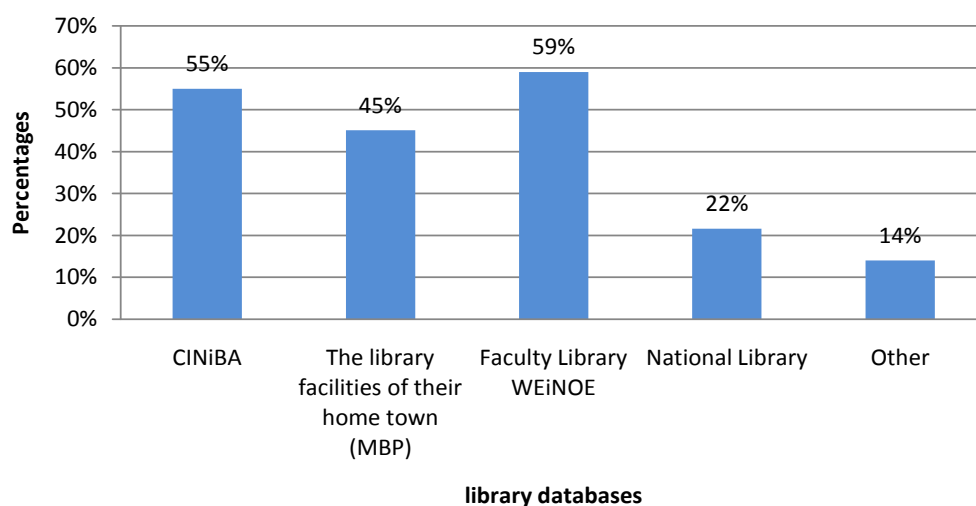
The last – third group of questions referred directly to the way of spending free time conditioned by the level of information and search competences. Four short questions defined the preferences of choices made for the purposes of self-realization and recreation, future teachers in the field of visited websites, applications used and technical solutions. Important factors for researchers in the research process were as follows: students' technical search skills as an

important component of navigating among scientific Internet resources; ability to verify and select available materials as a manifestation of a critical attitude towards search results; knowledge of the possibilities of dissemination and use of scientific Internet resources in the educational process; awareness of student's own skills assessment or lack thereof. During the analysis of research results, the authors paid special attention to comparing the state declared by the student with the state resulting from the analysis of other questions. In addition, they emphasized the possibilities and even the need to prepare future educators in the use of new technologies and their transformations as an essential element to meet the contemporary challenges of preparing young people to function in a digital society.

#### 4. Results

*Library databases.* Online services and resources of modern libraries are at the center of attention of researchers from various countries. For example, a study (Pradhan, Agwa-Ejon, 2017) showed that online services and the resources of the Auckland Park Bunting Road (APB) campus library are satisfactory and relevant. Students, lecturers and employees of the APB campus are well aware of the e-library and often gain access to online services. Accessibility (24/7 and off campus) is the main advantage of using the e-library, other benefits include ease of searching, downloading and sharing materials. E-library services are often used in both academic and research activities (Pradhan, Agwa-Ejon, 2017). The article presents an analysis of the answers to the first group of questions, which was designed to determine, as far as possible, the students' competence in using one of the important categories of resource sources – libraries, especially digital ones.

The first two charts illustrate the responses received from respondents when asked about the active use of library databases in the current academic year. The question was closed multiple choice. A total of 98 responses were received from 51 respondents. As can be concluded from the data presented in Figure 1, the vast majority of respondents almost equally pointed to the use of the CINiBA database (Scientific Information Center and Academic Library) and the base library of the home university (in this case the former Faculty of Ethnology and Education Sciences, currently the Faculty of Arts and Educational Sciences of the University of Silesia). The disparities are small: 28 students (55 %) indicated using the CINiBA database, while 30 students (59 %) indicated using the WEiNOE library database. A fairly large group of 23 (45 %) respondents indicated the use of the library facilities of their home town. There were also declarations of activity of 11 students (22%) in the databases of the National Library. The remaining answers of 6 students (14 %) classified as "other" point to pedagogical libraries and those located nearby the university, as it results from the data presented in Table 1.



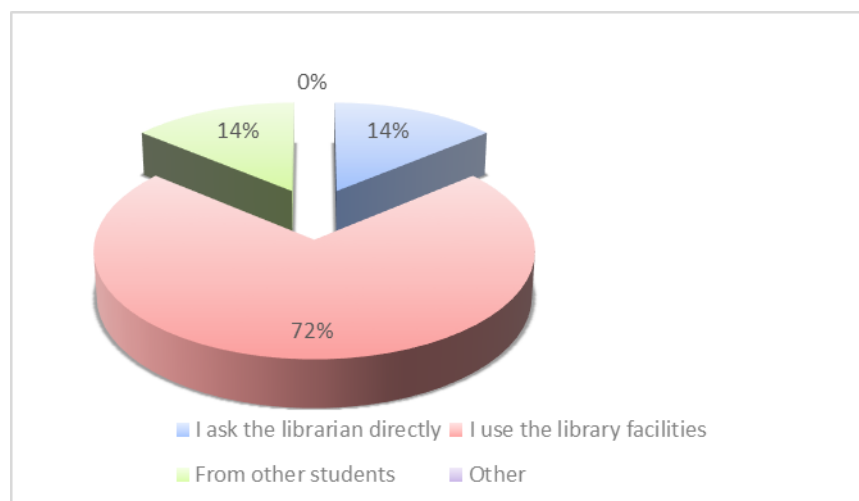
**Fig. 1.** Percentage distribution of responses in total on the active use of library databases in the current academic year  
Source: own source

The answer of 1 respondent is worth pointing out as a measure of knowledge of the definition of library databases (2 % of 51 respondents) about using Google Scholar.

**Table 1.** Percentage distribution of overall responses regarding the active use of library databases in the current academic year. Others indicated (Source: Own source)

	Number of respondent responses	Percentage of response (%)
Municipal Library in Cieszyn	30	2
Pedagogical Library in Cieszyn	23	4
Pedagogical Library in Katowice	28	2
Pedagogical Library in Rybnik	11	2
Małopolska Voivodeship Public Library in Krakow	7	2
Google Scholar		2

Continuing the topic of widespread use of library databases by the respondents, it is worth comparing the above results with those presented in Fig. 2. As can be seen, that the vast majority of 39 (72 %) interested in searching for specific literature find searching in library databases the most advantageous form. Equally 6 people (14 %) declared using traditional forms as conversation with a librarian or other students. None of the persons indicated an alternative form of searching for information on the availability of the desired literature.



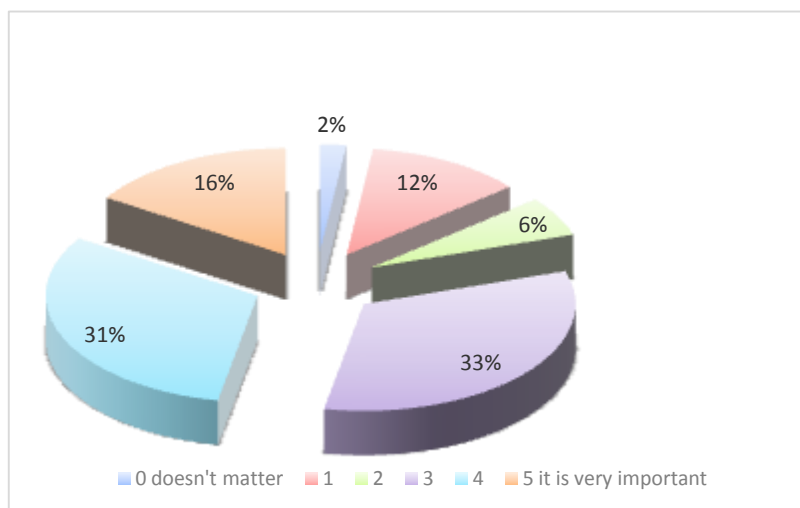
**Fig. 2.** Percentage distribution of answers given on the most-practiced method of searching for information on the availability of a particular book

Source: own source

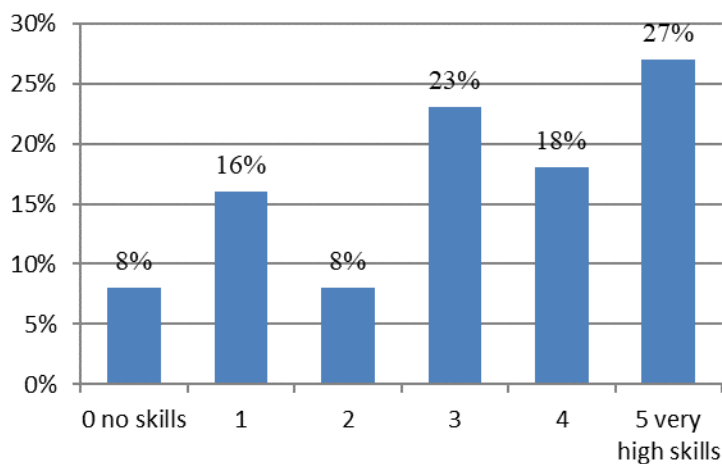
In the light of the respondents' declarations above, the data illustrated in the next two charts are very important. Students were asked two very similar questions, however, related to two completely different issues: In the first question, they were asked to determine on a rating scale from 0 to 5 the quality of verification of information determined by search skills. In the second question, on the other hand, they were asked (also on a rating scale from 0 to 5) to define their own skills in using library databases as objectively as possible. The vast majority of students 17 (33 %) indicated an average correlation of the level of search skills to verification of found information, almost the same number of respondents indicated a large relationship of this type. But only 8 (16 %) students declared high awareness of the conditions between the ability to search and verify information. A small group of future educators did not record high results: 3 people (6 %) indicated low connections, 6 (12 %) indicated that it was not significant or that 1 (2 %) person did not matter.

Further data should be considered in relation to the respondents' declarations presented in Figure 2. Although the vast majority of them declared the use of the library facilities as the basic

form of searching for information about books from the data presented in Figure 4. There is a large group of 12 (23 %) students who declare an average level of technical skill to operate the library facilities. A very similar group of 18 (27 %), however, assess their skills at the highest level. 9 (18 %) respondents believe that they have good/satisfactory competences in this field, and equally 4 (8 %) define their level as poor or lack of skills. Exceptionally 8 (16 %) respondents declare a very weak but not zero level of competence.



**Fig. 3.** Percentage distribution of answers provided on the declared level of conditioning of information search skills and verification on a rating scale from 0 to 5  
Source: own source



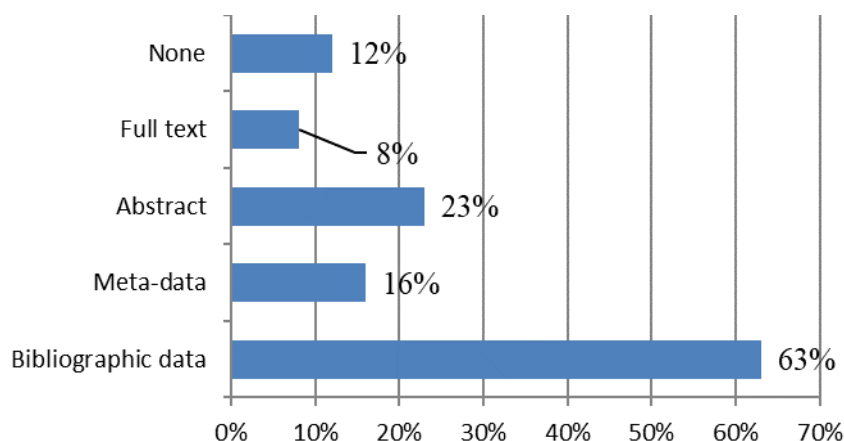
**Fig. 4.** Percentage distribution of answers provided on the declared ability to use the library facilities on a rating scale from 0 to 5  
Source: own source

Quite high results of the above part of the research concerning library databases are perhaps related to the next part in which the respondents answered to the question: Did you attend primary school or later participated in cyclical classes during which you were taught to search for information? They clearly show that the majority of them 29 (57 %) at earlier stages of education participated in classes educating information and search competences, and thus awareness of the correlation between skills and the quality of search effects. What's worrying is that there is a fairly large group of 22 (43 %) with educational gaps in this area.

In the last question of this part of the research – concerning the broadly understood knowledge of library databases by respondents, was as follows: *Which of the information about a specific item contained in library databases can be safely shared with third parties?* The question was a closed multiple choice. 62 responses were received from 51 respondents. The purpose of the question was to obtain a general picture about the respondents' awareness about respect for



intellectual property of materials available in library databases. As a result, 32 (63 %) correctly indicated bibliographic data, slightly less 12 (23 %) on abstract and 8 (16 %) on meta data which is within the limits of respect for copyright. However, a specific group of students indicated, however, the possibility of sharing the full text of 4 (8 %) or worse, no data of 6 (12 %) people (Figure 5).



**Fig. 5.** Percentage distribution of responses regarding the awareness of sharing and disseminating data

Source: own source

This, of course, may indicate a lack of sufficient information in this area and the need for further training.

*Digital literature and scientific publications.* Researchers emphasize that 'the characteristics of student reading require addressing the function that university libraries fulfill in acquiring knowledge. This process is increasingly supported by electronic information sources. At the same time, according to the latest data published by the National Library regarding the readership of Poles, as many as 56 % do not read any books, and 25 % of Poles with higher education did not have contact with any book during 2010 (Report for 2010: <http://www.bn.org.pl/aktualnosci/230-with-reading-still-bad-report-from-the-national-library-research.html>). Therefore, it is worth checking how the university students look against this background" (Rogińska-Usowicz, 2012: 256). Unfortunately, this situation has not changed significantly taking into account the data from reports for 2010–2018 (except that the data for 2018 are preliminary) as indicated by the data in Table 2 below:

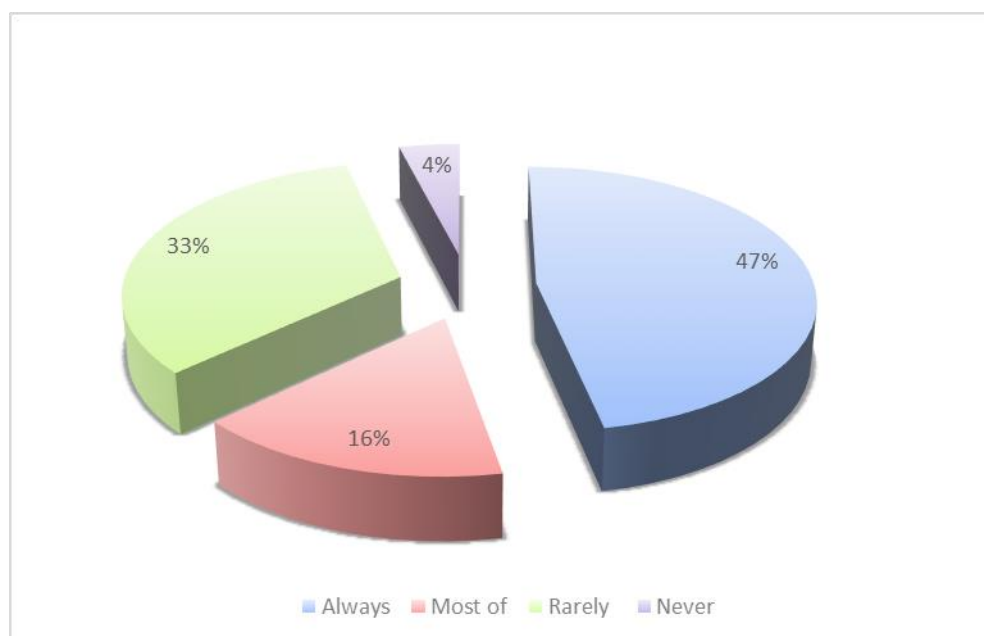
**Table 2.** Reading activity in 2010–2018

Reading activity	2010	2012	2014	2015	2016	2017	2018
Over 7 books	44 %	39 %	42 %	37 %	37 %	38 %	37 %
Above 1 to 6 books	14 %	11 %	11 %	8 %	10 %	9 %	9 %
He doesn't read at all	42 %	50 %	47 %	55 %	53 %	63 %	54 %

Source: Own source based on Chymkowski et al., 2013; Koryś et al., 2015; Koryś, Chymkowski, 2019

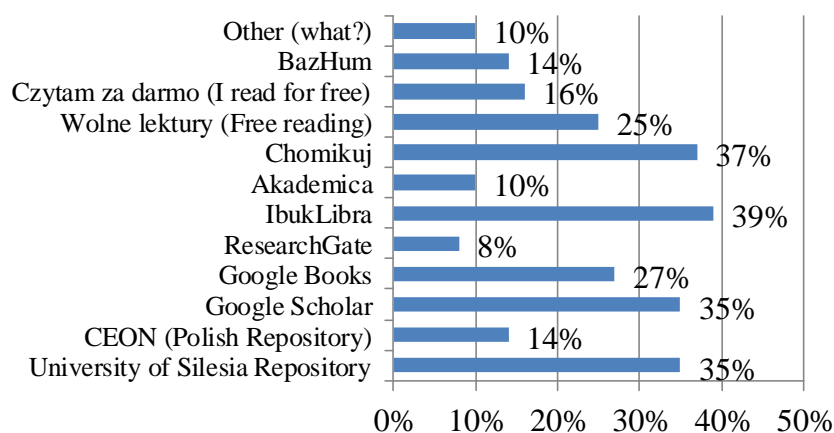
University libraries are expected to support traditional and digital access to educational, academic, research and information resources, and maintain a modern information and library space. In her study, the author (Vtyurina, 2019) discusses new approaches and solutions for designing repositories and organizing information resources, methods and instruments for users to access them. Like the case study of the Novosibirsk State Pedagogical University, the acquisition of the collections of the university's digital library system as well as the Interuniversity e-library, which is an integrated EU database of digital university documents providing general access to the digital resources of member universities, is discussed. Membership in the Interuniversity e-library enables universities to support educational programs through electronic resources; enables students, post-graduate and lecturers to track digital publications by member universities; provides a platform for the faculty to post and promote their work (Vtyurina, 2019). In the study (Smyrnova-Trybulska, 2018: 477), conducted among active teachers on questions about a group of results

called: "Vocational training, professional development", on the first question Q7, which was: "How do you use information technologies to develop their professional career and professional development (multiple choice question)" – 91 % of respondents chose, among others, the answer option Search for information useful in professional development; Supporting an individual professional electronic portfolio – 52 %; Active participation as an observer in professional online communities – 43 %; Active participation in professional network discussions, debates – 35 %; Vocational training using e-learning – 61 %; Participation in MOOCs – 26 %. This indicates that active teachers are aware that Searching for information useful in professional development, including digital thematic publications, is useful and very important. The second part of the author's research contains questions focusing on the use of digital and scientific literature available on the Internet by students of pedagogy. The questions analyze the use of scientific resource databases and in this part of questions it is necessary to clearly outline the difference between the results below and those from the previous part which focused exclusively on library databases. The first of the questions was of a single-choice closed nature. Respondents' declarations to this question are significant enough to affect the data from subsequent charts. 24 (47 %) students admitted that they always use compulsory digital literature in their curriculum. Quite a large number of 17 (33 %) do this rarely. Eight (16 %) students often use digital literature, and only 2 (4 %) students do not practice such activities (Figure 6).



**Fig. 6.** Percentage distribution of declared search for compulsory literature for digital classes (Source: Own source)

At the next stage, respondents were asked to mark the resource base they use most often. The question was a closed multiple choice. 136 responses from 51 respondents were obtained. Additional factors to which attention should be paid are listed among the scientific resource databases, commercial portals and non-scientific databases. Respondents also had the opportunity to indicate alternative statements. The most numerous of them are illustrated in Figure 7. The top commercial solutions were Ibuk Libra, which was indicated by 20 (39 %) respondents and Chomikuj, which was indicated by 19 (37 %) respondents. Further values equally on Google Scholar and University of Silesia Repository 18 (35 %) respondents. Slightly less but still at a high level remained Google Books 14 (27 %) and another commercial base Wolne Lektury 13 (25 %). What is worth pointing out is the relatively low level of use by students of typically scientific databases such as BazHum or CEON only 7 (14 %) declarations. Akademicka – 5 (10 %) and ResearchGate – 4 (8 %) students are very low in this ranking (Fig. 7). Percentage distribution of responses 'Other' shows in the Table 3.



**Fig. 7.** Percentage distribution of responses in total on the active use of resource databases

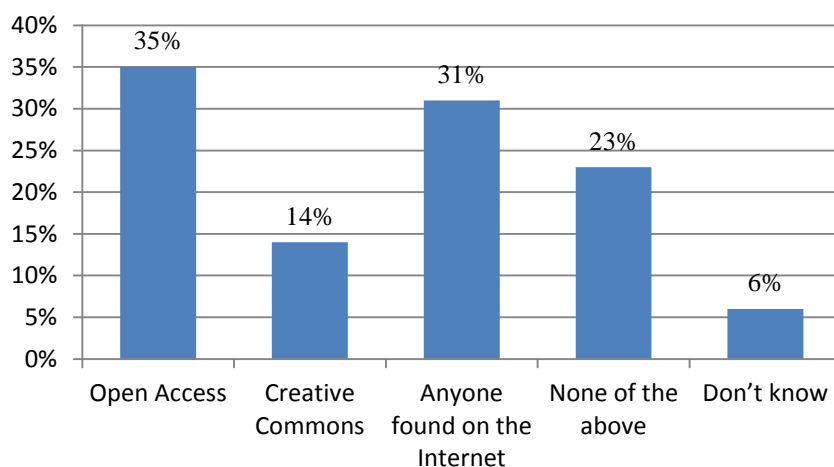
Source: Own source

**Table 3.** Percentage distribution of responses 'Other'

Source: Own source

Responses in total on the active use of resource databases	Percentage distribution
Prolib	2 %
Docer	2 %
Ściąga	2 %
Silesian Digital Library	2 %
Nothing	2 %

As part of the study on copyright awareness in the education process, respondents were asked the question about which of these types of publications can be legally downloaded and used for educational purposes. The question was a closed multiple choice. 55 responses from 51 respondents were obtained. The largest group of respondents considered that for educational purposes materials open license 18 (35 %) and each found on the Internet 16 (31 %) could be used, declarations of using resources under Creative Commons 6 (14 %) students constituted a smaller group. Interestingly, not a small group were indications of the inability to publish the abovementioned resources 12 (23 %) (Figure 8). Three of the respondents could not provide information on this subject.

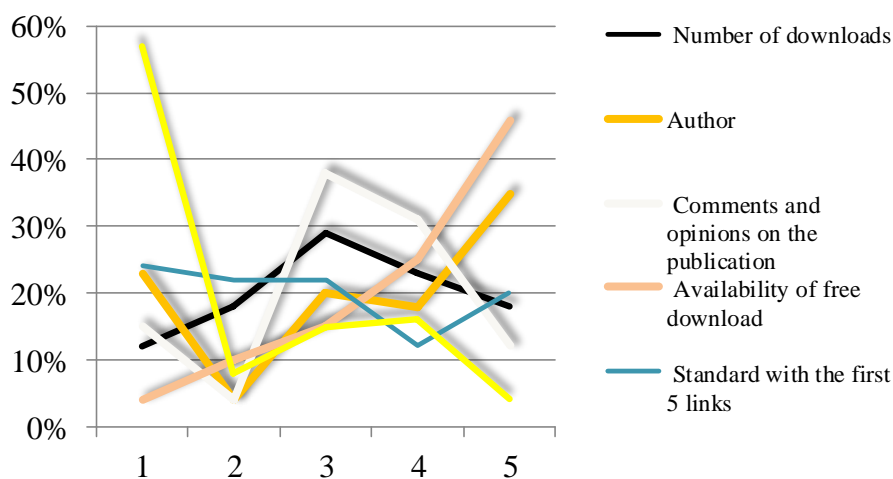


**Fig. 8.** Percentage distribution of answers provided on the use of publications for educational purposes

Source: Own source

The next question in this part of the study was to determine the actual state of knowledge of advanced search options. The question was of a single-choice closed nature. The data is very puzzling (in the context of literature search skills), and even in opposition to the data from Figure 8. "Percentage distribution of declared search for compulsory literature for digital classes", where the declarations of using literature in digital form were quite high. At this point, as many as 36 (71 %) students admitted that they do not use the advanced Google search option and do not know commands. Only 15 (29 %) students declared such internships, which directly can determine the quality of sophisticated literature and its commercial aspect.

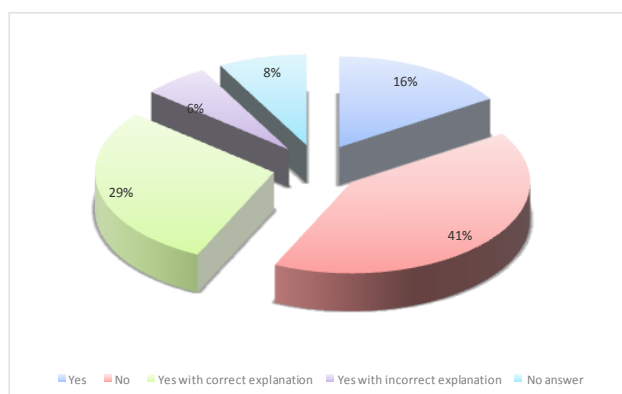
After analyzing the above results, the question arises about the selection criteria that students follow. Respondents were asked to answer a similar question. They were to assess the importance of the above criteria on a scale of 0 to 5, in their opinion in the selection of educational/scientific materials.



**Fig. 9.** Percentage distribution of answers provided on the motivation to choose publications

Source: Own source

The last question referring to students' competences and their awareness of the determinants of these competences to the quality of education was an open question with a request to explain in their words the term "citation of publications". The results were collected and sorted into five categories: those in which the knowledge of the term was declared without explanation, those in which the term was not known, those in the free speech that indicated the knowledge of the term, those in the free speech that indicated the knowledge of the term and those in which the respondents they couldn't answer. The vast majority of respondents 21 (41 %) declared not knowing the term without a desire to explain. A large group of 13 (29 %) was able to indicate the correct explanation, interestingly 8 (16 %) students declared that they knew the term but did not give an explanation. A small group of 4 (6 %) were those who declared knowledge of the term but gave an incorrect explanation, and those who did not answer 5 (8 %).



**Fig. 10.** Percentage distribution of explanations for the phrase "publication citation"

Source: Own source

A General conclusion from the results of the statistical analysis is that students' knowledge is very low in the field of copyright and training in this subject is necessary (i.e. the number of results 0 in questions 5, 8). Similar results can be formulated regarding the answer YES (answer to question 9) – people who use the advanced search options in Google are fewer than those for No, which also requires additional transformation of students in this regard.

Therefore, we have a strong positive ( $r > 0$ ) relationship between – the ability to use the 3a library database and the ability to search and verify information up to the level and quality of preparation for classes 3B. The higher the level of database skills, the higher is the competence in searching and verifying information (Tab. 4, 5).

Description of the methods: The relationship between variables was analyzed using Spearman's rank correlation coefficient. Categorical data were analyzed with the Fisher–Freeman–Halton test. All results were considered significant at  $p < 0.05$ . Statistical analyses were conducted using Statistica 13.0 (StatSoft, Dell, Round Rock, TX) or StatXact 9.0 (Cytel Inc., Cambridge, MA, USA).

**Table 4.** Statistical analyses using Spearman Test

Pair of Variables	Spearman Rank Order Correlations MD pairwise deleted Marked correlations are significant at $p < 0.05000$		
	Valid N	Spearman R	p-value
Q. 3A & Q 3B	51	0.71	<0.001

**Table 5.** Statistical analyses: Descriptive Statistics

Variable	Descriptive Statistics					
	Valid N	Median	Minimum	Maximum	Lower Quartile	Upper Quartile
Q 3A	51	3	0.00	5.000000	2.000000	5.000000
Q 3B	51	3	0.00	5.000000	3.000000	4.000000

**Table 6.** Statistical analyses using Spearman Test

Pair of Variables	Spearman Rank Order Correlations MD pairwise deleted Marked correlations are significant at $p < 0.05000$	
	Valid N	p-value
Q. 3A & 5 mistakes	51	0.991399
Q. 3B & 5 mistakes	51	0.272593

**Table 7.** Statistical analyses using Spearman Test

Pair of Variables	Spearman Rank Order Correlations MD pairwise deleted Marked correlations are significant at $p < 0.05000$	
	Valid N	p-value
Q. 3A & 8 mistakes	51	0.585272
Q. 3B & 8 mistakes	51	0.644090

The tables above indicate that there is no correlation (relationship) between the answers to questions 3a and 3b and the number of answers in questions 5 or 8 ( $p > 0.05$ ).



In question 5 and 8, where we have only one correct answer (B) and the other options are wrong and this is a multiple choice question. The person who scored 0 is the person who answered these questions correctly. There are very few such respondents.

**Table 8.** 2–Way Summary Table: Observed Frequencies

	2–Way Summary Table: Observed Frequencies			
	Q2 I ask the librarian directly	Q2 I use the library facilities	Q2 From other students	Row Totals
8 mistakes	0	3	0	3
0	0	3	0	3
Column %	0.00 %	8.11 %	0.00 %	
Row %	0.00 %	100.00 %	0.00 %	
1	7	33	7	47
Column %	100.00 %	89.19 %	100.00 %	
Row %	14.89 %	70.21 %	14.89 %	
2	0	1	0	1
Column %	0.00 %	2.70 %	0.00 %	
Row %	0.00 %	100.00 %	0.00 %	
Totals	7	37	7	51

FFH  $p=1$ ,  $p>0.05$  no correlation between the answers to question 8 and the answer to question 2.

**Table 9.** 2–Way Summary Table: Observed Frequencies

	2–Way Summary Table: Observed Frequencies			
	Q 2 I ask the librarian directly	Q 2 I use the library facilities	Q 2 From other students	Row Totals
5 mistakes	0	3	1	4
0	0	3	1	4
Column %	0.00 %	8.11 %	14.29 %	
Row %	0.00 %	75.00 %	25.00 %	
1	7	28	5	40
Column %	100.00 %	75.68 %	71.43 %	
Row %	17.50 %	70.00 %	12.50 %	
2	0	6	1	7
Column %	0.00 %	16.22 %	14.29 %	
Row %	0.00 %	85.71 %	14.29 %	
Totals	7	37	7	51

FFH  $p = 0.7399$   $p > 0.05$  no relationship between answers to questions 5a.

**Table 10.** 2–Way Summary Table: Observed Frequencies

	2–Way Summary Table: Observed Frequencies		
	Q 9 Yes	Q 9 No	Row Totals
5 mistakes	2	2	4
0	2	2	4
Column %	13.33 %	5.56 %	
Row %	50.00 %	50.00 %	

1	11	29	40
Column %	73.33 %	80.56 %	
Row %	27.50 %	72.50 %	
2	2	5	7
Column %	13.33 %	13.89 %	
Row %	28.57 %	71.43 %	
Totals	15	36	51

The FFH test  $p = 0.6457$ ,  $p > 0.05$ , therefore, there is no relationship between the variables tested (i.e. answers to questions 9 and 5).

The number of errors made in question 5 is not related to the use of advanced search options on Google. In other words: the distribution of answers to question 5 is similar between respondents who use the advanced search options in Google (GROUP ON YES) and a group that does not use advanced options (GROUP on NO).

It can be said that there is no correlation between the knowledge of respondents about information that can be safely shared with third parties in library databases and using advanced search options on Google.

**Table 11.** 2–Way Summary Table: Observed Frequencies

	2–Way Summary Table: Observed Frequencies		
	Q 9 Yes	Q 9 No	Row Totals
0	2	1	3
Column %	13.33 %	2.78 %	
Row %	66.67 %	33.33 %	
1	12	35	47
Column %	80.00 %	97.22 %	
Row %	25.53 %	74.47 %	
2	1	0	1
Column %	6.67 %	0.00 %	
Row %	100.00 %	0.00 %	
Totals	15	36	51

FFH test  $p = 0.07101$ ,  $p > 0.05$ , therefore similar conclusions as above = no relationship between variables, however,  $p$ -value is on the border of statistical significance (i.e. slightly higher than 0.05). When  $p < 0.05$  we have a significant relationship between variables.

Looking at the results with the distribution, it can be said that it is worth continuing the research on a larger group because it may turn out that we have a relationship between the knowledge of the respondents about information types of publications that can be legally downloaded and used for educational purposes and the use of advanced search options on Google. ( $P < 0.05$ ).

The number of mistakes made in answering question 8 may differ significantly between the No group (97.22 %) and the YES group (80 %). For respondents with YES, knowledge about information types of publications that can be legally downloaded and used for educational purposes may be better. But for this you need further research. YES (answer to question 9) – respondents who use the advanced search options in goggles NO – respondents who do not use the advanced search options on Google.

## 5. Conclusion

Summing up the first part of the study, concerning library databases, one can point to quite satisfactory results. Student declarations regarding the use of library databases, active search of literature information in databases may indicate a fairly high level of students' general competence in the use of library databases and awareness of respect for intellectual property. However, the extremely

different answers are puzzling. Therefore, in order to obtain a full picture of the reliability of student declarations, it would be necessary to compare the above results with the results of students separately attending classes educating information and search competences in earlier years with students separately not participating in such classes at earlier stages of education. Summing up the second part of the study, it can be stated that, unfortunately, the statements of the respondents both in the selection and independent suggestions indicate a probable lack of competence in distinguishing between scientific and non-scientific resource bases, and even using those with questionable practices in respect of intellectual property. Data indicating knowledge of the possibilities of using the resources/publications available in the databases may indicate the need for additional education of students in this field. The results of the answers from different stages of research are inconsistent: on the one hand, a majority of students declare the practice of digital reading, but on the other hand, they lack the skills of advanced search and a low level of knowledge about the selection of this literature. What would indicate that the data on the explanation of the term "publication citation" could indicate? Both factors: the method of access to resources and access time can have (but not necessarily) a direct impact on the level of competence and awareness of respondents. Therefore, special attention should be paid not only to the respondents' declarations, but also to the possibilities at their disposal. Perhaps the activity of these people is related to the ability to access devices, which would have to be verified in a separate statement.

Digital and media literacy calls for media and digital education which are in the process of constant development. However, soft skills, and especially critical thinking should be developed within the framework of an information and communication technology course as well as a media education module. If it is to be anything more than only declaration, digital and media literacy needs sustained programmes of teaching and learning. This means that in schools and universities media and technology should be taught using a complementary approach (Buckingham, 2019).

## 6. Acknowledgements

The research leading to these results has received, within the framework of the "Faculty distance learning platform in improving the quality of preparation of future and active teachers" project, funding from statutory research, financial support by Ministry of Science and Higher Education of Poland. We would like say thanks a lot dr hab. Magdalena Roszak for her support in deep statistic analysing of research results.

## References

- Bar-Haim et al., 2007 – Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M.J., van IJzendoorn, M.H. (2007). Threat-related attentional bias in anxious and non-anxious individuals: A meta-analytic study. *Psychological Bulletin*.
- Baron, 2007 – Baron, J. (2007). *Thinking and Deciding* (4th ed.). New York, NY: Cambridge University Press.
- Borawska-Kalbarczyk, 2015 – Borawska-Kalbarczyk, K., (2015). Kompetencje informacyjne uczniów w perspektywie zmian szkolnego środowiska uczenia się. Warszawa: Żak.
- Buckingham, 2020 – Buckingham, D. (2020) Epilogue: Rethinking digital literacy: Media education in the age of digital capitalism. *Digital Education Review*. 37. June 2020. [Electronic resource]. URL: <http://greav.ub.edu/der/>
- Chunyan Xu, 2017 – Chunyan Xu (2017). A Personalized Recommender System Based on Library Database. *International Journal of Emerging Technologies in Learning (iJET)*. 12(12): 134.
- Chymkowski et al., 2013 – Chymkowski, R., Koryś I., Dawidowicz-Chymkowska, O. (2013). Społeczny zasięg książki w Polsce w 2012 r. [Electronic resource]. URL: <https://www.bn.org.pl/download/document/1362741578.pdf>
- Dezuanni, 2018 – Dezuanni, M. (2018). Minecraft and children's digital making: implications for media literacy education. *Learning, Media and Technology*. 43(3): 236-249. DOI: 10.1080/17439884.2018.1472607
- Doyle, 1992 – Doyle, C. (1992). Outcome Measures for Information Literacy within the National Education Goals of 1990: Final Report of the National Forum on Information Literacy. Summary of Findings. Washington DC: US Department of Education.
- Gawrysiak, 2006 – Gawrysiak, P. (2006). W stronę inteligentnych systemów wyszukiwawczych w sieci Internet. [Electronic resource]. URL: <http://bolek.ii.pw.edu.pl/~gawrysia/publ/missi.pdf>

**Goddard et al., 2011** – Goddard, K., Roudsari, A., Wyatt, J.C. (2011). Automation bias – a hidden issue for clinical decision support system use. *International Perspectives in Health Informatics. Studies in Health Technology and Informatics*. IOS Press. DOI: <https://doi.org/10.3233/978-1-60750-709-3-17>

**González-Martínez et al., 2019** – González-Martínez, J., Esteban-Guitart, M., Rostan-Sanchez, C., Serrat-Sellabona, E., Estebanell-Minguell, M. (2019). What's up with transmedia and education? A literature review *Digital Education Review. Digital Education Review*. 36: 207-222.

**Gul, Bano, 2019** – Gul, S., Bano, S. (2019). Smart libraries: an emerging and innovative technological habitat of 21st century. *The Electronic Library*. 37(5): 764-783. DOI: <https://doi.org/10.1108/EL-02-2019-0052>

**Hazanov, 2018** – Hazanov, I. (2018). Formation of media competence of future teachers in the process of studying pedagogy. *Mediaobrazovanie – Media Education*. 1: 77-88.

**Iasias, Issa, 2015** – Isaias, P., Issa, T. (2015). Information system development life cycle models. in: high level models and methodologies for information systems. New York, NY: Springer. DOI: [https://doi.org/10.1007/978-1-4614-9254-2\\_2](https://doi.org/10.1007/978-1-4614-9254-2_2)

**Jansen, Rieh, 2010** – Jansen, B.J., Rieh, S. (2010) the seventeen theoretical constructs of information searching and information retrieval. *Journal of the American Society for Information Sciences and Technology*. 61(8): 1517-1534.

**Kammerer, Gerjets, 2012** – Kammerer, Y., Gerjets, P. (2012). Chapter 10 how search engine users evaluate and select web search results: the impact of the search engine interface on credibility assessments. In Lewandowski, D. (ed.) *Web Search Engine Research. Library and Information Science*. 4: 251-279. DOI: [https://doi.org/10.1108/S1876-0562\(2012\)002012a012](https://doi.org/10.1108/S1876-0562(2012)002012a012)

**Kazanidis et al., 2018** – Kazanidis, I., Pellas, N., Fotaris, P., Tsinakos, A. (2018). Can the flipped classroom model improve students' academic performance and training satisfaction in Higher Education instructional media design courses? *British Journal of Educational Technologies*. 50(4): 2014-2027. DOI: <https://doi.org/10.1111/bjet.12694>

**Koryś et al., 2015** – Koryś, I., Michalak, D., Chymkowski, R. (2015). Stan czytelnictwa w Polsce w 2014 roku [Electronic resource]. URL: <https://www.bn.org.pl/download/document/1428654601.pdf>

**Koryś, Chymkowski, 2019** – Koryś, I., Chymkowski, R. (2019). Stan czytelnictwa w Polsce w 2018 roku. Wstępne wyniki [Electronic resource]. URL: <https://www.bn.org.pl/download/document/1553593649.pdf>

**Leaning, 2019** – Leaning, M. (2019). Critical Perspectives, An approach to digital literacy through the integration of media and information literacy. *Media and Communication*. 7(2): 4-13

**Morze et al., 2016** – Morze, N., Makhachashwili, R., Smyrnova-Trybulska, E. (2016). Research in Education: Survey Study, In Kostolányova, K. (Ed.), *Information and Communication Technology in Education (ICTE-2016)*, 17th Annual Conference Proceedings, University of Ostrava, Ostrava, Czech Republic, 2016: 114-123.

**Nichols, Stornaiuolo, 2019** – Nichols, T.P., Stornaiuolo, A. (2019). Assembling "digital literacies": Contingent pasts, possible futures. *Media and Communication Open Access Critical Perspectives*: 7(2): 14-24.

**Noskova et al., 2015** – Noskova, T., Yakovleva, O., Pavlova, T., Smyrnova-Trybulska, E. (2015). Students in the Information Environment: A Study of Educational and Extracurricular Activities. *Journal Continuing Engineering Education and Life-Long Learning*. 25(4): 394-410.

**Polizzi, 2020** – Polizzi, G. (2020). Digital literacy and the national curriculum for England: Learning from how the experts engage with and evaluate online content. *Computers and Education*. 152.

**Pondel, 2008** – Pondel, J., Pondel, M. (2008). Pozyskiwanie Informacji z Internetu. *Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu. Informatyka Ekonomiczna*. 12(23): 132-142.

**Pradhan, Agwa-Ejon, 2017** – Pradhan, A., Agwa-Ejon, J.F. (2017). Effectiveness of the online library database in the university: a case study of the University of Johannesburg bunting road campus. *19th Annual International Conference, Global Business and Technology Association (GBATA)*, Vienna, Austria. Volume: Global Business Environment: Gamechangers, Opportunities and Risks.

**Redecker, 2017** – Redecker, C. (2017). European framework for the digital competition of educators (DigCompEdu). [Electronic resource]. URL: <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/european-framework-digital-competence-educators-digcompedu>

- Report...**, 2010 – Report for 2010. [Electronic resource]. URL: <http://www.bn.org.pl/aktualnosci/230-with-reading-still-bad-report-from-the-national-library-research.html>
- Reyna, Meier, 2018** – Reyna, J., Meier, P. (2018). Learner-generated digital media (LGDM) as an assessment tool in tertiary science education: A review of literature. *IAFOR Journal of Education*. 6(3): 93-109.
- Rogińska-Usowicz, 2012** – Rogińska-Usowicz, J. (2012). Czytelnictwo studentów w świetle badań empirycznych. *Biblioteka*. 16(25): 215-256.
- Smyrnova-Trybulska, 2018** – Smyrnova-Trybulska, E. (2018). Technologie informacyjno-komunikacyjne i e-learning we współczesnej edukacji. Katowice: Wydawnictwo Uniwersytetu Śląskiego w Katowicach.
- Smyrnova-Trybulska, 2019** – Smyrnova-Trybulska, E. (2019). Evolution of media competences. "Open educational e-environment of modern university" special edition: 77-92. DOI: 10.28925/2414-0325.2019s7
- Smyrnova-Trybulska, Morze, 2018** – Smyrnova-Trybulska E., Morze N. (2018). *Wybrane teoretyczne i praktyczne aspekty sposobów wyszukiwania informacji do celów dydaktycznych i naukowo-badawczych* 'Zeszyty Naukowe Wydziału Elektrotechniki i Automatyki Politechniki Gdańskiej'. 58: 73-76. [Electronic resource]. URL: <https://pbn.nauka.gov.pl/polindex-webapp/browse/article/article-a373d630-8096-4108-9a89-1d7602b3a05f>
- Smyrnova-Trybulska, Zegzuła, 2018** – Smyrnova-Trybulska, E., Zegzuła, D. (2018). Cooperation of Educational Institutions with Public Libraries in the Context of ICT-Supported Media And Reading Education In Smyrnova-Trybulska, E. (ed.) *E-learning and Smart Learning Environment for the Preparation of New Generation Specialists (E-learning series. 10)*. Katowice – Cieszyn: Studio Noa for University of Silesia: 265-290.
- Statistica 13.0** – Statistica 13.0. StatSoft, Dell, Round Rock, TX.
- StatXact 9.0.** – StatXact 9.0. Cytel Inc., Cambridge, MA, USA.
- Strategic framework...**, 2020 – Strategic framework – Education & Training 2020 [Electronic resource]. URL: [http://ec.europa.eu/education/policy/strategic-framework\\_en](http://ec.europa.eu/education/policy/strategic-framework_en)
- Suto, 2013** – Suto, I. (2013) 21st Century skills: Ancient, ubiquitous, enigmatic? Research Matters: A Cambridge Assessment Publication. [Electronic resource]. URL: <http://www.cambridgeassessment.org.uk/>
- The Faculty...** – The Faculty of Ethnology and Sciences of Education Distance Learning Platform. [Electronic resource]. URL: <http://el.us.edu.pl/weinoe>
- Toff, Nielsen, 2018** – Toff, B., Nielsen, R.K. (2018). "I just Google it": Folk theories of distributed discovery". *Journal of Communication*. 68(3): 636-657.
- Torlińska, 2004** – Torlińska, B. (2004). Alfabetyzm społeczeństwa wiedzy a kompetencje informacyjne. In: Strykowski, W.W. Skrzydlewski, W. (red.). *Kompetencje medialne społeczeństwa wiedzy*. Poznań: Wydawnictwo eMPi2: 368-379.
- Tucker, 2014** – Tucker, V.M. (2014), The Expert searcher's experience of information, information experience: approaches to theory and practice. *Library and Information Science*. 9. Emerald Group Publishing Limited: 239-255. DOI: <https://doi.org/10.1108/S1876-056220140000010012>
- UNESCO...**, 2011 – UNESCO ICT competency framework for teachers (2011). [Electronic resource]. URL: <https://unesdoc.unesco.org/ark:/48223/pf0000213475>
- Vrabec, 2016** – Vrabec, N. (2016). Is Media literacy still one of the priorities for policy makers? Interview with David Buckingham and Alexander Fedorov. *Communication Today*. 7(2): 100-107.
- Vtyurina 2019** – Vtyurina, N. (2019). E-libraries as a resource to support learning and scientific activities at universities. *Scientific and Technical Libraries*. 6: 87-94. DOI: <https://doi.org/10.33186/1027-3689-2019-6-87-94>
- Zhang et al.,** – Zhang, Y., Lewis, M., Pellon, M., Coleman, P. (2007). A Preliminary research on modeling cognitive agents for social environments in multi-agent systems. Department of Computer Sciences, Trinity University. Working paper: 116-123.
- Zurkowski, 1974** – Zurkowski, P.G. (1974). The Information service environment, relationships and priorities. Related Paper No 5. National Commission on Libraries and Information Science, Washington, D.C. National Program for Library and Information Services.