CHAPTER II
INTERNATIONAL COMMUNICATION AS A TOOL FOR SHAPING THE STATE'S IMAGE

2.1. Adherence to the principles of integrity in international communications as a basis for forming a positive image of the state

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Abstract

The scientific work has examined the adherence to the principle of integrity in international communications and substantiated that integrity in international communications is the foundation for shaping a positive image of the state internationally. The main theoretical approaches to understanding the concepts of "integrity", "virtue", and "honor" have been outlined and emphasized that they belong to key categories of ethics and philosophy as well that allow to establish clear and sustainable principles of justice, personal responsibility for decisions made and actions taken in society. It has been emphasized that international communication involves interaction among people from different cultures, and cultural awareness plays a key role in ensuring its effectiveness. Therefore, by understanding cultural codes and communication norms, one can avoid misunderstandings and conflicts, build trustful relationships and create a favorable environment for shaping a positive image of the state. It has been substantiated that in international communications, the principle of honesty includes not only the obligation to tell the truth, but also to prevent concealing important information, which is particularly relevant in situations where the information has political or economic significance for a state's image. Honesty helps to ensure equal conditions for all party states to the negotiations, where each participant can assess the situation without distortions; accountability for citing sources of information is also important to promote trust, which helps avoid data falsification or data manipulation. It has been noted that unreliable data, especially in the globalization context, can lead to serious consequences, including the escalation of conflicts or the spread of fake news, therefore, in this context, journalists and communicators should pay special attention to fact-checking and refuting false information. It has been proven that honesty and reliability help maintain balance in international communications, providing a healthy foundation for global cooperation. It has been emphasized that principles of responsibility and accountability in international communications are fundamental to upholding ethics and transparency in the global information exchange, as it implies that participants in international communication, including states, international organizations, corporations, and civil society, must be accountable for their actions and decisions. It has been demonstrated that international communication based on the principle of integrity contributes to strengthening a state's positive reputation, enhancing trust in its policies and economic potential, as well as increasing its influence globally. The research findings can be used in subsequent scientific theoretical studies on public diplomacy as a tool for promoting the development of international relations.

Keywords: *international communications, integrity, state image, public diplomacy, globalization.*

Introduction

In today's world, where information spreads instantly, the issue of integrity in international communications is becoming extremely important. States strive to strengthen their positions in the international arena by shaping a positive image that directly affects their reputation, economic attractiveness, and diplomatic relations. In the context of globalization, integrity in communications becomes not only an ethical principle, but also an effective tool of state policy.

The growing role of digital technologies and social media opens up wide opportunities for communication among states, but at the same time creates risks of manipulation, disinformation, and undermining trust. In this context, integrity implies truthfulness, transparency, and accountability in disseminating information. These factors contribute to promoting trust in the state both at the level of international partners and among citizens, which is the basis for sustainable development and international cooperation.

Challenges related to fake news, information wars, and propaganda require the state to have a clear communication strategy based on integrity. Openness and reliability of official statements, accountability for disseminated information, and adherence to international standards contribute to promoting a positive image. States that demonstrate honesty in international communications become more attractive to investors, partners, and tourists.

In contemporary international relations, integrity in communications is not just a desirable quality, but also a necessary condition for promoting trust and long-term cooperation among states. In the age of information, every message, official statement, or diplomatic communication can influence a state's image, its political and economic prospects. The absence of integrity in communications can lead to reputational losses, diplomatic conflicts, and even economic sanctions.

The relevance of the issue raised is stipulated by the need to develop effective mechanisms to ensure integrity in the face of contemporary information challenges. Studying this aspect will allow us to identify best practices in international communications and contribute to strengthening the state's position globally. The relevance of the issue raised is also determined by the threats of disinformation, which has become a powerful tool of hybrid wars as well as manipulation of public opinion.

Fake news, distortion of facts, and propaganda can undermine international relations and erode the authority of states. In such conditions, integrity in communications is a key element of information security and an important factor in strengthening stability worldwide. Furthermore, in a globalized environment, states compete not only for economic influence, but also for the trust of the international community.

Openness, truthfulness, and accountability in international communications contribute to promoting a positive image of the state, attracting investment, strengthening diplomatic ties, and developing cultural exchange. At the same time, a lack of transparency and manipulative communication strategies can lead to isolation and loss of international authority.

Thus, the study of integrity in international communications is extremely important for developing effective mechanisms to counter disinformation, ensure transparency in public policy, and strengthen the state's position in the international arena. Exploring this topic will help find a balance between freedom of speech, state interests, and ethical standards in international relations.

The study of integrity in international communications as a factor of shaping a positive image of the state attracts the attention of many foreign scholars. Among them, it is worth noting the American economist and sociologist Boulding Kenneth (1956)[1], who in his fundamental work "The Image: Knowledge in Life and Society" analyzes how an image is created and changed in society, including the international context, and details the impact of state image on international relations.

The American political scientist J. S., Jr. Nye (2005)[2] developed the concept of "soft power", emphasizing the importance of attraction and integrity in international relations for shaping a positive image of the state. J. S., Jr. Nye (2011)[3] analyzed how the influence of states changes in the modern world, particularly through communications.

The British researcher S. Anholt (2007)[4] studied how states can shape their positive images through strategic communication management. S. Anholt (2016)[5] analyzed how integrity and international communications influence the perception of states in the world. G. Szondi (2008)[6] studied public diplomacy and nation branding, focusing on the role of communications in shaping the international image of the state. G. Szondi (2007)[7] analyzed the shaping Central and Eastern European states' image after political changes. These works are key to understanding the role of integrity in international communications and its impact on the state image.

In recent years, Ukrainian scholars have actively researched the issue of integrity in international communications and its impact on shaping a positive image of the state. In particular, P. Kyrylenko (2023)[8] analyzed integrity as a multi-component phenomenon in public administration and examined various approaches to its

[1] Boulding Kenneth (1956). The Image: Knowledge in Life and Society / Ann Arbor, MI : University of Michigan Press. 175 pp. URL: https://www.beyondintractability.org/bksum/boulding-image

[2] Nye, Joseph S., Jr. (2005). Soft Power: The Means to Success in World Politics. Public Affairs Books. URL: http://www.tinyurl.com/2b5wv9az

[3] Nye, Joseph S., Jr. (2011). The Future of Power. *Bulletin of the American Academy of Arts and Sciences, 64* (3) (SPRING 2011), 45–52 (8 pages). URL: https://www.jstor.org/stable/41149419

[4] Anholt Simon (2007). Competitive Identity: The New Brand Management for Nations, Cities and Regions. URL: https://link.springer.com/book/10.1057/9780230627727

[5] Anholt Simon (2016). Places: Identity, Image and Reputation. URL: https://www.researchgate.net/publication/311270275_Places_Identity_image_and_reputation

[6] Szondi Gyorgy (2008). Public Diplomacy and Nation Branding: Conceptual Similarities and Differences. URL: https://www.researchgate.net/publication/253744488_Public_Diplomacy_and_Nation_Branding_Conceptual_Similarities_and_Differences

[7] Szondi Gyorgy (2007). The Role and Challenges of Country Branding in Transition Countries: The Central and Eastern European Experience. URL: https://link.springer.com/article/10.1057/palgrave.pb.6000044

[8] Kyrylenko P. O. (2023). Integrity in public administration: from an ideal to corruption prevention instrument. *Efficiency of public administration, 1/2* (74/75) [in Ukrainian]. URL: https://epa.nltu.edu.ua/index.php/journal/article/view/520

understanding, proposing a functional approach to defining integrity as a tool for preventing corruption.

V. Yemets et al. (2023)[1] analyzed the use of information and communication technologies, particularly social media, to influence the shaping of public opinion abroad as well as a positive image of the state internationally. A. Mykhailenko (2024)[2] examined the process of shaping Ukraine's image through public diplomacy strategies, focusing on cultural initiatives and the use of information and communication technologies.

O. Yurchenko (2024)[3] considered the instruments of public diplomacy as a form of international communications and their significance in supporting and promoting Ukraine's international image.

S. Illiashenko et al. (2023)[4] analyzed the impact of Ukraine's war-shaped international image and proposed prospects for post-war recovery and innovative development of the state.

However, the study of recent publications has shown a lack of research on integrity in international communications as a factor of shaping a positive image of the state. There is a need to supplement the analysis in the Russian-Ukrainian war context.

Materials and methods

The research is based on an electronic source database and media reports. Various research methods have been used to assess the level of integrity and its impact on international relations. In particular, the content analysis method was used to study integrity in international communications through a systematic study of publications, media content, and official messages related to the image of the state. This approach allowed us to assess which messages, ideas, and images contribute to shaping a positive state image in the international arena, as well as to determine how international media and public diplomats support or provoke negative perceptions through specific practices or communication strategies. During the content analysis, the content was classified according to key categories such as integrity, transparency, ethics, and social responsibility, with the subsequent correlations between them and the state's level of trust in the international context.

The method of comparative analysis of international experience has facilitated the study of practices from various states that successfully integrate principles of integrity into their foreign policy and international communication strategies. The strategies

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[1] Yemets V., Moroz A. (2023). The Role of Social Networks in Shaping the Image of the State during a Full-Scale War. *Mediaforum: Analytics, Forecasts, Information Management.* T. 12 [in Ukrainian]. URL: https://journals.chnu.edu.ua/mediaforum/article/view/235

[2] Mykhailenko A. O. (2024). Formation of the image of Ukraine through the strategies of public diplomacy of Ukraine. *Socio-political studies* [in Ukrainian]. URL: https://dspace.onu.edu.ua/handle/123456789/24057

[3] Yurchenko O. (2024). Public diplomacy as a form of international communications, its role in shaping the image of Ukraine. *Economy and society, 64* [in Ukrainian]. URL: https://economyandsociety.in.ua/index.php/journal/article/view/4339

[4] Illiashenko S. M., Shypulina Yu.S., Illiashenko N. S. (2023). The impact of Ukraine'sinternational image on the prospects of its post-war innovative development. *Marketing and Digital Technologies, 7* (3) [in Ukrainian]. URL: https://mdt-opu.com.ua/index.php/mdt/article/view/313

focused on shaping and maintaining a positive image of the state have been analyzed, taking into account the socio-cultural and political characteristics of each state.

Special attention has been paid to states where ethical standards and transparency in international communications have become the foundation of their influence internationally and the promotion of trust from other states.

The case study method of integrity in international communications has been an important tool for analyzing the effectiveness of shaping a positive image of a state in the international arena. The study of specific cases has revealed how moral principles, ethics, and integrity in communications between state structures and other states contribute to strengthening trust and the positive image of the state. The study of such specific cases has allowed us to assess the impact of transparency, accountability, and diligence on international relations, particularly in the economic, political, and cultural areas, which, in turn, enhances the state's authority worldwide.

The method of network analytics and digital technologies for studying integrity in international communications has involved the use of modern tools to analyze large amounts of data circulating in global information networks, such as monitoring social media, news portals, and other digital platforms to examine feedbacks, publications, and discussions related to the state's image.

Digital technologies not only allowed us to identify potential negative or positive trends in international communications, but also enabled forecasting the impact of certain events or campaigns on the state's reputation. This approach allows states to promptly respond to changes in their image perception and to promote a positive reputation, which is an important factor in international relations.

The survey methods and indexing of integrity research have allowed us to collect data regarding the attitudes of the public, experts, and other participants in communication processes towards the political and economic practices that define the integrity of the state. The survey methods include questionnaires, interviews, and media content analysis, which have revealed both positive and negative aspects of the image.

Integrity indices, such as the corruption perception index, serve to formalize and compare data between states, helping to determine the level of trust in governments and their institutions.

All of these methods are essential for shaping a positive image of the state in the globalization context as well as developing international communications.

The analysis of international legal acts regarding integrity and anti-corruption policy in international communications is an important stage in shaping a positive image of the state internationally. Relevant acts, including international agreements, recommendations, and declarations, establish standards of ethics, transparency, and the fight against corruption that states must adhere to in order to ensure sustainable and fair development. They lay the foundation for international cooperation and demonstrate the state's readiness to ensure integrity in governance and reduce corrupt practices. In this way, states can enhance their reputation, attract investments, and strengthen trust from international organizations and partners.

Modeling scenarios has allowed us to predict the outcomes of various communication strategies in the face of uncertainty. This approach has involved creating hypothetical situations or scenarios, such as launching an international information campaign, responding to crisis events, or conducting large-scale cultural initiatives, in order to assess their impact on the perception of the state by target audiences. Modeling has also helped take into account factors such as cultural differences, the dynamics of the media space, and the reactions of competitors, making international communications more sustainable and effective.

The use of these methods has allowed us to comprehensively assess the level of integrity in international communications and identify effective strategies for improving the state's image. The combination of traditional and innovative approaches have contributed to an objective analysis and the formation of long-term policies in the field of international relations.

Results and Discussion

Reliability, openness, and accountability in interacting with other states and international organizations lay a foundation for trust and cooperation, so one of the most important factors of successful international communications is integrity, which implies adherence to ethical standards, transparency of decisions, and consistency in actions.

Integrity in international relations (Table 1) is manifested through honesty in negotiations, adherence to international obligations, and avoidance of manipulation or misinformation. States that demonstrate high standards of integrity strengthen their reputation, increase the level of trust between partners, and attract investments. This is particularly important for states that seek to enhance their influence in global politics, economics, and cultural exchange.

Shaping a positive image of the state largely depends on its ability to act responsibly and ethically in international relations. Transparency of government institutions, legal stability, and effective diplomacy contribute to strengthening the state's position in the international arena. Thus, integrity becomes not only a moral requirement, but also a strategic advantage determining the success of a state globally.

The term "integrity" is a complex concept encompassing an individual's inner culture, spiritual culture, and it is systematic in nature in terms of norms, values, rules, and responsibility. The Great Explanatory Dictionary of the Modern Ukrainian Language (2001)[1] describes integrity as a property defined as "virtuous", high moral purity, honesty, and a "virtuous" individual is one who lives honestly, adhering to all moral rules.

The concept of "integrity" originates from the Latin word "integritas", which means prudence, completeness, and wholeness, and in a figurative sense – "purity, correctness, and innocence". The root of this word (integer – whole) is preserved in the English word "integrity", which means a state of integrity, unity, as well as the quality of an honest person who has strong moral principles.

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[1] The Great Explanatory Dictionary of the Modern Ukrainian Language (2001). [in Ukrainian]. URL: https://slovnyk.me/dict/vts

Table 1. The principle of integrity in international relations

The principle of integrity	Description	Examples in international relations
Transparency	Openness in decision-making, availability of information to the public and partners	Publication of international treaties, reports of international organizations (UN, EU)
Honesty	Adherence to ethical standards, avoidance of manipulation and deception	Diplomacy without double standards, honest information about foreign policy
Accountability	Willingness to take responsibility for decisions and their consequences	Fulfillment of international obligations, recognition of mistakes in foreign policy
Adherence to international law	Implementation of international treaties, compliance with UN norms, Geneva Conventions, etc.	Respect for territorial integrity of other states, enforcement of international court decisions
Justice	Equal treatment of all participants in international relations, no discrimination	Avoiding double standards in sanctions, equal trade agreements
Cooperation	Interaction between states on the basis of mutual benefit and respect	Global climate change initiatives, international assistance in crisis situations
Peaceful settlement of conflicts	Use of diplomatic methods to resolve disputes	Minsk agreements, nuclear disarmament negotiations
Fighting against corruption	Prevention of corruption schemes, transparency of international project financing	G20 anti-offshore initiatives, UN anti-corruption programs

Source: author's development

M. Toftul (2014)[2] interprets the concept of integrity in the Modern Dictionary of Ethics as "a positive moral quality determined by the consciousness and individual will, which is a generalized stable characteristic of an individual, his/her lifestyle and actions; a quality that characterizes the individual readiness and ability to consciously and persistently focus on the principles of good and justice in his/her activities and behaviour. The presence of integrity in an individual not only indicates his or her social nature (they act in accordance with generally accepted norms), but also that it is a sovereign unit of existence, since it has free will, the ability to make its own choices, independent decisions and actions. Integrity is one of the two forms to objectify morality along with its principles, norms, and prescriptions. However, unlike the latter, which reflect the transpersonal universally significant essence of morality, it expresses individuality and, so to speak, the "arbitrariness" of morality. Integrity is a manifestation of morality as a form of social consciousness, internalized by an

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[2] Toftul M. G. (2014). Modern dictionary of ethics. Zhytomyr : ZhDU. 416 p. [in Ukrainian]. URL: http://eprints.zu.edu.ua/11783/1/%D0%B5%D1%82%D0%B8%D0%BAa-1.pdf

individual and implemented by him/her in specific actions, that is, transformed into a fact of morality".

The concept of "integrity" also belongs to key categories of ethics and philosophy. These categories allow us to establish clear and stable principles of justice, personal responsibility for decisions made, and actions taken in society. In particular, the Short Terminological Dictionary of Professional Ethics has noted that "Virtues are individual positive moral qualities of people; a general moral characteristic of an individual".

V. Shynkaruk (2002)[1] defines the concept of "honour" in the Philosophical Encyclopedia as "a category of ethics that, together with a category of dignity, reveals historical forms of an individual's attitude to himself and attitude towards it on the part of society. However, unlike the category of "dignity" representing the plane of the universal in individual moral consciousness, the category of "honour" highlights the plane of the particular, namely the differentiated assessment of an individual by society, recognition of his or her dignity". As the philosopher asserts "public opinion respects a specific individual for the totality of his/her inherent abilities, physical and spiritual qualities, but the social value, significance of an individual is related in one way or another to the ideals or patterns of behavior dominant in a specific historical environment". At the same time, the individual's attitude towards his/her actions from the perspective of honour is not the highest form of moral self-awareness. With the development of moral culture, the concept of "dignity" comes to the forefront, orienting the individual "I" towards universal human potentialities, values, and ideals.

The development of information technology creates both new opportunities and challenges for maintaining a positive image of the state internationally; therefore, communications play an important role. Both Ukrainian scholars and foreign linguists have studied various aspects of communications. Like any new concept, international communications have not received a systematic understanding among scholars yet. The term "communication" comes from the Latin word "commūnicātio", which means "message". In many European languages, there are similar spellings and pronunciations of this term, namely: in English – "communication", in French – "communication", in German – "kommunikation", which means "interaction, connection, message, and information". Moreover, in English, "communication" also means "dissemination, spread (of disease, etc.)". In Slavic languages, where the term "communication" adapted to the Romance-Germanic language group coincides with synonymous words, namely: in Ukrainian «спілкування», in Belarusian – 'зносіны», and in Polish – "porozumiewanie się".

In scientific sources, the concept of "communication" is presented with varying meanings. In particular, the Great Explanatory Dictionary of Modern Ukrainian (2001)[2] defines "communication as a way of messaging, the connection of one place to another; interaction, the transmission of information from person to person,

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[1] Shynkaruk V. I. (2002). Philosophical encyclopedic dictionary. Kyiv : Abris. 751 p [in Ukrainian]. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi_entsyklopedychnyi_slovnyk.pdf
[2] The Great Explanatory Dictionary of the Modern Ukrainian Language (2001) [in Ukrainian]. URL: https://slovnyk.me/dict/vts

primarily carried out through language. Communication is also referred to as signaling methods of connection in animals". I. Kondratiuk (2016)[3] notes that "Communication is a means of correcting the antisocial manifestation of an individual or group. Since communication is a social process, it shapes society as a whole, fulfilling the function of connection within it".

Yu. Kosenko (2011)[4] presents a broad understanding of this concept, namely: "Communication is a process determined by the situation and the socio-psychological characteristics of communicators, establishing and maintaining contacts between members of a certain social group or society as a whole based on the spiritual, professional, or other unity of the participants in communication, which occurs in the form of interconnected intellectual, cognitive, and emotional-volitional acts, mediated by language and discrete in time and space – that is, in the form of speech acts, acts of a paralinguistic nature and psychophysiological influence, acts of perception and understanding, and so on, related to the processes of fact collection, their storage, analysis, processing, presentation, expression, and, if necessary, dissemination, perception, and understanding, occurring with or without the use of various sign systems, images, sounds (writing, gestures, facial expressions, etc.), means of communication (newspapers, magazines, audio-visual programs, etc.), means of communication (telephone, telegraph, transport, etc.), and the result of which is a specific intellectual, cognitive, and emotional-volitional behavior of the interlocutor, specific results of his/her activities, decisions made that satisfy the members of a certain social group or society as a whole".

V. Kryvenko (2024)[5] states that individual components of communicative activity, proposed by scholars, are somewhat inaccurate and controversial, namely: "firstly, the subject of communication should be considered somewhat broader. In particular, in the context of communication, there is an exchange of information between subjects, where the subject of communication can be ideas, specific knowledge, thoughts or feelings, emotions, etc.; secondly, the need for communication also includes the need for social interaction, emotional support, and information exchange. People communicate for not only self-knowledge or evaluating others, but also to satisfy social, cultural, and practical needs; thirdly, the concepts of "goal" and "objective" generally refer to the aims and focus of activity, but they have different levels of abstraction and details. A goal is the ultimate result that the subject of activity strives for. It is a general guideline defining the focus and meaning of the activity. In turn, an objective is a specific step or stage necessary to achieve the goal. Objectives are more specific and detailed than goals".

[3] Kondratyuk I. B. (2016). Psychological imbalance in the process of communication. *The current state and prospects of linguistic research and translation problems* : theses of reports All-Ukrainian Scientific *Bulletin of Uzhgorod National University,* 13.05. Ivan Franko State University [in Ukrainian].

[4] Kosenko Yu. V. (2011). Basics of the theory of language communication: teaching. Manual. Sumy : Sumy State University. 187 p. [in Ukrainian].

[5] Kryvenko V. V. (2024). Communication: concept, essence, content. Scientific *Bulletin of the Uzhhorod National University. Law series, 84* (1), 71–77 [in Ukrainian]. URL: https://visnyk-juris-uzhnu.com/wp-content/uploads/2024/09/11.pdf

N. Ishchuk et al. (2017)[1] noted, "The existing convention among scholars regarding the use of the term "communication" has a number of concerns related to the phenomenal complexity of human interaction processes. Efforts in certain sciences and communicative philosophy to actualize not only informational and cooperative, but also existential connotations of this concept lead to the obvious "blurring" of its content and scope. According to scholars, the purpose of communication is to serve information and representation functions concerning the unity of communicators".

In scientific literature, international communication is defined as the interaction and exchange of information among different cultures and national groups. V. Chekalyk (2016)[2] considers the issue of state positioning in the media and the use of media tools to shape a positive image, which is important in the context of international communications.

One of the leading foreign scholars researching international communications is the Spanish sociologist and economist M. Castells (2009)[3], known for his works on the information society and network communication. The scholar has studied how globalization and digital technologies influence international information flows, as well as how new media shape public consciousness. His work "The Information Age: Economy, Society, and Culture" is one of the key studies in this field. Another influential researcher is the American political scientist J. S., Jr. Nye (2004)[4], who developed the concept of "soft power" and analyzed how states use international communications, cultural influence, and diplomacy to strengthen their positions in the world. His research is significant for understanding how international media, state branding, and public diplomacy affect international relations.

American researcher of mass communications C. Hallin Daniel et al. (2004)[5] studied the role of journalism in international politics and justified how news and media influence public opinion regarding global events, particularly in conflict zones. Their model of three-sphere media coverage of international events helps to understand how to shape agenda in global journalism and how political factors influence the information space. These works are key to understanding how international communications globally influence politics, society, and culture.

International communications differ from domestic ones in that they involve interaction among representatives of different states, cultures, and linguistic environments. They are an important tool in diplomacy, business, education, and other areas where mutual understanding is globally required. The main difficulty

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[1] Ishchuk N., Ishchuk S. (2017). The concept of communication: plurality of connotations. *East, 1* (147) January-February. WITH, 97–101 [in Ukrainian]. URL: https://skhid.kubg.edu.ua/article/view/97451

[2] Chekalyk V. (2016). Image-Created Media Instruments in the State Image Formation / Integrated communications [in Ukrainian]. URL: https://intcom.kubg.edu.ua/index.php/journal/article/view/41

[3] Castells M. (2009). Communication Power. URL: file:///C:/Users/user/Desktop/Manuel_Castells_Communication_Power_2009.pdf

[4] Nye J. S., Jr (2004). Power in the Global Information Age: From Realism to Globalization. URL: https://www.researchgate.net/publication/281875643_Power_in_the_Global_Information_Age_From_Realism_to_Globalization

[5] Hallin Daniel C., Mancini P. (2004). Comparing Media Systems: Three Models of Media and Politics. URL: https://www.cambridge.org/core/books/comparing-media-systems/B7A12371782B7A1D62BA1A72C1395E43

of such communications is the language barrier, as even with a common language, cultural specifics can influence the information understanding.

The language barrier is one of the main obstacles in international communications; it can complicate mutual understanding among representatives of different cultures and states. It arises due to differences in languages, levels of foreign language proficiency, as well as cultural communication features. One of the main language problems is the difficulty in conveying the exact meaning of words and expressions. Many words can have multiple meanings or be specific to a certain culture, which can lead to misunderstandings. In addition, intonation, gestures, and non-verbal signals can have different meanings in different cultures, which can also lead to communication problems. Furthermore, according to N. Morgunova et al. (2020), "the causes for the language barrier are closely related to low self-esteem and the fear of having to express oneself in a foreign language. From a psychological perspective, it is based on various fears associated with temperament traits, low emotional resilience, and a lowered sense of self-worth".

To overcome a language barrier, it is important to use various communication methods, specifically:

1. The use of international languages, such as English, which is the most widely spoken language of international communication.

2. The application of professional translation and interpreter services, especially in official or business negotiations.

3. The use of simple, clear formulations and avoiding complex linguistic structures.

4. The use of visual aids, such as graphs, diagrams, gestures, that help convey information without words.

5. The improvement of foreign language proficiency through education and practice.

In our opinion, a language barrier is a serious obstacle in international communications, but it can be minimized through the right approach and effective strategies. Important aspects of overcoming this problem include mutual respect, tolerance, and the willingness to understand the interlocutor.

An important specific of international communications is the difference in non-verbal communications. Gestures, facial expressions, and mannerisms can have completely different meanings in different cultures. For example, direct eye contact in Western countries indicates confidence, while in some Eastern cultures it may be perceived as a challenge or disrespect. Such differences require a deep understanding and adaptation during cross-cultural interactions. Without addressing the issue of how non-verbal communications occur and how they correlate with verbal activities, I. Kovalynska (2014)[6] notes, "it is impossible to model communication systems and the process of thinking itself. The real basis for combining different non-verbal subsystems becomes a single semantic language (metalanguage) of non-verbal units and categories. Internal integrity of non-verbal semiotics and the integration of non-verbal semiotics and linguistics within the framework of a general theory of communication can be achieved only on a common semantic foundation".

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[6] Kovalynska I. (2014). Non-verbal communication. Kyiv : "Education of Ukraine" publishing house. 289 p [in Ukrainian]. URL: https://elibrary.kubg.edu.ua/id/eprint/4631/1/I_Kovalynska_NC_GI.pdf

Different approaches to negotiations and decision-making also pose a challenge to international communications. In some cultures, such as American, quick decision-making and openness to risk are valued, while in Japanese or German traditions, careful analysis and consensus are important. This can complicate cooperation between companies or diplomats from different states if they do not consider such differences. According to O. Vygovska (2023)[1], in connection with the new information paradigm, the modern concept of international negotiations "requires a serious revision of old schemes and rules and should rely on the latest information technologies and socio-cultural priorities. This means that for quality preparation for international negotiations, it is necessary not only to carefully select the negotiation dossier as well as develop strategy and tactics, but also to conduct a brilliant information campaign in the mass media that will accompany the negotiation process".

Thanks to globalization and the development of digital technologies, international communications are becoming more accessible, but at the same time, the need for intercultural competence is increasing. It is important not only to know foreign languages, but to understand partners' mentality peculiarities, values, and traditions too. The ability to adapt to these differences contributes to successful communication, mutual understanding, and effective cooperation internationally.

Intercultural competence is a key factor in successful international communications (Table 2). It is defined as the ability to effectively interact with representatives of other cultures, understand their characteristics, and adapt one's behavior according to cultural contexts.

In today's globalized world, intercultural competence is an important skill facilitating effective interaction between representatives of different cultures. One of its key aspects is cultural awareness, which provides an understanding of cultural norms, values, traditions, and communication nuances. A high level of cultural awareness promotes virtuous international communications based on respect, openness, and tolerance.

Cultural awareness implies the ability to be aware of and understand both own culture and the culture of others. It includes knowledge of cultural differences, understanding the influence of culture on behavior and communications, and critical reflection on one's own biases and stereotypes. Developing cultural awareness contributes to adapting to different social contexts, avoiding intercultural conflicts, and fostering intercultural dialogue.

International communication involves interaction among people from different cultures, and cultural awareness plays a key role in ensuring its effectiveness. By understanding cultural codes and communication norms, one can avoid misunderstandings and conflicts, build trustful relationships, and create a favorable environment for cooperation. For example, in business communication, knowledge of the etiquette of different states helps to avoid situations that may seem impolite or unacceptable to partners from another culture.

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[1] Vygovska O. (2023). Theory and practice of international negotiations: teaching method. Manual. Kyiv : University named after B. Grinchenko. 220 p [in Ukrainian]. URL: https://elibrary.kubg.edu.ua/id/eprint/46578/1/O_Vyhovska_TPMP.pdf

Table 2. Key aspects of intercultural competence

Aspect	Description
Cultural awareness	Understanding your own culture and its impact on the perception of other cultures.
Tolerance and openness	Willingness to accept a variety of cultural norms, traditions and values.
Linguistic competence	Knowledge of languages or intercultural communication skills to avoid misunderstandings.
Empathy and respect	The ability to put yourself in the shoes of representatives of other cultures, taking into account their peculiarities.
Flexibility and adaptability	Ability to adapt to different cultural contexts and change communication strategies.
Ethical principles of communication	Adherence to the norms of honesty, justice and responsibility in intercultural contacts.
Knowledge of cultural differences	Awareness of the specifics of norms, values, customs, behavioral patterns of different cultures.
Intercultural interaction and cooperation	Ability to work effectively in an international environment, taking into account cultural peculiarities.
Overcoming stereotypes and prejudices	Critical thinking on own perceptions of other cultures and prevention of discrimination.
Communication skills	Ability to engage in constructive dialogue, active listening, and use of non-verbal signals.

Source: author's development

To increase cultural awareness, various approaches can be used, including:

1) education and self-development – studying the history, traditions, language, and social norms of other peoples;

2) experience of intercultural interaction – traveling, participating in international exchange programs, and volunteering projects;

3) openness to diversity – the ability to listen, analyze, and accept different viewpoints without prejudice.

In our opinion, cultural awareness is an important aspect of intercultural competence promoting harmonious international communications. The development of this skill allows for building trustful relationships, preventing conflicts, and effectively interacting globally. In a world where cultural diversity is the norm, cultural awareness becomes not only a professional, but also a personal necessity for every citizen of the world.

A key aspect of intercultural competence is cognitive flexibility, which promotes effective and virtuous international communications, as it allows individuals to adapt their thinking strategies according to different cultural contexts, avoid stereotypical thinking, and exhibit openness to new ideas. As a result, an individual is not only capable of correctly interpreting communicative signals from representatives of other cultures, but also of appropriately adjusting their own reactions, ensuring understanding without prejudice or conflict.

One important manifestation of cognitive flexibility is the ability to switch between different perspectives, consider situations from the viewpoint of another culture and adapt one's communication approaches. This helps to avoid cultural misunderstandings that may arise from different perception models, behavioral norms, or communication styles. Flexibility in thinking also contributes to effective problem solving in an intercultural environment, as it allows for finding compromise solutions that take into account the needs of all parties.

Ultimately, cognitive flexibility plays an important role in promoting trust and integrity in international communications. An individual who can flexibly respond to cultural differences demonstrates empathy and respect for the values of other nations, which strengthens intercultural ties. This lays a foundation for constructive cooperation, reduces the risks of conflict, and promotes the establishment of ethical standards in global communication.

Tolerance for uncertainty is an important aspect of intercultural competence that contributes to effective and honest international communications. In today's globalized world, people increasingly interact with representatives of different cultures, whose values, behavioral norms and ways of thinking may differ significantly. The willingness to accept ambiguity and adapt to new situations helps to avoid prejudice, reduces the risk of conflict and promotes constructive dialogue among participants in intercultural interactions.

A high tolerance for uncertainty allows people to be more comfortable with situations where rules and expectations are not clearly defined or familiar. This is especially important in intercultural communications, where certain gestures, language expressions or traditions may have different meanings depending on the context. Flexibility in accepting new cultural codes and openness to different points of view promote trust and mutual respect, which is the basis for good communication among people from different cultures.

Tolerance for uncertainty also helps to overcome stereotypes and avoid rushing to judgement about others. It promotes the understanding that different cultural systems are not 'right' or 'wrong', but simply reflect the unique experiences and worldviews of each society. This attitude encourages honest and ethical communications based on mutual respect, openness and a desire to cooperate, even across cultural differences.

Intercultural empathy implies the ability to understand the emotions, values and worldview of other people, avoiding stereotypical thinking and prejudice. Thanks to intercultural empathy, communication becomes more open, which helps to promote trust and mutual understanding among representatives of different states and cultural traditions.

The development of intercultural empathy helps to overcome barriers that may arise due to language differences, cultural backgrounds or different communication styles. An individual who possesses this skill is able to put himself in the place of another, better perceive the context and adapt his behavior according to the situation. This is especially important in international cooperation, diplomacy, business and

education, where understanding and respect for the cultural characteristics of partners determine the success of joint initiatives.

Intercultural empathy also promotes good international communications, because it helps to avoid conflicts based on misunderstanding or cultural differences. It forms a culture of tolerance, respect and openness that allows you to build mutually beneficial relationships without manipulation and discrimination. Thus, intercultural empathy is not only an ethical principle, but also a practical tool for harmonious international communications.

Communication skills are a key aspect of intercultural competence, as they provide an effective exchange of information among representatives of different cultures. The ability to listen, express thoughts clearly and adapt your manner of communication to the context helps to overcome both language and cultural barriers. Non-verbal communication is also an important element, since gestures, facial expressions and intonation can have different meanings in different cultures, which requires attention and sensitivity to context.

Intercultural competence implies openness to dialogue and the ability to take into account the cultural characteristics of the interlocutor, which contributes to promoting trust and mutual respect. An important aspect is tolerance for different points of view, avoiding stereotypes and using language that does not contain prejudices. Developed communication skills help to avoid conflicts and misunderstandings, promoting harmonious cooperation among representatives of different cultures.

Honest international communication is based on honesty, mutual respect, and a desire for understanding. The use of ethical principles in communication, such as openness, accountability, and consideration of cultural contexts, contributes to building productive relationships between people from different states. Thus, communication skills play a key role in strengthening intercultural ties and ensuring effective cooperation internationally.

The challenges in international communications include: the language barrier – difficulties may be related to accent, slang, or professional jargon even with the language knowledge; differences in communication styles – direct and indirect communication, various levels of formality, emotional expressions; ethics and norms of behavior – different perceptions of honesty, politeness, hierarchy, and acceptable manners; lack of cultural understanding – the risk of misunderstandings due to the disregard of the interlocutor's cultural characteristics.

O. Vasylenko (2022)[1] has proposed communicative tactics and advice for promoting effective communications in a culturally diverse environment: to maintain open-mindedness; to have some knowledge of other people's culture; to practise active listening; to pay attention to one's non-verbal communication; to maintain personal contact. According to O. Vasylenko, intercultural communication requires understanding that different cultures have different values, beliefs, behaviors, social

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[1] Vasylenko O. (2022). Intercultural competence: concept, structure, principles and methods of development. *Adult education: theory, experience, perspectives, 22* (2) [in Ukrainian]. URL: http://www.adult-education-journal.com.ua/index.php/aej/article/view/221

customs, and thought patterns, thus, developed intercultural communication skills imply a willingness to accept these differences and adapt to them.

Ways to develop intercultural competence include: education and self-development – the study of cultures, traditions, and mentality of other peoples; practice of international communication – participation in international projects, travels, and exchange of experience; reflection – analysis of one's own interactions with other cultures, taking into account mistakes, and improving skills; active listening – attentive perception of the interlocutor, avoidance of stereotypes and a genuine interest. Intercultural competence is not just a useful skill, but also a necessary condition for successful international cooperation. The development of this competence helps to avoid conflicts, promotes effective communication, and fosters mutual understanding among representatives of different cultures.

In today's world, international communications play a key role in shaping a positive image of the state. They encompass diplomatic relations, cultural exchange, information policy, and interaction with the media. Effective communication allows the state to convey its values, economic achievements, and cultural uniqueness to the international community, which contributes to strengthening its reputation worldwide.

One of the main tools of international communications is public diplomacy (table 3), which involves interaction not only between governments, but also with the other states' public. The perception of a state worldwide can be significantly improved through cultural projects, international educational programs, film, art, sports, etc. For example, hosting international festivals or participating in global exhibitions demonstrates the openness and willingness of the state to cooperate.

Table 3. Aspects of ensuring integrity in international communications

Aspect	Significance in public diplomacy	Role in ensuring integrity
Education programmes	Student exchanges, scholarships, international research initiatives	to shape a positive image of the state and trust
Media and digital communications	Use of social networks and media to shape public opinion	to counteract fake news and promote truthful information
Public diplomacy	Involvement of NGOs and society	to strengthen trust in the country through active participation of society
Economic diplomacy	Promoting international cooperation in business and trade	to guarantee fair economic relations and sustainable development
Cultural diplomacy	Promoting the state's culture, language and traditions	to promote mutual understanding among peoples, to shape a positive image of the state and trust
Crisis and anti-crisis communications	Responding to international challenges and overcoming conflicts	to ensure stability and to solve diplomatic problems

Source: *author's development*

Public diplomacy is aimed at establishing long-term relationships with the public of other states through cultural exchange, education, media, and communication campaigns. Unlike traditional diplomacy focusing on official negotiations between governments, public diplomacy engages broad segments of the population and shapes a positive perception of the state abroad. O. Yurchenko (2024)[1] describes, "The public diplomacy tools as one of the forms of international communications"; he also studies the essence and tasks of public diplomacy in the context of supporting the state's image using a systematic approach".

One of the key areas of public diplomacy is the promotion of national culture and art. Festivals, exhibitions, concerts, and film screenings help to highlight the state uniqueness, its traditions, and achievements. In addition, supporting national cultural figures, athletes, and scientists internationally contributes to shaping a recognizable and positive image of the state. For example, successful participation in Eurovision or the Olympic Games not only enhances the prestige of the state, but also strengthens its position in the global information space.

Educational and scientific diplomacy also plays an important role. Providing scholarships for foreign students, opening cultural centers, and participating in international research programs help strengthen intergovernmental ties and foster a friendly attitude towards the state. Such initiatives contribute not only to academic cooperation, but also create a strong network of international partners who may become bearers of the state's positive image in the future.

In general, public diplomacy is an effective tool for shaping the state image, based on trust, mutual understanding and cooperation. Thanks to an integrated approach to interaction with the international community, the state can strengthen its position in the world, expand political and economic opportunities and ensure stable development in the international arena.

An important aspect is the use of modern media and digital platforms to promote a positive image. V. Kubko (2023)[2] notes that "Digital diplomacy as a form of new public diplomacy through the internet, cutting-edge information and communication technologies, and social networks is a means to strengthen diplomatic relations. Considering the advantages, such as broad reach, greater interaction, and transparency, digital diplomacy has a significant drawback – it is a quite probable factor of disinformation, the presence of manipulations and fakes in the rapid flow of information. However, in combination with traditional methods of conducting foreign policy, digital diplomacy is the most effective means of disseminating information through information and communication means as well as a powerful instrument of foreign policy relations with various public groups and positive modeling of public opinion".

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[1] Yurchenko O. (2024). Public diplomacy as a form of international communications, its role in shaping the image of Ukraine. *Economy and society, 64* [in Ukrainian]. URL: https://economyandsociety.in.ua/index.php/journal/article/view/4339

[2] Kubko V. (2023). Digital Diplomacy in modern international Relations. *Visnyk of the Lviv University. Series Philos.-Political Studies, 50,* 170–176 [in Ukrainian]. URL: http://fps-visnyk.lnu.lviv.ua/archive/50_2023/22.pdf

Social networks, information campaigns and diplomacy on the Internet allow you to quickly respond to crises, refute misinformation and shape an objective perception of the state. A successful communication strategy must include transparency, responsiveness and creativity to engage an international audience and inspire confidence.

Thanks to the global availability of information, social networks, news resources and multimedia platforms allow you to quickly and effectively spread the message about the state, its achievements, culture and international initiatives. The main feature of digital platforms is their interactivity, which allows government agencies, diplomats and public figures to communicate directly with foreign audiences, establishing trustful relationships.

One of the main advantages of digital media is the ability to quickly respond to information challenges and crises. Thanks to the official accounts of governments, diplomatic missions and opinion leaders, the state can refute misinformation, counteract fake news and shape an objective perception of events. For example, in crises, the rapid dissemination of truthful information through Twitter, Facebook or Telegram helps to reduce the negative impact of manipulation and create a transparent information environment.

In addition, digital platforms offer great opportunities to promote the state's culture, economy and tourism potential. The use of video content, virtual tours, blogs and interactive campaigns helps to create an attractive image of the state for an international audience. For example, YouTube channels about national traditions, cuisine, or historical monuments help to promote the state among foreigners, which can have a positive impact on tourism and investment.

Modern media and digital platforms are a powerful tool for shaping a positive image of the state. Their flexibility, speed of information dissemination and the possibility of direct dialogue with the audience allow states to communicate effectively with the world, promote trust and improve their international reputation.

In general, international communications are an integral tool for shaping the image of the state, which affects its political, economic and socio-cultural position in the world. A well-built communication policy contributes to developing international cooperation, attracting investments and strengthening trust from other states, which are important factors of sustainable development and prosperity of the state.

Integrity is one of the key values in international relations, which protomes trust and mutual understanding between states. It implies openness, honesty and responsibility in diplomatic, economic and cultural contacts. In today's world, where information spreads extremely quickly, a state's reputation largely depends on its ability to adhere to ethical principles in international communications.

The shaping of a positive image of the state is directly related to the extent to which its representatives adhere to integrity principles (Table 4). This applies not only to official diplomacy, but also to the activities of business, civil society and the media as well. Transparency in decision-making, compliance with international agreements, and the absence of corruption are the main factors that contribute to strengthening the state's credibility in the international arena.

Table 4. The Principle of integrity in international communications

Principle	Description
Transparency	Openness and honesty in transmitting information, avoiding manipulation.
Privacy	Protection of personal data and compliance with ethical standards for information.
Mutual respect	Respect for cultural and national peculiarities of communication.
Responsibility	Awareness of the consequences of own words and actions internationally.
Reliability	Use of verified sources and avoidance of fake information.
Ethics	Adherence to professional ethics and moral principles
Non-discrimination	Avoiding hate speech, gender, racial and other prejudices.
Cooperation	Willingness to engage in dialogue, compromise and find common solutions.
Compliance with legal regulations	Compliance with international communication laws and regulations

Source: author's development

According to V. Nesterovyts (2016)[1], "an integral feature of contemporary democracy, which is based on the principles of active participation of citizens and their associations in addressing state and public affairs, is the implementation of the principles of openness and transparency".

Transparency and openness are key principles of effective international communications, as they promote trust between states, organizations, and citizens. Open communication about intentions, political decisions, economic agreements, or international initiatives helps avoid misunderstandings and contributes to shaping a positive image of a state or a company worldwide. For example, international organizations such as the UN and the WHO publish their decisions and reports to ensure public control and feedback.

Transparency also plays an important role in diplomatic negotiations and cooperation among states. An honest and openly presented vision of issues and ways to address them helps to avoid conflicts and facilitates the search for compromises. In particular, in the field of international trade, transparency in conducting business, adherence to rules and standards reduces corruption risks and improves interaction between partners.

However, the openness principle implementation requires a balance between publicity and the protection of national interests or confidential information. States and organizations must ensure access to important information while maintaining the necessary level of protection for strategic data. Modern technologies and digital platforms significantly simplify open dialogue, making international communications more accessible and interdependent.

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[1] Nesterovyts V. (2016). Principles of openness and transparency in the activities of state authorities as a prerequisite for approval articipatory democracy. *Fìlosofs'kì ta metodologìčnì problemi prava, 2* (12) [in Ukrainian]. URL: https://philosophy.navs.edu.ua/index.php/philosophy/article/view/364

The foundational principle for ensuring effective and mutual understanding among participants from different cultures and nations is the principle of honesty and reliability in international communications. An important component of this principle is the desire to transmit accurate, verified information without intentional distortions or manipulations. When the information is truthful and honest, it promotes trust between the parties and helps to avoid misunderstandings and conflicts. In particular, in the diplomacy context, the accuracy of facts and the reliability of statements can be crucial for maintaining peace and stability.

In international communications, the principle of honesty includes not only the obligation to tell the truth, but also to prevent the concealment of important information. This is especially relevant in situations where the information has political or economic significance. Honesty helps ensure fair conditions for all party states to negotiations, where each party has the opportunity to assess the situation without distortions. To maintain trust, it is also important to be responsible for identifying the sources of information, as it helps avoid falsification or manipulation of data.

At the same time, at the level of media and public communications, the principle of reliability is a guarantee of high-quality information exchange. Unreliable data, especially in the globalization context, can lead to serious consequences, including the escalation of conflicts or the spread of fake news. In this context, journalists and communicators must pay special attention to fact checking and refuting false information. Integrity and reliability help maintain balance in international communications, providing a healthy foundation for global cooperation.

The principle of responsibility and accountability in international communications (table 5) is fundamental for maintaining ethics and transparency in the global information exchange, as it implies that participants in international communications, including states, international organizations, corporations, and civil society, must be accountable for their actions and decisions. This means that each party state should be prepared to explain their actions, respond to critical remarks, and adhere to international standards, rights, and norms in the communication process.

Accountability requires that subjects of international communications are responsible for their decisions both nationally and internationally. It involves mechanisms for monitoring and evaluating the effectiveness of certain actions that ensure responsibility for one's deeds. This includes not only legal accountability, but also moral and social accountability, as global communications often relate to issues of human rights, ecology, development, and security affecting the lives of millions of people worldwide.

The principle of responsibility and accountability in international communications also contributes to promoting trust among participants in the global dialogue. When parties adhere to transparency and mutual accountability, it helps reduce levels of distrust and conflict, as well as stimulates cooperation that is more constructive. The transparency of actions and accountability for outcomes become important elements of effective diplomacy, economic relations, and international investment, which, in turn, contributes to strengthening international stability and development.

Table 5. Principle of responsibility and accountability in international communications

Principle	Description
Ethical compliance	Use of honest, correct and ethical communication methods without manipulation and misinformation
Accountability	Responsibility for actions and statements, ensuring that information and decisions can be verified
Consistency	Consistent messaging at all levels of international communication to promote trust
Focus on dialogue	Active listening, involvement of international partners and consideration of their opinions in the communication process
Speed of response	Rapid response to crises, negative information campaigns and international challenges
Cultural sensitivity	Taking into account the peculiarities of cultures and traditions of different countries for more effective communication
Diplomaticity	Use of balanced and professional language in international statements and negotiations
Use of modern technologies	Adaptation to the digital age: active use of social media, video messages and interactive formats
Strategic approach	Developing long-term communication strategies to shape a sustainable and positive image of the state

Source: author's development

The principle of respect for international norms and standards in international communications is the basis for developing sustainable and effective interactions between states, organizations and other participants in the international arena.

O. Nalyvaiko et al. (2023)[1] believe that "an important feature is the states' obligation to comply with international legal standards. Given their deontic status, they can be either mandatory instructions or formally binding, or they are recommendations that should be taken into account when designing and modeling all other legal norms". The principle of respect for international norms and standards in international communications implies adherence to behavioral norms established by international agreements and conventions, which contributes to creating a favorable environment for cooperation, maintaining peace and security. This means that all participants in international communications must act according to the norms of international law, not violate the rights of other states, and act with respect for their sovereignty. This principle encompasses not only legal aspects, but also ethical norms that should ensure constructive dialogue among different cultures, languages, and ideologies. In international communications, it is important to take into account the diversity of views and traditions to avoid conflicts and ensure mutual understanding among participants. States can achieve compromises, implement common interests, and resolve contentious issues peacefully only by respecting international standards.

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[1] Nalyvaiko O. I., Bratishko N. A. (2023) Concepts and features of international legal standards human rights. *Analytical and comparative jurisprudence* : electronic scientific publication, 411–418 [in Ukrainian]. URL: https://app-journal.in.ua/wp-content/uploads/2023/05/73.pdf

Preserving the principle of respect for international standards is also important for ensuring stability in global economy, science, education, human rights protection, and other areas. Adhering to these standards creates conditions for promoting mutual trust between states and other subjects of international law, which is the foundation for long-term and mutually beneficial relations in the international environment.

The principle of impartiality and justice in international communications is an important aspect ensuring equality, trust, and effectiveness in global interactions among states, organizations, and individuals. This principle implies that information should be presented without bias, taking into account diverse points of view and without attempting to manipulate facts or distort events. The principle of justice means that all participants in international communications should have equal opportunities to express their opinions and access information relevant to their interests.

Impartiality is important to ensure an honest assessment of situations that avoids conflict and promotes compromises. It provides the opportunity for different states or cultures to interact without the threat of biased attitudes towards one of the party states. At the same time, international organizations, the media, and diplomats must be as objective as possible and ensure that their communication does not contribute to political or economic discrimination, as well as avoids imposing one culture or worldview.

The application of the principle of justice allows for understanding between different nations and enhances international relations. To achieve justice in international communications, it is important to create mechanisms that take into account the interests of less developed states, as well as ensure equality of votes when discussing important issues. Thus, adherence to the principles of impartiality and justice is the foundation for shaping harmonious international relations.

The principle of ethics in interaction and mutual respect in international communications is the foundation for shaping harmonious and productive relationships among people from different cultures, countries, and nations. In this context, the ethics of interaction implies not only adherence to behavioral standards, but also understanding and taking into account the cultural, social, and historical characteristics of each participant. Mutual respect for views, values, and beliefs is the basis for establishing effective dialogue and avoiding conflicts.

International communications often encounter various language barriers, as well as diverse perceptions of time, space, and even etiquette. Considering the ethics of interaction ensures that information is not perceived incorrectly or offensively. This is important for achieving mutual understanding, especially in situations where participants have different cultural backgrounds or interests. Such an approach promotes trust and helps avoid misunderstandings that may arise from cultural differences.

Mutual respect in international communications also contributes to developing cooperation in various fields, from diplomacy to business. When party states to negotiations or business meetings are ready to take into account each other's interests and adhere to the ethics of interaction, it creates an atmosphere of trust

and mutual respect. As a result, even in difficult and controversial situations, the possibility of reaching a compromise and finding common solutions becomes much more realistic.

States with high level of integrity find it easier to attract international investments, receive support in addressing global issues, and strengthen their political stability. The absence of manipulations in communications, honest reporting on events and a responsible attitude towards international obligations contribute to shaping a positive image enhancing the state's appeal to partners and citizens of other states.

Thus, integrity is not only an ethical standard, but also a strategic tool in international communications, as it affects the shaping of a state's reputation, promotes trust from the global community, and contributes to its sustainable development. Adherence to the principles of honesty and transparency allows states to effectively interact in the international arena and achieve long-term positive outcomes.

Conclusions

Integrity in international communications is a key factor in shaping a positive image of the state worldwide, as it encompasses adherence to ethical standards, openness, transparency, and responsibility in interactions with other states, international organizations, and society. In the context of globalization and the rapid spread of information, a state's reputation largely depends on its ability to act honestly and responsibly in foreign policy and diplomatic activities.

Adherence to the principle of integrity contributes to strengthening trust in the state among international partners, citizens, and investors as well. Transparent policies, the absence of corruption schemes and manipulations enhance international cooperation and improve the state's economic prospects. On the contrary, violations of integrity norms can lead to a loss of authority, reduced diplomatic influence, and economic isolation.

Government institutions, media, and civil society play a special role in ensuring integrity. The openness of information policy, the fight against disinformation, and responsible coverage of international relations contribute to shaping a positive image of the state in the international arena. In addition, it is important to adhere to ethical standards in diplomatic negotiations, international trade, and cultural exchange.

Integrity in international communications contributes to establishing sustainable international relations, reduces the risks of conflicts, and promotes international cooperation. States that demonstrate a high level of integrity gain more trust and support from the international community, which in turn positively affects their development and stability.

Recommendations

It is important to ensure openness in international communications to strengthen a positive image of the state. Official statements, diplomatic messages, and information policy must be based on truthfulness, clarity, and adherence to international standards. Transparency in reporting on domestic reforms, economic indicators, and social initiatives promotes trust from the international community, which enhances the state's authority globally.

Adherence to ethical standards in international communications implies the inadmissibility of manipulation, dissemination of false information or propaganda. The state must actively fight against disinformation by creating independent analytical centers and cooperating with international organizations specialized in countering fake news. It is extremely important to support independent media and ensure freedom of speech, which positively affects the state's reputation.

Cultural diplomacy as well as participating in international initiatives can be actively used to shape a positive image of the state. Promoting national culture, education, science, and sports internationally contributes to establishing trustful relationships between states. Cooperation with international organizations, participation in humanitarian projects, and support for global initiatives on human rights and sustainable development enhance the state's authority and demonstrate its integrity in international relations.

References

[1] A large explanatory dictionary of the modern Ukrainian language (2001). Kyiv; Irpin : VTF "Perun". 1440 p. URL: https://slovnyk.me/dict/vts

[2] Anholt Simon (2007). Competitive Identity: The New Brand Management for Nations, Cities and Regions. London. URL: https://link.springer.com/book/10.1057/9780230627727

[3] Anholt Simon (2016). Places: Identity, Image and Reputation. URL: https://www.researchgate.net/publication/311270275_Places_Identity_image_and_reputation

[4] A short terminological dictionary of professional ethics. URL: http://pe.ptngu.com/slovnyk.html

[5] Boulding Kenneth (1956). The Image: Knowledge in Life and Society / Ann Arbor, MI : University of Michigan Press. 175 pp. URL: https://www.beyondintractability.org/bksum/boulding-image

[6] Castells M.(2009). Communication Power. URL: file:///C:/Users/user/Desktop/Manuel_Castells_Communication_Power_2009.pdf

[7] Chekalyk V. (2016). Image-Created Media Instruments in the State Image Formation / Integrated communications [in Ukrainian]. URL: https://intcom.kubg.edu.ua/index.php/journal/article/view/41

[8] Hallin Daniel C., Mancini P. (2004). Comparing Media Systems: Three Models of Media and Politics. URL: https://www.cambridge.org/core/books/comparing-media-systems/B7A12371782B7A1D62BA1A72C1395E43

[9] Illiashenko S. M., Shypulina Yu.S., Illiashenko N. S. (2023). The impact of Ukraine'sinternational image on the prospects of its post-war innovative development. *Marketing and Digital Technologies,* 7 (3) [in Ukrainian]. URL: https://mdt-opu.com.ua/index.php/mdt/article/view/313

[10] Ishchuk N., Ishchuk S. (2017). The concept of communication: plurality of connotations. *Схід,* 1 (147) Jan.-Feb, 97–101 [in Ukrainian]. URL: https://skhid.kubg.edu.ua/article/view/97451

[11] Yemets V., Moroz A. (2023). The Role of Social Networks in Shaping the Image of the State during a Full-Scale War. *Mediaforum: Analytics, Forecasts, Information Management, T. 12* [in Ukrainian]. URL: https://journals.chnu.edu.ua/mediaforum/article/view/235

[12] Yurchenko O. (2024). Public diplomacy as a form of international communications, its role in shaping the image of Ukraine. *Economy and society, 64* [in Ukrainian]. URL: https://economyandsociety.in.ua/index.php/journal/article/view/4339

[13] Kondratyuk I. B. (2016). Psychological imbalance in the process of communication. *The current state and prospects of linguistic research and translation problems* : theses of reports All-Ukrainian Scientific Bulletin of Uzhgorod National University. 13.05. Ivan Franko State University [in Ukrainian].

[14] Kosenko Yu.V. (2011). Basics of the theory of language communication: teaching. Manual. Sumy : Sumy State University. 187 p [in Ukrainian].

[15] Kovalynska I. (2014). Non-verbal communication. Kyiv : "Education of Ukraine" publishing house. 289 p [in Ukrainian]. URL: https://elibrary.kubg.edu.ua/id/eprint/4631/1/I_Kovalynska_NC_GI.pdf

[16] Kryvenko V. V. (2024). Communication: concept, essence, content. *Scientific Bulletin of the Uzhhorod National University. Law series, 84* (1), 71–77 [in Ukrainian]. URL: https://visnyk-juris-uzhnu.com/wp-content/uploads/2024/09/11.pdf

[17] Kyrylenko P. O. (2023). Integrity in public administration: from an ideal to corruption prevention instrument. *Efficiency of public administration, 1/2* (74/75) [in Ukrainian]. URL: https://epa.nltu.edu.ua/index.php/journal/article/view/520

[18] Kubko V. (2023). Digital Diplomacy in modern international Relations. *Visnyk of the Lviv University. Series Philos.-Political Studies. Issue 50*, 170–176 [in Ukrainian]. URL: http://fps-visnyk.lnu.lviv.ua/archive/50_2023/22.pdf

[19] Morgunova N., Prykhodko S. (2020). Language Barriers and the Possibilities of their Supplements in the Process of Learning foreign Language by students of Technical Universities. *Innovative pedagogy, 30* (1), 109–112 [in Ukrainian]. URL: http://www.innovpedagogy.od.ua/archives/2020/30/part_1/24.pdf

[20] Mykhailenko A. O. (2024). Formation of the image of Ukraine through the strategies of public diplomacy of Ukraine. *Socio-political studies* [in Ukrainian]. URL: https://dspace.onu.edu.ua/handle/123456789/24057

[21] Nalyvaiko O. I., Bratishko N. A. (2023) Concepts and features of international legal standards human rights. *Analytical and comparative jurisprudence* : Electronic scientific publication, 411–418 [in Ukrainian]. URL: https://app-journal.in.ua/wp-content/uploads/2023/05/73.pdf

[22] Nye, Joseph S., Jr. (2005). Soft Power: The Means to Success in World Politics. PublicAffairs Books. URL: http://www.tinyurl.com/2b5wv9az

[23] Nye, Joseph S., Jr. (2011). The Future of Power. *Bulletin of the American Academy of Arts and Sciences, 64* (3) (SPRING 2011), 45–52 (8 pages). URL: https://www.jstor.org/stable/41149419

[24] Nye, J. S., Jr (2004). Power in the Global Information Age: From Realism to Globalization. URL: https://www.researchgate.net/publication/281875643_Power_in_the_Global_Information_Age_From_Realism_to_Globalization

[25] Nesterovyts V. (2016). Principles of openness and transparency in the activities of state authorities as a prerequisite for approval participatory democracy. *Fìlosofs'kì ta metodologìčnì problemi prava, 2* (12) [in Ukrainian]. URL: https://philosophy.navs.edu.ua/index.php/philosophy/article/view/364

[26] Szondi Gyorgy (2008). Public Diplomacy and Nation Branding: Conceptual Similarities and Differences URL: https://www.researchgate.net/publication/253744488_Public_Diplomacy_and_Nation_Branding_Conceptual_Similarities_and_Differences

[27] Szondi Gyorgy (2007). The Role and Challenges of Country Branding in Transition Countries: The Central and Eastern European Experience URL: https://link.springer.com/article/10.1057/palgrave.pb.6000044

[28] Shynkaruk V. I. (2002). Philosophical encyclopedic dictionary. Kyiv : Abris. 751 p. [in Ukrainian]. URL: https://shron1.chtyvo.org.ua/Shynkaruk_Volodymyr/Filosofskyi_entsyklopedychnyi_slovnyk.pdf

[29] Toftul M. G. (2014). Modern dictionary of ethics. Zhytomyr : ZhDU. 416 p [in Ukrainian]. URL: http://eprints.zu.edu.ua/11783/1/%D0%B5%D1%82%D0%B8%D0%BAa-1.pdf

[30] Vasylenko O. (2022). Intercultural competence: concept, structure, principles and methods of development. *Adult education: theory, experience, perspectives, 22* (2) [in Ukrainian]. URL: http://www.adult-education-journal.com.ua/index.php/aej/article/view/221

[31] Vygovska O. (2023). Theory and practice of international negotiations: teaching method. Manual. Kyiv : Kyiv. University named after B. Grinchenko. 220 p. [in Ukrainian]. URL: https://elibrary.kubg.edu.ua/id/eprint/46578/1/O_Vyhovska_TPMP.pdf

2.2. International Communication as a Factor in Shaping the Professional Training of Future Experts as well as the State's Image

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Abstract

The paper investigates the impact of international communications on the shaping of professional training of future agrobiologists. The main theoretical approaches to understanding international communications and their impact on the training of future specialists are outlined. The role of international communication in the training of specialists in agrobiology is defined and the tendencies of its development in the modern educational space are traced. The works of domestic and foreign scholars on the integration of international experience into higher agricultural education are studied. A comparative analysis of different approaches to education that include an international component, including the use of English-language teaching materials, participation in international exchange programmes and cooperation with foreign scientific institutions, was performed. Particular attention was paid to the role of international communication platforms, in particular scientific conferences, online courses and academic exchanges, in shaping the professional skills of future agrobiologists. The influence of international communication on the shaping of students' professional

competences, their competitiveness in the labour market and the level of readiness for innovation is defined. It is proved that international communication is not only a means of knowledge transfer, but also an important factor in the professional growth of future agrobiologists in a globalised environment. The article substantiates the role of ethics and cultural sensitivity in international communication, since professionals should be aware of the norms of business communication in different countries, avoid stereotypes and conflicts, and develop the ability to engage in constructive dialogue, which helps to form globally oriented professionals who are able to work successfully in any international environment. It is proved that learning foreign languages, mastering digital technologies for remote collaboration and understanding global agricultural trends is an integral part of the professional training of agrobiologists, and the growing integration of the agricultural sector into the global economy requires new approaches to training that will ensure the competitiveness of future specialists. The study of the impact of international communications on the shaping of professional training of future agrobiologists contributes to the development of innovative approaches to the educational process. The results of the study can be used in further scientific and theoretical research to improve educational programmes that meet international standards and ensure the competitiveness of agrobiology graduates in the international labour market.

Keywords: *international communications, globalisation, professional training, agrobiologists, global agricultural sector.*

Introduction

The relevance of the study of international communication as a factor in shaping professional training of future agrobiologists is due to the globalisation and integration of the global agricultural sector. The modern agrobiological market requires specialists who are able to effectively interact with international partners, apply advanced techniques and technologies, and be well-informed about international agricultural production standards.

Many innovations in the field of agrobiology are developed in international research centres and implemented through joint projects, conferences and exchanges of experience. According to V. Imber et al. (2023)[1], 'Thanks to the introduction and dissemination of innovations in education, an educational system of open, flexible, individualised, creative knowledge, and lifelong learning is being formed. This system should combine the following components: modern educational technologies, new methods and techniques of teaching and learning (pedagogical innovations) and new means of interaction in the educational process, i.e. information and communication technologies.' Therefore, the ability of future agrobiologists to communicate effectively with foreign colleagues is an important factor in their competitiveness. The use of foreign languages in professional activities is becoming not just an advantageous skill but a mandatory component of specialist training.

The importance of international communication is also explained by the need to adapt domestic agricultural production to global requirements for product quality, environmental safety and innovative development. Knowledge of international legislation, certification standards and the ability to participate in international programmes allow agrobiologists to implement new methods in their professional

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[1] Imber V. I., Voytovych I. S., Musiichuk S. M. (2023). Professional training of future specialists in a blended learning environment. *Innovative pedagogy, 66*, 243–246 [in Ukrainian]. URL: http://www.innovpedagogy.od.ua/archives/2023/66/51.pdf

activities more effectively. The role of international communication in the educational process of future agrobiologists is growing due to the active use of open educational platforms, the exchange of educational materials and distance lectures by foreign experts. This contributes to the development of critical thinking, professional mobility and the ability to quickly adapt to new conditions.

International communication contributes to the development of intercultural competence, which is an important aspect for professionals working in multinational teams or cooperating with international organisations. Understanding the cultural characteristics of partners helps to avoid conflict situations and establish effective cooperation. Participation in international internships and grant programmes, as well as in research projects, allows agrobiology students to apply their knowledge in practice, master the latest technologies, and gain valuable experience. This contributes to their professional self-realisation and professional development.

Thus, international communication is a key factor in the formation of high-quality professional training of agrobiologists, providing them with access to modern knowledge, innovation, and international cooperation. It promotes the integration of domestic agricultural science into the global context and increases the competitiveness of graduates. Therefore, improving language training, developing intercultural communication skills and actively involving students in international educational and research programmes are important tasks of modern agrobiology education. This will ensure the training of highly qualified specialists capable of working effectively in the global agricultural space.

The issue of international communication has been the subject of research by many foreign scholars who have analysed its various aspects, including social, political, economic, and cultural. In particular, the Canadian communications philosopher Herbert Marshall McLuhan proposed the concept of a 'global village' and noted that the development of mass media, especially television and the Internet, leads to a reduction in information barriers between countries and the formation of a single information space. His ideas influenced the understanding of international communication in the context of globalisation. McLuhan, Herbert Marshall (1964) presented a conceptual model of the development of society through the prism of communication means, including writing, printing, newspapers, radio, television, telephone, etc.

The American sociologist H. Schiller (1976) studied the influence of transnational corporations and mass media on international communication and developed the concept of 'cultural imperialism', according to which developed countries, in particular the United States, use the media to spread their own values and ideology in other countries. The scholar emphasised the inequality in international information exchange and the need to protect the cultural identity of less developed countries. The British researcher D. McQuail (1983)[1] made a significant contribution to the study of international communication. In particular, the author substantiated the role of the media in the international information space and their impact on society, and the

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[1] McQuail Denis (1983). McQuail's Mass Communication Theory.

interaction of media with political institutions and analysed the impact of global media corporations on local markets. The scientist emphasised the importance of pluralism in international communication and studied the mechanisms of regulation of the global information space.

The Spanish sociologist M. Castells (2009)[2] analysed how digital technologies are changing international communication, political processes and social interaction, as well as explored the role of information technologies in the formation of a 'network society' and described how digital communication technologies are changing international relations and economic development. The scholar noted that the Internet and social media contribute to the democratisation of information, but can also be used as a tool for manipulation and control. His work is important for understanding current trends in international communication. International communication plays a key role in shaping the professional training of future specialists. Various foreign scholars have studied this aspect, emphasising the importance of academic mobility and intercultural interaction in the educational process. Research by foreign scientists shows that international communication and academic mobility are important factors in shaping the professional training of future agrobiologists, facilitating the exchange of knowledge and the development of intercultural competencies.

Ukrainian scholars have made a significant contribution to the study of international communication, particularly in the fields of media theory, political science and social communication. O. Parkhomchuk (2021)[3] has made a significant contribution to the study of international communication. She is the author of numerous publications on international relations, world politics and political issues of global development. Her works help to understand the complex processes of international communication and interaction between states. L. Batsenko et al. (2023)[4] considered different approaches to system analysis, namely: analysis of the system of interaction between international organisations and states in the field of sustainable development, application of SWOT analysis to assess the potential of international organisations and states in the field of sustainable development, identification of key performance indicators to assess the achievement of the sustainable development goal.

These methods will help to assess potential problems and risks in international communications, as well as develop strategies to prevent and resolve them.

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[2] Castells Manuel (2009). Communication Power. URL: https://maestriacomunicacionibero.word-press.com/wp-content/uploads/2014/03/castells-power-in-the-network-society.pdf

[3] Batsenko L. M., Galenin R. V. (2023). Modern challenges of the theory and practice of international communications in the system of administrative management of the organization in the conditions of sustainable development: a systemic approach. *Collection of scientific papers DUIT. Series: Economics and Management, 53*, 58–66 [in Ukrainian]. URL: file:///C:/Users/user/Downloads/em-edition-53-2023-article-6%20 (8).pdf

[4] Batsenko L. M., Galenin R. V. (2023). Modern challenges of the theory and practice of international communications in the system of administrative management of the organization in the conditions of sustainable development: a systemic approach. *Collection of scientific papers DUIT. Series: Economics and Management, 53*, 58–66 [in Ukrainian]. URL: file:///C:/Users/user/Downloads/em-edition-53-2023-article-6%20 (8).pdf

O. Yurchenko et al. (2024)[1] investigated the importance of international communications for the social formation and development of young people as a special socio-demographic group and analysed how scientists interpret the essence of the 'intercultural communication' category and identified several tools of international communications in the youth environment, including youth exchanges, academic mobility, international volunteering, participation in international youth organisations, youth communications within international programmes and competitions.

These works of Ukrainian scholars contribute to the understanding and development of international communication, facilitating the deepening of knowledge about global information processes and interaction between states and organisations. A. Kalensky (2016)[2] studied the key aspects of professional and pedagogical ethics of future teachers of specialised disciplines of higher educational institutions of agrarian and environmental sectors and developed the author's concept of development of professional and pedagogical ethics, in particular a system of theoretical, methodological, scientific, and methodological ideas, provisions and principles of understanding and interpretation of values, norms and rules of professional and pedagogical ethics based on systemic, acmeological, synergistic, cultural, competence-based, and subjective-activity approaches. This serves as the basis of the pedagogical system for the development of professional and pedagogical ethics, describes its information and legal space and interaction with other systems.

However, the study of recent publications has shown a lack of research on international communications as a factor in shaping the professional training of future specialists. Understanding the importance and relevance of the research topic, the issue of shaping the professional training of future agrobiologists require further study.

Materials and Methods

The research is based on electronic sources and media reports. The research methods are based on a comprehensive analysis of international communications as a factor in shaping the professional training of future specialists, in particular agrobiologists. In the process of studying international communication as a factor in shaping the professional training of future agrobiologists, the method of analysis and synthesis of scientific literature was applied, which allowed to identify the main theoretical approaches to the study of international communication, define its role in the training of specialists in the agrobiological sector and trace the trends of its development in the modern educational space. The works of domestic and foreign scholars on the integration of international experience into higher agricultural education were studied.

The synthesis of scientific sources contributed to the formation of a holistic view of international communication as a complex factor influencing the professional

[1] Yurchenko O., Nikonyuk, K. (2024) International communications in the youth environment. *International scientific journal "Internauka". Series: Economic Sciences, 2,* 43–49 [in Ukrainian]. URL: https://elibrary.kubg.edu.ua/id/eprint/49176/

[2] Kalensky A. (2016). Development of professional and pedagogical ethics in future teachers of special disciplines. 2nd ed., ed. and added Kyiv : CP "Comprint". 424 p [in Ukrainian].

training of agrobiology students. A comparative analysis of different approaches to education that include an international component, including the use of English-language teaching materials, participation in international exchange programmes and cooperation with foreign academic institutions, was performed. This made it possible to summarise the key mechanisms for the effective implementation of the international component in the educational process.

The application of the method of analysis and synthesis allowed to substantiate the importance of international communication in the professional training of future agrobiologists and determine its impact on the development of their competences, including foreign language skills, intercultural interaction skills and the use of modern world scientific achievements in their activities. Based on the study, recommendations were developed to improve educational programmes in the international context.

Comparative analysis was a key research method allowing to identify the features and trends in the development of professional training of future agrobiologists in different countries, which involved a systematic comparison of educational programmes, teaching methods, the level of international integration and cooperation of agricultural educational institutions. The main purpose of the comparative analysis was to identify best practices and approaches that can be adapted to improve the national system of training specialists in agrobiology.

The methodological basis of the study included an analysis of curricula, educational standards and competencies of graduates of agrobiology programmes in the European Union, the USA, and Ukraine. The methods used were content analysis of official documents, surveys of teachers and students, and statistical analysis of data on international academic mobility. Particular attention was paid to the role of international communication platforms, in particular scientific conferences, online courses and academic exchanges, in shaping the professional skills of future agrobiologists.

The results of the comparative analysis made it possible to determine the impact of international communication on the shaping of students' professional competences, their competitiveness in the labour market and the level of readiness for innovation. The comparison of educational models helped to identify effective learning strategies that facilitate the integration of international experience into national educational practices. Thus, international communication is not only a means of transferring knowledge but also an important factor in the professional growth of future agrobiologists in a globalised environment.

In this study, the method of an expert survey was used. That method allowed us to obtain informed opinions of experts in the field of agrobiology, who can share their experience and knowledge of the necessary competencies for future professionals. The expert survey involved experts from different countries, which helped to identify specific requirements for the professional training of agrobiologists in the international context. The survey was conducted among experts representing academic institutions, research organisations and agricultural companies. In order to ensure a diversity of opinions, the sample included specialists from different

regions of the country who are engaged in agrobiology. The data collection tool was semi-structured interviews, which allowed experts to freely express their opinions and recommendations on international communication as an important element of professional training.

The data was analysed using qualitative content approach allowing to identify the main topics and trends that experts consider most important for the development of future agrobiologists' skills. The study identified key aspects of international communication that should be taken into account when developing curricula, as well as recommended approaches to integrating international practices into the process of training specialists in the field of agrobiology.

The research method involved the use of quantitative and qualitative approaches to data analysis. The study used surveys and questionnaires among students of agrobiology, which allowed us to collect data on their experience of international communication, level of foreign language proficiency and the use of international relations in the educational process. That made it possible to identify a link between the level of professional training and the degree of involvement in international communications.

The statistical analysis used descriptive statistics to summarise the data obtained, as well as infrastructure methods such as correlation and regression analysis. That allowed us to identify trends and patterns in the impact of international communication on the professional training of future agrobiologists. In addition, the differences in student training depending on their level of activity in international projects and exchange programmes were considered.

The qualitative part of the study included interviews with teachers and specialists in the field of agrobiology, which helped to identify their vision of the role of international communication in education. That allowed us not only to supplement the statistical data, but also to provide a deeper understanding of the problem. The collected data were analysed using specialised statistical processing software, which ensured high accuracy and reliability of the research results.

Results and Discussion

The study of international communication in the context of professional training of future specialists involves an analysis of the role of intercultural interaction in the modern educational process. Globalisation processes facilitate the intensive exchange of information, technologies and working methods, which requires professionals to be able to communicate effectively with representatives of different cultures. The study of international communication covers not only linguistic aspects but also cultural, social, and ethical factors that determine the success of professional activities.

I. Drach et al. (2021)[1] believe that 'Global digitalisation, economic competition, and rapid changes in production contribute to the search for effective ways to modernise educational activities to ensure the training of a new generation of specialists who

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[1] Drach I., Litvynova S., Skornyakova O. (2021). Formation of competitiveness of future IT specialists in the conditions of the information and educational environment of technical colleges [in Ukrainian]. URL: https://journal.iitta.gov.ua/index.php/itlt/article/view/4421

can compete in the modern labour market and able to act in uncommon situations and adapt to the current conditions. Therefore, higher and vocational pre-university education institutions that train future specialists have a high responsibility'.

One of the key features of the study of international communication in the context of professional training of future specialists is an interdisciplinary approach that includes the analysis of pedagogical, linguistic, sociological and economic aspects. It is important to study how international communication affects the development of competences required to work in a multicultural environment. This involves assessing the level of foreign language proficiency, negotiation skills, diplomatic communication, and understanding national characteristics of different countries.

Another important aspect is the introduction of modern educational technologies and interactive teaching methods that promote the development of communication skills. The use of online platforms, participation in international projects, and internships abroad help students better adapt to the international professional environment. It is important to research which methods are most effective in developing communication competence and critical thinking in future professionals.

N. Zakharchuk (2021)[2] notes that 'Communicative competence is understood as the ability to establish and maintain the necessary contacts with other people, a certain set of knowledge, skills, and abilities that ensure effective communication. It involves the ability to change the depth and range of communication, to understand and be understood by the communication partner. Communicative competence is formed in the context of direct interaction, so it is the result of the experience of communication between people. This experience is gained not only through direct interaction but also through indirect interaction, including literature, theatre, and cinema, from which a person receives information about the nature of communication situations, the peculiarities of interpersonal interaction, and the means of solving them. In the process of mastering the communicative sphere, a person borrows from the cultural environment the means of analysing communicative situations in the form of verbal and visual forms'.

Professionals should be aware of the norms of business communication in different countries, avoid stereotypes and conflicts, and develop the ability to engage in constructive dialogue. The study of these aspects helps to develop globally oriented professionals who are able to work successfully in any international environment. A modern agrobiologist must have intercultural communication skills, know international standards of farming, have access to global scientific developments and cooperate with colleagues from different countries. In this regard, the interdisciplinary approach of the study (Table 1) focuses on the role of international communications in ensuring quality education and professional development of students.

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[2] Zakharchuk N. (2021). The role of intercultural communication in the process of training future ecologists. P. 356–358 [in Ukrainian]. URL: file:///C:/Users/user/Downloads/356–358.pdf

Table 1. An interdisciplinary approach to the study of international communication in the context of professional training of future agrobiologists

Discipline	Main Aspects	Relation to International Communication	Application Examples
Agrobiology	Biological basis of agronomy	Understanding biological processes for effective communication with international partners	Discussion of new technologies in agriculture
Economy	Economic principles of agribusiness	Knowledge of international markets and financial mechanisms	Developing strategies for entering international markets
Sociology	Study of social processes	Understanding the social contexts of different countries	Adapting communication strategies in different cultures
International relations	Political and economic relations	Analysing the impact of political decisions on agribusiness	Interaction with international organisations and foundations
Communication sciences	Principles of effective communication	Developing communication strategies for international projects	Creating information campaigns for international partners
Ecology	Human interaction with the environment	Research on international environmental initiatives	Participation in international environmental projects
Cultural Studies	Learning about cultural specifics	Importance of cultural adaptation in international communication	Developing materials for different cultural contexts

Source: author's development

According to M. Yevtukh et al. (2019)[1], 'Globalisation processes have led to a reassessment of the value system and the formation of a new model of relations focused on the awareness of the self-worth of a person as an equal subject of the environment and civilisation relations. Socio-economic and technological transformations, rapid accumulation of knowledge products, innovative technologies and their producers cause restructuring of industry, economy, management, etc., which makes the higher education system, despite its sustainability and preservation of traditional values, reorient to the challenges of society'.

The globalisation of the agricultural sector is gaining momentum, facilitating international trade, spreading innovative technologies and creating new economic opportunities. Open markets and stronger economic relations between countries facilitate the rapid exchange of experience, seeds, fertilisers and modern machinery.

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[1] Yevtukh M., Terentieva N. (2019). Increasing the professionalism of specialists in the educational sphere as one of the areas of human formation with a new type of thinking / Professional training of specialists in the context of new educational realities. *Ukrainian and foreign experience* : monograph. Ivano-Frankivsk : NAIR, 2019. 340 p. URL: https://repository.ldufk.edu.ua/items/116ae1c4-3bb4-4d42-9585-df3bd57bdee8

This is changing approaches to agriculture, increasing its efficiency and resilience to climate challenges. In this context, international communication plays a key role in shaping the professional training of future agrobiologists. Knowledge exchange and participation in international research projects and conferences allow students to gain access to advanced agricultural technologies and methods of organic farming. Cooperation with foreign scientific institutions and agricultural companies helps to broaden the horizons and prepare specialists to work in a global environment.

Modern agrobiologists need to have not only specialised knowledge but also develop effective international communication skills. Learning foreign languages, mastering digital technologies for remote collaboration, and understanding global agricultural trends is an integral part of their professional training. The growing integration of the agricultural sector into the global economy requires new approaches to education that will ensure the competitiveness of future professionals. O. Riddubtseva et al. (2024)[2] note that 'Linguistic and sociocultural competence is an important component of the professional communicative competence of an agricultural specialist in modern settings, because our country is actively developing contacts with foreign countries, which have their own language, culture and communication features that a competent specialist should be aware of'.

The second important aspect is the use of foreign languages as the main instrument of international communication (Table 2). According to N. Bondar (2019)[3], 'Developing the education system in Ukraine and bringing it to the European level are impossible without increasing attention to the teaching of foreign languages. Mastery of a foreign language as a means of communication is required for students to acquire relevant skills and abilities'.

The use of foreign languages as the main tool of international communication plays an important role in the professional training of future agrobiologists. Modern agricultural production and research are actively integrating into the global space, which requires specialists to be able to communicate with colleagues from other countries, share experiences and implement advanced technologies. Knowledge of a foreign language opens up access to relevant scientific literature, international conferences and professional forums, which are key sources of new knowledge in the field of agrobiology.

K. Kudryk (2015)[4] notes that 'Today, the most unifying language for representatives of different countries is English, which has received the status of a global language of international communication, the lingua franca. In the modern world, it has become an integral part of every existing industry. It is an international language of communication, business, science, information technology, tourism, entertainment, etc.'.

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[2] Piddubtseva O., Semak L. (2024). Analysis of educational and normative requirements for the formation of linguistic and sociocultural competence of future agrarians. *Scientific bulletin of the Vinnytsia Academy of Continuing Education. Series: Pedagogy. Psychology,* *5*, 135–140 [in Ukrainian]. URL: https://journals.academ.vinnica.ua/index.php/ped-psyh/article/view/153/143

[3] Bondar N. (2019). Intercultural communication as a prerequisite for foreign language training of specialists in the field of tourism. Actual problems of philology and methods of teaching foreign languages in the modern multilingual space: materials of the All-Ukrainian Scientific and Theoretical Conference. Vinnytsia. P. 8–9 [in Ukrainian].

[4] Kudrik K. O. (2015). English language and international tourism: modern trends of development and interaction. *Collection of scientific works "Pedagogical Sciences", 125.* 71–82 [in Ukrainian].

Table 2. The use of foreign languages as the main tool of international communication in the professional training of future agrobiologists

Aspect	Description
Learning objective	Developing communication skills for effective interaction at the international level in agrobiology.
Importance of foreign languages	Providing access to international research, publications, conferences and cooperation.
Main foreign languages	English, German, and French are the most popular languages for agrobiological research.
Teaching methods	Interactive seminars, group projects, presentations, and discussions of scientific articles.
Course content	Vocabulary of agrobiology, scientific terms, business correspondence, ethics of scientific communication.
Speaking practice	Conducting role-playing games, participating in simulations of international conferences, communicating with native speakers.
Knowledge assessment	Testing, oral presentations, written work, participation in international projects.
Graduates	Trained professionals who are able to communicate with international colleagues and present research and findings.

Source: author's development

Knowledge of foreign languages facilitates the academic mobility of students and teachers of agricultural specialities, allowing them to participate in international educational programmes, internships and projects, which enables future agrobiologists to study at leading universities around the world, learn about the latest agricultural technologies and conduct joint research with foreign colleagues. Further, a foreign language is an important tool when working with international grants and publications, which contributes to the professional growth of specialists in this field.

The importance of foreign languages in the professional activities of agrobiologists is also related to the need to use modern scientific and technical documentation and regulations. Many international standards, patents, and guidelines are published in English, German, or French, so understanding them is a necessary competence for agricultural professionals. In addition, agribusiness is increasingly going international, and knowledge of a foreign language makes it possible to effectively negotiate, enter into contracts and establish cooperation with foreign partners. Learning foreign languages is an important element of the professional training of agrobiologists, as it facilitates integration into the global scientific community, provides access to modern knowledge and technologies, and expands employment opportunities. In the context of the globalisation of the agricultural sector, language skills are becoming not just an additional skill but a necessary component of the professional competence of future specialists.

In the context of improving the professional level of future agrobiologists and their adaptation to the international labour market, international cooperation (Table 3),

academic mobility programmes, joint research projects, and student and faculty exchanges play important role.

Table 3. International cooperation of agricultural education institutions as a tool for international communication in the professional training of future agrobiologists

Cooperation Aspects	Description	Examples
International exchange programmes	Participation of students and teachers in exchange programmes to gain new knowledge and experience.	Erasmus+, Fulbright
Joint scientific research	Implementation of joint projects in the field of agronomy and agrobiology.	Projects with universities in Europe and the USA
Conferences and seminars	Holding and participating in international conferences to exchange experience and ideas.	International agronomic forums
Distance learning	Using online platforms to teach students from other countries.	Coursera, edX, an agronomy platform
Joint internships	Organising internships at agricultural companies abroad for the purpose of gaining practical experience.	Internships at the US and EU agricultural companies
Cross-cultural projects	Projects that promote cultural exchange and the development of intercultural competencies.	International volunteer programmes
Laboratories and research centres	Cooperation in establishing joint laboratories for scientific research.	Joint laboratories with universities
Academic partnerships	Agreements between universities to provide academic support and knowledge exchange.	Partnerships between agricultural universities
Professional development courses	Organising courses for teachers and specialists to share new teaching methods.	Courses on innovations in agronomy

Source: author's development

V. Sinyov et al. (2020)[1] described the concepts of reforming and bases for a long-term vision of the development of domestic higher education. The emphasis is placed on the importance and necessity of studying and implementing the best practices of foreign countries in the terms of higher education. The key parameters for ensuring the competitiveness of a specialist in this field were defined, namely: a high overall level of development of the national education system; assimilation of new and advanced experience gained in the process of cooperation with foreign countries, ensuring the quality of services in the domestic and foreign markets of educational services; availability of high-quality educational and research infrastructure; development of strategic partnerships, development of mobility, etc.

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[1] Sinyov V., Suprun D., Sheremet M. (2020). Trends in professional training of special education specialists in the higher school system. *Higher education of Ukraine, 1* [in Ukrainian]. URL: https://journals.udu.kyiv.ua/index.php/vou/article/view/163

International cooperation between agricultural education institutions plays an important role in the development of modern agricultural science and the training of highly qualified specialists. Through the exchange of experience, the latest technologies and teaching methods are implemented and students gain access to advanced knowledge and practical skills, which contributes to the improvement of educational programmes and ensures the competitiveness of graduates in the international labour market.

According to S. Arkhypova et al. (2020)[1], 'In modern science and practice, the greatest achievements occur at the intersection of different fields and specialities, often quite distant from each other. This "mixture" of different specialists, technologies, and ideas occurs in a certain way in an organised environment where formal, non-formal, and informal education can be organically combined. At the same time, this environment opens up opportunities for students to gradually develop their own individual professional profile'.

International communication, which is implemented through partnership programmes, internships, academic mobility and joint research, allows students and teachers to adapt to the global challenges of the agricultural sector. Cooperation with foreign universities and research institutions helps students to develop critical thinking, intercultural communication skills and the ability to work in a multinational setting.

An important aspect of international cooperation is the introduction of innovative methods in the educational process, such as distance learning, international scientific conferences and online educational platforms. This not only expands educational opportunities, but also contributes to the creation of a common scientific space where future agrobiologists can discuss current issues and jointly seek effective solutions.

We believe that international cooperation is a key tool in the training of future agrobiologists, as it provides them with access to the latest knowledge, technologies and global trends. As a result, graduates of agricultural educational institutions become competitive specialists able to work effectively in the context of globalisation and sustainable development of the agricultural sector. M. Lakatosh (2019)[2] notes that 'the peculiarity of the organisation of the educational process of agricultural educational institutions is their professional orientation to and close connection with agricultural production and the achievements of science and technology in this sector. These are the peculiarities of a separate section of pedagogy called agrarian pedagogy'.

Digital technologies and online platforms play a key role in international communication, which has a significant impact on the professional training of future agrobiologists. Thanks to digital tools, students have access to the most

[1] Arkhypova S., Leshchinsk. O. (2020). Lifelong professional training of specialists in the conditions of formation of the common European educational space : Monograph. Cherkasy : Bohdan Khmelnytsky National University at Cherkasy. 335 p [in Ukrainian]. URL: https://r.donnu.edu.ua/bitstream/123456789/1422/1/28_PDF_Монографія.pdf

[2] Lakatosh M. (2019). Professional training of agrarian profile specialists as a psychological-pedagogical problem. *Scientific Bulletin of Uzhhorod University. Series: Pedagogy. social work, 2* (45), 115–119 [in Ukrainian]. URL: http://visnyk-ped.uzhnu.edu.ua/article/view/170986

up-to-date research, analytics and practical experience of experts from around the world. The use of distance learning, webinars, online courses and knowledge-sharing platforms helps to integrate future agricultural professionals into the global scientific community and improve their training. International digital platforms such as Coursera, EdX, ResearchGate, and others allow students of agrobiology to take courses from leading universities and communicate with scientists from around the world. Agrobiologists also have the opportunity to participate in joint projects, use specialised databases and artificial intelligence to analyse agronomic research. This significantly improves their skills and ensures their competitiveness in the international labour market.

The importance of digital platforms for collecting, processing and analysing agricultural data is worth noting. Thanks to innovative technologies such as satellite monitoring, sensor networks and agribusiness management software, students can gain practical experience while studying. This enables future agrobiologists to apply digital solutions more effectively to improve agricultural productivity and environmental sustainability. Thus, digital technologies and platforms contribute to the formation of highly qualified specialists in the field of agrobiology, providing them with access to global knowledge, professional networks and advanced tools. The use of international communication in the educational process allows students not only to improve their professional competences, but also to develop intercultural skills necessary for a successful career in a globalised world.

International communication in the field of agrobiology is based on effective practices that can be adapted to improve the national system of training. One of the key approaches is the integration of interdisciplinary learning, which involves combining agricultural sciences, biotechnology, ecology and economics. N. Oliinyk (2020)[3] notes that in accordance with the structure of professional training of future specialists in the agricultural sector, which is based on the pragmatic approach and consists of three interrelated components, namely, content, activity-based and personal development, cognitive, activity-based and developmental criteria are distinguished. According to the scientist, such training contributes to the formation of specialists with a broad outlook who are able to work in international projects and adapt advanced technologies to local settings. Domestic education can adopt this approach by expanding the range of courses and deepening cooperation between universities and research centres. V. Nagaev (2011)[4] examined modern didactic means of managing the process of training personnel of higher agricultural education under market economic conditions.

The use of online platforms, international webinars, virtual laboratories and artificial intelligence enables students to acquire knowledge and skills in a global context. Such tools facilitate providing access to global research, best practices in agricultural business

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[3] Oliinyk N. (2020). Criteria, Indicators and Levels of Formation of Professional Training of Future Specialists in the Agricultural Sector on the Basis of Praxeological Approach. *Pedagogical Discourse, 28*, 62–68 [in Ukrainian]. URL: https://ojs.kgpa.km.ua/index.php/peddiscourse/article/view/1073

[4] Nagaev V. (2011). Peculiarities of the training of agricultural specialists using the pedagogical technology of managing the educational and creative activities of students. *Problems of engineering and pedagogical education, 32–33*, 137–140 [in Ukrainian]. URL: http://nbuv.gov.ua/UJRN/Pipo_2011_32-33_21

and modern data analysis methods. The introduction of these technologies into the national education system will help to increase the competitiveness of graduates.

The world's leading universities actively support exchanges, internships and joint research. This practice contributes not only to the expansion of professional experience, but also to the establishment of partnerships that can be useful for the development of agrobiological science. Adapting this practice in the domestic context involves creating more international exchange programmes, expanding cooperation with foreign educational institutions, and involving foreign experts in the educational process.

International communication platforms play an important role in shaping the professional skills of future agrobiologists, providing them with access to the latest research, innovative technologies and global trends in the field of agricultural sciences. In particular, participation in scientific conferences allows students and young researchers to present their projects, receive feedback from leading experts, and establish scientific contacts. Discussion of current issues in agriculture and biotechnology contributes to the expansion of knowledge and the development of critical thinking, which is key to building a successful career in this field. T. Borko (2023)[1] notes that 'There is now a need for urgent measures to protect nature. The only way out of this situation is when humanity realises the problem, changes its outlook and practices. And the solution to this problem is seen in the educational space, in the search for new approaches to education aimed at forming a person ready for active environmental protection and capable of finding optimal solutions to environmental problems. That is why we need high-quality training of environmentally competent specialists who are able to take responsibility for preserving the environment'.

Online courses offered by leading universities and international educational platforms significantly expand the opportunities for obtaining a quality education in agrobiology. They make it possible to study the latest methods of soil analysis, crop cultivation, genetic modification of plants, etc. regardless of where you live. In addition to theoretical knowledge, many of these courses include practical assignments and simulations of real research processes, which helps students to acquire the necessary skills to work in laboratories and at agricultural companies.

Academic exchanges such as the Erasmus+ and Fulbright programmes provide future agrobiologists with a unique opportunity to gain international experience by working at foreign universities and research centres. They are introduced to various research methods, modern laboratory equipment and innovative approaches to farming. In addition to purely academic benefits, such programmes promote intercultural communication, which is an important aspect of working at international companies and on research projects.

In our opinion, international communication platforms, including scientific conferences, online courses and academic exchanges, significantly contribute to the development of professional skills of agrobiologists. They provide access to the latest knowledge, help to expand professional contacts and provide the practical experience

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[1] Borko T. (2023) Environmental competence formation of higher agricultural education [in Ukrainian]. URL: https://dspace.mnau.edu.ua/jspui/bitstream/123456789/16616/1/zbirnyk-tez-21-04-23-36-41.pdf

necessary for a successful career in the field of agricultural sciences. Integration into the global scientific community allows future specialists to keep abreast of the latest scientific achievements and apply them effectively in their work.

International communication plays an important role in the formation of professional competences of agrobiology students (Table 4), making them more in demand in the global labour market.

Table 4. The influence of international communication on the formation of professional competences of agrobiology students and their competitiveness in the labour market

Impact Aspect	Forms of International Communication	Outcomes for Students	Impact on Competitiveness
Gaining up-to-date knowledge	Participation in international conferences, seminars, webinars	Introduction to the latest achievements in the field of agrobiology	Knowledge of advanced technologies and working methods
Development of language skills	Teaching in English, international exchange programmes	Improving professional foreign language skills	Ability to work at international companies and on research projects
Practical experience	Internships abroad, international practical trainings	Gaining skills to work at modern agricultural enterprises	A competitive advantage in employment
Cooperation	Joint research projects, exchange of experience with foreign experts	Expansion of professional contacts, exchange of experience	Opportunities for employment or internships at international companies
Access to advanced technologies	Studying international standards and using innovative technologies	Mastering modern agricultural technologies and farming methods	Meeting the requirements of the modern labour market
Development of soft skills	Work in international teams, participation in discussions	Improving communication skills, adaptability, critical thinking	Leadership skills and ability to work in a multicultural environment
Development of academic mobility	Double-degree programmes, participation in international grants	Oppo-rtunity to study and work abroad	Expanded career prospects

Source: author's development

International communication plays an important role in the training of agrobiology students, expanding their knowledge of current global trends in agricultural science and technology. By participating in international conferences, exchanges, webinars and joint research projects, students gain access to the latest scientific achievements and techniques that facilitate improving their professional competencies. This contributes

not only to the development of analytical thinking but also to the formation of a global outlook, which is important in today's agribusiness environment.

In addition to the academic aspect, international communication allows students to master professional terminology in foreign languages, which increases their ability to work with foreign scientific sources and communicate with specialists from different countries. This is especially important in the context of European integration and Ukraine's cooperation with international agricultural organisations, where knowledge of English or other languages significantly increases work efficiency.

International internships and educational programmes allow students to gain practical experience in different agro-climatic conditions and learn about the latest agricultural technologies. Cooperation with leading universities and companies helps students to develop practical skills, adaptability and critical thinking, which are integral components of competitiveness in the modern labour market. Experience of working abroad or communicating with international experts helps students to expand their professional opportunities and increase their level of mobility.

Thus, international communication is a powerful tool for developing the professional competences of agrobiology students, expanding their knowledge, language skills and practical experience. This ensures their competitiveness in the global labour market, opening up employment opportunities in both domestic and international agricultural companies and research institutions.

In the face of current global challenges, agrobiology plays an important role in ensuring food security, sustainable agricultural development and biodiversity conservation. We talked to leading experts in the field of agrobiology and international education to find out about current trends, innovative solutions and prospects for the development of the industry. Dr. Svitlana Kalenska, Professor and Head of the Department of Plant Science at the National University of Life and Environmental Sciences of Ukraine, emphasises that modern agrobiology is increasingly focused on sustainable production and environmentally friendly technologies.

Viktor Kalenskyi, Professor of the Department of Agrochemistry and Quality of Crop Production named after O. I. Dushechkin at the National University of Life and Environmental Sciences of Ukraine, an expert in international education, explains that cooperation between countries in the scientific and educational space facilitates the exchange of experience and the latest technologies, and international educational programmes, internships and grants help students and researchers from different countries to join forces to solve global agricultural problems. Despite its significant achievements, experts say that the industry faces a number of challenges, including climate change, soil degradation and the need to introduce more environmentally friendly farming practices. It is important to continue investing in education, science and international cooperation to find the best ways to overcome these challenges.

Interviews with experts have confirmed that the development of agrobiology is closely linked to international education, technological progress and an interdisciplinary approach. It is thanks to the combined efforts of scientists,

teachers, and students that the sustainable development of this important industry is possible. Experts in the field of agrobiology believe that international communication not only develops professional competences but also increases the competitiveness of graduates in the labour market. Teaching foreign languages, participation in international exchange programmes and internships are becoming important components of the curriculum of agrobiology faculties, allowing students to be prepared for the challenges of the modern labour market.

Thus, in the modern world, international communication has a significant impact on the formation of professional competences of students of agrobiological specialities. Communication at the international level facilitates the exchange of knowledge and experience, which is especially important in the rapidly changing field of agrobiology. Interaction with foreign colleagues and participation in international projects allows students to acquire new skills, including in research, project management, and innovative technologies. Further, international communication opens up access to modern technologies and methods used in agrobiology in other countries. This contributes not only to raising the level of education but also to the development of critical thinking and creative problem-solving, which are important components of professional competence. Experts emphasise that the ability to work in a multicultural environment is becoming increasingly important in the global labour market.

Conclusions

International communication plays an important role in the professional training of future agrobiologists, helping to broaden their horizons and integrate them into the global agricultural community. Thanks to international knowledge exchange, students gain access to advanced research, innovative technologies, and modern farming methods. This enables future specialists not only to learn best practices but also to adapt them to the specifics of the national agricultural sector.

One of the key aspects of international communication is cooperation with educational and research institutions in other countries. Academic mobility programmes, international conferences and internships help students to improve their skills, expand their professional contacts and develop intercultural competence. This ensures the formation of highly qualified agrobiologists who are able to work effectively in the global market.

Mastery of foreign languages, especially English, which is the main language of scientific communication, has a significant impact on the professional training of future agrobiologists. Fluency in foreign languages allows students to access relevant scientific information, participate in international projects, and interact effectively with foreign colleagues. This greatly expands their opportunities for career growth and the fulfilment of their professional potential.

International communication is an important factor in shaping the professional training of future agrobiologists, facilitating their integration into the international scientific and industrial community. It ensures access to advanced knowledge, promotes academic mobility and the development of language competencies, making graduates competitive in the global labour market.

Recommendations

It is recommended to intensify cooperation between Ukrainian agricultural universities and international educational and research institutions, which may include participation in joint research projects, exchange of students and teachers, and the signing of double-degree agreements. Such interaction will help to improve the level of professional training of future agrobiologists and their integration into the global agricultural community.

It is necessary to strengthen the teaching of foreign languages, especially English, since it is the main language of international scientific communication. This can be done by introducing specialised language courses for agricultural majors, encouraging students to participate in international conferences, and using bilingual teaching in certain disciplines.

Students and teachers should be encouraged to participate in international educational programmes such as Erasmus+, Horizon Europe, etc. To this end, it is important to expand information campaigns about study and internship opportunities abroad, simplify paperwork procedures, and develop financial mechanisms to support mobility.

It is recommended to introduce the best international practices in agrobiology into curriculums, which may include the use of modern foreign textbooks, lectures by invited foreign experts, and the use of interactive teaching methods, such as distance learning courses from leading universities.

The implementation of these recommendations will facilitate the formation of highly qualified agrobiologists, who are able to work effectively in a globalised agricultural sector, and the introduction of advanced technologies into agricultural production process.

References

[1] Arkhypova S., Leshchinsk. O. (2020). Lifelong professional training of specialists in the conditions of formation of the common European educational space: Monograph. Cherkasy : Bohdan Khmelnytsky National University at Cherkasy. 335 p. URL: https://r.donnu.edu.ua/bitstream/123456789/1422/1/28_PDF_Монографія.pdf

[2] Batsenko L. M., Galenin R. V. (2023). Modern challenges of the theory and practice of international communications in the system of administrative management of the organization in the conditions of sustainable development: a systemic approach. *Collection of scientific papers DUIT. Series: Economics and Management, 53*, 58–66 URL: file:///C:/Users/user/Downloads/em-edition-53-2023-article-6%20 (8).pdf

[3] Bondar N. (2019). Intercultural communication as a prerequisite for foreign language training of specialists in the field of tourism. *Actual problems of philology and methods of teaching foreign languages in the modern multilingual space* : materials of the All-Ukrainian Scientific and Theoretical Conference. Vinnytsia. P. 8–9.

[4] Borko T. (2023) Environmental competence formation of higher agricultural education URL: https://dspace.mnau.edu.ua/jspui/bitstream/123456789/16616/1/zbirnyk-tez-21-04-23-36-41.pdf

[5] Castells Manuel (2009). Communication Power. URL: https://maestriacomunicacionibero.wordpress.com/wp-content/uploads/2014/03/castells-power-in-the-network-society.pdf

[6] Drach I., Litvynova S., Skornyakova O. (2021). Formation of competitiveness of future IT specialists in the conditions of the information and educational environment of technical colleges. URL: https://journal.iitta.gov.ua/index.php/itlt/article/view/4421

[7] Dyer-Wiseford Nick, Matvienko Svitlana (2021). Cyber war and revolution. Publisher : Kritika, 328 p.

[8] Imber V. I., Voytovych I. S., Musiichuk S. M. (2023). Professional training of future specialists in a blended learning environment. *Innovative pedagogy, 66,* 243–246 URL: URL: http://www.innovpedagogy.od.ua/archives/2023/66/51.pdf

[9] Yevtukh M., Terentieva N. (2019). Increasing the professionalism of specialists in the educational sphere as one of the areas of human formation with a new type of thinking. *Professional training of specialists in the context of new educational realities: Ukrainian and foreign experience* : monograph. Ivano-Frankivsk : NAIR, 2019. 340 p. URL: https://repository.ldufk.edu.ua/items/116ae1c4-3bb4-4d42-9585-df3bd57bdee8

[10] Yurchenko O., Nikonyuk, K. (2024) International communications in the youth environment. *International scientific journal "Internauka". Series: "Economic Sciences", 2,* 43–49. URL: https://elibrary.kubg.edu.ua/id/eprint/49176/

[11] Kalensky A. (2016). Development of professional and pedagogical ethics in future teachers of special disciplines. 2nd ed., ed. and added Kyiv : CP "Comprint". 424 p.

[12] Kudrik K. O. (2015). English language and international tourism: modern trends of development and interaction. *Pedagogical Sciences* : collection of scientific works, *125,* 71–82.

[13] Lakatosh M. (2019). Professional training of agrarian profile specialists as a psychological-pedagogical problem. *Scientific Bulletin of Uzhhorod University. Series: "Pedagogy. Social work", 2* (45). 115–119. URL: http://visnyk-ped.uzhnu.edu.ua/article/view/170986

[14] McLuhan, Herbert Marshall (1964). Understanding Media: The Extensions Of Man. 1st Ed.: McGraw Hill, 1964; Reissued by MIT Press, 1994 URL: https://designopendata.wordpress.com/wp-content/uploads/2014/05/understanding-media-mcluhan.pdf

[15] McQuail Denis (1983). McQuail's Mass Communication Theory.

[16] Nagaev V. (2011). Peculiarities of the training of agricultural specialists using the pedagogical technology of managing the educational and creative activities of students. *Problems of engineering and pedagogical education,* 32–33, 137–140. URL: http://nbuv.gov.ua/UJRN/Pipo_2011_32-33_21

[17] Oliinyk N. (2020). Criteria, Indicators and Levels of Formation of Professional Training of Future Specialists in the Agricultural Sector on the Basis of Praxeological Approach. *Pedagogical Discourse, 28,* 62–68. URL: https://ojs.kgpa.km.ua/index.php/peddiscourse/article/view/1073

[18] Parkhomchuk Olena (2021). *Globalization as a megatrend of world politics: interconf,* 93, 46–62. URL: https://ojs.ukrlogos.in.ua/index.php/interconf/article/view/17607

[19] Piddubtseva O., Semak L. (2024). Analysis of educational and normative requirements for the formation of linguistic and sociocultural competence of future agrarians. *Scientific bulletin of the Vinnytsia Academy of Continuing Education. Series "Pedagogy. Psychology", 5,* 135–140. URL: https://journals.academ.vinnica.ua/index.php/ped-psyh/article/view/153/143

[20] Schiller Herbert (1976). Communication and Cultural Domination. URL: https://www.yakaboo.ua/revival-communication-and-cultural-domination-1976.html?srsltid=AfmBOoqo-eXRmAWc1UkeZKvckyeM5g3GrZPCmNC-HMvjpAZClxA5hPs9

[21] Sinyov V., Suprun D., Sheremet M. (2020). Trends in professional training of special education specialists in the higher school system. *Higher education of Ukraine, 1.* URL: https://journals.udu.kyiv.ua/index.php/vou/article/view/163

[22] Zakharchuk N. (2021). The role of intercultural communication in the process of training future ecologists. P. 356–358 URL: file:///C:/Users/user/Downloads/356-358.pdf

2.3. International Communication in the Modern Scientific Environment as a Tool for Shaping the State's Image

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Abstract

The modern world is experiencing a period of globalization in all spheres of social life. Information technologies play an important role in this process, and their role is becoming particularly acute and controversial. However, the problem of the influence of information technologies on globalization and the transformation of communication interaction of the scientific community today is still poorly studied. The beginning of the 21st century is characterized by the rapid growth of the development of science, which in turn was provoked by both the development of technical means used in science and the development of technology in scientific knowledge itself. One of such technologies is grid computing, which emerged as a new important area of computing, differing from the traditional one in its focus on innovative applications associated with the need to share large-scale resources and provide the possibility of high-performance data processing. The section presents a study of the phenomenon of Grid computing in the context of globalization processes of modern science. The new information structure being created is already being used to solve a wide range of problems: in high-energy physics, cosmophysics and astronomy, meteorology, biomedicine and pharmacology, aircraft construction and other areas. The complexity and multifaceted nature of the topic requires an analysis of the functioning of the information network, the problems of its development have become more acute in the last decade due to the global consequences of economic, political and cultural transformations. Reflection on these trends encourages philosophers of science to rethink the worldview problems of the development of science and its impact on society.

Keywords: communication, international communication, scientific communication, globalization, information, innovative technologies, Internet, grid, grid technologies.

Introduction

The turn of the millennium can rightly be described as the era of globalization. The trends of integration of cultures, intellectual potentials, technologies have become dominant in social development, which today determine not only social progress, but also the transformation of the communicative space of billions of people. The modern world is experiencing a period of globalization in all spheres of social life. Information technologies play an important role in this process, and their role is becoming especially acute and contradictory.

A special role in the merger of human communities is played by the computer revolution and the improvement of electronic communication systems. Today, almost any person with quite modest material capabilities can exchange news with a resident of any continent within a few minutes, watch a television show from any city using satellite communication, "go" to a museum, and also visit a library using the Internet. The Internet is becoming one of the main factors of globalization. The expansion of access to the means of receiving and transmitting information is occurring at an

avalanche-like pace, which leads to a sharp increase in the number of factors that connect individuals around the world.

The globalization of the modern communicative space opens up new prospects for society and man, but at the same time it generates a fairly wide range of risks. In particular, this type of risk can include the risks of human development itself, the crisis of the modern education system, hyperurbanization and a number of others.

Materials and Methods

Our research is based on the analysis of electronic sources, media and scientific publications. The research methods were based on the analysis of the development of communication processes in the scientific environment of today.

The analysis of communication processes in the modern scientific environment allowed us to characterize the specific features of the development of knowledge in fundamental science. The global nature of scientific projects creates a need for the creation of a geographically distributed infrastructure that is able to combine a multitude of resources of different types, access to which the user can get from any point, regardless of their location

Content analysis as a research method allowed us to assess the content of publications in electronic sources, media and scientific publications, which contributed to the actualization of the problem of communication in the scientific community in the context of the formation of a system of distributed information resources, thanks to which a consistent, open and standardized environment is created that provides a flexible, secure, coordinated distribution of computing resources and information storage resources that are part of this environment, within the framework of one virtual organization.

Comparative analysis allowed to reveal the essential characteristics of communication processes and strategies for the development of scientific interaction in the globalized information environment of science of the 21st century.

Modeling helped to take into account the factors of improving the interaction of scientific teams and collaborations, in the context of the development of scientific and technological means of the information world era.

All stages of the study contributed to a comprehensive consideration of the essential aspects of the development of international scientific communication in the process of systemic transformation of information interaction and digitalization of the global world. Each method was necessary to achieve the main goal – to study the impact of information technologies on communication processes in the scientific community.

Results and Discussion

The complexity of the problems facing modern society is extremely high, and each of the above-mentioned problems is influenced by a multitude of interwoven factors, is in turn the result of complex processes, each problem entails a whole complex of new problems, new extreme situations, new understandings. For example, the crisis of nation-states, which is a consequence of globalization, forces us to reconsider such recently undeniable categories as sovereignty, nationalism, ethnicity, national security, etc. States show their powerlessness in controlling the movement of money, migration

flows, in confronting violence, they cannot eliminate budget deficits, pay their debts. And this is only one aspect of each problem. It should be borne in mind that most global problems are closely intertwined, complementing each other.

Among the many assessments of globalization, there are both positive and negative. F. Fukuyama (1992) believes that "increasing interdependence will lead to an increase in the standard of living of peoples, to the emergence of a single international system focused on technological values, and the incentive to subjugate other states will disappear"[1]. At the same time, there are also directly opposite assessments and forecasts.

Nevertheless, despite all the complexity, from the point of view of synergetic philosophy, the processes taking place today in political and economic globalization are a natural process, independent of the will of individuals. The implementation of various scenarios depends on many factors, including human. At the same time, to discuss the possibility of changing the scenario, it is necessary, first of all, a deep analysis of the processes taking place at the present time and the expected results both in the near and distant future.

From the point of view of synergetic philosophy, crisis situations always initiate the search for new ways out of them. This is noticeable both in the field of new political and strategic decisions and in the field of new technologies that bring society, as a system, to a higher level, where new opportunities open up, although at the same time, usually new problems also appear. At a time when in some societies, on the one hand, tendencies towards isolationism are clearly visible, and on the other hand, electronic communications networks repeatedly enhance the possibilities of people's communication, as a result of which entire subcultures with a global structure arise.

Also, in today's complex society, there is a need for increasingly complex management systems, which are naturally associated with globalization. Modern machines: airplanes, spacecraft, submarines – are becoming increasingly complex, they contain so many sensors that a person can no longer cope with analyzing their data. Therefore, there is a need to create a more advanced computer "nervous system" and a neutral "brain" that controls these machines.

According to the well-known Moore's law, such parameters as the density of elements and the speed of microprocessors double every 18 months. The computerization of all spheres of social activity in everyday human life is the most impressive phenomenon of recent years. In the most developed countries of the West, the number of computers per thousand inhabitants has reached unprecedented proportions. To achieve the same level of prevalence that a computer has by the beginning of the 21st century, it took about forty years for a television set at one time, and seventy for a car. In addition to quantitative growth, any analyst is greatly impressed by the growth in the number of functions – ways of using computer technologies. From a simple calculating machine, now called by the half-forgotten abbreviation EOM, a computer has turned into a universal device that can equally serve as a professional tool for a scientist, engineer, businessman, lawyer, doctor,

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[1] Fukuyama F. (1992). The End of History and the Last Man. N. Y., p. 44; Schell J. (2000). The Folly of Arms Control. URL: https://www.researchgate.net/publication/272544352_The_Folly_of_Arms_Control

as well as a means of learning, everyday communication and entertainment. Computerization will contribute to the increase in the interest of sociologists-theorists and will be interpreted in models of the transformation of modern society as a key trend. However, the scientific community, in general, follows the path of "embedding" new trends in a general series with previous ones. The most popular is the thesis that claims that the spread of personal computers and computer networks (especially the development of the Internet) is a decisive step on the way to an information society.

The infrastructure of the information society is a new "intellectual", not "mechanical" technology. Social organization and information technology form a "symbiosis". Society enters the "technetronic era", when social processes become programmable.

An information society of this type has not developed, although the main technical and economic attributes of the post-industrial era are present: the predominance of the share of services in GDP, a decrease in the share of employment in the "secondary" and an increase in the share of the "tertiary" sector of the economy, total computerization, etc. The university did not replace the industrial corporation as the basic institution of the "new society", rather, academic knowledge was incorporated into the process of technical production. Today, society is little like a holistic programmed system of institutions. It is, according to the same A. Touraine (1969), more like a mosaic field of debates and conflicts over the social use of symbolic goods. The forecasts of the theorists of the information society turned out to be untenable primarily because their authors identify information and knowledge. Information in modern society is a commodity, it plays a huge role, but it does not follow that in modern society knowledge is power[2].

The predictions of theorists of the information society have proven untenable primarily because their authors identify information and knowledge. Information is a commodity in modern society, it plays a colossal role, but it does not follow that in modern society knowledge is power.

To understand what information is and why it plays such a role in the modern era, it is necessary to clearly distinguish between message (or message), interpretation (or perception) and communication. Message is a "thing", that is, the product of human intellectual activity is transmitted; interpretation is a "thought", that is, knowledge is acquired; communication is only an operation of transmission, broadcasting. But in our modern society, it is the operation of broadcasting that is the defining, dominant link in the triad of message-communication-interpretation.

Replication of an intellectual product, transmission of information about it through printed publications, telegraph, radio, television, lectures and seminars within the framework of the general education system, and now also the Internet – this is what speaks of modern society as an information society. And behind the word "information" stands precisely communication, not knowledge. Observing modern politicians, stockbrokers, journalists and their audiences, it is easy to see: a more informed person is not the one who knows more, but the one who participates in more communications.

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[2] Touraine A. (1969). La societe postindustrielle. Paris, p. 319.

The important technical, economic, political, cultural role of information is explained precisely by the fact that it is not substantive ("knowledge") and not objective ("product"). Information is operational, it serves as a justification / justification for actions. That is why it is so necessary for modern man, valuable for him, and influences him. In modern society, information is an idol. In a traditional society built on religious justification of actions, and even in a modern society built on ideological justifications of activity, information could not claim the role it plays now. Only as communication, and not as knowledge or an object, information is able to cause new operations. People act using information, and communication flows are not only not absorbed as a resource of activity, like raw materials or energy resources, but, on the contrary, multiply and accelerate. This happens because information is not so much a resource as a stimulus (motive) of activity.

So, information is communication, the operation of translating symbols, which stimulates action. If we define information in this way, it becomes clear why the main phenomenon of the computer revolution was the Internet, and not giant electronic data banks or artificial intelligence. No knowledge is created in the global Internet network, but the possibilities of communication are increased many times. At the same time, the statements of supporters of the theory of the information society that in the modern era information plays a more significant role than material factors do not become more convincing. Even if we are convinced that information is not knowledge, but an operation of translation, it is still difficult to take seriously the judgment that advertising is "information support" of a certain product, person or stock, or that competition between mass media is "information war". It is not the transmission of data about the properties of a product/service, that is, the rational denotation of an object, but the creation of its image, mobilizing affective connotations, that brings profit in the modern economy and stimulates the development of the advertising business. The owners of the media are not fighting for a monopoly on the transmission of news, but for the creation of an image of events that is profitable for them or their customers. Creating an image is always the manipulation of signs, symbols, and communication is a flow of symbols. What looks like an information flow is the process of creating an image. According to the apt expression of M. McLuhan back in the 60s of the 20th century, the real content of the message is the one who communicates. This approach provides the key to understanding the nature of modern technological and social trends.

The power of a modern businessman, politician, scientist, artist, etc. lies not in knowledge and not in its transmission, but in communication, in the creation of attractive images. Therefore, A. is absolutely correct. Touraine, while avoiding the terms "knowledge" and "information", writes that in the post-industrial era social conflicts arise over "symbolic goods". And for the same reason A. Touraine (1969)[1] and Z. Brzezinski (1970)[2] were mistaken in predicting the development of technotronic

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[1] Touraine A. (1969). La societe postindustrielle. Paris, p. 319.
[2] Brzezlnski Z. (1970). Between two ages: America's role in the technetronic era. URL: https://ia601302.us.archive.org/7/items/books_201603/between_twoages.pdf

social control institutions in the post-industrial era. In a society where images are more important than real actions and things in people's activities and in their relationships with each other, the development of so-called information technologies could not possibly move in the direction of creating centralized control systems and programming social processes, in the direction of accumulating and processing data for the purpose of comprehensive knowledge of the characteristics and future behavior of an object. Recently, next-generation digital networks (Internet 2, Super-Internet, etc.) have been created in which communication between nodes is carried out via satellite or via fiber-optic lines laid along telephone or power lines. In the near future, this will provide the opportunity to combine home computers, professional supercomputers, means of communication (telephone, fax), as well as mass media (books, newspapers, magazines, radio and television) into a single system, taking on the features of an environment of global intelligence.

Since the existing information flows already exceed the possibilities of human perception by a million times, in a few years we will not be able to cope with the task of selecting the information that is most relevant for each of us. To solve this problem, the network must become a camoopганized or synergized network, becoming, in fact, a global AIS (GAIS), a collective intelligence system or a planetary brain. To do this, the synergized network must learn to effectively store, process and analyze the information flows that enter it. The first steps in this direction have been taken in the new Semantic Weh concept of Internet development, adopted by the World Wide Web Consortium.

Today, anyone can upload virtually any information to the network through their website, regardless of its value. Users can find the information they need using search engines that search by keywords. GAIS, like a magazine editor, will accept your information and enter it into its database only if it is of interest to them, which coincides with the public interest. Otherwise, GAIS will draw your attention to places that need clarification and refinement. Instead of arguing or convincing a large number of specialists, each of us will be able to conduct a dialogue directly with GAIS, which, communicating with us, will build a general system of collective knowledge. Such a global network will probably have a hierarchical structure. At the lower level, it may be a local network belonging to a family or a team of a certain organization. The next level may unite different people with common interests, as is currently happening, for example, using tools such as Live Journal. Thus, artificial intelligence is increasingly developing towards the creation of global superintelligence systems, communication with which via the network will increasingly resemble communication with an omnipresent and wise partner.

On the one hand, man will use the enormous capabilities of GAIS, but on the other hand, it can be said that GAIS will also use its physical shell. Society already possesses immortality today, since the duration of its existence is not limited by anything or at least much higher than the life span of an individual. Researchers assume that in the future society will increasingly become a single organism Mega Sapiens.

However, if we return from a long-term perspective to our days, it becomes clear that the only reasonable way to overcome the current crises with the least losses

is the path of further development of technologies, their reasonable application based on the dialogue of different cultures, social groups and civilizations, an important role in which synergetic philosophy can play, as well as the related directions of transhumanism and futurology.

One such technology is grid computing, which has emerged as a new important area of computing, different from traditional computing, focusing on innovative applications that are associated with the need to share large-scale resources and provide high-performance data processing capabilities.

The term "grid computing" appeared in the early 1990s as a metaphor demonstrating the possibility of as easy access to computing resources as to the power grid in the collection edited by I. Foster and C. Kesselman (1998) "The Grid: Blueprint for a new computing infrastructure"[1]. Since the mid-1990s, the term "grid" has been used to refer to a specific distributed computing infrastructure proposed to serve advanced scientific and engineering projects. Subsequently, significant progress was made in building such an infrastructure, the meaning of the term "grid" has expanded significantly and began to encompass everything from advanced network solutions to developments in the field of artificial intelligence[2].

Currently, the grid is defined as a geographically distributed infrastructure that combines many resources of different types (processors, long-term and random access memory, storage and databases, networks), access to which the user can get from any point, regardless of their location. That is, grid computing (English grid – lattice, network) is a form of distributed computing in which the "virtual supercomputer" is represented in the form of clusters connected by a network, loosely coupled, heterogeneous computers that work together to perform a huge number of tasks. This technology is used to solve scientific, mathematical problems that require significant computing resources. Grid computing is also used in commercial infrastructure to solve such labor-intensive tasks as economic forecasting, seismic analysis, and the development and study of the properties of new drugs.

From the point of view of a network organization, a grid is a consistent, open, and standardized environment that provides a flexible, secure, and coordinated distribution of computing resources and information storage resources that are part of this environment within a single virtual organization[3].

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[1] Foster I., Kesselman C. (1998). The Grid: Blueprint for a New Computing Infrastructure. P. 675. URL: https://dl.acm.org/doi/10.5555/289914

[2] Beiriger J., Johnson W., Bivens H., Humphreys S. and Rhea R. (2000). Constructing the ASCI Computational Grid. URL: https://dl.acm.org/doi/10.5555/822085.823324

Bolcer G. A. and Kaiser G. (1999). SWAP: Leveraging theWeb To Manage Workflow. URL: https://www.researchgate.net/publication/3419223_SWAP_Leveraging_the_Web_to_manage_workflow

Grimshaw A., Wulf W. (1996). Legion – A View from 50,000 Feet. URL: https://dl.acm.org/doi/10.5555/525592.823110; Nakada, H., Sato, M. and Sekiguchi, S. (1999). Design and Implementations of Ninf: towards a Global Computing Infrastructure. URL: https://dl.acm.org/doi/abs/10.1016/S0167-739X%2899%2900016-3

[3] Amy M. Braverman. (2004). Father of the Grid. URL: https://magazine.uchicago.edu/0404/features/index.shtml

The idea of grid computing arose with the spread of personal computers and the development of the Internet and packet data transmission technologies based on optical fiber (SONET, SDH, and ATM), as well as local area network technologies (Gigabit Ethernet). The bandwidth of communication facilities has become sufficient to attract the resources of another computer if necessary. Given that many computers connected to the global network are idle most of the time and have more resources than are needed to solve their daily tasks, there is an opportunity to apply their resources that are not used elsewhere.

The use of free processor time and volunteer computing became popular in the late 1990s after the launch of the volunteer computing projects GIMPS in 1996, distributed.net in 1997 and SETI @ home in 1999. These first volunteer computing projects used the power of networked computers of ordinary users to solve research problems that required large computing power.

Grid ideas (including ideas from the field of distributed computing, object-oriented programming, the use of computer clusters, web services, etc.) were collected and combined by I. Foster, K. Kesselman and S. Tiki, who are often called the fathers of grid technology. They began the creation of a set of tools for grid computing Globus Toolkit, which includes not only computing management tools, but also tools for managing data storage resources, ensuring security of access to data and to the grid itself, monitoring data usage and movement, as well as tools for developing additional grid services. Currently, this toolkit is the de facto standard for building infrastructure based on grid technology, although there are many other tools for grid systems on the market both within the enterprise and on a global scale.

A real and concrete problem that emphasizes the importance of the grid concept is the coordinated sharing of resources and problem solving in dynamic, multidisciplinary virtual organizations. The sharing we have in mind is not primarily the exchange of files, but rather direct access to computers, software, data and other resources when joint problem solving and mediation in the provision of resources is required, arising in industry, science and technology strategies. This sharing is tightly controlled by resource providers and consumers, and it is clearly and precisely defined: what is shared, who is allowed to share and under what conditions. The association of individual specialists and/or institutions, defined by such sharing rules, forms what we call a virtual organization.

Grid technologies support the sharing and coordinated use of various resources in dynamic virtual organizations, that is, the creation of such virtual computer systems from geographically and organizationally distributed components that are arranged in such a way that they can provide the desired quality of service (QoS)[4].

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[4] Foster I., Kesselman C. and Tuecke S. (2001). The Anatomy of the Grid: Enabling Scalable Virtual Organizations. URL: https://www.researchgate.net/publication/215757945_The_Anatomy_of_the_Grid_Enabling_Scalable_Virtual_Organizations

Grid concepts and technologies were initially developed to enable resource sharing within globally distributed associations of research teams[1]. Research areas included collaborative visualization of large volumes of scientific data, distributed computing for data analysis calculations (pooling computing power and storage systems), and the integration of scientific measuring devices with remote computers and archives (expanding functionality and accessibility)[2]. We believe that similar applications will also prove important in the commercial sector, initially for scientific and engineering calculations (where we can already speak of successful results).

The most important is the interdisciplinary nature of the work on the development of grid computing – these technologies are already being used in various application areas. Hundreds of grid forums and projects have emerged in the world – in high-energy physics, cosmophysics, microbiology, ecology, meteorology, various engineering fields (e.g., in aircraft engineering). Examples of such systems and grid projects are: Open Science Grid, AliEn, Nordugrid, and EGEE. The largest and most famous of them is EGEE.

The EGEE infrastructure was formed on the basis of the European Union research network GEANT, and its formation used the accumulated experience of the DataGrid, LCG projects, as well as national projects, for example, E-sciencE, INFN Grid, Nordugrid, and Open Science Grid. EGEE provided the opportunity to work together with other grids around the world, including the USA and Asian countries, which contributed to the emergence of a global grid infrastructure.

The main objective of the EGEE project (Enabling Grids for E-sciencE) was to create a global grid infrastructure. As a result, scientists working in both academic institutions and industry gained access to significant computing resources regardless of where they were located.

The project objectives were: to deploy a unified, reliable, scalable grid system and the corresponding infrastructure; to increase the computing resources and data storage combined by this grid infrastructure; to improve the middleware; to attract new users from both scientific and industrial areas; to ensure a high level of their training and support in using the project's grid infrastructure.

The project was funded by the European Community and the participating countries. Its first two-year phase ended in March 2006, after which the second,

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[1] Catlett C. (1992). In Search of Gigabit Applications. URL: https://dl.acm.org/doi/abs/ 10.1109/35.135788; Catlett C. and Smarr L. (1992). Metacomputing. URL: https://dl.acm.org/doi/ 10.1145/129888.129890; Foster I. (2002). The Grid: A New Infrastructure for 21st Century Science. URL: https://www.academia.edu/371578/The_Grid_A_New_Infrastructure_for_21st_Century_Science; Foster I. and Kesselman C. (1998). The Grid: Blueprint for a New Computing Infrastructure URL: https://dl.acm.org/doi/10.5555/289914; Johnston W. E., Gannon D. and Nitzberg B. (1999). Grids as Production Computing Environments: The Engineering Aspects of NASA's Information Power Grid. URL: https://www.researchgate.net/publication/3824529_Grids_as_production_computing_environ-ments_the_engineering_aspects_of_NASA's_Information_Power_Grid; Stevens R., Woodward P., DeFanti T., Catlett C. (1997). From the I-WAY to the National Technology Grid. URL: https://dl.acm.org/ doi/10.1145/265684.265692

[2] Johnston W. Realtime Widely Distributed Instrumentation Systems. https://www.academia.edu/ 16581035/Realtime_widely_distributed_instrumentation_systems

also two-year, phase, EGEE-II, began. The goal of EGEE-II is to build on the results of the EGEE project to create a fully functional, continuously operating global grid infrastructure of "production" level, interacting with other grids around the world. The result is a high-performance global infrastructure that is far superior in its capabilities to local clusters and individual centers.

The EGEE-II consortium includes more than 90 participants from 32 countries. They are united in 12 federations and represent almost all major European international and national grid projects, as well as projects in the USA and countries in Asia. The numerous projects that have developed from EGEE and EGEE-II or are related to them confirm the role of EGEE as an incubator of grid technologies.

The EGEE grid infrastructure has already become an everyday working tool for a number of large and small research communities. It developed directions of work in specialized areas of knowledge for high-energy physics, biological sciences and related disciplines, Earth sciences, space physics, computational chemistry, fusion energy and others.

It is very important that many of these developments have moved from the testing stage of the process of launching their tasks in the grid environment to practical routine work to obtain new results in their fields. At the same time, the efficiency of loading EGEE grid resources reaches ~ 80–90 %.

In the development of high-energy physics problems, research is being conducted in the LCG project. The main goal of the LCG project (Large Hadron Collider Computing Grid) is to use the grid environment for modeling and processing experimental data from the Large Hadron Collider (LHC) at the European Center for Nuclear Research (CERN) near Geneva (Switzerland). The flow of experimental data that needs to be processed is about 15 petabytes per year. To concentrate the computer resources required to process such a stream directly at CERN becomes an impossible task for both technical and financial reasons.

It was CERN, together with partner institutes from different countries of the world participating in the LHC project, that initiated the creation, within the framework of the LCG project, of first a pan-European and then a global grid system for solving the tasks of the LHC project, which later grew into the universal EGEE grid infrastructure.

The grid system developed at the LCG underwent trial operation in preparation for the launch of the LHC. It is used to simulate the data streams of four large experiments (ALICE, ATLAS, CMS and LHCb), which were carried out at the collider in the accelerator operating mode. Let us very briefly describe these experiments:

• ALICE (A Large Ion Collider Experiment) is an experiment to study the physics of strong interactions at ultra-high density, where the formation of a new state of matter is expected – quark-gluon plasma.

• The ATLAS experiment (A Toroidal LHC ApparatuS) studies the deep foundations of the structure of matter and the fundamental forces that formed the Universe.

• CMS (Compact Muon Solenoid) is a detector for research during which an attempt will be made to confirm or refute a single theory of the fundamental forces of nature.

• LHCb (Large Hadron Collider beauty) is an experiment related to the study of charge and parity symmetry breaking. This effect may be the reason for the lack of equilibrium between matter and antimatter during the emergence of the Universe.

In 2001–2006, the teams of all these experiments carried out sessions of mass generation of model data streams. The main types of computational tasks (modeling, reconstruction of events in the accelerator and their analysis) were tested at capacities comparable in scale to the operating parameters of the LHC. The results of these tests were record speeds of data transmission and distributed processing, as well as previously unavailable data storage capabilities.

The high-energy physics community was the first in EGEE to start operating the grid, and is still the largest user of the EGEE grid infrastructure. In addition to the LHC experiments, the EGEE grid is also used by other experiments in this field, including BaBar, CDF, H1, ZEUS and DO.

Since high-energy physics applications by their nature place very high demands on the EGEE infrastructure, this greatly contributes to the improvement of EGEE services and the development of principled approaches to their development. This applies to all services – from documentation and user support to the development of middleware. In addition, during the high-energy physics experiments, valuable middleware components are created that can be considered prototypes for the entire community of grid users.

Perhaps the greatest achievement of the application of this communication technology in the ALICE, ATLAS, CMS and LHCb experiments was the discovery of the "Higgs boson", which became the cornerstone of the Standard Model of physics. The theory predicts that there should be a new neutral elementary particle with a mass greater than a hundred proton masses, but much smaller. Until now, this particle has manifested itself only indirectly. It is impossible to see it directly – it lives too short a time – but it can be detected by the decay products into lighter and known elementary particles. By hunting for the "Higgs boson" (the concept of which was proposed simultaneously and independently in the works of three groups of authors in 1964: R. Brot and F. Englert[1], P. Higgs[2], D. Guralnik, K. R. Hagen, and T. Kibble[3]).

Each particle born in the collision of protons must be registered: to establish the exact time of the appearance of the "newborn", its mass, charge, speed and direction of departure. To do this, each of the four collision sites is surrounded by detectors. The main four detectors are called ATLAS, CMS, ALICE and LHCb. In essence, the LHC is four huge microscopes, with the help of which physicists "examine" the details of the structure of matter on a record-breaking scale.

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[1] Englert F., Brout R. Broken Symmetry and the Mass of Gauge Vector Mesons. URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.321

[2] Higgs P. W. Broken symmetries and the masses of gauge bosons. URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.508

[3] Guralnik G., Hagen C., Kibble T. Global Conservation Laws and Massless Particles. URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.585

CMS and ATLAS are the two facilities whose main task is to discover the Higgs boson and search for "new physics" – physical phenomena that lie beyond the current Standard Model.

The difficulty lies in the fact that in each collision, a huge number of particles are produced, which create a background for the decay products of the sought-after boson. For example, the Higgs boson can decay into two hard gamma quanta (photons). But if a collision produces many photons (and this is what happens), then it is obvious that it is difficult to identify the two photons that are formed precisely from the decay of the Higgs boson – especially if you do not know in advance what their total energy should be.

The Higgs boson is the last missing element of the current theory of elementary particles of the so-called Standard Model. It is a hypothetical particle that is responsible for the mass of all other elementary particles. However, the theory does not allow us to accurately determine the mass of the Higgs boson.

On December 13, 2011, a special seminar was held in Geneva at the European Organization for Nuclear Research (CERN), where two papers were presented on the search for the Higgs boson. A few days before the event, particle physics blogs were actively discussing rumors that physicists might announce the discovery of the Higgs boson on that day. To some extent, this information was confirmed.

The first to speak was ATLAS experiment leader F. Gianotti[4]. She presented data confirming the absence of the Higgs boson in the mass range of 131–453 GeV, which, in general, was not a big surprise – at the summer conference in Grenoble, physicists had already announced that they had ruled out a wide range of masses above 141 GeV.

Much more interest was aroused by the confirmation of information that a signal was registered at a value of 126 GeV, which could be a sign of the existence of the Higgs boson.

However, the level of confidence of this signal was 3.5 sigma (a value of 3 would be enough to speak about signs of the particle's existence, but 5 sigma is needed for a discovery). Following F. Gianotti, G. Tonelli, head of the CMS experiment, presented data that the Higgs boson does not exist at masses from 127 GeV to 600 GeV. Thus, the signs of the Higgs boson's existence, which were detected in the narrow mass interval of 130–150 GeV and reported in the summer, turned out to be simple fluctuations.

However, the CMS experiment also recorded signs of a signal at a mass of 126 GeV, the level of confidence of this signal, depending on the data processing method, is 2.6 or 1.9 sigma. The discovery, of course, did not happen in one day. First, the data appeared, then doubts appeared, then doubts dispelled, then new doubts appeared. At some point, when you see a large number of positive fluctuations, when they start to look like a signal, you start to believe in it, but this does not cancel the verification and the need to collect statistics to achieve sufficient accuracy, G. Tonelli noted in his report [5]. E. Gross, an ATLAS collaborator and also a representative of the Weizmann Institute of Science (Israel), noted in his report that looking back, we can say that for the first time we saw

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[4] In the sixth part of the Higgs10 series, the ATLAS and CMS experiments announce the discovery on 4 July 2012. URL: https://home.cern/news/series/higgs10/higgs10-when-spring-2012-turned-summer

a signal back in June 2011. But we can only say that this was the signal we needed now, when we know for sure that it was him. And at the same time, it could have turned out to be just a statistical fluctuation that has nothing to do with the real Higgs boson.

Scientists explained that this observation could not be considered a major discovery. It was not science, it was just a coincidence. We saw a hint of signals at other energies, but what is interesting here is that it was a complete coincidence, exactly 126 GeV. But now it is funny to realize that this was the mass that scientists were looking for, said ATLAS employee M. Cadeau from the University of Paris-Sud.

It is necessary to clearly understand the difference between a real signal and a statistical fluctuation. A signal is an excess of the number of events responsible in this case for the decay of a new particle, over the background, but by an absolutely clearly defined number of times, a clearly defined amount. That is, this is not just any abstract emission. If there are too many of these emissions at different energies, it could be some kind of abnormal signal, statistical emissions, experimental error, whatever. Perhaps that "exact" signal was just that.

The real discovery took place at the end of November 2011. At that time, scientists already knew that they were on target and that this elementary particle had already been found. But they still had to collect data, observe different decay channels, but still they already believed in their discovery. The final answer to the question of the existence of the Higgs boson was given in 2012.

The Higgs boson is the last missing element of the modern theory of elementary particles, the so-called Standard Model of physics. This hypothetical particle is responsible for the mass of all other elementary particles.

Both collaboration leaders noted the excellent work of all the equipment and their scientific colleagues. "It would be impossible to imagine our physical results today so quickly – two weeks after receiving the data – if it were not for the amazing work of our distributed data processing and computing network GRID. Dozens of people around the world contributed to the rapid processing of the data we received on our detector", said F. Gianotti[1].

This is a milestone in our understanding of nature, a big day. The discovery of a particle similar to the Higgs boson opens the way to a more detailed study, which requires more statistics. However, it will allow us to describe in detail the properties of the new particle and, probably, will shed light on the secrets of our Universe.

The discovery of the Higgs boson at the Large Hadron Collider was recognized as the most significant scientific breakthrough of the past year – according to the journals Science and Nature[2].

In an editorial, Bruce Alberts, editor-in-chief of Science magazine, called this achievement a triumph of human intelligence and the culmination of decades of work by many thousands of physicists and engineers. According to Alberts, this discovery

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[1] In the sixth part of the Higgs10 series, the ATLAS and CMS experiments announce the discovery on 4 July 2012. URL: https://home.cern/news/series/higgs10/higgs10-when-spring-2012-turned-summer

[2] Cho A. The Discovery of the Higgs Boson. URL: https://www.science.org/doi/10.1126/science.338.6114.1524; Ten people who mattered this year. *Nature, 492* (7429), 311–462.

begins an era of new physics. Whether this is true or not, the future will tell, but despite the lush bouquet of discoveries in 2012, the Higgs boson took the top line of the Science list on an uncontested basis.

In the journal Nature, the first place in the achievement of the year is occupied by the discovery of the Higgs boson, which could not have happened without the diplomatic efforts of CERN Director General Rolf-Dieter Heuer as the head of the experiments at the HAC[3].

The second direction that uses the EGEE grid infrastructure is related to research in cosmophysics and astronomy. Two directions in the field of cosmophysics supported by EGEE are related to the processing of data from the Planck satellite and from the MAGIC telescope.

The European Space Agency (ESA) Planck satellite was launched in 2008 and is designed to create a "microwave atlas" of the sky: the detectors installed on the satellite will perform a complete scan of the celestial sphere in the microwave range (30 ÷ 850 GHz) twice with previously unavailable completeness, stability, accuracy and sensitivity. The EGEE grid will provide preliminary simulation of the satellite data processing process, and later on, their actual processing (expected ~ 100MB of data per day; the total amount of data will be about 100GB).

The principle of operation of the MAGIC telescope, which has been operating since 2004, is based on the so-called Cherenkov effect. The telescope is located in the Canary Islands and is used to study high-energy particles coming from space – cosmic rays and the "showers" of charged particles caused by them in the high layers of the atmosphere. Trial processing of data from this telescope on EGEE resources (Data Challenge) began in 2005. An important stage of this project was the commissioning of a second similar telescope. This allowed not only to significantly improve the capabilities of cosmic ray research, but also to significantly increase the flow of data processed in the EGEE grid infrastructure.

The third area of research related to nuclear fusion is the ITER (International Thermonuclear Experimental Reactor), an international research and development project that aims to demonstrate the scientific and technical feasibility of using fusion energy. The reactor will be built in Cadarache, France. The hydrogen plasma in it will be contained in a torus at a temperature of over a million degrees, which could allow for the creation of a controlled fusion reactor with a capacity of about 500 megawatts.

The Steering Committee, operating within the framework of the European Fusion Development Agreement (EFDA), has established a group whose task is to study the future needs of the European fusion research community in computing resources. The ability of the grid infrastructure to meet these needs has already been demonstrated. Currently, EFDA application tasks are processed in the EGEE grid infrastructure. In the future, the creation of a dedicated ITER grid infrastructure is not excluded.

In the Drug Discovery research area, which operates within the framework of EGEE, which is designed to find fundamentally new drugs for mass diseases, such as malaria, which affects more than 300 million people annually, while killing a million.

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[3] Ten people who mattered this year. URL: https://www.nature.com/articles/492335a

And the situation here is getting worse due to the increasing resistance of the disease to existing therapeutic drugs.

This program was initiated and implemented by the Fraunhofer Institute for Algorithms and Scientific Computing (SCAI) in Germany and the Laboratory of Corpuscular Physics in Clermont-Ferrand, France (IN2P3). It allows pharmaceutical companies and academic research institutes to increase access to diverse, complex and distributed information about diseases and to provide the possibility of joint research to find new drugs.

The area is based on the ability to calculate the probability that new potential drugs will come into direct contact with the active part of one of the malaria parasite proteins. Typically, such calculations are performed on clusters of personal computers and are limited to about 100,000 drug candidates. A massive data processing exercise called WISDOM (Wide In Silico Docking On Malaria) conducted on the EGEE grid in August 2005 examined over 46 million candidates. The session used 1,000 computers in 15 countries around the world simultaneously, while a single personal computer would take 80 years to perform the same task. The success of the WISDOM session demonstrated how the grid can help drug discovery research, significantly accelerating the development process.

The next steps in the development of the drug discovery program include the classification of large amounts of data to identify potential drugs for use in the treatment of a number of diseases, and to bridge the gap between such "virtual candidates" and traditional drug development. This could lead to a significant number of physical drug candidate molecules that can be further developed into real therapeutic components.

The Earth Science and Geophysics Communities in EGEE support five specialized areas in the fields of hydrology, land surface observation, climatology and solid Earth physics. Two virtual organizations have been created: ESR (Earth Science Research) for academic institutions and EGEODE (Expanding GEOsciences on Demand), founded in France by the private company CGG (Compagnie Generale de Geophysique).

The EGEODE virtual organization operates for the first production area, the EGEE software package Geocluster is used for processing seismic data and studying the composition of the Earth's crust. It should be noted that the task of attracting industrial applications within the framework of the EGEE project is given great attention. The EGEE Industry Forum, the Industry Task Force and the EGEE Business Associate program, which are intended to make the infrastructure and know-how of the EGEE grid open to industry, contribute to achieving this goal.

The EGEE project has realized the idea of transforming the world's computing resources into a single homogeneous environment that can be shared on a global scale. The result is a high-performance global infrastructure that is far superior in its capabilities to local clusters and individual centers. The EGEE project was successfully completed in April 2010.

The EGEE consortium included over 140 organizations from over 50 countries, organized in 13 federations, and represented almost all major European international

and national grid projects, as well as projects in the USA and Asia. In addition, several related projects (50 associated participants) extended the grid infrastructure to the Mediterranean, the Baltics, Latin America, India and China.

The EGEE grid infrastructure has become a daily working tool for a number of large and small research communities: high-energy physics, life sciences and related disciplines, Earth sciences, space physics, computational chemistry, fusion power engineering and others. The number of users of the EGEE infrastructure, united in more than 200 virtual organizations, was more than 14,000 people, and more than 400 thousand tasks were executed in the EGEE infrastructure every day, that is, more than 12 million tasks per month.

Following the completion of the EGEE project, the European Grid Infrastructure (EGI) project began operating in April 2010. The initiative is based on cooperation between national grid infrastructures (NGIs) and the coordinating organization (the EGI Organisation, EGI.eu). This cooperation should ensure the further development of a sustainable and continuously operating global grid infrastructure, which will contribute to the optimal use of computing and data storage resources.

As already noted, Grid technology is now most widely used to solve problems that require intensive computational processing, for example, for complex modeling in the development of new drugs, calculating financial risks, automating design, etc. It is for these purposes that numerous Grid supercomputers have been created in different countries. The TeraGrid project is being implemented in the USA, which will unite American computing centers into one huge Grid supercomputer with a performance of 20 Tflops. Britain has gone even further, directing its efforts to develop the E-sciencE initiative, which makes it possible to create a Grid infrastructure for scientific and technical calculations. Another interesting project is being implemented in this country – the CosmoGrid network, which includes computing centers of Cambridge and other universities and is designed to build a historical model of the development of the Universe. The DataGrid system was created at the European Organization for Nuclear Research (CERN), on the basis of which EGEE was later built, funded by the European Union, which serves for data processing in high-energy physics, biology, and for Earth surface observation, and since April 2010 the European Grid Infrastructure (EGI) project has been operating.

And these are not all, but only the most significant Grid-projects for scientific purposes. In fact, there are many of them, because historically this technology has received the greatest development in the scientific sphere.

Each new form of communication that has appeared throughout the history of the development of science has provided acceleration of information exchange and therefore was instantly picked up by scientists. Acceleration, simplification, and increase in the information capacity of scientific contacts are a constant aspiration of researchers. In this regard, computer telecommunications, which include the user in the world banks of scientific information and provide almost direct communication of subscribers, maximally meet the needs of scientists.

International computer network systems, which provide almost instant transfer of any information, form the basis of the most modern form of human communication.

In science, communication plays a special role, being not only a necessary condition for individual scientific activity, but also its system-forming mechanism. Through them, the works of individual scientists are connected into scientific fields, areas and disciplines, and disparate elements of knowledge form a system. The entire professional activity of the scientific community depends significantly on the efficiency and speed of scientific communications.

Today, the Internet is an independent and uninterrupted global communication system. It includes such means of providing and sending information as e-mail, websites, various data transfer protocols, for which broadband modem or wireless communication is used. Personal computers, mobile phones, pocket computers, etc. are equipped with means for communication with the Internet. Technically, the Internet is a complex system of communications, protocols and technical means, combining hosts, servers, communication lines, satellites and much more.

That is, the Internet is a network that connects specific places with clearly defined social, cultural, physical and functional characteristics. Based on these elements, the network provides communication opportunities for interaction between different individuals, providing various resources and connections for transmitting information over different distances. The Internet is growing rapidly and is being introduced more and more into various fields of activity every day. The famous writer A. C. Clarke said that: – "Of all the technical innovations that have appeared since the industrial revolution, the Internet has become the most significant technological achievement"[1].

The creation of the Internet as a global and at the same time decentralized hierarchical information network that does not have a single governing body initiated a virtual revolution and significantly accelerated globalization.

Millions of users have joined the Internet, it has become one of the most democratic clubs in the world. Here is the assessment of the American K. Meni: "How the invention of the Internet changes the world reflects many features. There is a dramatic drop in the cost of creating, sending and preparing information with a simultaneous expansion of its availability. The Internet breaks any monopoly on information"[2].

A significant part of humanity has for the first time gained unimaginable access to knowledge and information data, which decades ago were the property of only a select few. Governments are unable to isolate their population from the boundless sea of various information about themselves and other peoples, about ways to solve economic and social problems, about the diversity of choices. "Thanks to the Internet, people give and receive, talk and get to know each other, get acquainted with ideologies and reject ideological messages, buy and sell – and do all this in such a way that the possibility of control is excluded. It is thanks to the information revolution that the cost of communications using the telephone, fax machine, the Internet, radio, television and other information devices has decreased, so the creation of dividing walls in the world is meaningless. And when we all know about each other's lives,

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[1] Clarke Arthur Charles. How the world was one, beyond the global village. URL: https://archive.org/details/howworldwasonebe0000clar_l7b2

[2] U.S.A. Today. August 9, 1999. URL: https://www.usatoday.com/

this creates a completely new dynamic of world politics" is exactly how T. Friedman characterized the role and essence of the Internet in globalization processes[3].

However, the impact of global social processes on individual components of human life is far from being characterized unambiguously. If we talk about science, then I would like to argue that the combined efforts of scientists from different countries expand the boundaries of knowledge, make science truly omnipotent, but even in this case, reality forces us to avoid unambiguous positive assessments. From this point of view, the problem of studying the mutual influence of globalization and science becomes relevant. There is no doubt that it was the successes of modern science that allowed the development of the latest information technologies in the twentieth century, created the infotech environment that determined the directions, pace and possibilities of globalization. There is no doubt that globalization has determined the most important tasks of modern science: the fight against diseases, the extension of human life, improving the quality of medicines and food, increasing productivity, penetrating the secrets of the human brain and heredity, environmental cleanliness, the search for alternative ways of obtaining energy, the development of outer space, protection from space dangers. It is also obvious that the successes of information technologies, with which globalization processes are directly associated, have significantly expanded the range of scientific tasks that can be solved, and have made possible and quite simple computer research of those systems that were recently practically inaccessible for study. First of all, we are talking about cosmological models, objects of the microworld, and extremely complex social and biological systems. The creation of international scientific centers, projects, and research programs is invaluable in the process of developing space, the depths of the ocean, and the bowels of the earth. It should also be noted its fair role in the field of electronic communication of members of the scientific community, sometimes separated by thousands of kilometers. It was in the era of globalization that the integration of scientific knowledge developed into interdisciplinary sciences, general scientific concepts such as systems theory and synergetics, which allowed the generalization of mathematical description into systems of different levels.

Along with this, the following should be noted. Modern science is losing its ideals and its heuristic guidelines, and therefore is becoming neither more developed nor more true. Back in the early twentieth century, E. Husserl wrote that the sciences of his time were moving away from their primary goals, the very first of which is the knowledge of the world, and had long since turned from generators of ideas into technology factories. Science has ceased to supply humanity with truth, and supplies it only with production techniques, making human life not more meaningful, but only more pleasant and convenient. Science serves production, forgetting about serving the truth. There are situations when in scientific knowledge the truth is not achieved, but is removed, hidden, obscured. In the pursuit of new technologies, the scientific

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[3] Friedman Th. Understanding Globalization. The Lexus and the Olive Tree. URL: https://www.researchgate.net/publication/377209545_The_lexus_and_the_Olive_Tree_Understanding_Globalization

community forms more and more new, sometimes very specialized sciences, which often duplicate one another, and splits knowledge into such narrow areas that the subject of their knowledge is practically reduced to zero, invents more and more new terms that are known to a few and do not meet the most important requirements of clarity and expressiveness in science.

Another distinctive characteristic of modern science is the ever-growing scientific uncertainty. The circle of knowledge, expanding, also increases the boundaries of human ignorance. Science faced this at the beginning of the twentieth century, and since then the state of affairs has practically not changed. Thus, one of the basic principles of quantum mechanics, the Heisenberg uncertainty principle, imposes a ban on the exact determination of the state of microobjects, and the notion of deterministic chaos, which entered science in the seventies of the twentieth century, prohibits the exact determination of the state of macrosystems, that is, the very objects in relation to which classical Newtonian dynamics experienced the euphoria of complete certainty and predictability. At the end of the twentieth century, it became clear that chaotic states are predominant in the development of systems of the most diverse nature, including social ones, chaos, catastrophes and crises, which are typical in the behavior of most objects studied by science. As a result, unpredictability and uncertainty appear not only as fundamental norms of dynamics and development, but also as norms of cognition. Twenty-first century science does not know whether space and time are continuous or discrete, does not know what form the Universe has, does not know to what extent matter is fragmented, cannot guarantee that disastrous cosmic catastrophes will not occur in the near future, does not know how human consciousness functions. The situation is further complicated by the fact that for some time now science has begun to operate with purely speculative concepts, the real existence of which it is not able to prove. What is the value, for example, of the idea of a cosmological singularity, the existence of which caused the big bang and the emergence of space, time, the Universe and all physical laws. It does not seem possible to verify this fact by experimental or other means, but such theories are accepted on faith and forever remain only in the rank of hypotheses. New floors of the scientific building are being built on such a hypothetical foundation, so this whole structure seems unstable and short-lived.

The combined efforts of the united scientific community have led to the fact that modern science turns out to be more uncertain than the science of the nineteenth and even eighteenth centuries. And it was in the twentieth century that many scientists became aware that there are problems that positive, factual science is unable to cope with. This gave rise to the main trends in the development of modern science. The first can be assessed as positive, this is the trend of humanization of knowledge. The humanities are trying to find answers to those questions that the natural and exact sciences are unable to face, and they do it quite successfully. Philosophical anthropology, for example, provides no less significant ideas about man than biology and medicine. The second trend is negative, this is the emergence and rapid growth of parasciences, pseudosciences, quasisciences and even pseudosciences.

From the essential properties of modern science, let us move on to the properties of the second order and touch on the so-called "applied" side effects of globalization. First of all, this is the apparent accessibility of scientific knowledge, associated with the development of the global Internet. Many who embark on the path of scientific knowledge use it as a global repository of information, but practice shows that the percentage of false information on the Internet is extremely high, and not everyone who uses it is able to separate the true from the false. Numerous scientific Internet publications do not have an accepted editorial board, and the sites are overflowing with articles by non-professionals. Secondly, this is the social profanation of science associated with the Internet and mass media, and as a consequence, a decrease in the status of a scientist and the status of science in general. Neophytes who have barely learned to use computers imagine themselves to be professional programmers, everyone understands genetic engineering, space problems, knows how to philosophize, etc. These trends are so strong that today it is already worth talking about "pop science", which is related to science in about the same way as "pop culture" is related to culture.

As for new forms of organization of scientific teams, it is impossible not to admit that electronic networks and the Internet have made possible international communities of scientists. And such communities turn out to be quite practical types of scientific teams. Indeed, electronic correspondence is a mobile and convenient function of the Internet, which allows you to significantly save time, get the necessary consultations from well-known specialists, and quickly get approvals and expertise.

However, it should be noted that the face of modern science is still primarily determined by traditional schools, university laboratories and communication between professionals. Modern science, which is connected with the Internet, does not surpass the science of the early twentieth century, when the famous German or Cambridge physics schools defined the scientific revolution and almost one hundred percent formed the bank of Nobel laureates. Science continues to be created to a greater extent behind the closed doors of real laboratories, and in the era of globalization Cambridge remains Cambridge, Sorbonne – Sorbonne, both of these universities are invaluable assets of their countries, but at the same time the Internet is becoming the main factor in the communicative globalization of scientific communities. The era of the information world is a grandiose period in the history of civilization, the comprehension of which is still very far from its completion. The science of this era, which mastered the laws of interaction of electrons with electromagnetic fields, with macrofields in the working space of an electronic device, as well as with physical fields inside an atom, molecule, crystal lattice, allowed man to create a powerful industry of communication and computing technologies, the practice of which gave rise to radio, telephony, television, extreme computing, computer networks WWW (Internet) and WWG (Grid), electronic communicative praxis of the planet. The scope of application of the achievements of such science is immense.

The latest communication and computing revolution, which is radically transforming the basic areas of computer science, marks only the beginning of a new phase of the era of the information world, the era of "smart electronics", that

is, the one that already today fills people's living space with such realities as smart space telescopes, smart supercolliders, smart bio-laboratories on microchips, smart cottages, smart furniture, smart clothing, smart cars, smart construction materials, smart highway pavement, smart traffic lights, smart machines, smart factories, smart cities, etc. According to social experts' forecasts, over time "smart electronics" will restore not only the general way of reproducing human existence in the world, but also the physicality of a person, his psychosomatics, immune system, intelligence, biosocial nature.

Conclusions

The science of the information age is a force that allows man to make breakthroughs at all levels of the material universe, from quarks to quasars. Generating a megatrend of convergence of "scientific and technical power" and gigantic "energies" that are released by man from the atomic nucleus and the subnuclear world, the information age has marked itself with grandiose events. This is, first of all, the discovery of dark matter and dark energy, the scientific and technological expansion of man into the world of nonlinear complexity, the creation of a technopark of petaflop hypercomputers and global computing Grid networks, the transformation of the "Internet of People" into the "Internet of Smart Things".

Radically expanding the ensemble of natural human senses, with the help of which scientists perceive signals coming from all levels of the megastructure of matter, the era of the information world has enriched this ensemble with various «»computer organs of world perception" – digital surveillance cameras, detectors, electron microscopes, digital space telescopes, night vision devices, digital transmitters, scanners, digital cameras, special video recorders, various means for monitoring, etc. Using such an arsenal of electronic devices, the scientific community of the era of the information world has transformed itself into a subject of cognitive actions not carried out by natural human organs. In the pre-information era, a person was aware of himself as a carrier of five senses and natural intelligence. In the era of information technology, it imagines itself as a subject that progresses in the process of convergence of the carrier of natural intelligence, which reinforces itself with a kind of army of electronic assistants. Each such electronic assistant transforms the cognitive abilities of the collective creator of science, it becomes a technology for transforming the subject of scientific knowledge. Today, such technologies are called "intelligence technologies".

"Intelligence technologies" not only radically enhance a person's cognitive abilities, but also endow him with superhuman abilities. Each such technology is essentially a computer program that is capable of automatically (i.e. without human intervention) achieving the goal encoded in it by a person. In achieving such goals, electronic assistants that exchange information with each other via the Internet are able to self-organize into multi-agent systems, that is, into a kind of army of interacting intelligent agents.

Recommendations

The cognitive practice of such a creator of science destroys the worldviews of the pre-electronic era about the structure of the universe and the origin of man, about

the ways of shaping the future, resembles a giant whirlpool that draws in not only science, but also all non-scientific types of cognitive activity of planetary society. No one knows what the long-term social consequences of this grandiose process of using intelligence technologies may be. Today, this practice is expanding into all spheres of life of planetary society. The boundaries of this cognitive practice will expand as the hypercomputer industry overcomes exaflops, zettaflops and even higher levels of computing power. Thus, the practice of upgrading the computing technology industry lies at the heart of the formation of a superindustrial civilization.

The 21st century can rightly be called the Internet Era. Technical progress enters every home and becomes an integral part of it. The Internet industry is only at the beginning of its rapid development, technogenic progress is constantly growing and evolving – everyone can see this. Therefore, the Internet is becoming an important part of the future generation. It is for these reasons that various social networks are developing so rapidly in the Internet spaces, and more and more opportunities for doing business appear.

Providing wide access to such centralized information services as library catalogs or databases of various social spheres (educational, medical, legal, etc.), the Internet network provides interconnection between business enterprises, on the one hand, and their customers and suppliers – on the other. Creating the possibility of interconnection between individual subscribers, computer networks such as the Internet, Grid, Cloud Computing, significantly affect the communicative praxis of the Planet.

References

[1] Amy M. Braverman. (2004). Father of the Grid. https://magazine.uchicago.edu/0404/features/index.shtml

Beiriger, J., Johnson, W., Bivens, H., Humphreys, S. and Rhea, R. (2000). Constructing the ASCI Computational Grid. https://dl.acm.org/doi/10.5555/822085.823324

[2] Bolcer, G. A. and Kaiser, G. (1999). SWAP: Leveraging theWeb To Manage Workflow. URL: https://www.researchgate.net/publication/3419223_SWAP_Leveraging_the_Web_to_manage_workflow

[3] Brzezlnski Z. (1970). Between two ages: America's role in the technetronic era. URL: https://ia601302.us.archive.org/7/items/books_201603/between_twoages.pdf

[4] Catlett, C. (1992). In Search of Gigabit Applications. URL: https://dl.acm.org/doi/abs/10.1109/35.135788

[5] Catlett, C. and Smarr, L. (1992). Metacomputing. URL: https://dl.acm.org/doi/10.1145/129888.129890

[6] Cho A. The Discovery of the Higgs Boson. URL: https://www.science.org/doi/10.1126/science.338.6114.1524

[7] Clarke Arthur Charles. How the world was one, beyond the global village. URL: https://archive.org/details/howworldwasonebe0000clar_l7b2

[8] Englert F. and Brout R. Broken Symmetry and the Mass of Gauge Vector Mesons. https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.321

[9] Foster I. Kesselman C., (1998). The Grid: Blueprint for a New Computing Infrastructure. https://dl.acm.org/doi/10.5555/289914

[10] Foster, I. (2002). The Grid: A New Infrastructure for 21st Century Science. URL: https://www.academia.edu/371578/The_Grid_A_New_Infrastructure_for_21st_Century_Science

[11] Foster, I., Kesselman, C. and Tuecke, S. (2001). The Anatomy of the Grid: Enabling Scalable Virtual Organizations. URL: https://www.researchgate.net/publication/215757945_The_Anatomy_of_the_Grid_Enabling_Scalable_Virtual_Organizations

[12] Friedman Th. Understanding Globalization. The Lexus and the Olive Tree. URL: https://www.researchgate.net/publication/377209545_The_lexus_and_the_Olive_Tree_Understanding_Globalization

[13] Grimshaw, A. and Wulf, W. (1996). Legion – A View from 50,000 Feet. URL: https://dl.acm.org/doi/10.5555/525592.823110

[14] Fukuyama F. (1992). The End of History and the Last Man. N. Y. P. 432

[15] Guralnik, G.; Hagen, C.; Kibble, T. Global Conservation Laws and Massless Particles. URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.585

[16] Higgs P. W. Broken symmetries and the masses of gauge bosons. URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.13.508

[17] In the sixth part of the Higgs10 series, the ATLAS and CMS experiments announce the discovery on 4 July 2012. URL: https://home.cern/news/series/higgs10/higgs10-when-spring-2012-turned-summer

[18] Johnston, W. Realtime Widely Distributed Instrumentation Systems. URL: https://www.academia.edu/16581035/Realtime_widely_distributed_instrumentation_systems

[19] Johnston, W. E., Gannon, D. and Nitzberg, B. (1999). Grids as Production Computing Environments: The Engineering Aspects of NASA's Information Power Grid. URL: https://www.researchgate.net/publication/3824529_Grids_as_production_computing_environments_the_engineering_aspects_of_NASA's_Information_Power_Grid

[20] Nakada, H., Sato, M. and Sekiguchi, S. (1999). Design and Implementations of Ninf: towards a Global Computing Infrastructure. URL: https://dl.acm.org/doi/abs/10.1016/S0167-739X%2899%2900016-3

[21] Schell J. (2000). The Folly of Arms Control. URL: https://www.researchgate.net/publication/272544352_The_Folly_of_Arms_Control

[22] Stevens, R., Woodward, P., DeFanti, T. and Catlett, C. (1997). From the I-WAY to the National Technology Grid. URL: https://dl.acm.org/doi/10.1145/265684.265692

[23] Ten people who mattered this year. URL: https://www.nature.com/articles/492335a

[24] Touraine A. (1969). La societe postindustrielle. Paris, p. 319.

[25] U. S.A. Today, August 9, 1999. URL: https://www.usatoday.com/