

Digital Meta-Skills Development for Interdisciplinary Competence in Foreign Languages Education

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Abstract²

The development of digital economy in the XXI century, elaboration of the networked society and communities of knowledge, digitization of education due to pandemic measures have led to revisions of the 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.

The study is focused on the diagnostics of the development of meta-learning status, interdisciplinary interoperability of digital competence for students of European (English, Spanish, French, Italian, German) and Oriental (Mandarin Chinese, Japanese) Languages major programs through the span of educational activities in the time-frame of COVID-19 quarantine measures of March 2020 to April 2021. The inquiry derives a model of digital meta-skills for interdisciplinary competence in foreign languages education and professional application. The survey study is implemented to evaluate the digital meta-literacy of foreign languages majors through dimensions of interdisciplinarity of educational content, domains of professional application, soft skills, professional linguistic and communication skills, and customized digital skills for Foreign Languages Education.

Keywords: *Digital Meta-Skill, Interdisciplinary Competence, Foreign Languages Education (FLE), Digital literacy, Digital communication*

1. Introduction

The global pandemic and quarantine measures have imposed challenges on the complex structures and procedures of higher education workflow. These

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restrictions influenced the scope of individual experiences, educational and meta-educational outcomes, and estimated quality of higher education in countries across the world.

The COVID-19 pandemic 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, remote, and hybrid frameworks.

The consequent functional tasks to meet this challenge are estimated as 1) to activate comprehensive complex skillsets, otherwise latent or underutilized in the educational process; 2) to boost ICT competence and digital literacy of all participants of the educational process, relocated to the computer realm. Digital literacy and ICT competence, therefore, acquire the status of meta-skills, informing all levels of educational activities and professional skills application. Meta (from the Greek μετά, meta-, meaning "after" or "beyond" (CED 2020) is used as a prefix to define a skill more comprehensive or transcending to the point of being self-aware.

The important caveat in the study of meta-educational status of skills development is the underlying understanding of the transcendent nature of education (Callaos, Marlowe 2020) in the digital age, that provide for activation of interdisciplinary knowledge domains in professional activity and communication.

The inquiry objective, therefore, is to diagnose and critically review the empirical case of digital meta-skills development and application to construe interdisciplinary competencies of students of European and Oriental Languages major programs in Ukraine, employed in the years 2020-2021 due to quarantine measures.

The meta-educational significance of the study is informed by the inherent understanding of meta-learning as "the process by which learners become aware of and increasingly in control of habits of perception, inquiry, learning, and growth that they have internalized" (Maudsley 1979). The underlying understanding of educational systems as a meta-negentropy phenomenon, that is - a spatial and a temporal ordering of the educative process (Callaos et al 1993), provides for estimating digital or electronic learning (e-learning) to be a form of ubiquitous learning (u-learning) that involves learning in an environment with full access to digital devices and services at any given moment.

The meta-educational dimension of the presented study is, therefore, revealed through such avenues of inquiry:

- 1) The identification of various interdisciplinary competency principles, derivative of twenty-first-century skills for FLE (Foreign Languages Education) majors, and corresponding digital literacy requirements;
- 2) The diagnostic analysis of different digital literacy components, ICT tools, and digital skills implementation, used to assess the parameters of efficiency of transforming real-life foreign languages education and application practices into the digital and hybrid format;
- 3) The assessment of the correlation between various groups of applied digital skills and soft skills, instrumental to develop interdisciplinary professional awareness of FLE students.

A meta-model of soft skills paradigms and digital literacy frameworks interoperability in Foreign Languages Education is developed. The online survey method is used to measure and evaluate the digital meta-skills across different dimensions that ensure the efficiency of transforming foreign languages education practices and subsequent professional linguistic competence into the digital and hybrid format. The survey sample comprises of 502 respondents across 7 Foreign Languages Programs (European - English, Spanish, French, Italian, German, and Oriental - Mandarin Chinese, Japanese) on 3 tiers of FLE programs (Bachelor's, Master's, Graduate).

The study *design* includes the following steps:

- 1) The modelling of interoperability between various interdisciplinary competency principles, derivative of twenty-first-century skills (Abbot 2013), (American Library Association 2020), (Davis, Fidler 2011), (Dos Reis 2015), (DQGSR 2019), (Makhachashvili, Semenist 2021), (WEF 2020) and projected digital literacy requirements for Foreign Languages Education (FLE) across core digital literacy frameworks (European e-Competence Framework (European Commission 2020), UNESCO ICT Competence framework for educators (UNESCO 2018) and European Commission Digital Competence Framework: DigComp 2020 (European Commission 2020));
- 2) The survey method application for diagnostic analysis of interdisciplinary domains, crucial for successful professional development overall;

- 3) Systematization and assessment of interdisciplinary competence, enhanced by higher philological education in the digital format;
- 4) The identification of the correlation between various groups of applied digital skills and soft skills, instrumental to develop interdisciplinary professional competence of FLE students.

The study employs the combination of mixed methods (Almalki 2016) – a proportional arrangement of quantitative and qualitative inquiry to assess in-depth aspects of subjective and individual quality estimation of digital distant and hybrid learning.

The survey structure comprised of 2 parts: Part 1 – diagnostics of interdisciplinary professional competence of in-training linguistic specialists; Part 2 – meta-assessment of digital literacy level in the framework of COVID-19 lockdown and quarantine measures for university programs of Oriental and European languages and diagnostics of interoperability of linguistic / communicative / soft professional and digital skills for university programs of European and Oriental languages.

2. Findings

2.1. Conceptual Grid of the Study: Meta-status of Digital Skills for Interdisciplinary Competence in FLE

The following grid of groundwork concepts is applied to profile the Foreign Languages Education (FLE) digitization in the COVID-19 timeframe (Fig. 1):

- INTERDISCIPLINARITY;
- META-LEARNING;
- INTEROPERABILITY;
- DIGITAL META-SKILLS;

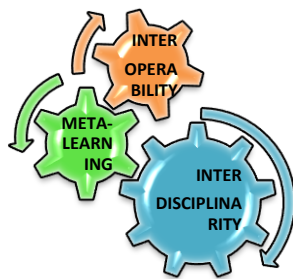


Figure 1: Conceptual Grid of the Study

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 (Callaos, Marlowe 2020), (Frodeman 2017), (Holbrook 2013), (Jacobs 2009).

META-STATUS of a property or a category is generally understood as ability to **“exist everywhere (ubiquity), or transcend and connect other like entities”** (CED 2020). In the context of this study we suggest to attribute the property of meta-learning status to digital skills for social activity, vocational activity and professional performance of FLE specialists.

The concept of INTEROPERABILITY is disclosed across different approaches (IWG 2020), (Slater 2013), (Slater 2012) 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 meta 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 interdisciplinarity and meta-status of activities, skills and competence applications of FLE stakeholders.

The generic concept of multiple disciplinarity (Alvargonzález 2011), (Makhachashvili, Semenist 2021), (Torre et al 2020) comprises, in its turn, of a framework of interconnected concepts, that the define the meta-learning coordinates in FLE of:

- Multi-disciplinarity;
- Interdisciplinarity;
- Transdisciplinarity.

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.

Interdisciplinarity in FLE in general is, therefore, postulated in this study as a computational framework of interconnected types of disciplinarity (Fig. 2):



Figure 2: Computational Framework of Multiple Disciplinarity in FLE

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.

Interdisciplinary and transdisciplinary skills ensure *universal* applicability of FLE majors on the job market across various spheres of social activity. Actual job market demands for FLE graduates in the year 2020 (benchmarking conducted across national and international hiring platforms – LinkedIn, Indeed.com, Work.ua, Jooble.org, include the positions in the following areas:

- Teacher of language / literature, corporate coach / MOOC tutor / curriculum developer / teacher (negotiation) – EDUCATION
- Translator, proofreader, CAT editor – TRANSLATION, COPYEDITING;
- Researcher (scholar) - writing grants and grant applications, linguist-expert – RESEARCH AND DEVELOPMENT, NGO SECTOR; SOCIAL SERVICES; LEGAL SERVICES;
- PR manager, Copywriter, Content manager, SMM – MEDIA COMMUNICATIONS; ADVERTISING, CONTENT-CREATION;
- Computational linguist (NLP), lexicographer, applied terminologist, digital humanities – IT SECTOR, GAMING INDUSTRY.

Interoperability for FLE digital skills is ensured by the communicative nature (Hymes 1972) of interdisciplinary skills in general. The core cross-sectorial domain that is referential for primary skills (social skills, emotional intellect, collaboration, communication, digital literacy), necessary for educational goals achievement, is estimated to be COMMUNICATION. DIGITAL LITERACY in its turn is defined as the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills (ALA 2020), (Heim 1993), (Morze et al 2016), (TDD 2020). Digital literacy, thus, acquires the transcendent status of meta-literacy.

Thus, the fundamental meta-learning status, that COVID-19 digital procedural transformations imposed on the educational process in the area of Foreign languages acquisition, is verified by a unified model of correspondence between the components of professional competence in FLE (Holbrook 2013), comprising of a diverse communicative skillset, and digital meta-competence (DGGSR 2019), (Eduvantures 2020), (Hymes 1972), (Makhachashlivli 2021), instrumental to the variable communicative dimensions activation, elaborated for the purposes of this study (Fig. 3):

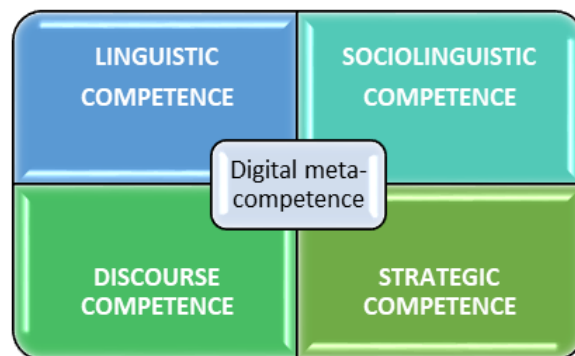


Figure 3: Model of Correspondence Between Communicative Dimensions and Digital Meta-Competence in FLE

Therefore, a **DIGITAL META-SKILL** in FLE for the purpose of this study is defined as *a transcendent capability of processing and management of digital data, digital tools, interdisciplinary knowledge domains and communication formats, utilized across all types of foreign language mediated professional, educational and individual interaction.*

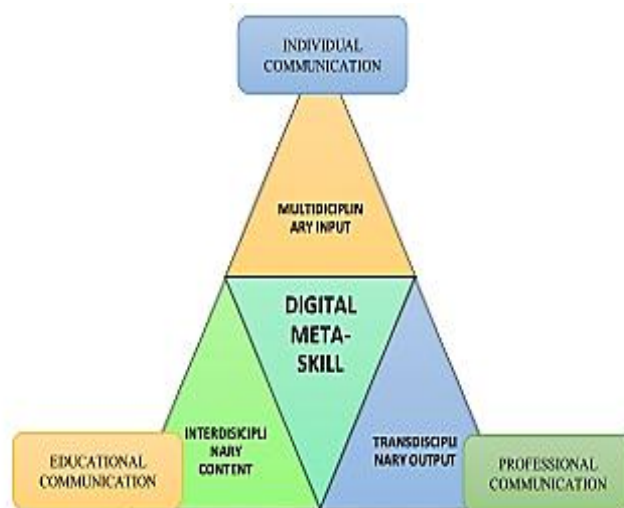


Figure 4: Model for Digital meta-skills in FLE

The study suggests and empirically verifies a model (Fig.4) of digital skills meta-status that transcends the correlation across the interdisciplinary domains of FLE and foreign language professional application in different spheres.

2.2. Digital Meta-Skills for Interdisciplinary Competence *in* Foreign Languages Education: Survey results

A sizable sample of 502 respondents total across 7 Foreign Languages Programs - Oriental (Mandarin Chinese, Japanese) and European (English, French, Spanish, Italian, German) languages at Borys Grinchenko Kyiv University took part in the survey. The following groups of stakeholders of the digital distant education in the timespan of COVID-19 pandemic measures were respondents of the survey overall on all three tiers of educational levels according to the legislature of Ukraine: undergraduate, graduate and post-graduate: 1) students of Bachelor’s programs for Oriental (Mandarin Chinese, Japanese) and European (French, Italian, Spanish, English, German) languages (1st, 2nd, 3rd and 4th years of study) – 94%; 2) students of Master’s programs for Oriental (Mandarin Chinese, Japanese) and European (English, French, Spanish, Italian, German) languages (1st and 2nd years of study) – 4.5%; students of Post-graduate programs for Oriental

(Mandarin Chinese, Japanese) and European (French, Italian, Spanish, English, German) languages (1st, 2nd, 3rd and 4th years of study) – 2.2%.

Groundwork understanding of FLE interdisciplinarity was qualitatively estimated across such core parameters: Mastery of several foreign languages; History, culture, and literature; Philosophy, psychology, sociology of law; Applied skills (programming, statistical analysis, mathematical modeling); Digital language data processing; Teaching skills and educational materials development; National and international historical-political and economic context; Trends of the globalized world.

Polyglocy (Mastery of several foreign languages – 71.5%), domains of history, culture (73.5%) and education (Teaching skills and educational materials development – 60%), as well as digital sphere and IT (Applied skills (programming, statistical analysis, digital language and data processing – 40%) are a consistent average interdisciplinary priority of FLE content.

Interdisciplinary social domains most accommodating or lucrative for foreign languages education are estimated as follows: Private sector (business) (77% of respondents); Public sector (civil service, public education, state social sector, etc.) (68.65% of respondents); Foreign economic activity (58.62%); IT sector (48.5%).

Assessment of skills in FLE across different levels of study yielded the evocative results, as to the potential of foreign languages education for enhancing interoperability of different types of soft and professional skills. Key interoperable (soft) skills, across different skills frameworks, identified as enhanced by FLE are as follows: New knowledge creation; Innovative and adaptive thinking; Interdisciplinary connections; Social intellect; Emotional intellect; Digital literacy; Cognitive management; Making outlook; Cross-cultural communication; Collaboration; Communication; Entrepreneurship; Creativity; Critical thinking; Innovativity; Leadership; Problem solving; Team-work; Facilitation/mediation; Coordination.

The consistent interoperable skills, acquired through FLE, regardless of multi-disciplinary input or transdisciplinary output estimate are scored according to the Likert Scale (a response scale in which responders specify their level of engagement with a statement or a parameter in five points: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree): *communication* (mean score 4.6 out of 5), *critical thinking* (score mean 4.4), *problem solving and innovation* (score mean

4.5). *Digital literacy* proper (score mean 4.6) features as a prominent interoperable skill, acquired through FLE, with respondents, presumably, because digital literacy is perceived in the timeframe of 2020-2021 as a core literacy, instrumental to foreign languages education and instrumental to application of other types of soft skills of the communicative nature.

Meta-assessment of digital literacy level in the framework of COVID-19 lockdown and quarantine measures for university programs of Oriental and European languages - yielded the following representative results across the board.

Estimation of overall digital literacy level in the framework of COVID-19 lockdown for university programs of Oriental and European languages was conducted according to the 5-Point Likert Scale (a response scale in which responders specify their level of engagement with a statement or a parameter in five points: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree). The extremum points for evaluation were 1 (maximum negative overall mastery of the given digital literacy level) and 5 (maximum positive overall mastery of the given digital literacy level).

The qualitative dimensions provided for evaluation were: Elementary digital literacy; Medium digital literacy; Advanced digital literacy; No defined digital literacy level.

The quantitative assessment of individual digital level yielded a range of scalable results. Stakeholders of European and Oriental languages programs evaluated their individual digital literacy level in the COVID-19 timeframe as predominantly *advanced* (83% of respondents) and *medium* (73.2%). However, the elementary and medium digital literacy levels were assessed with the highest standard deviation of score range (SD=34). These levels of digital literacy mastery were assessed as predominantly 5 (maximum positive overall mastery of the given digital literacy level): Elementary level - 41.3%; Medium level – 40% of respondents.

Comparative evaluation of individual digital literacy level for university programs of Oriental and European languages during and prior to the framework of COVID-19 lockdown (Figure 5) allowed to estimate the dynamics of digital literacy from the timespan before the global pandemic measures and through the emergency online education of 2020-2021:

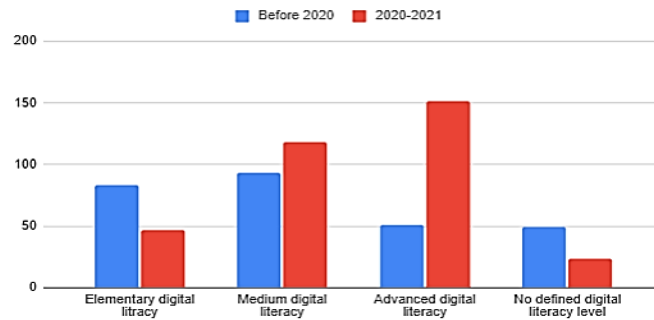


Figure 5: Comparative evaluation of individual digital literacy level

Digital literacy level in the timeframe before 2020 is estimated by the stakeholders of Oriental and European languages university programs as predominantly Elementary (35.3%) to Medium (39.6%). Digital literacy level in the timeframe of Covid-19 quarantine measures of 2020-2021 is estimated by the stakeholders of Oriental and European languages university programs as estimated as predominantly Medium (50.2%) to Advanced (64.3%). The estimated positive dynamics of the digital literacy mastery by Foreign Languages students comprises +10% for the Medium level and +42% for the Advanced level. There's a notable drop in the score for the 'No defined digital literacy level' dimension of assessment between the compared timespans of pre-pandemic and during the pandemic emergency online learning measures (20.8% decreased to 10.2% accordingly).

Diagnostics of interoperability of linguistic / communicative / soft professional and digital skills for university programs of FLE - yielded the following comprehensive results.

Dominant combinations of digital communication elements, instrumental for professional linguistic competence formation are estimated as follows: 1) linguistic (semiotic) competence is enhanced by such elements of digital communication as *creation of e-learning content* (26.7%), *systemic use of ICT* (27.6%); 2) sociolinguistic competence is enhanced by such elements of digital communication as *participation in group ICT initiatives* (25%), *systemic use of ICT* (27%); 3) discursive competence is enhanced by such elements of digital communication as *systemic use of ICT* (28%), *creation of e-learning content* (26%); 4) strategic competence is enhanced by such elements of digital communication as *systemic use of ICT* (27%), presentation to the community of the results of one's activity via ICT (26%).

Professional linguistic competence elements, instrumental for digital communication (Figure 6) were evaluated by the Foreign Languages stakeholders.

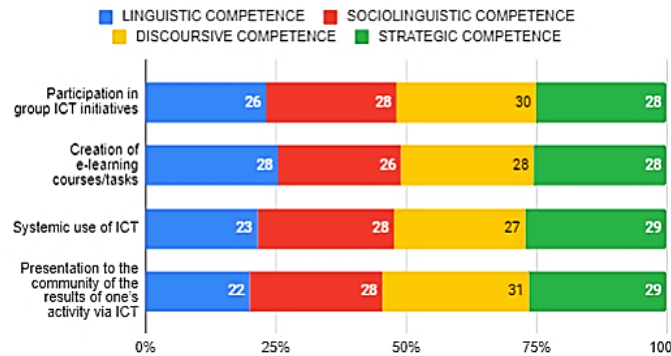


Figure 6: Professional linguistic competence elements, instrumental for digital communication

Dominant linguistic competence elements, instrumental for digital communication were evaluated as follows: 1) *discursive competence* is estimated as dominant for participation in group ICT initiatives (27%); 2) *linguistic (semiotic) competence* and *strategic competence* are estimated as dominant for creation of e-learning content (25.5%); 3) *sociolinguistic competence* (26.2%) and *strategic competence* (27.1%) are estimated as dominant for systemic use of ICT; 4) *discursive competence* is estimated as dominant for presentation to the community of the results of one's activity via ICT (28.2%).

Digital competence dimensions effective for the implementation of foreign language acquisition activities (Figure 6) were assessed by the Foreign Languages programs stakeholders. The following set of foreign language acquisition activities was identified and evaluated: Oral monologue; Oral dialogue; Small group communication; Public speech; Written literary communication; Written business communication; Written private communication; Listening; Active vocabulary; Passive vocabulary; Grammar skills; Phonetic skills; Rhetorical skills; Stylistic skills.

Key digital competencies, effective for the implementation of foreign language acquisition activities, were quantified as follows: 1) for *Oral speech* activities the dominant digital competences are Information and data literacy (43.1%), Communication and collaboration (61%); 2) for *Written speech* activities the dominant digital competences are Communication and collaboration (33.7%), Digital content creation (32.6%), Safety (24%); 3) For *Audial* activities the dominant digital competences are Information and

data literacy (39%), Communication and collaboration (30.6%), Digital content creation (30.6%); 4) For *Vocabulary* acquisition activities the dominant digital competences are Communication and collaboration (36%) and Digital content creation (34.1%); 5) for *Stylistic* acquisition activities the dominant digital competences are Communication and collaboration (39.1%), Digital content creation (32.5%), Problem solving (27.4%).

3. Conclusions

The global pandemic emergency e-learning measures and underlying shift in the digital economy informed the comprehensive modelling of interoperability between various competency principles, derivative of the soft marketable skills and projected digital literacy requirements for foreign languages education across core digital literacy frameworks.

The study findings disclose:

- 1) the overall meta-assessment of digital literacy level in the framework of COVID19 lockdown and quarantine measures for university programs of Oriental and European languages;
- 2) the comparative evaluation of digital literacy meta-level for university programs of Oriental and European languages during and prior to the framework of Covid-19 lockdown;
- 3) the diagnostics of interoperability of linguistic/communicative professional and digital skills for university programs of European and Oriental languages;
- 4) key digital competencies, effective for the implementation of foreign language acquisition activities;
- 5) soft skills and digital competence dimensions' interoperability in FLE.

The dominant interoperable skills, acquired through FLE, are: communication, emotional intellect, creativity, problem solving and innovation. Digital literacy features as a prominent interoperable skill, facilitating the application of other types of soft skills of the communicative nature.

The priority avenues of interoperable meta-skills development and expansion of FLE meta-learning scope in professional application include interdisciplinary up-skilling across adjacent Arts and Humanities and Social sciences domains, and transdisciplinary re-skilling across cross-sectorial

domains, not immediately connected to language acquisition and communication (hard sciences, computer science, engineering, economics). These findings are indirectly corroborated by the diagnostic of transdisciplinary potential of FLE applicability across different social domains (Private business sector, Public service sector, Foreign economy sector, Finance, IT sector).

The presented study is limited in scope to the indicative survey results, exemplifying the interoperable dimensions of e-skills development and assessment for Oriental and European languages programs in the capital city university of Ukraine, induced by Covid-19 measures. 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 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, for different types of e-learning tools used for foreign languages acquisition, as well as to diagnose interdisciplinary digitization trends of FLE across countries of Asia and countries of Europe.

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