UDC 001.92:[316.77:004:070]-026.46

Functional Aspects of Defining Popular Science Content in Conditions of Convergent Information Space

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This scientific article studies the problem of identifying the characteristics of content aimed at popularising science as a specific type of information that functions within the framework of a larger scientific process. The dissemination of scientific knowledge among broad audiences that are not involved in scientific activity is a key factor for the public perception of research achievements and, as a result, the implementation of scientifically sound decisions, approaches and principles in everyday life. In addition, popular science content helps to attract potentially interested people to scientific work. Thus, the study of this problem is relevant.

The relevance of this article grounds on defining the phenomenon of popularisation of science at the current stage of development of communication technologies, which involve increasingly closer interaction of various means of data dissemination and allow the formation of holistic information media systems of certain organisations, which, ultimately, leads to the functioning of scientific information as a subject of competition.

Accordingly, it is found that the communication of scientific information within the academic community differs from the process of science popularisation, although it is interconnected with it. The key factors that influence the difference between popular science content and scientific content itself are studied, namely: the form of presentation of scientific information, the target audience and the data transmission platforms.

Thus, in the popularisation of science, specific artistic stylistic techniques are widely used in order to attract and hold the attention of the audience, and a broader context of the realisation of a scientific discovery and its role for society is also provided.

Popular science content is focused on a wide audience that is not directly involved in the scientific process to form a scientific worldview in it and potentially involve it in scientific activity. Such a content operates on an extensive set of topics, partly appealing to political and social issues, as well as popular culture phenomena, which are used to interest readers, viewers or listeners, but which do not distort scientific information.

At the same time, popular science content is informal, extensively uses the capabilities of social networks and websites in their interaction. Such characteristics partly lead to the fact that science popularisation activities are carried out by private, even commercial initiatives, which are in a state of competition. This allows to consider popular science content also as a subject of competition. In turn, in some places, this leads to the emergence of pseudoscientific-popular media that distort scientific knowledge.

Keywords: *popularisation of science, popular science content, scientific communication, scientific information.*

ФУНКЦІОНАЛЬНІ АСПЕКТИ ВИЗНАЧЕННЯ НАУКОВО-ПОПУЛЯРНОГО КОНТЕНТУ В УМОВАХ КОНВЕРГЕНТНОГО ІНФОРМАЦІЙНОГО ПРОСТОРУ

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У цій статті досліджено проблему виокремлення характеристик контенту, спрямованого на популяризацію науки як специфічного виду інформації, що функціонує в межах більшого наукового процесу. Поширення наукових знань серед великих аудиторій, не пов'язаних з науковою діяльністю, є ключовим фактором для суспільного сприйняття результатів досліджень і, як наслідок, імплементації в повсякденне життя науково обґрунтованих рішень, підходів і принципів. До того ж науково-популярний контент сприяє залученню потенційно зацікавлених людей до наукової роботи. Отже, дослідження визначеної проблеми є актуальним.

Новизна статті полягає у визначенні феномену популяризації науки на актуальному сучасному етапі розвитку комунікаційних технологій, які передбачають щораз тіснішу взаємодію різноманітних засобів поширення даних і дають змогу формувати цілісні інформаційні медіасистеми окремих організацій, що, зрештою, спричиняє функціонування наукової інформації в ролі предмета конкуренції.

Відповідно, з'ясовано, що комунікація наукової інформації всередині академічної спільноти відрізняється від процесу популяризації науки, хоч і є взаємопов'язаною з ним. Розглянуто ключові фактори, які впливають на відмінність науково-популярного контенту від власне наукового, а саме: форма подання наукової інформації, цільова аудиторія і платформи передавання даних.

Так, у діяльності з популяризації науки широко використовуються специфічні художні стилістичні прийоми для привернення й утримання уваги аудиторії, а також надається ширший контекст здійснення наукового відкриття та його ролі для суспільства.

Науково-популярний контент орієнтується на широку аудиторію, яка не є безпосередньо причетною до наукового процесу, з метою формування в ній наукового світогляду і її потенційного залучення до наукової діяльності. Такий контент оперує містким набором тем, почасти апелюючи до політичних і соціальних питань, а також явищ популярної культури, які застосовуються для зацікавлення читачів, глядачів чи слухачів, але не спотворюють наукову інформацію. При цьому науково-популярний контент є неформальним, зокрема масштабно використовує можливості соціальних мереж та веб-сайтів у їхній взаємодії. Такі характеристики часто призводять до того, що діяльність з популяризації науки провадять приватні й навіть комерційні ініціативи, що перебувають у стані конкуренції. Це дозволяє вести мову про науково-популярний контент також і як про предмет конкуренції що, своєю чергою, подекуди зумовлює виникнення псевдонауково-популярних медій, які спотворюють наукові знання.

***Ключові слова**: популяризація науки, науково-популярний контент, наукова комунікація, наукова інформація.*

The relevance of the problem

Popularising of scientific knowledge is a specific type of activity, which is different in its characteristics from scientific work itself. If science is aimed at studying and systematising information about objective reality by formulating theories and testing them through experiments and observations, then popularisation of science is a dissemination of already acquired knowledge to as wide a range of society as possible. Its goal is to shape a worldview in society based on scientific data, which ultimately contributes to implementing research results in the everyday life of the community, fosters public interest and support for research (National Academy of Sciences, Engineering, and Medicine, 2017; Fischhoff, 2013; Kappel & Holmen, 2019). In the case where technical means of disseminating information are constantly evolving and increasingly influencing people's lives and decisions, studying the specifics of popularisation of science in order to optimise the effectiveness of this activity is an extremely urgent task.

Problem statement

Knowledge circulating in the information space directly influences people's daily decisions on a range of issues — from personal health to political views. The totality of certain actions ultimately forms a social reality in which all members of a given society coexist. Thus, the information consumed by people has an indirect influence on the functioning of entire social groups. The presence of such possibilities of influencing large groups of people leads to the production, publication and dissemination of false information by interested parties, which, moreover, is distributed by platforms with greater probability when compared to reliable data (Aïmeur et al., 2023). This partly applies to scientific information, which is sometimes being distorted during its transmission. In view of this, it is important to determine characteristics by which popular science content can be defined in order to understand its differences from purely scientific data, which can help minimise its distortion, as well as to further form the most effective methods of disseminating scientific information.

Formulation of the goal and objectives of the scientific article. The goal of the scientific article is to analyse the characteristics of popular science content in conditions of a convergent information space.

The implementation of this goal involves the completion of the following tasks:

– to determine the characteristics that distinguish popular science content from scientific data;
– to identify the main factors that influence the formation of popular science information as a separate phenomenon;
– to outline the peculiarities of distributing popular science information in conditions of convergent information space.

The methodology of this study includes socio-communication and axiological approaches. The main methods applied in this scientific article are analysis, synthesis and generalisation.

State study of the problem

A number of Ukrainian and foreign scientists are engaged in the study of the definition of popular science content and the popularisation of science as a separate phenomenon. O. Kyrylova (2021) differentiates between science journalism, which forms its materials for a highly specialised academic audience in order to familiarise it with current scientific discoveries in a specific sphere, and popular science journalism, which is focused on the dissemination of scientific knowledge among an audience that does not have prior specialised training.

A broader approach to this issue is taken by X. Xia et al. (2022), who single out popular science content in the category of "science and knowledge communication". Focusing their research on the YouTube platform, scientists came to the conclusion that the characteristics inherent in popular science content can also be found in the communication of knowledge in such spheres as politics, philosophy, cinematography, etc., which go beyond the scope of classical sciences, thus allowing researchers to speak of the existence of a broader category. Z. Li and J. Ma (2021) mention that the popularisation of science, since its inception, has evolved from the simple dissemination of knowledge to the popularisation of scientific ideas, methods, and ethics. The use of social media tools for the science popularisation on the example of Slovakia is studied by N. Vrabec and L. Pieš (2023). The features and tendencies of popularising science in Ukraine are researched by M. Butyrina (2020) and M. Ivanytska (2021). The relationship between the popularisation of scientific knowledge and higher education is studied by Y. Geng and Y. Yan (2021).

Main material presentation

Popularisation of science can be characterised as an activity of disseminating scientific information with the aim of forming a worldview based on a scientific understanding of the world in people and society as a whole. It also aims to attract people, who previously had no relation to this sphere of activity, and to engage them in science. This system of knowledge about the physical world and its phenomena involves unbiased observations and systematic experimentation. It can be argued that conducting research does not necessarily involve disseminating the obtained information to a wide audience, and therefore popularisation of science should be considered as a separate phenomenon that can both accompany the implementation of scientific discoveries and function independently of the ongoing scientific process ("Science", 2025). In such a case, it is important to understand the main characteristics by which the activity of science popularisation can be determined. To achieve this, three factors that are

of key importance for defining popular science content are highlighted: form of presentation of scientific information; target audience; data transmission platforms. All of them are studied gradually.

Considering that modern scientific activity is rather a collective process of cumulative accumulation of ideas, knowledge and scientific paradigms, which occurs through the cooperation of the global scientific community, involving a large number of scientific and educational organisations and research groups, the communication of discoveries acquires exceptional importance (Kuhn, 1997). The dissemination of data within the scientific community on a global scale requires a presence of clear and coherent norms and requirements for the format of recording information in order to minimise possible distortions and, as a result, to achieve the greatest possible reliability of the final result of research based on previously acquired knowledge. For this purpose, a universal scientific style of writing and speech is elaborated, which includes a clear set of established speech structures and references to common terminology, that is mutually understandable in the scientific community. Accordingly, when publishing scientific works in highly specialised journals, as well as when presenting research findings at various scientific conferences, it is a mandatory requirement to use universally understandable scientific language. The perception of this kind of information requires significant preliminary preparation and familiarisation with the topic being discussed. Therefore, if we perceive the goal of popularising science as involving broad segments of society in the scientific process, direct internal scientific communication cannot be considered a part of this process, but rather its prerequisite, because although a preliminary academic background is required for its understanding, the results of this communication are still relied on by the science popularisers. At the same time, it cannot be ruled out that, due to the educational process, wide audiences possess scientific terminology and can perceive to some extent this kind of scientific communication. The bigger problem in perceiving information presented on the pages of highly specialised scientific publications and at scientific conferences, in this case, is precisely the specific focus and lack of a broader context of the research and its place in physical and social reality.

Based on this, it can be noted that the distinctive characteristic of popular science content in the aspect of the form of information provided is not so much the use or non-use of the scientific style of speech, but rather the provision of more extensive and general explanations and contexts. At the same time, it is important not to overlook the fact that creators of popular science content often use a wide range of stylistic techniques aimed at capturing and holding the audience's attention, which is mostly not observed in direct internal scientific communication. Among these techniques, a few can be distinguished, namely: subjective assessments of a phenomenon, emotional vocabulary, epithets, etc. It is important to clarify that these

techniques should not distort scientific information, but only draw attention to it. Accordingly, they should be separately highlighted, noting that this is precisely the author's addition to the presentation of scientific data. If this is not done, the content cannot be considered popular science.

The difference in the form of popular science content compared to the scientific one is caused by the orientation towards a different audience. As previously mentioned, scientific communication is primarily aimed at familiarising a highly specialised audience with the results of the latest research. On the other hand, popular science communication is addressed to the widest possible segments of society, and should take on more general forms and touch on more common topics before leading the audience to a specific specialised issue. This leads to a difference in the selection of issues. Thus, popular science content can tell not only about the latest relevant scientific research (although it covers them quite often), but also about previous scientific discoveries, classical science and fundamental natural principles. It can be oriented towards explaining the principles of the functioning of society, referring to current political issues and social problems, as well as appeal to popular culture, offering it as a reflection of certain natural or social phenomena, etc. That is, efforts to popularise science operate on a wider range of topics, capturing both current scientific problems and explaining various aspects of everyday life that have long been researched within the scientific domain.

Approaches to popularising science depend on the formats of information transmission, which, in turn, depend on technical capabilities. As of today, the main source of information among Ukrainians is the Internet in general and social networks in particular (Rating Group, 2024). Accordingly, the largest volumes of scientific information are popularised precisely with the help of this communication tool. It is important to clarify that the educational process is also a separate sphere of activity, different from the popularisation of science itself. Although, it can widely use the latter. Education is a key basis in forming a scientific worldview in people. Therefore, it is a prerequisite for the ability to perceive the science popularisation; in some way, it is identical to it in this characteristic. However, by definition, education is formalised and institutionalised, which distinguishes it from other informal means of socialisation and knowledge transfer in society (Lawson & Nakosteen, 2025). On the other hand, popularisation of science is characterised by a lower degree of formalisation or even its absence altogether. Events to popularise science can also include various kinds of science festivals, exhibitions or displays in museums and galleries.

In this study, the main focus is put on the dissemination of scientific information in a convergent information space. It involves the existence and interaction of different forms of data transmission. A wide range of physical and digital methods of information transmission are used as a holistic system for the popularisation of science, in which certain elements comple-

ment each other. This can apply to the combination of digital means of information transmission with physical ones within a single media ecosystem, as well as to the formation of coherent information systems using various formats and tools for data distribution exclusively on the Internet. The most widely used platforms for the dissemination of information on the Internet are social networks, each of which operates according to slightly different principles and involves the use of different content formats. It is important to understand that popular science content must be adapted to the standards of the relevant platforms. For some of them this is easier to do than for others. For example, on the YouTube video hosting platform, it is possible to publish long-format videos, which allows for a broad exploration of complex topics, providing the maximum possible context to the audience. Thus, for popularising science, this platform is quite convenient. On the other hand, in social networks focused on publishing short messages, the most famous of which is X (formerly Twitter), explaining complex topics is possible only in the format of so-called threads — short messages, each of which responds to the previous one and thus forms a logical line of one story. This approach allows to clearly structure information and may even have a positive effect on keeping the reader's attention. However, the limitations of this platform still leave an imprint on the depth of the information provided, not giving room for the use of various stylistic techniques. Additionally, text-based platforms provide fewer opportunities for data visualisation, compared to video hosting sites. Nevertheless, by using both of these platforms, it is possible to simultaneously deeply and visually attractively reveal a scientific issue using the capabilities of YouTube and attract an additional audience using short textual posts on the X social network.

A similar principle of interaction applies to other social networks, which have other ways of disseminating information. For example, the TikTok platform focuses on short-format videos, in which authors present the main elements of the data in a concise form. This approach to covering scientific information limits the possibilities of authors compared to long-format videos, but still, it allows you to reach a different audience and engage it with a specific topic. At the same time, the Instagram social network has several different formats. First of all, there are short videos, almost identical to those found on TikTok. In addition to them, there are also visual posts in the form of images with captions in the description below. In practice, when it is necessary to convey information, it is often displayed in the form of text on pictures. If the text is quite extensive, it is divided into several slides that follow each other within one post (this format is usually called a "carousel"). Both short videos and "carousels" can be used in science popularising. This can be done both by explaining certain scientific knowledge to a wide audience with their help, and by disseminating news about current scientific research in a format that attracts the attention of viewers or readers.

In addition to social networks, an important tool for disseminating information on the Internet are owned by certain organisations websites. They can also be applied in order to popularise science, as the formats for presenting information, design and other possible configurations, that can be freely customised on organisational websites. This allows the creation of visually appealing and engaging scientific data hubs aimed at sparking public interest in science. Usually, media initiatives aimed at popularising science combine several social networks and, quite often, also websites. Thus, modern media engaged in popularising science can use the wide possibilities of a convergent information space, in which various digital sources of information transmission, physical printed publications (usually magazines or books), as well as various kinds of events aimed at popularising science, such as lectures, exhibitions, etc. (all of them complement each other). It is important to understand that unlike internal communication in the scientific community, which takes place at closed conferences and within academic information platforms, the popularisation of science is inherently open.

Conclusions

It can be summarised that in conditions of a convergent information space, popular science content is characterised by a number of factors:

– orientation towards a wide audience;
– extensive explanation of the context of scientific data;
– appliance of various stylistic techniques aimed at attracting and maintaining the audience's attention;
– specific selection of topics, not necessarily related to the most relevant scientific research, but which does not exclude them;
– wide use of the capabilities of social networks and organisational websites in their interaction in order to reach the largest possible number of readers, viewers or listeners.

A key feature of popularising science is also its informality. It is not legally obligatory in comparison with education, and it is also characterised by the lack of clear regulation. All these characteristics contribute to the fact that science popularisation can be carried out by private initiatives, including those that set profit as their goal, that is, are commercial structures which are in a state of competition with each other.

Accordingly, it can be argued that popular science content can be viewed as a specific subject of competition. This often contributes to the emergence of pseudoscientific media, which disseminate information that does not correspond to the scientific worldview and objective facts, but at the same time, use stylistic techniques to pass them off as reliable data. However, this problem touches on issues of media literacy and fact-checking skills which go beyond the scope of this study.

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