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HOW THE CONTENT OF SCIENCE EDUCATION WILL CHANGE DUE TO THE GLOBAL RISKS OF TODAY

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Annotation. *Changes in the content component of educational model and training programs are based on ensuring the security and defense of the country, on the popularization of the results of scientific research of scientists and on the preservation of the state of the environment. The New Ukrainian School (NUS) has key competencies, cross-cutting skills, attitudes and basic knowledge (physics, chemistry, biology, geography) about natural resources, population and economy. For example, in observations, reflections on how we handle waste (solid domestic, organic, electronic), which is the source of the spread of infectious diseases, methane emissions, and chemical pollution.*
Keywords: *global risks, New Ukrainian School, cause-and-effect relationships, sustainable development, waste.*

We live in turbulent times of global changes in natural, economic and social systems, we must remember about the near future of pupils and students, who will form a new professional environment in the field of education and science in general secondary education institutions of Ukraine. The main impact of today's science education will be felt in the near future as a priority for the post-war development of Ukraine. It will manifest itself primarily in ensuring the security and defense of the country, popularizing the results of scientific research by scientists and preserving the state of the environment. Of course, this ambitious vision of the future encourages researchers, methodologists and teachers of natural sciences to change the content of educational model and training programs in physics, chemistry, biology, ecology and geography today. Our vision is to timely compare the changes in the transformational economy, the formation and functioning of business systems at the macro-, meso- and microeconomic levels, the peculiarities of the national economic system, strategic priorities of sustainable development, digitalization. The practice of economic cooperation in the system of "scientists – practitioners – business", where scientific experience and practical skills are taken as a basis, remains far from ideal. The New Ukrainian School (NUS) has key competencies, cross-cutting skills, attitudes and basic knowledge (physics, chemistry, biology, geography) [1].

Global risks are the possibility of an event or condition that, if it occurs, will adversely affect a significant share of global gross domestic product (GDP), population or natural resources. The Global Risk Perception Survey (GRPS) has been at the heart of the Global Risk Report for two decades and is the main source of original data on global risks from the World Economic Forum [2, 4]. business, government, international organizations and civil society, the voiced global risks will determine the vector of development of many countries in the near future (approximately until the 2035s and 2050s) (Table 1). Beyond the description, there are important risks about misinformation and disinformation, which can be viewed through the prism of AI-generated and human-generated content, for example,

in video, image, voice, and text formats. After all, according to the World Economic Form, 5.5 billion. people use the Internet, incl. more than 5 billion. – social networks [2, 46].

Table 1. How and where to change the content of educational model and training programs in natural sciences*

Physics	**Chemistry**	**Biology**	**Ecology**	**Geography**
Technological acceleration	Personal care products	Biotechnology	Climate change	State armed conflicts
Artificial Intelligence (AI)	Sunscreens, insect repellent	Pandemic	Extreme weather conditions	Geoeconomic confrontation
Information and Communication Technologies (ICT)	Detergents (household)	Diseases and premature deaths	Air, water, soil pollution	Migrations and displacements
Measuring instruments	Antimicrobials	Inequality in access to health care	Loss of biodiversity	Social inequality

[* Compiled by the author based on source 2]

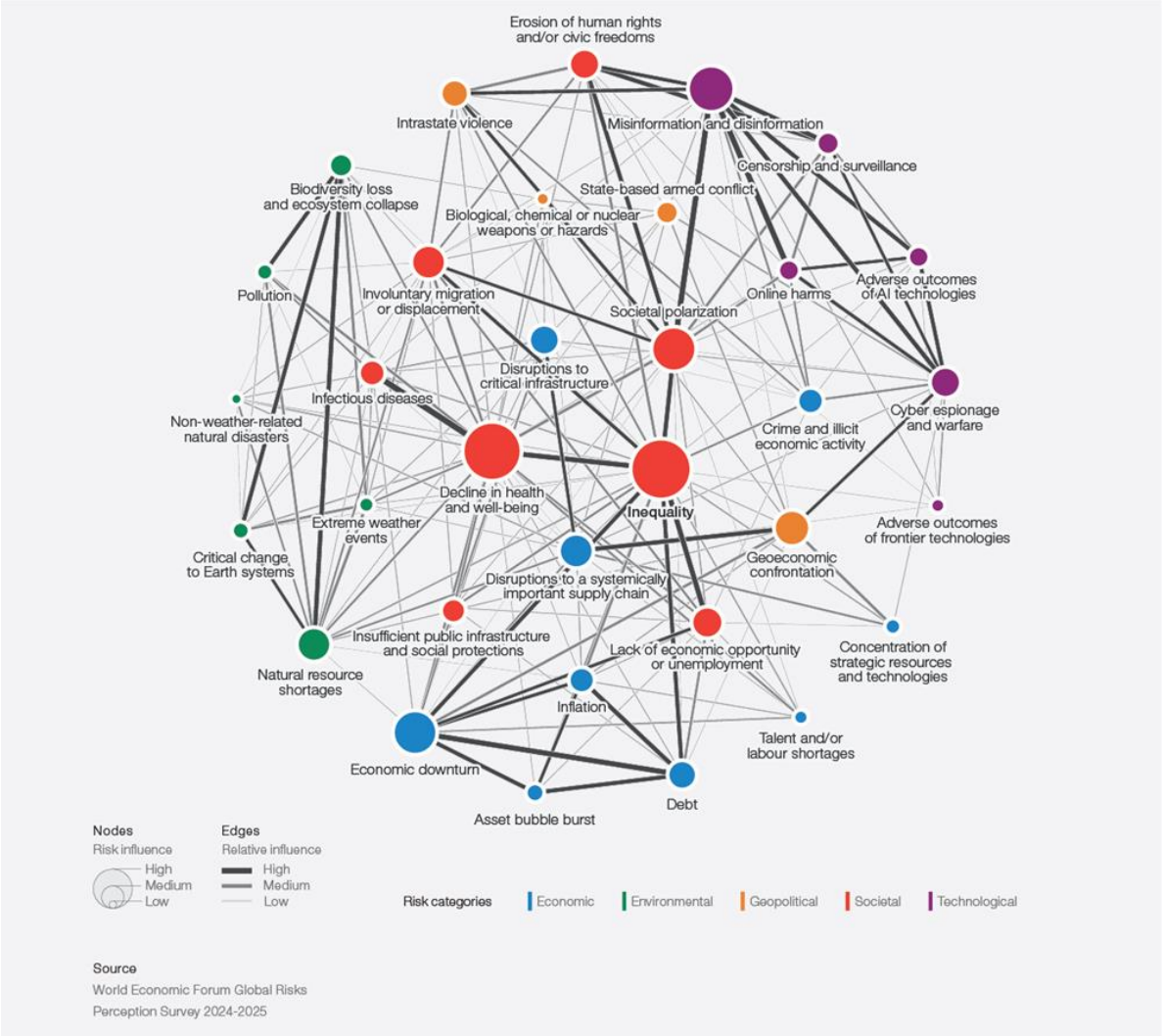

Fig. 1. Map of the interconnections of global risks [2, 9]

Technological acceleration, information and communication technologies (ICT), AI and other technologies permeate all natural sciences throughout, creating a unique digital footprint that is a kind of trigger for the risk of citizen surveillance, the development of cyber espionage on a global scale and/or convenient to use. Of course, some educational functionaries want to introduce digital literacy as a separate educational subject or course in secondary schools, but in our opinion, there are already too many subjects in educational practice. What to do? "Weave" the basics of digital literacy into the educational process in general! But you should start adapting technologies from kindergarten and continue for the rest of your life.

On the map of the interrelations of global risks (Fig. 1), different spheres of activity interact: technological, geostrategic, climate and demographic. Understanding these rather complex relationships will unlock the potential of education through research for a prosperous society. How to build student and student research in practice? In search of cause-and-effect relationships, you can start with those topics that most excite, fascinate or, as if magnetically attract. (Figure 2).

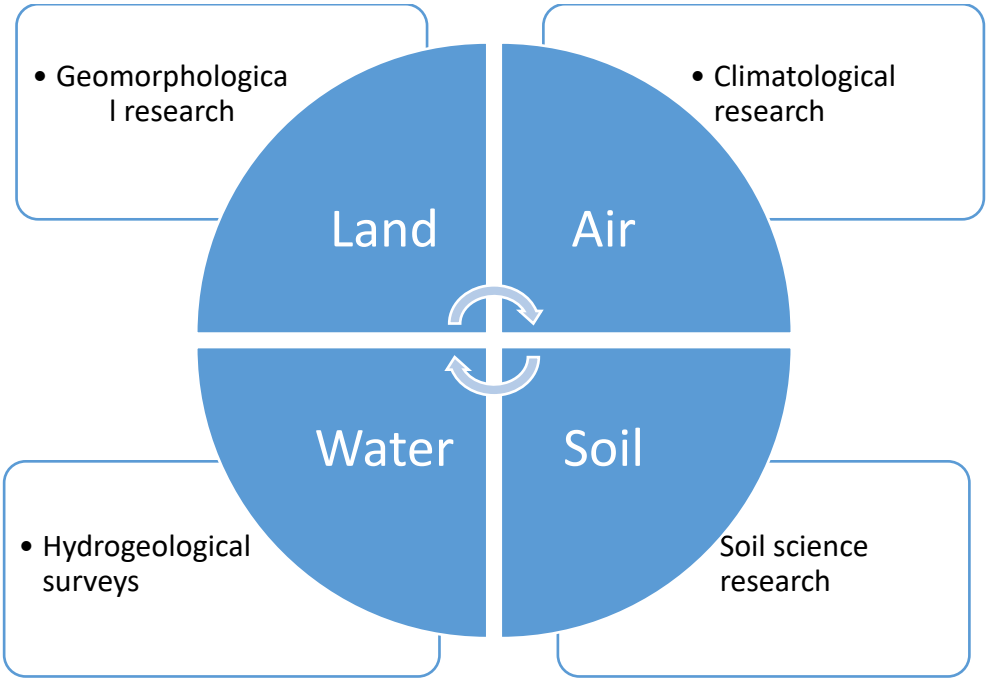

Fig. 2. Subjects of research on the basics of physics, chemistry, biology, geography

In each of the subjects of research in the natural sciences, we see, first of all, the potential for knowledge. For example, studying the cause-and-effect relationships of pollution at the local, regional or global levels, we learn: why the population is growing, how it affects soil degradation, why crop yields decrease as a result, how it affects food security, where forests have gone... These studies are important for students, and for students more complex levels of cognition: in *physics* and *chemistry* – weather and climatic processes, phenomena (greenhouse gases such as carbon dioxide, methane, nitrogen affect nature and humans); in *biology* and *geography* – the spread of diseases and premature deaths (92% cardiovascular, respiratory, infertility and cancer) due to air, water or soil pollution and inequality in access to medical care and burdens, economic losses, the use of fossil fuels (coal, oil and natural gas), shortage of natural resources and energy.

As a result, students not only understand, but take an active part in the ecological and energy transition of sustainable development of their native country. From sources of greenhouse gases:

energy use, industrial and agricultural production, waste and/or natural factors (forest fires) to the scientific study of the physical and chemical properties of carbon dioxide, methane, ozone, sulfur, nitrogen, soot, nitrogen oxide, etc. The geographical component provides an understanding of the impact of pollution on human health (respiratory, cardiovascular and other chronic diseases); labor productivity, which can be reduced by extreme heat; on nature – acceleration of melting of snow and ice and economy, as yield losses.

Of course, we should start with ourselves, in observations, reflections on how we deal with waste (solid domestic, organic, electronic), which is a source of the spread of infectious diseases, methane emissions, and chemical pollution. These processes can be of a cross-border nature, which are recommended to be studied locally (within walking distance to a secondary school or a higher education institution (HEI)). Ordinary citizens are practically unfamiliar with the system of environmental monitoring, reporting and assessment, air, water or soil quality standards. This must be taught, and education based on research – physical, chemical, biological and geographical – is a possible way of civic education.

Consumers are not sufficiently aware of the economical use and proper disposal of wastes such as per- and polyfluoroalkyl substances (PFAS), which are highly toxic, micro- and nanoplastics, genetically modified organisms (GMOs). By the middle of the XXI century. socio-political risks such as inequality, labor shortages, declining birth rates and worries about increasing life expectancy will deepen. The aging of a person, nations and even entire states leads to a permanent pension crisis, tensions between generations, job loss, advanced training or retraining to be able to continue their careers. It is in the exploration of the world that we begin to realize the value of leading a healthy lifestyle regardless of age, where we pay attention to exercise, a balanced diet and social interaction.

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