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THEORETICAL AND METHODOLOGICAL FOUNDATIONS OF DEVELOPING FUTURE TEACHERS' SKILLS IN WORKING WITH INTERNATIONAL DATABASES

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Abstract: This article examines the theoretical and methodological foundations of developing future teachers' skills in working with international databases. It analyzes the relevance of international scientific information resources in modern education and explores the relationship between information literacy, digital competence, and research activities. Particular attention is paid to Scopus, Web of Science, ERIC, Google Scholar, and DOAJ databases and their educational potential. Based on international frameworks, including UNESCO's ICT Competency Framework for Teachers and the European Commission's DigCompEdu framework, the article discusses approaches to developing the digital and information competencies of prospective teachers. The main components of database-related skills are identified, and the methodological approaches and pedagogical principles for their development are substantiated.

Keywords: future teachers, international databases, information literacy, digital competence, scientific information, pedagogical competence, research activities, Scopus, Web of Science, ERIC, Google Scholar.

Аннотация: В данной статье научно анализируются теоретико-методологические основы формирования навыков работы с международными базами данных у будущих учителей, их значение и педагогическая необходимость в современной системе образования. Рассматриваются взаимосвязь информационной грамотности, цифровой компетентности и научно-исследовательской деятельности, а также педагогические возможности использования международных научных информационных ресурсов. Особое внимание уделяется базам данных Scopus, Web of Science, ERIC, Google Scholar и DOAJ. На основе международных подходов, в частности рамки компетенций ЮНЕСКО в области ИКТ для учителей и модели DigCompEdu Европейской комиссии, раскрываются возможности развития цифровой и информационной компетентности будущих педагогов. Определяются основные компоненты навыков работы с международными базами данных и обосновываются методологические подходы и педагогические принципы их формирования.

Ключевые слова: будущий учитель, международные базы данных, информационная грамотность, цифровая компетентность, научная информация, педагогическая компетенция, научно-исследовательская деятельность, Scopus, Web of Science, ERIC, Google Scholar.

INTRODUCTION

Globalisation, digital transformation and the rapid advance of information and communication technologies in world education are fundamentally reshaping the requirements placed on the content and quality of teacher training. Today, the educational process is no longer limited to mastering existing knowledge and passing it on to learners; it also encompasses the ability to search for new knowledge independently, analyse scientific information, draw on current research findings and apply them in practice.

In particular, the integration of future teachers into the international scientific information space, their familiarity with pedagogical research conducted worldwide and their ability to apply advanced foreign experience in their professional work are becoming pressing issues. A modern teacher must not only have a deep command of their subject but also be able to locate scientific information, make use of it, assess the reliability of available data and develop new pedagogical solutions.

International databases are one of the key instruments for achieving this. They provide access to scientific articles, research findings, monographs, dissertations and other academic sources published in many countries. As a result, future teachers broaden their scientific outlook, develop independent inquiry and gain the information environment needed to enhance their professional competence.

From this perspective, developing future teachers' skills in working with international databases should be viewed not merely as a technological matter but as an important pedagogical and methodological problem.

The Republic of Uzbekistan is likewise paying particular attention to digitalising the education system, developing the professional competencies of teaching staff and integrating higher education institutions into the international academic and educational space. Specifically, Law of the Republic of Uzbekistan No. ZRU-637 "On Education" of 23 September 2020 and Decree of the President of the Republic of Uzbekistan No. PF-6079 of 5 October 2020 "On approval of the Digital Uzbekistan – 2030 Strategy and measures for its effective implementation" serve as an important regulatory basis for the use of modern information technologies in education and the development of digital skills.

However, the mere availability of international databases does not mean that the skills to use them effectively will emerge automatically. To achieve this, it is necessary to guide students towards purposeful inquiry, teach them scientific search strategies, train them to evaluate sources critically, and develop a methodology for processing scientific data and applying it in pedagogical practice.

The main aim of this article is to analyse the theoretical and methodological foundations of developing future teachers' skills in working with international databases, to reveal the pedagogical essence of this process and to substantiate the priority scientific approaches to organising it effectively.

RESEARCH METHODOLOGY

Developing future teachers' skills in working with international databases is a complex, multi-component pedagogical process, and its scientific study requires several methodological approaches. The systemic, competency-based, activity-oriented, learner-centred and integrative approaches provide an essential theoretical foundation for revealing the content of this process.

The study employed the following methods: review of pedagogical, psychological and methodological literature, comparative analysis, scientific generalisation, classification, systematisation and the study of international experience. In addition, conceptual documents on digital competence and information literacy developed by international organisations were analysed.

The systemic approach makes it possible to study skills in working with international databases as an interrelated set of knowledge, skills, abilities and attitudes. According to this approach, a student's work with scientific information is not a sum of separate operations but a holistic process consisting of consistently interconnected stages.

For example, a student moves through a process that starts with defining a research topic and continues with selecting relevant keywords, searching an international database, screening the sources found, assessing their scientific value and, finally, applying the results in their own research. Each of these stages directly affects the effectiveness of the next.

The competency-based approach, in turn, focuses on developing future teachers' ability to apply independently, in practice, the knowledge they have acquired about using international databases. The emphasis here is not on whether the student knows what a database can do, but on whether they can use it to solve specific scientific and pedagogical tasks.

The activity-oriented approach involves organising work with international databases through practical assignments, independent inquiry, projects and problem situations. This approach enables students to apply theoretical knowledge in real practical situations.

The learner-centred approach requires taking into account students' individual abilities, current level of knowledge, professional interests and experience in handling information. This is because the scientific information needed by students in different teacher-education programmes, and the purposes for which they use it, may differ considerably.

The integrative approach envisages developing skills in working with international databases not within a single course but in close connection with pedagogical, psychological, methodological and information technology disciplines.

The combination of these approaches forms the methodological basis for developing the theoretical knowledge and practical skills that future teachers need in order to work independently in the international scientific information environment.

MAIN BODY

The pedagogical essence of international databases and their role in the education system

In an information society, scientific databases are among the key infrastructural tools for the development of education and science. They facilitate the systematisation, storage, retrieval, dissemination and use of scientific knowledge.

An international database is understood as an electronic information system that collects, describes and indexes scientific information produced in various countries according to defined criteria and enables users to search it. Such systems allow users to quickly identify the data they need for their academic or professional work, study its content and make comparisons.

The pedagogical significance of international scientific databases manifests itself in several ways.

First, they help to enrich the content of education with new scientific developments. A teacher can keep up to date with the latest research in their subject, new methodological approaches and foreign pedagogical practice.

Second, international databases foster students' independent learning. Rather than relying solely on material provided in class, students are able to search independently for academic sources that match their interests and research topics.

Third, these platforms support the development of research competence. Students learn how scientific articles are structured, how research methods are applied, how evidence is presented, and how results are analysed and conclusions drawn.

Fourth, international databases make it possible to compare research carried out in different countries. This helps future teachers develop a broad scientific outlook and critical thinking.

When studying international databases, it is important to distinguish between their functions and information coverage, since not all platforms provide the same type of data.

Table 1. Pedagogical potential of selected international databases

Database	Main feature	Potential in pedagogical practice
Scopus	Indexing of scientific publications and citations	Exploring scientific articles and research, analysing citations
Web of Science	Data on scientific publications and citations	Studying connections between research works
ERIC	Scientific information in the field of education	Searching for sources on pedagogy, teaching methodology and teacher training
Google Scholar	Comprehensive academic search engine	Finding articles, dissertations and academic books
DOAJ	Directory of open access scientific journals	Identifying openly accessible scientific articles

As the table shows, international scientific information resources differ in content, function and the ways in which they can be used. It is therefore not enough simply to teach future teachers the names of these platforms. What matters is developing their ability to select a database suited to a particular research task, to use its search features and to interpret the results correctly.

For example, a pedagogy student researching inclusive education might search ERIC for specialised literature on the topic. At the same time, they could use Google Scholar to identify a range of academic sources, and Scopus and Web of Science to examine the relevant indexed publications and their citation data.

Work of this kind develops the student's culture of handling scientific information and helps them organise the research process purposefully.

The role of information literacy and digital competence in working with international databases

Developing future teachers' skills in working with international databases is directly linked to the concepts of information literacy and digital competence.

Information literacy refers to a person's ability to recognise their need for information, to search for, select and evaluate the necessary data and to use it purposefully. The concept is broader than simple information retrieval: the content, origin and reliability of information, as well as the ethical aspects of its use, also play an important role.

In his article "Information and digital literacies: a review of concepts", David Bawden analyses information literacy and digital literacy as interrelated concepts. In his view, operating in a digital environment is not limited to using technical tools; it also involves intellectual processes such as understanding, evaluating and making effective use of information [1].

This view is highly relevant to developing skills in working with international databases. A student may know how to use a search system, yet if they cannot assess the reliability of a scientific article they have found, the value of using it diminishes.

The conceptual document "Framework for Information Literacy for Higher Education", developed by the Association of College and Research Libraries (ACRL), is of particular importance for developing information literacy.

In this framework, information literacy is explained through six core concepts:

1. Authority of an information source is constructed and contextual.
2. Information creation is a process.
3. Information has value.
4. Research is a process of inquiry and questioning.
5. Scholarship develops through conversation and scholarly debate.
6. Searching for information is a strategic and iterative process [2].

Based on this approach, future teachers should pay attention to the following aspects when using international databases:

- identifying the author of a source and their academic standing;
- examining the journal in which the article was published and the characteristics of the publication;
- analysing the aim and methodology of the study;
- assessing how well the evidence and conclusions in the article are substantiated;
- comparing the source with other academic sources;
- citing the sources used correctly.

Digital competence, in turn, denotes the ability to use information and communication technologies purposefully, safely and effectively. It covers not only a future teacher's work with international databases but also their ability to integrate the information obtained into teaching, create digital resources and develop learners' digital literacy.

Thus, information literacy and digital competence are interrelated concepts that together form the theoretical and practical basis of skills in working with international databases.

Developing the digital and information competence of future teachers: international experience

In modern teacher education, developing the digital competence of future teachers is regarded internationally as an important area of research and practice. Various international organisations have developed conceptual models addressing how educators operate in a digital environment, use scientific information and introduce modern technologies into teaching.

In particular, UNESCO's "ICT Competency Framework for Teachers" supports the development of teachers' competencies in using information and communication technologies.

This framework aims to help educators integrate digital technologies into teaching and learning, improve curricula, organise assessment and sustain their continuous professional development. It also describes stages of competency development such as knowledge acquisition, knowledge deepening and knowledge creation [3].

This concept also provides an important theoretical basis for developing skills in working with international databases, since a teacher's digital competence is closely bound up with using scientific information, processing it and creating new knowledge.

The European Commission's "Digital Competence Framework for Educators" (DigCompEdu) is another significant international approach aimed at building the digital competence of future teachers.

The DigCompEdu model examines educators' digital competence across six areas:

1. Professional engagement and development.
2. Using digital educational resources.
3. Organising teaching and learning.
4. Assessment with digital tools.
5. Empowering learners.
6. Facilitating learners' digital competence [4].

The relevance of this model to working with international databases lies in the fact that it treats selecting, evaluating, creating and responsibly using digital resources, and integrating them into teaching, as key competencies.

Pedagogical principles for developing skills in working with international databases

The development of future teachers' skills in working with international databases should be organised according to specific pedagogical principles.

Principle of scientific rigour. The information presented to students should be scientifically grounded, reliable and based on up-to-date sources. When using international academic databases, it is essential to understand the difference between scientific evidence and subjective opinion.

Principle of systematicity and consistency. Knowledge and skills related to working with international databases should be built step by step, from simple search operations to complex scientific analysis.

Principle of unity of theory and practice. Alongside studying the theoretical features of databases, students should use them to search for and analyse real scientific articles and apply the results in practice.

Principle of independence and active engagement. Priority should be given in the learning process to students' independent inquiry, individual projects and research assignments.

Principle of awareness and critical thinking. Students should not accept all the information they find unconditionally; they must be able to judge independently its origin, scientific grounding, relevance and reliability.

Principle of academic integrity. When using academic sources, students are required to respect copyright, cite correctly, avoid plagiarism and format references in accordance with established rules.

Applying these principles in the educational process develops not only the technical but also the scientific, ethical and professional dimensions of skills in working with international databases.

Pedagogical conditions for developing skills in working with international databases

Effectively developing future teachers' skills in working with international databases requires the creation of certain pedagogical conditions.

The first condition is establishing the necessary digital and information infrastructure at the higher education institution. Stable internet access, electronic libraries, access to international academic platforms and appropriate software play an important role here.

The second condition is integrating into the curriculum dedicated practical sessions focused on the use of international databases. In such sessions, students should conduct inquiries on real research topics and complete practical assignments.

The third condition is improving the methodological preparedness of academic staff in using international scientific information resources. Lecturers should teach students not only how to use the platforms but also how to analyse academic sources and apply them in teaching.

The fourth condition is encouraging students' independent study and research activity. Analysing scientific articles, preparing bibliographic reviews, giving research presentations and carrying out small research projects are effective tools for this.

The fifth condition is developing a system for identifying and assessing the level of skill development. It is necessary to assess not only students' theoretical knowledge but also the results of their practical searches, their ability to evaluate academic sources and how effectively they use them.

Together, these pedagogical conditions make it possible to develop future teachers' skills in working with international databases consistently and purposefully.

Using innovative methods to develop skills in working with international databases

In the modern educational process, developing skills in working with international databases should not be confined to traditional lecture and explanation methods. It is advisable to use innovative pedagogical methods that activate students' practical engagement.

First, the **problem-based learning method** can be used. Students are presented with a specific pedagogical problem or research question. For example, based on the question "How do digital technologies affect primary school pupils' learning?", students search international databases for scientific articles, compare the findings and formulate their own conclusions.

Second, the **project-based learning method** is effective. Students are assigned to prepare a small research project on a given topic using international academic sources. To do so, they must find and analyse relevant articles, compile a bibliography and present their conclusions.

Third, through the **inquiry-based learning method**, students learn to investigate research problems independently, formulate hypotheses, search for sources and draw evidence-based conclusions.

Fourth, the **collaborative learning method** creates opportunities for students to exchange scientific information and learn from each other's experience. Working in small groups, students

carry out a comparative analysis of sources on a single topic retrieved from different international databases.

Fifth, the **digital portfolio method** allows students to keep a systematic record of the skills they have acquired and the research and practical tasks they have completed. A portfolio may contain search results, bibliographies, article analyses and materials from independent research.

For example, in a practical session on "Developing creative thinking in future teachers", students might complete the following tasks:

1. Formulate 5–10 keywords related to the topic.
2. Conduct a search on the ERIC and Google Scholar platforms.
3. Select relevant scientific articles from the sources found.
4. Analyse the aims, methodology and results of the articles.
5. Compare the findings of different studies.
6. Prepare a short analytical review based on the academic sources.
7. Format the references in line with the required bibliographic standards.

Tasks of this kind help students master, in practice, all the main stages of working with scientific information.

Reliability of scientific information and academic integrity in the use of international databases

Using international databases effectively is not simply a matter of finding the right article. The reliability, relevance and scientific grounding of the information found, and the compliance of its use with ethical norms, are equally important.

The following criteria can be used to evaluate scientific information:

- the author's research record and area of expertise;
- the academic standing of the journal in which the article appeared;
- the aim of the study and the soundness of its methodology;
- the reliability of the evidence and results;
- the quality of the references and citations used;
- the article's relevance and topicality to the subject;
- the publication date and scientific novelty.

One important point should be stressed here: indexing in Scopus or Web of Science does not mean that every conclusion in an article is unquestionably correct. The content of an academic source must also be analysed critically. Likewise, not every document found through Google Scholar is automatically a peer-reviewed scientific article.

For this reason, it is necessary to cultivate in future teachers a critical attitude towards information sources.

Academic integrity is an integral part of working with international databases. When using academic sources, students should respect copyright, refrain from appropriating other scholars' ideas, cite properly and format their references correctly.

Furthermore, when generative artificial intelligence tools are used, it is important to verify scientific information, trace it back to its original sources and check the accuracy of automatically generated bibliographic data.

Consequently, in developing skills in working with international databases, information literacy, critical thinking and academic integrity should be fostered as a single pedagogical system.

CONCLUSIONS AND RECOMMENDATIONS

The theoretical and methodological analysis carried out leads to the following conclusions:

1. International databases are important tools in the modern education system for searching, screening, analysing and using scientific information. They offer wide opportunities for broadening future teachers' scientific outlook, developing their independent learning and enhancing their professional competence.
2. Developing future teachers' skills in working with international databases is a complex pedagogical process closely linked to information literacy, digital competence and research activity.
3. International frameworks, in particular the UNESCO ICT Competency Framework for Teachers and DigCompEdu, can serve as a theoretical and methodological basis for developing educators' digital competence. It is advisable to adapt these approaches to the practice of higher teacher education.

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