Innovative Educational Communication in the Global Digital Environment: Trans-Disciplinary Models, Tools, and Mechanisms

Rusudan MAKHACHASHVILI

Romance Languages and Typology Department

Borys Grinchenko Kyiv University, Bulvarno-Kudryavska-st., 18/2,

Kyiv, Ukraine

Ivan SEMENIST

Oriental Languages and Translation Department

Borys Grinchenko Kyiv University, Bulvarno-Kudryavska-st., 18/2,

Kyiv, Ukraine

ABSTRACT

The objective of the inquiry is on innovative communication in the light of identifying trans-disciplinary aspects of phylogeny, sociogenesis, and technogenesis of educational communities, which determines the identification of this communicative sphere as an integrative structure determined by the internal unity of its micro- and macro-structures, which in the plane of the sign substrate synthesizes the features of existential, cognitive, anthropological and technological substance.

Applied trans-disciplinary lens of the phenomenological approach to the study contributes to the solution of holistic modeling of processes and results of updating models and mechanisms of the highly dynamic communication system of education in the digital environment as a whole and its individual formats at the beginning of the XXI century in particular. The object of research is innovative educational communication in the global digital environment. The study focus is on innovative language and technology models, digital tools, and mechanisms of educational communication in the digital realm. The empirical basis of the research is the practices of innovative communication related to different substrates, formats, objects, and phenomena of acquiring new knowledge and education in the digital realm. The study results allow to provide a transdisciplinary synthesis (across communicative theory, information theory, philosophy, education and e-learning studies, semiotics, digital humanities).

Keywords: Transdisciplinarity, Innovative Educaiotnal Communication, Digital Environment, Framework Transformation of Communicative Scenario, Digital Education, Digital Thesaurus, Modeling, Phenomenology

1. INTRODUCTION

As a product of modern civilization, the digital reality has become an independent format of being. Accordingly, electronic media act not only as a means of transmitting information, but also reveal their own world-creating, meaning-making and, as a consequence, language-forming and communicative potential [46; 48; 50]. The global digital realm stands as an integral environment, demanding new cognition and perception ways via complex philosophic, cultural, social, linguistic approaches, providing unlimited opportunities for human intellect, language development and research.

Given the conceptual system of identification of onto-mental and linguo-mental complex formations to identify constructs of reality, the global digital realm (cyberspace) and its innovative communicative shell can be located in the transdisciplinary coordinates of such paradigms: 1) philosophy - as *a particular type of substance* – material and ideal reality in the multitude of its forms; a meta-negentropy (the term after Nagib Callaos [6]); 2) anthropology – as an environment for actualization of post-humanistic forms of anthropogenesis; 3) psychology – as psychosomatic and emotional plane of a personality functioning; 4) sociology – as a system of multi-tiered and multi-directional social and communicative relations; 5) in culturology - as a sphere of spiritual experience, 6) in the theory of communication - as a system of multilevel, multidirectional social relations and communicative interaction.

Innovative educational communication in the global digital realm (IECDR) is, therefore, transdisciplinary understood as an integrated at the macro and micro level set of usual language innovations and innovative communication practices and technologies, which by their specific characteristics are conditionally exhaustive phenomenological correlates of various substrate elements of the digital environment.

Theoretical problems of holistic, transdimensional modeling of reality and its separate spheres are directed by the deterministic interaction of objects, signs of their reception and interpretation (in the field of individual and collective consciousness), embodiment, consolidation and retransmission of the results of interaction of these systems of features.

Conditions for the development of modern globalization civilization determine the expansion and refinement of the paradigm of views on the theoretical principles of determining the groundwork and characteristics of the consolidation of the world order, its perception in culture, collective social consciousness and natural language.

The transdisciplinarity of innovative educational communication in this respect is accessed through is the conceptual lens of the **logosphere**, synthetically perceived as 1) the plurality of language units, which are conditionally exhaustive phenomenological realizations of abstract and empirical

---

elements of different spheres of life [4; 23]; 2) the zone of integration of thought, speech, and experience continuums of cultures [5; 16; 26]; 3) the plurality of culturally relevant universal meanings and signs - **semiosphere** [27]; 4) a plurality of transcendent spiritual meanings – **pneumatosphere** [14].

Foreign Languages Acquisition on university-level major programs is a rigorous process that involves different stages and a regimen of communicative educational activities, communication types and competences across interconnected domains [24; 25]. Transdisciplinarity and ubiquity (universality) of innovative communication for Foreign Languages Education (FLE) in the 21st century, therefore, is informed, in crucial ways, by intellectualization and amplified information capacity of human activities in general. Thus, the intellectualization of modern global culture determines a qualitatively new approach to understanding the processes of parallel development of human activities, cognitive (intellectual), and communicative experiences. That is the origin and methodological premise of the concept of "noosphere". Noosphere is the unity of "nature" and culture, especially from the moment when the intellectual culture reaches (by force of influence on the biosphere and geosphere) the power of a peculiar "geological force" [40].

The noosphere is defined as the current stage of development of the biosphere, associated with the emergence of humanity in it [16; 40], and is interpreted as part of the planet and planet ambient with traces of human activity.

The integral real component of the Noosphere is identified as the Technosphere - a set of artificial objects (technologies) created by the humankind, and natural objects changed as a result of technological activity of humankind [28]. In turn, Computer Being (computer reality, cyberspace) is a complex, multidimensional sphere of synthesis of reality, human experience and activity mediated by the latest digital and information technologies; technogenic reality, a component of the technosphere of existence [17; 28].

Therefore, it is stipulated in **the study design**, that the cognitive (Noosphere) premise *of innovative educational communication in the digital realm* (IECDR) is informed by the following **dimensions**: 1) the *transdisciplinary dimension* of IECDR, disclosed through the mutual transformative potential of information and modern technology, as "knowledge in a scientific sense can lag only slightly behind this world transformation because knowledge becomes transformed in the process" [17]; 2) *the universal dimension* of IECDR, disclosed through the pervasive, ubiquitous nature of humanitarian and linguistic (especially multi-cultural) knowledge applicability, as "science and technology revolutionize our lives, but memory, tradition and myth frame our response" [32]; 3) *the interoperable dimension* of IECDR, informed by the underlying anthropocentrism of linguistic knowledge and skills, providing the interface for development and application of skills and activities across different domains, as "a human is a nexus of existential horizons" [22].

The result of a fundamental Technosphere shift in the sphere of Foreign Languages Education, induced by the COVID-19 pandemic development and enhanced by continuous iterative digitalization measures, was the need to take quick comprehensive action [29; 36] in order to achieve such desirable results: a) To activate comprehensive transdisciplinary domains and corresponding interdisciplinary skillsets, otherwise latent or underutilized in the Foreign languages educational process; b)To enhance the scope foreign language communication skills beyond the domains traditionally reserved for Liberal Arts education; c) To boost information and communication technological competence and digital literacy of FLE

stakeholders, to meet the requirements of COVID-19 job market and workplace.

The inquiry **objective** is to determine innovative communication in the light of identifying trans-disciplinary aspects of phylogeny, sociogenesis, and technogenesis of educational communities in the digital realm, which determines the identification of this communicative sphere as an integrative structure determined by the internal unity of its micro- and macro-structures

The study of groundwork principles of universality and transdisciplinary of educational communication in professional linguisitc training and linguistic education in general is a parcel of the framework project *TRANSITION: Transformation, Network, Society and Education* [29; 30].

2. FINDINGS

Transdisciplinary Modelling of Innovative Educational Communication

The modelling of innovative educational communication in the digital realm is predicated on the following **key premises**: 1) the phenomenological nature of innovative communication in the field of acquiring new knowledge (education in the broader sense) in the digital environment involves an inseparable, mutual combination of its linguistic and substantive (ontological, epistemic and anthropological) aspects in the vertical plane of mutual expression of categories of essence$\Leftrightarrow$phenomenon; 2) the innovative nature of communication in the field of acquiring new knowledge in the global digital environment is determined by the phenomenological consolidation of substantive (ontological, presuppositional/cognitive) characteristics of the macrostructure of communication in statics and end-to-end dynamic interaction of formal and semantic constituents and technological (digital) tools.

Within the phenomenological approach [49; 51] global semiotic integration of macro- and microstructures of innovative communication in the field of acquiring new knowledge in the global digital environment is identified as provided and implemented through deterministic interaction of multi-substrate (linguistic, spatiotemporal, essential, anthropological and social) parameters of this innovative communicative logosphere, given the significant synchronous density of rates and results of parallel development of verbal, ontological and anthropological continuums of the global digital environment [42; 43; 45].

The framework innovation of educational communication in the digital realm, thus (as a multidimensional, complex, dynamic system) is the most comprehensive quantitative and qualitative terms of language representation of the linguistic actualization of being, determined by a number of qualifying conditions of its emergence, existence and development, including: 1) exhaustive synchronization process of the object, phenomenological and anthropological field of computer being and development processes of the ICT meta-language; 2) exhaustive output of parameterization isomorphism of ontological (substance phenomenological), anthropic and digitized structures of reality; 3) flexibility, adaptability and dynamic potential of the vocabulary of the modern languages (heavily influenced by English hegemony) in correlation with the ICT sphere (that is fulfilled, in particular through info-capacity, sign hybridization, the evolution of the basic ontological and functional features of neologisms in relevant areas).

Given the features of digital logosphere as specific linguistic-onthological, phenomenological-linguistic and a linguistic-semiotic object, it is possible to distinguish the following typological characteristics of IECDR:

A) The ability to conditionally complete phenomenological realization of substantive identity of the cyberspace in significative characteristics of verbal units that constitute the relevant innovative logosphere. The following typological characteristics of ICL are to be phenomenologized, particularly at the level of the external form of discrete ICSL units. For example, paronymic unit elements of affixation paradigm based on formant dot- one that pertains to the Internet: dot-biz - legal body that implements its activities through Internet, dot-con - offender that performs fraud (con) through Internet (in these units is dot- verbal manifestation graphical point - [.] - as semiotic marker recording Interent protocol address). A meta-term innovation 404 – to be offline for a long while (404 – a semiotic representation of protocol error on the results of an unsuccessful search Internet page). On the internal form level of discrete ICL units: sextuple-u – a metaphtonymic conventional transcoding of an Internet protocol address: www (where: three-double-u - initial transcoding → 3x2-u =-u 6 – a metaphtonymic correlate); 888 in Japanese (pronounced as ぱちぱちぱち, the sound of snapping or clapping) – an online communication formula.

Due to a combination of external and internal form configurations of discrete units ICL: for example, an innovation paradigm Web 2.0/Web.3.0/Web 4.0 - the newest visual and technological configuration of Internet space where the Web - Internet 2.0 (N.0) is an analogical representation of meaningful semiotic element "a new (improved) version" (operating system, software, software, etc.).

B) Structural density volume, uniformity and conditional completeness of innovative codification of multi-substrat configuration of digital communication.

The following grid of groundwork concepts is applied to profile the Innovative Communication for Foreign Languages Education (FLE) in such disciplinary dimensions (Fig. 1):

•   TRANSDISCIPLINARITY
•   UNIVERSALITY
•   INTEROPERABILITY

Figure 1: Conceptual Grid of the Inquiry

The meaning of TRANSDISCIPLINARITY is synthesized for the purpose of this study as a transcendent agglomeration of two or more fields of knowledge into one scope/goal of study, inquiry or activity [6; 15; 18; 21].

UNIVERSALITY is generally understood as a property of object or state **to "exist** everywhere **(ubiquity), or involve everyone"** [7]. In the context of this study we suggest to attribute the property of universality/ubiquity to social activity, vocational activity and professional performance.

The concept of INTEROPERABILITY is disclosed across different approaches [20; 34; 35] as a characteristic of an object, product or system, that allows its interface to be comprehensible, to work with other objects, products or systems.

As applied to innovative educational commuiaction in the digital realm, the concept of interoperability represents the property of functional, dynamic interconnectivity between the source and target domains of linguistic content, linguistic theory content, related areas of scientific and universal knowledge, and domains of professional and social application. Degrees of interoperability help define the measure of interdisciplinary transcendence and universality of activities, skills and competence applications of FLE stakeholders (Fig. 2):
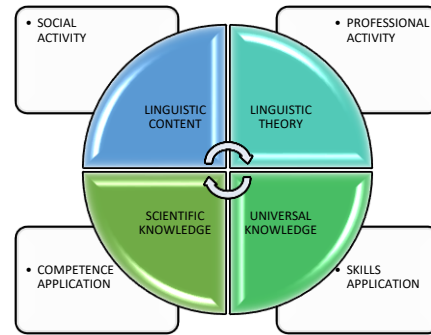

Figure 2: Interoperablity Model for Innovative Educational Communicaiotn in the Digital Realm

The generic concept of multiple disciplinarity [1; 38] comprises, in its turn, of a framework of interconnected concepts:

•   Multi-disciplinarity;
•   Interdisciplinarity;
•   Transdiciplinarity.

Multi-disciplinarity, thus, is understood as a multitude of fields of knowledge, that comprise the scope of understanding a certain object, problem or area of inquiry.

Interdisciplinarity in this respect is interpreted as the interconnectivity of multiple spheres of knowledge that comprised the content of a problem or area of inquiry.

Trans-disciplinarity, subsequently, is perceived as a transcendent product of merging multiple interconnected knowledge domains. *Transdisciplinarity of innovative educational communication in general* is, therefore, postulated in this study as a computational framework of interconnected types of disciplinarities.

Multidisciplinary **input** into the education design and content in the form of data, information and facts across different source domains of human knowledge in order 1) to constitute the thematic content of language acquisition; 2) to constitute the semantic referents of linguistic units; 3) to constitute the vast framework of reference and contexts for communicative application.

Interdisciplinary connections of the educational **content** for FLE – internal interconnectivity of theoretical and applied disciplines, external interconnectivity of FLE content with non-related areas of human knowledge (computer science, physiology, anthropology, philosophy etc.).

Transdisciplinary **output** in the transcendent nature target knowledge domains and universal applicability of skills, training and outlook of the FLE professionals upon graduation.

The transdisciplinary integration of innovative educational communication could be referred to the following key interdisciplinary domains of human activity [30]: COMMUNICATION; COGNITIVE ACTIVITY; PERSONAL INTERACTION; SOCIAL ACTIVITY; HEURISTICS.

Interoperability for FLE skills ensured by the communicative nature of interdisciplinary skills. The core cross-sectorial domain that is referential for primary skills (social skills, emotional intellect, collaboration, communication, ICT-literacy), necessary for educational goals achievement, is COMMUNICATION.

The digital dimension of communicative interoperability of FLE stems from the structure of Noosphere [40] and content of its components: ANTHROPOSPHERE - a set of people as living organisms, their activities and achievements; SOCIOSPHERE - a set of social factors characteristic of this stage of society

development and its interaction with nature; TECHNOSPHERE - a set of artificial objects created by man, and natural objects, altered as a result of human activity.

Given the nature of increasingly digitalized context of foreign languages education and communicative application ("the Technospheric shift" [30]), it is suggested to consider the different types of information source and information destination (human and machine/computer/program, accordingly) in the structure of the groundwork Communication model (Cf. Claude Shannon [33]), when communication is approached as the core factor of interoperability of source and target knowledge and application domains in FLE (Fig. 4):
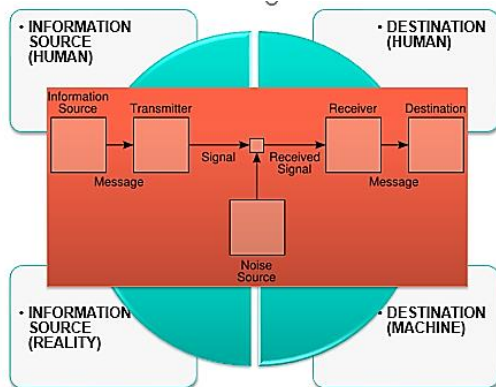

Figure 4: Adaptation of communication model to digitized context of FLE

Thus, the fundamental transdisciplinarity, that COVID-19 digital procedural transformations imposed on the educational process in the area of Foreign languages acquisition, is verified by a unified framework of correspondence between the components of a crucial communicative competence [19], comprising of a diverse skillset, and various aspects of ICT competence in Liberal Arts [3; 12; 13; 39;], utilized in the educational process, elaborated for the purposes of this study (Fig. 5):
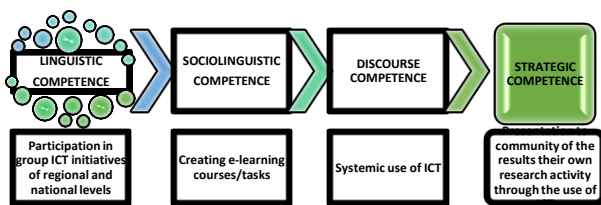

Figure 5: Transdisciplinary Correspondence Between Communicative Competence and ICT Competence in Liberal Arts

The following study aims to identify, among other parameters, challenges for actual and underdeveloped cross-sectorial and transdisciplinary skills (hard, technical and soft), that participants of the educational process encounter through the progress of complex innovative communicative, digitally enhanced scenarios.

Transdisicplinary Mechanisms of Innovative Educational Communication in the Digital Realm

The thesaurus of innovative communication in the field of education in the digital environment as a presuppositional and locative structure consists of such groups of components and their language implementation (information and communication technologies / digital tools, digital formats of cognition / learning, digital competencies). The thesaurus is structured to identify and categorize the key components of innovative cyberterminology that contribute to the construction and operation of the electronic learning environment / acquisition of new knowledge. Modeling of macro-, micro- and supra-structures of innovative communication in the field of acquiring new knowledge and their digital processing in the coordinates of three main dimensions is proposed: 1) **Intranet-heuristic anthroposphere of acquiring new knowledge** (anthropic communicative digital environment) - e.g. digital immigrant - a subject of innovative communication in the digital environment, for which it is not the primary communicative experience by age, twitterati (Twitter + literaty) - a professional communicator in digital social networks in the genre of "microblog"; 2) **Extranet-heuristic anthroposphere of acquiring new knowledge** (components of digital reality that function in the communicative environment outside the context of digital communication) - e.g. tradigital (traditional + digital) - a familiar object of the non-digital environment that incorporates digital technology, Zoomer, Generation Z(oom) - the subject of innovative communication in the digital environment as a social group for a set of features of communicative behavior; Zoomwear - a type of clothing suitable for digital video communication; al desko (Sp. Eng.) - the subject of innovative communication in the digital environment by type of location in real space; 3) **Technogenic anthroposphere of acquiring new knowledge** (reoriented components of the anthropogenic communicative environment with the replaced ontological parameter to the corresponding anthropic) - e.g. Webucation (acquisition of new knowledge, education, in a digital communication environment); word-of-blog - dissemination of information in the digital communication environment; Wikification - opening a data resource for the collaboration of communicators in the digital environment; destiny revolution (Ch. Eng.) - digital revolution of the communicative environment (according to the consonance of the pronunciation of hieroglyphs to denote the concepts of fate / destiny and digital).

The dynamic interaction of structural levels of ICT content in the layers of innovative communication in the field of acquiring new knowledge is characterized by anthropogenic and cognitive parameters of the content plane, mediated by subjective and collective cognitive experience of cognitive subjects in the digital environment embodied in digital transformation.

The Thesaurus of Innovative Communication in the field of gaining new knowledge in the digital environment as a presuppositional and locutive Structure reveals the phenomenological (nominative, reference, denotative, significant) ability to converge coding at the system level of its internal and external elements of all the above parameters. The specificity of the thesaurus of English-language innovative communication in the field of acquiring new knowledge in the digital environment is determined by the isomorphic nature of the integration of its external and internal structure and the integration of the macrostructure of innovative communication in the field of acquiring new knowledge in the global digital environment.

Specific differential features of the logosphere of innovative communication in the digital environment as a linguo-ontological, linguophenomenological object are: Normativeness arising from the parametric features of the concept of "logosphere" (while maintaining the characteristics of dynamic

variation of the logosphere); Lingual substantiality - the phenomenological ("actualizing") status of the shells of language signs and communicative actions in reality; The principle of isomorphism of the signified and signified.

As a language macrostructure, innovative communication in the digital environment is modeled by the interoperability of language, cognitive (presuppositional) and communicative-activity parameters (Fig. 6):
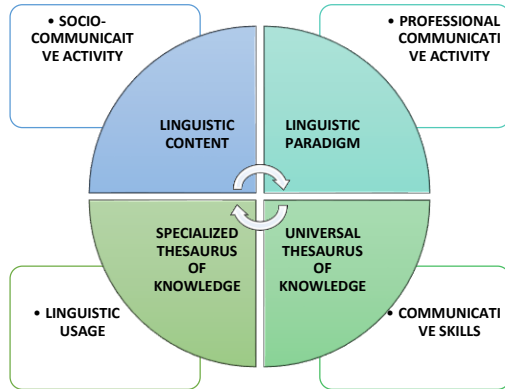

Figure 6: Model of Linguo-Cognitive Interoperability of Innovative Educational Communication

As a structural macrocomponent of the digital environment, innovative communication in the field of acquiring new knowledge is modeled by interoperability and synthesis of technological and communicative-activity parameters (Fig. 7):
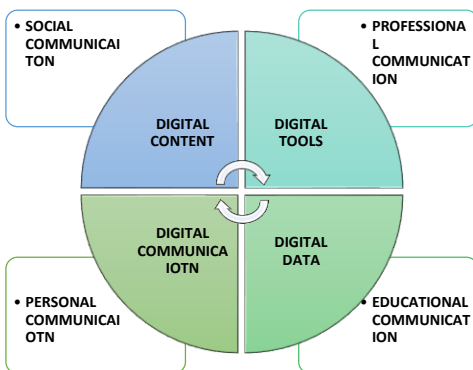

Figure 7: Model of Digital Interoperability of Innovative Educational Communication

The process of digitization of the linguistic and communicative space of global society, especially under the quarantine restrictions of 2020-2021, required the simultaneous use and intersection of such structurally and communicatively complex formats of new knowledge and visualization of the paradigm of relevant linguistic nouns to denote innovative formats: E-Learning 1.0 (direct synchronous distance communication in the field of acquiring new knowledge using digital technologies and tools); E-Learning 2.0 (mainly asynchronous communication in the field of acquiring new knowledge through digital technologies and tools; this nomen is part of a synonymous pair of innovations together with "networked learning"); E-Learning 3.0 (mostly asynchronous communication in the field of acquiring new knowledge using digital artificial intelligence technologies); B-

(lended) -learning (personal communication in the field of acquiring new knowledge using asynchronous ICT-based methods, this innovation unit is part of the telescopic reduction paradigm according to the STL model (space / time / location) - learning: u (biquitous) -learning , m (abundant) -learning); Hybrid learning (synchronous learning of present and personal subjects with the help of ICT).

Modeling the epistemic basis of innovative communicative activity and the transformation of cognitive experience of acquiring new knowledge into digital format, thus, is possible through the combination and synthesis of the following set of parameters: Time; Space; Communicative distance; Dependence on digital communication tools and digital infrastructure; Level of difficulty.

Given the above, the innovative logosphere of information and communication technologies, e-learning and digital competencies as a linguistic and presuppositional prerequisite for innovative communication in the field of acquiring new knowledge in the digital environment is defined as: a) syncretic, fixed in its semantic volume; are asymptotically (i.e. in an unlimited approximation) exhaustive incarnations of the basic and factual elements of the modern digital environment. b) vertically integrated at the macro and micro level set of digital technologies, communicative practices of e-learning, hybrid learning, thesaurus of digital and interdisciplinary competencies as a locative and presuppositional component of innovative communication, its typological specificity is relatively comprehensive phenomenological environment.

The application of various ICT tools, inherent to each type of educational communicative activity, allows to disclose the transformation procedure as a complex frame scenario of the dynamic actional or script type, meaning a structure, which presents procedural knowledge about the course of events [44]. The "frame" is information data, formed in a certain way, that reflects the acquired experience of knowledge about a certain stereotypical situation, which is perceived quite generally, because it can mean action, image, narration etc. [52]. Therefore, the framework scenario of Innovative Educational Communication transformation into digital format assisted by ICT tools, comprises of the following separate cognitive schemes:

1) **Agency scheme**: X (AGENT) [stakeholder of communiaiotn] => performs EDUCATIONAL ACTIVITY => [digital equivalent activity]
2) **Localization scheme**: X (AGENT) [stakeholder of communiaiotn] => performs activity THERE [locus] => [digital equivalent locus]
3) **Instrumental scheme**: X (AGENT) [stakeholder of communicaiotn] => uses INSTRUMENT => for PURPOSE [to perform educational activity] => [EQUIVALENT ICT TOOLS] for => [DIGITAL EQUIVALENT ACTIVITY]
4) **Object scheme**: X (INSTRUMENT) [ICT tool] => is APPLIED to PATIENT [educational activity / [digital equivalent activity] => for PURPOSE [educational goal].

The set of schemes for the transformation of innovative digital communication procedures have a complex basis based on the use of ICT tools and digital communication practices that meet different levels of cognitive goals (and corresponding illocutionary intentions) to obtain and transmit new knowledge in communication.

Responsible technology [47] in the context of innovative communication in the digital environment is understood as anthropocentric technology and tools designed for real communication situations and scenarios, tested by assessing the most perlocutionary effective communication practices. Functional interpretation of responsible technology is the most optimal for the analysis of syncretic transformation of complex language-communicative scenarios in the field of acquiring new knowledge into digital format.

3. CONCLUSIONS

Applied linguophenomenological approach to the study of the object of inquiry contributes to solving the scientific problem of holistic modeling of processes and results of updating models and mechanisms of highly dynamic communication system in the field of acquiring new knowledge in the digital environment as a whole and its individual formats at the beginning of the XXI century in particular. The scientific novelty of the inquiry is derived from the conclusions and generalizations as to the identified and parameterized innovative communication in the field of acquiring new knowledge in the global digital environment as a consolidated macro- and micro-level object of analysis, which is qualified by specific phenomenological and dynamic features, properties and tools of implementation.

The study results allow to provide a transdisciplinary synthesis (across communicative theory, information theory, philosophy, education and e-learning studies, semiotics, digital humanities) to disclose the following findings: the integrative theoretical and methodological bases of research of educational communication are defined; the innovative educational communication in the digital realm is parametrized in the conditions of global quarantine restrictions; the methodological framework of modeling innovative educational communication in the digital environment in the ontological, semiotic and cognitive planes is introduced; the macrostructure of innovative educational communication is identified as a set of linguistic, communicative, and instrumental innovations in the systemic unity of their reference correlation with substantial (ontological, epistemic, anthropological, technological) dimensions and elements of the global digital environment, the manifestation of which determines the phenomenological nature of the studied linguistic-communicative sphere; the typology of cognitive scenarios of innovative educational communication in the digital environment is defined; the methods and tools for empirical measurability of the effectiveness of innovative educational communication in the digital environment are introduced; experimental verification of the effectiveness of innovative educational communication during the period of emergency quarantine restrictions are implemented; the principles of universality of interdisciplinary and trans-disciplinary modeling of educational communication in the digital environment are identified; the anthropocentric bases of communication innovation in the field of education in the global digital environment are determined; the instrumental mechanisms of realization of innovative educational communication in the digital environment are systematized.

Further perspective for the study is to expand the scope of research to assess the parameters of digital literacy as a presuppositional and locutive component of innovative communication in the field of new knowledge for certain groups of languages, for different types of e-learning tools applied for acquisition and usage global communication languages. diagnostics of transdisciplinary tendencies of digitization of communicative formats in the countries of Asia, North and South America and the countries of Europe.

4. ACKNOWLEDGEMENT

5. REFERENCES

[1] Alvargonzález D. "Multidisciplinarity, "Interdisciplinarity, Transdisciplinarity, and the Science', **International Studies in the Philosophy of Science,** Vol. 25(4), 2011, pp. 387-403.

[2] Abbott S., **The Glossary of Education Reform**. Retrieved from: http://edglossary.org/hidden-curriculum (accessed July 2020), 2013.

[3] American Library Association, **Digital Literacy**. Retrieved from: https://literacy.ala.org/digital-literacy, 2020.

[4] Bakhtin M. **Aesthetics of verbal creativity**, M.: Art, 1979.

[5] Barthes R. **Elements of Semiology**, Hill and Wang, 1968.

[6] Callaos N., Marlowe T., "Inter-Disciplinary Communication Rigor". **Rigor and Inter-Disciplinary Communication: Intellectual Perspectives from Different Disciplinary and Inter-Disciplinary Fields**. TIDC, LLC, 2020, pp. 4-29.

[7] **Cambridge Dictionary,** CUP, Retrieved from: https://dictionary.cambridge.org, 2020.

[8] Davies A., Fidler D. et al, **Future Work Skills 2020**, Institute for the Future for University of Phoenix Research Institute. Retrieved from: https://www.iftf.org/uploads/media/SR-1382A_UPRI_future_work_skills_sm.pdf, 2011.

[9] Dos Reis A., "To Be a (Blended) Teacher in the 21st Century - Some Reflections", **International Journal of Research in E-learning**, 1(1), 2015, pp. 11-24.

[10] DQ Global Standards Report, **World's first global standard for digital literacy, skills and readiness launched by the Coalition for Digital Intelligence.** Retrieved from: https://www.dqinstitute.org/, 2019.

[11] Eduventures, **TechLandscape.** Retrieved from:https://encoura.org/2020-eduventures-tech-landscape-heres-what-to-expect/, 2020.

[12] European Commission, **Digital Competence 2020**. Retrieved from: https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework, 2020.

[13] European Commission, **European E-Competence Framework Guideline.** Retrieved from: https://www.ecompetences.eu/, 2020.

[14] Florensky P. "Namehail as a philosophical proposition. On the name of God", **Studia Slavica Hung,** Budapest**,** Vol. 34/1–4, 1988. pp. 40–75.

[15] Frodeman R. (ed). **The Oxford Handbook of Interdisciplinarity (2 ed.)**, OUP, 2017.

[16] Gachev G. "Humanistic commentary to natural science", **Issues of Literature**, Issue 11, 1993, pp. 71–78.

[17] Heim M., **The Metaphysics of Virtual Reality.** LA: Westport Publishers, 1993. 278 p.

[18] **Holbrook, J. Britt (2013).** "What is interdisciplinary communication. Reflections on the very idea of disciplinary integration", **Synthese,** Vol. 190 (11), 2013, pp. 1865–1879.

[19] Hymes, Dell H., "Communicative competence", **Sociolinguistics: selected readings***,* Harmondsworth: Penguin., 1972, pp. 269–293.

[20] Interoperability Working Group, **Definition of Interoperability**. Retrieved from: http://interoperability-definition.info/en/, 2020.

[21] Jacobs, J.A. & S. Frickel, "Interdisciplinarity: a critical assessment", **Annual Review of Sociology,** Vol. 35, 2009, pp. 43–65.

[22] Khoryzhy S. "Notes on Ontology of Virtuality". **Issues of Philosophy**, Vol. 6, 1997, pp. 53–58.

[23] Kranz W. (ed.), **Die Fragmente der Vorsokratiker**, Zürich: Weidmann,1996.

[24] Legal Act of Ukraine, **On Higher Education.** Retrieved from: https://zakon.rada.gov.ua/laws/show/1556-18#Text, 2019.

[25] Legal Act of Ukraine, **On Standard of Higher Education in Specialization Field 035 "Philology".** Retrieved from: https://mon.gov.ua/storage/app/media/vishchaosvita/zatver dzeni%20standarty/2019/06/25/035-filologiyabakalavr.pdf, 2019.

[26] Losev A. "Philosophy of the Name", **Being. Name. Cosmos**. M: Thought, 1993, pp. 613–801.

[27] Lotman, Yu. **Semiophere**. SPb: Art, 2000.

[28] Makhachashvili R*., "*Models and Digital Diagnostics Tools for the Innovative Polylingual Logosphere of Computer Being Dynamics", **Italian-Ukrainian Contrastive Studies: Linguistics, Literature, Translation. Monograph**. Peter Lang GmbH Internationaler Verlag der Wissenschaften, Berlin, 2020, pp. 99-124.

[29] Makhachashvili, R., Semenist, I., "Digital Distance and Blended Learning Quality Assessment in Oriental and European Languages University Programs: Regions of Ukraine Survey Study", **Proceedings of the 9th International Conference on Information and Education Technology,** IEEE, 2021, pp. 149-156.

[30] Makhachashvili, R., Semenist, I., "Interdisciplinary Skills Development Through Final Qualification Assessment: Survey Study for European and Oriental Languages Programs", **Proceedings of the 12th International Multi-Conference on Complexity, Informatics and Cybernetics**, IIIS, 2021, pp.144-152.

[31] Morze N., Makhachashvili R., Smyrnova-Trybulska E., "Communication in education: ICT tools assessment". **Proceedings from DIVAI**, Sturovo: University of Nitra, 2016, pp. 351-354.

[32] Schlesinger, A.M. Jr. **Papers**. Manuscripts and Archives Division, The New York Public Library. Retrieved from: http://archives.nypl.org/mss/17775#overview, 2020.

[33] Shannon, C. E., "A Mathematical Theory of Communication", **Bell System Technical Journal**, Vol. 27 (3), 1948, pp. 379–423.

[34] Slater, T. "Cross-Domain Interoperability", **Network Centric Operations Industry Consortium - NCOIC**. Retrieved from: https:// www.ncoic.org, 2013.

[35] Slater, T. "What is Interoperability?", **Network Centric Operations Industry Consortium – NCOIC**. Retrieved from: https:// www.ncoic.org, 2012.

[36] Taleb, N. **The Black Swan: The Impact Of The Highly Improbable** (2nd ed.). London: Penguin, 2010.

[37] The Digital Divide, **Project Overview**. Retrieved from: https://cs.stanford.edu/people/eroberts/cs181/projects/digit al-divide/start.html (accessed October 2020), 2020.

[38] Torre, I., Łucznik, K., Francis, K. B., Maranan, D. S. et al. "Openness across disciplines: Reflecting on a multiple disciplinary summer school", **Open(ing) Education: Theory and Practice**, Brill, 2020, pp. 300–328.

[39] UNESCO, **ICT Competency Framework for Teachers.** Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000265721, 2018.

[40] Vernadsky V. **Scientific thought as a planetary phenomenon.** M.: Academia, 1991.

[41] World Economic Forum, **The Future of Jobs Report.** Retrieved from: http://www3.weforum.org/docs/WEF_Future_of_Jobs_202 0.pdf, 2020.

[42] Crystal D. **Language and the Internet.** Cambridge: CUP, 2001.

[43] Davis E. **Techgnosis: Myth, Magic and Mysticism in the Age of Information**. NY: New York Publishers, Inc., 2001.

[44] Fillmore, Ch. J., Baker, C. A. "Frames Approach to Semantic Analysis". In **The Oxford Handbook of Linguistic Analysis**. **eds B. Heine, H. Narrod**. 2010. P. 313–340.

[45] Hillis K. **Digital Sensations: Space, Identity, and Embodiment in Virtual Reality**. UM: University of Minnesota Press, 1999.

[46] Gelernter D. **Virtual Realism**. Oxford: Oxford University Press, 1998.

[47] Johnson V.E., Brennan L. **"**Examining the impact of technology on social responsibility practices**". Research in Ethical Issues in Organizations,** V. 4, 2002, pp. 107-123**.**

[48] Lazebna N. **English Language as Mediator of Human-Machine Communication**. Mysore, India: PhDians along with Ambishpere: Academic and Medical Publishers, Royal Book Publishing, 2021.

[49] Mamardashvili M., Pyatihorsky A. **Symbol and Mind. Metaphysical Rumination on the Mind, Symbolysm and Language.** Moscow: Academia, 1997.

[50] Shneiderman B. **Human Needs and the New Computing Technologies**. Cambridge, MA: The MIT Press, 2002.

[51] Spet G. **Phenomenon and Meaning (Phenomenology as a Science)**. Moscow: Academia, 2001.

[52] Zhabotynska S. "Lexical Fields and Non-Lineal Dynamics of Cognitive Structures". **Visnyk of the Lviv University. Series Philology,** 2011, Vol 52, pp. 3-11.