# Interdisciplinary Digital Skills Development For Educational Communication: Emergency And AI-Enhanced Digitization

**Rusudan MAKHACHASHVILI**
Germanic Philology Department, Borys Grinchenko Kyiv Metropolitan University,
Bulvarno-Kudryavska-st., 18/2, Kyiv, Ukraine

**Ivan SEMENIST**
Oriental Studies and Culture Department, Borys Grinchenko Kyiv Metropolitan University,
Bulvarno-Kudryavska-st., 18/2, Kyiv, Ukraine

**Ganna PRIHODKO**
English Philology Department, Zaporizhzhya National University,
Zhukovsky-st., 66a, Zaporizhzhya, Ukraine

**Irina KOLEGAEVA**
Lexicology and Stylistics of English Department, Odessa I.I. Mechnikov National University,
Dvoryans'ka St, 2, Odesa, Ukraine

**Olexandra PRYKHODCHENKO**
English Philology Department, Zaporizhzhya National University,
Zhukovsky-st., 66a, Zaporizhzhya, Ukraine

**Olena TUPAKHINA**
German Philology and Translation Department, Zaporizhzhya National University,
Zhukovsky-st., 66a, Zaporizhzhya, Ukraine

## ABSTRACT

The wartime emergency induced amplified digitalization measures in the higher education sphere, informed by the need to take quick comprehensive action in order to achieve the overarching result to transform educational scenarios into interdisciplinary digital, blended, and hybrid frameworks. Taking into account the context of the erupted military intervention on Ukraine in February 2022, and the ensuing information warfare in various digital environments (social media, news coverage, digital communications), the specific value of the learning outcomes and outputs is allocated to the digitally enhanced foreign languages education as a tool of the internationally broadcast strife of Ukraine for freedom and sovereignty. The study results disclose the comprehensive review of dynamics of the metadigital skills development and application to construe interdisciplinary competencies of students of European (English, Spanish, French, Italian, German) and Asian (Mandarin Chinese, Japanese) Languages major programs in Ukraine through the span of educational activities in the time-frame of wartime emergency digitization measures of 2022-2023.

**Keywords**: metadigital skills, digital literacy, dynamics, foreign languages education (FLE), emergency digitization

## 1. INTRODUCTION

Transformative shifts in the knowledge economy of the XXI century, Industry 4.0 development [17] and elaboration of networked society, emergency digitization due to quarantine measures has imposed pressing revisions onto interdisciplinary and cross-sectorial job market demands of Liberal Arts university graduates' skillsets, upon entering the workforce. This, in turn, stipulates reevaluation of the interdisciplinary approaches to comprehensive professional competences in foreign languages acquisition, education, and application [15].

First the global pandemic and later the active phase of the warfare induced amplified digitalization measures in the higher education sphere [13; 14; 16], informed by the need to take quick comprehensive action in order to achieve the overarching result to transform educational scenarios into interdisciplinary digital, blended, and hybrid frameworks.

Taking into account the context of the erupted military intervention on Ukraine in February 2022, and the ensuing information warfare in varying digital environments (social media, news coverage, digital communications), the specific value of the learning outcomes and outputs is allocated to the digitally enhanced foreign languages education as a tool of the internationally broadcast strife of Ukraine for freedom and sovereignty.

The consequent functional tasks to meet this challenge in the educational sphere are estimated as 1) adapt the existent educational scenarios to digital, remote and hybrid formats; 2) to upgrade ICT competence and digital literacy of all participants of the educational process under extreme duress; 3) to activate complex interdisciplinary (soft and hard) skillsets, otherwise latent or underutilized in the educational process.

The study objective is to diagnose and critically review the dynamics of metadigital skills development for educaitional communication to construe interdisciplinary competencies of students of European (English, Spanish, French, Italian, German)

---

[1] Peer-editor: Nataliia Lazebna, Hab. Doc., Würzburg University, Germany

and Asian (Mandarin Chinese, Japanese) Languages major programs in different regions of Ukraine through the span of educational activities in the time-frame of wartime emergency digitization measures of 2022-2023.

## 2. METHOLDOLOGY

The study methodological design includes the following steps:

1) The modelling of interoperability between various competency principles, derivative of twenty-first-century skills [1; 3; 4; 22] and projected digital literacy requirements for Foreign Languages Education (FLE) across core digital literacy frameworks (European e-Competence Framework [7], UNESCO ICT Competence framework for educators [20] and European Commission Digital Competence Framework: DigComp 2020 [6]);

2) The survey method application for diagnostic analysis of different digital literacy [5] components and dimensions, as well as digital skills implementation, used to assess the parameters of efficiency of transforming real-life linguistic education practices into the emergency digital and hybrid format.

The identification of the correlation between various groups of applied digital skills and soft skills, instrumental to develop interdisciplinary professional competence of FLE students.

## 3. FINDINGS

**Metadigital skills development modelling**
The following grid of groundwork concepts is applied to profile the Foreign Languages Education (FLE) in the study:

- INTERDISCIPLINARITY;
- INTEROPERABILITY;
- META SKILLS;
- VIRAL DIGITAL SKILLS.

The meaning of INTERDISCIPLINARITY is synthesized for the purpose of this study as an agglomeration of two or more fields of knowledge into one scope/goal of study, inquiry or activity [2; 8; 9; 12; 13].

The concept of INTEROPERABILITY is disclosed across different lens [11; 18] 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 Foreign Languages Education, 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.

Interoperability for FLE skills is ensured by the communicative nature [1] 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 estimated to be COMMUNICATION.

A METASKILL is defined as a skill requiring to process lots of information across different knowledge domains and make complex interoperable decisions simultaneously [21].

VIRAL DIGITAL SKILLS for the purpose of this study are defined as rhisomatic capabilities of interoperable manipulation of digital data, tools, and communication formats, acquired institutionally, intuitively or on the peer-to-peer basis.

Given the nature of increasingly digitalized context of foreign languages education and communicative application ("the Technospheric shift" [16], 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 [19], when communication is approached as the core factor of interoperability of source and target knowledge and application domains in FLE.

Subsequently, a model of soft skills paradigms and digital literacy frameworks INTEROPERABILITY in FLE is suggested:

1) European E-competence Framework Guideline (European Commission, 2020 [7]), customized according to European Professional Competence Framework, accommodates the following soft skills in terms of digital competence requirements for vocational activity in FLE: service orientation; attention to detail, learning strategies, leadership and social influence, cognitive creativity and flexibility, coordination and time-management; human resources management;

2) UNESCO ICT Competence framework and UNESCO for AI framework (UNESCO, 2018, 2021 [20]), customized for pre-service teachers of foreign languages, accommodates the following types of soft skills in terms of digital competence requirements: collaboration, team-work, problem-solving, reasoning and ideation.

3) Digital Competence 2.0 framework (European Commission, 2021 [6]) for general public, accommodates the following soft skills in terms of digital competence requirements for efficient digital citizenship: Communication and collaboration, creativity and adaptability, learning and innovation, trustworthiness, emotional intelligence, complex problem solving.

**E-skills dynamics in Foreign Languages Education: Survey results**
The survey analysis is further applied for in-depth, comprehensive diagnostics of interoperable digital literacy components, used to assess the parameters of efficiency of transforming real-life FLE education practices into the digital and hybrid format in the active wartime timeframe in Ukraine (February 2022 – December 2023) for students of Asian languages and European languages major programs.

The study results, eventually, canvassed the iterative benchmarking surveys (2020-2021, 2022-2023) across universities from different regions of the warzone, disclose the following interoperable dimensions of interdisciplinary digital skills development, instrumental for the efficiency of educational communication.

The survey sample consists of 762 respondents of 7 Foreign Languages Programs (Italian, Spanish, French, English, German, Mandarin Chinese and Japanese) across 3 tiers of FLE study (Bachelor's, Master's, Graduate) in the universities of the capital city (Kyiv, Ukraine), pre-frontline regions (Zaporizhzhya, Odessa) in the timeframe of wartime emergency digitization measures of 2022-2023 in Ukraine.

The survey structure comprised of 16 complex diagnostic questions (multiple choice, criteria comparison and Likert scale score types), divided into the following categories:

1) questions on overall assessment of digital literacy level in the framework of wartime digitization for university programs of Asian and European languages;

2) questions on diagnostics of future specialists in FLE according to the established frameworks of digital competencies in the professional field;

3) questions on diagnostics of interoperability of linguistic / communicative / soft professional and e-skills for university programs of European and Asian languages

The study results disclose the following interoperable dimensions of dynamic e-skills development, instrumental for the efficiency of Foreign Languages Education:

I.  Estimation of overall digital literacy level in the framework of emergency digitization for university programs of Asian and European languages;

- Comparative evaluation of individual digital literacy level for university programs of Asian and European languages during and prior to the framework of emergency digitization measures (in peacetime and in wartime);

II. Diagnostics of future specialists in FLE according to European e-Competence Framework and estimation of digital skills of FLE for professional application:

- The evaluation of the dominant professional e-competence dimensions for FLE students being to PLAN; to RUN; to ENABLE professional processes in FLE.
- The corresponding dominant professional goals for FLE students are measured to be: Planning of professional processes (in the field of foreign languages); Monitoring of professional activity (in the field of foreign languages); Provision (facilitation) of professional activity (in the field of foreign languages).
- General types of dominant digital skills for professional application of FLE students according to the European e-competence framework - ICT practitioner skills and ICT user skills
- Comparative assessment of general types of digital skills for professional application of FLE students (pre- and Covid-19 timeframe).

III. Diagnostics of digital skills of FLE for pre-service and in-service teachers according to UNESCO ICT and AI Competence Framework:

- Priority professional activity goals of FLE pre-service teachers for digital skills application are estimated as:
  1) to develop curricula using digital tools;
  2) to develop learning materials using digital tools;
  3) to understand the role of digital technologies in language education;
  4) to organize and administer the learning process using digital tools;
  5) to improve your own teaching skills with digital tools.
- Priority student oriented goals of FLE pre-service teachers for digital skills application are estimated as:
  1) Teach to implement different types of speech activities (oral, written, listening, dialogue, monologue);
  2) Teach to work in a team / organize collaboration;
  3) Teach to think critically using digital tools;
  4) Teach to solve problems with digital tools;
  5) Help learn independently via digital tools;
  6) Help to become effective participants in civil society through digital tools.

IV. Diagnostics of future specialists in FLE according to European Commission DigComp 2.0 Framework ensured assessment of digital skills of FLE for digital citizenship:

- Key digital competence dimensions for digital citizenship, enhanced by FLE (foreign languages education) are estimated as:

- Digital activities mastery in FLE, enhanced through emergency digitization timeframe: to articulate information needs, to locate and retrieve digital data, information and content; to judge the relevance of the source and its content; to store, manage, and organize digital data, information and content; to interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity; to keep up-to-date with the digital evolution.

V.  Diagnostics of interoperability of linguistic / communicative / soft professional and digital skills for university programs of FLE:

- Dominant combinations of digital communication elements, instrumental for professional linguistic competence formation are estimated as follows (Fig.1):
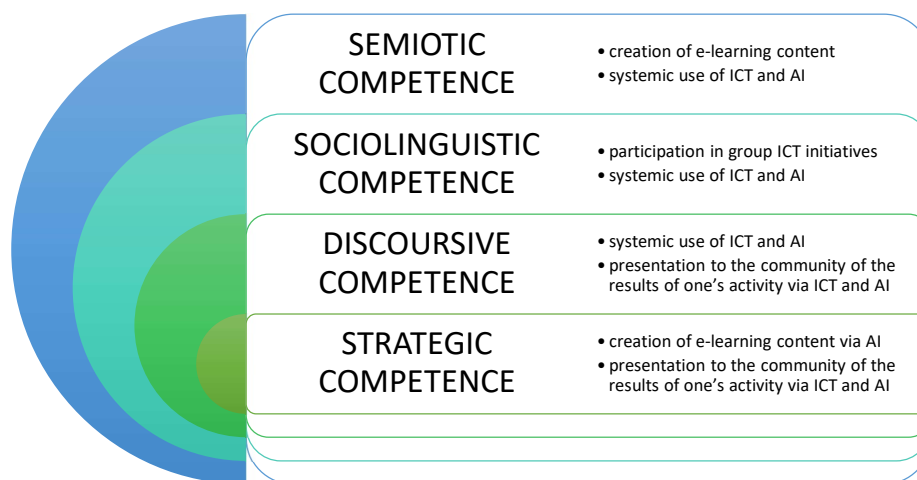


Figure 1. Digital communication elements, instrumental for linguistic competence formation.

1) semiotic competence is enhanced by such elements of digital communication as creation of e-learning content, systemic use of ICT and AI;

2) sociolinguistic competence is enhanced by such elements of digital communication as participation in group ICT initiatives, systemic use of ICT and AI;

3) discoursive competence is enhanced by such elements of digital communication as systemic use of ICT, presentation to the community of the results of one's activity via ICT and AI;

4) strategic competence is enhanced by such elements of digital communication as creation of e-learning content, presentation to the community of the results of one's activity via ICT and AI.

Dominant linguistic competence elements, instrumental for digital communication are evaluated as follows (Fig.2):
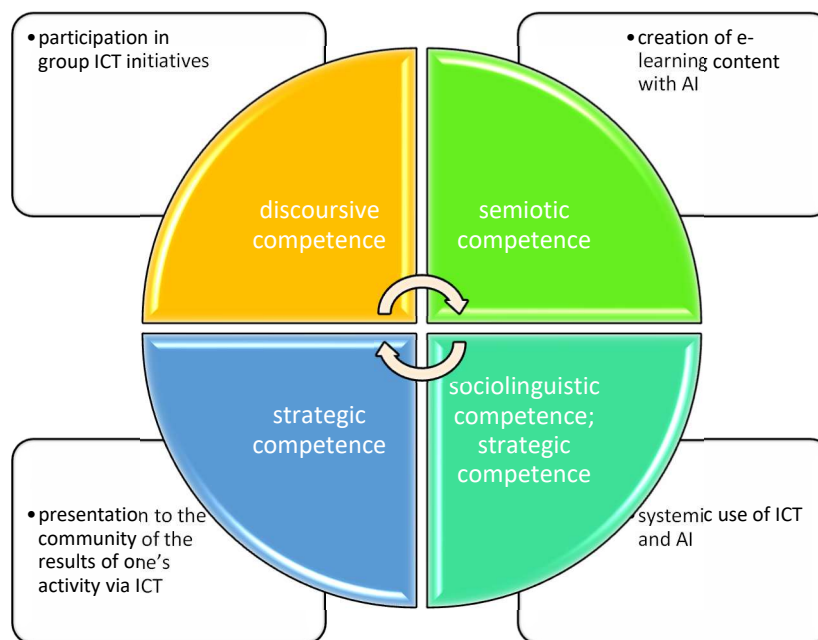


Figure 2. Linguistic competence elements, instrumental for digital educational communication.

1) discoursive competence is estimated as dominant for participation in group ICT initiatives;

2) semiotic competence is estimated as dominant for creation of e-learning content;

3) sociolinguistic competence and strategic competence are estimated as dominant for systemic use of ICT;

4) strategic competence competence is estimated as dominant for presentation to the community of the results of one's activity via ICT.

Key digital competencies, effective for the implementation of foreign language acquisition activities are evaluated and estimated as follows:

1) for Oral speech activities the dominant digital competences are Information and data literacy, Communication and collaboration;

2) for Written speech activities the dominant digital competences are Communication and collaboration, Digital content creation, Safety;

3) For Audial activities the dominant digital competences are Information and data literacy, Communication and collaboration, Digital content creation;

4) For Vocabulary acquisition activities the dominant digital competences are Information and data literacy, Digital content creation, Communication and collaboration;

5) for Stylistic acquisition activities the dominant digital competences in equal measures are Information and data literacy, Communication and collaboration, Digital content creation, Problem solving.

## 4. CONCLUSIONS

The study findings allow to estimate as well the interoperability of soft skills and digital competence dimensions in Foreign Languages Education, and to detect challenges for actual and underdeveloped skills (hard, technical, and soft), that stakeholders of the European and Asian languages education encountered through digital format adaptation in the emergency digitization timeframes in peacetime and in wartime. These challenges include the following types:

1) Digital literacy challenges: Lack of proficiency in the use of LMS tools for specific purposes (tests, test results export, essay question randomizer); Lack of proficiency in use of specific communicative interface options (for e.g. screen sharing, separate rooms division, individual and public chats); Lack of proficiency in use of Google Suite tools; Lack of proficiency in the use of mobile versions and Android/iOS app versions of platforms, tools and services, used in FLE workflow;

2) Digital divide in accessibility of computer and Web technologies, necessary for all stages of Foreign Languages Education: Internet bandwidth and stability of connection; Update of PC hardware and software for all participants of the FLE process (out of date software impaired videoconferencing possibilities, for e.g.); Access to back-up smart devices to carry out the FLE procedures.

3) Soft skills and emotional challenges: Learning and innovation (professional activity outside of the comfort zone); Entrepreneurial outlook; Time-management; Collaboration and networking via digital media in the

lockdown framework; Emotional intelligence and awareness; Critical thinking and decision making;

The comprehensive study results inform the derivation of the following recommendations for Foreign Languages Education in emergency digitization paradigms: to critically review of the curriculum content to accommodate the dynamics of multi-disciplinary digital input expectations of the FLE stakeholders; to review and update of the FLE curriculum content interconnectivity and learning outcomes to accommodate the interoperable interface of skills, customized to facilitate professional activity and language application in the intensely digitized world (especially under extreme duress); to devise a flexible model of FLE content upgrade to meet the dynamic transdisciplinary requirements of the job market in the digital economy of the post-pandemic / post-war timespans and to enhance universal employability of professional application for foreign languages majors in the digital age.

The study results have a potential to be furthered and elaborated in assessment of interdisciplinary and interoperable digital skills adaptability for separate groups FLE stakeholders, according to according to roles and tasks performed in the language acquisition workflow, as well as according to age and entry digital literacy level. The perspective of the study is in scaling the inquiry to estimate the parameters of digital literacy formation for separate groups of source and target languages acquired, as well as to diagnose interdisciplinary digitization trends of FLE across countries of Asia and countries of Europe.

## 5. ACKNOWLEDGEMENT

## 6. REFERENCES

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

[2] 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.

[3] 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.

[4] 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.

[5] 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.

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

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

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

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

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

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

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

[13] J. Peterlin, V. Dimovski, M. Meško, V. Roblek. "Cultivating Management Education Based on the Awareness of Students' Multiple Intelligences", **SAGE Open**. vol. 11, issue 1, 2021.

[14] Kulinich, T. Y. Lisnievska, Y. Zimbalevska, T. Trubnik, and S. Obikhod, "Digitalization of economies of low and middle income countries in the context of digital transformation", **Amazonia Investiga**, vol. 11, no. 51, pp. 300-311, Apr. 2022.

[15] Makhachashvili, R., Semenist, I., "Innovative Educational Communication in the Global Digital Environment:Trans-Disciplinary Models, Tools, and Mechanisms", **Proceedings of the 13th International Multi-Conference on Complexity, Informatics and Cybernetics**, IIIS, 2022, pp.134-140.

[16] Makhachashvili, R., Semenist, I., "Transdisciplinary Communication as a Meta-Framework of Digital Education", **Proceedings of the 26th World Multi-Conference on Systemics, Cybernetics and Informatics, WMSCI 2022,** IIIS, 2022, pp. 151-156.

[17] R. Debopriyo "Media Design and Technical Writing with Industry 4.0 Towards Developing Entrepreneurial Thinking in EFL Learners: A Pilot Study", *Proceedings of* 9th **International Conference on Information and Education Technology, ICIET 2021**, 1. pp. 98-109, 2021.

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

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

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

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

[22] Wulf, G., Shea, G. "Principles derived from the study of simple skills do not generalize to complex skill learning", **Psychonomic Bulletin & Review**, 9, 2002, pp. 185–211.