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Digital Transformation of Education and Social Inclusion: The Case of Ukrainian Refugees in the Baltic States

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Abstract

The integration of Ukrainian refugees in the Baltic countries (Latvia, Lithuania, and Estonia) has become one of the key social challenges amidst the crisis caused by military actions in Ukraine. Digital educational technologies are increasingly significant, facilitating refugees' social, economic, and linguistic integration into host countries. The digital transformation of educational processes contributes to the successful social integration of Ukrainian refugees

in the Baltic states by helping to overcome language barriers, providing access to education, and supporting their psychological well-being. The aim of this study is to assess the impact of digital educational programs on the social integration of Ukrainian refugees in the Baltic countries, as well as to determine the extent of their influence on language competence, employment levels, and social activity. The study employs correlation and regression analysis methods to evaluate the relationship between participation in digital educational programs and key integration indicators. Additionally, a multivariate factor analysis has been applied to identify the comprehensive impact of social and educational factors on integration success. The results show that participation in digital educational programs significantly influences language proficiency (a correlation coefficient of 0.75), contributes to higher employment rates (0.68), and has a moderate impact on social activity (0.52). However, digital inequality among refugees has been identified, creating additional barriers to integration. Digital educational technologies play a crucial role in the integration of Ukrainian refugees, particularly in overcoming language barriers and increasing employment opportunities. For successful integration, it is necessary to develop programs aimed at improving digital skills and enhancing social activity, as well as strengthening cross-sector cooperation to create an inclusive environment.

Keywords: Baltic countries, digital educational technologies, employment, integration, language barriers, social activity, Ukrainian refugees.

Introduction

The contemporary world grapples with numerous challenges, among the most pressing being migration triggered by armed conflicts. The crisis stemming from the war in Ukraine has precipitated a significant surge in refugees compelled to abandon their homes and seek sanctuary in neighboring nations. The Baltic states, having welcomed a substantial influx of Ukrainian refugees, confront the imperative not only to provide essential living conditions but also to establish mechanisms for effective social integration.

Education emerges as a pivotal instrument in achieving this objective, serving as the cornerstone for the adaptation and integration of migrants into novel social, cultural, and economic contexts. In the era of digitalization, education assumes new forms, fostering flexibility and accessibility for diverse segments of the population, including migrants and refugees. The digital transformation of educational processes plays a pivotal role in ensuring not only academic advancement but also the social connections indispensable for successful integration. Digital transformation has permeated all facets of our lives, including education. The COVID-19 pandemic has accelerated this process, rendering online learning an integral component of the educational landscape. However, digital technologies present not only new opportunities but also new challenges. These challenges are particularly acute for marginalized groups, such as refugees.

This research delves into the role of digital technologies in facilitating the social integration of Ukrainian refugees in the Baltic states. We will examine how digital tools can aid in overcoming language barriers, expanding access to education, and ultimately fostering the successful integration of refugees into host societies. Both the benefits and

drawbacks of implementing digital educational platforms will be considered, alongside an assessment of their impact on the efficacy of refugee integration into new social structures.

The primary objective of this study is to analyze the role of digital educational technologies in the process of social integration of Ukrainian refugees in the Baltic states. We will investigate how digital educational tools can be utilized to: (1) bridge language barriers; (2) provide access to education; (3) support psychological well-being; (4) foster social connections.

Literature Review
Digital Divide: Access to Digital Technologies, Digital Skills Among Refugees and Local Populations

Analyzing the digital divide among refugees requires a comprehensive approach that considers not only access to devices and the internet but also the level of digital literacy, language barriers, and social and cultural factors. Atkinson and Castro (2008) in their work "Digital Quality of Life" examine the impact of digital technologies on quality of life, emphasizing the social and personal benefits of information technology. They highlight that access to digital technologies is directly linked to human well-being, which is especially relevant for vulnerable groups such as refugees. Their research can be useful for analyzing how the lack of digital skills and access to technology can exacerbate social inequality among refugees and the local population. Basilaia and Kvavadze (2020) touch on the issue of the digital divide, analyzing how different groups of students coped with the sudden transition to remote learning. In an article devoted to the transition to online learning in Georgian schools during the COVID-19 pandemic, the authors describe the challenges associated with the introduction of digital educational platforms, especially in the context of a forced transition to remote learning. This work demonstrates the gap in access to quality education through technology and shows the importance of adapting such platforms for different social groups. The study (Harasim, 2000) "Shift Happens" is devoted to changes in the education system under the influence of online learning. The author considers digital technologies as a new educational paradigm that can both increase and decrease inequality depending on the availability of technologies and user preparedness. The work emphasizes that without proper support and ensuring access to technologies, online education can deepen the digital divide, which is particularly noticeable for refugees and other marginalized groups. The study (Kuo et al., 2013) demonstrates that the effectiveness of online learning largely depends on factors such as the level of interaction, confidence in one's digital skills, and the ability to self-regulate. This allows us to conclude that the digital divide can significantly affect student performance, self-efficacy in using the Internet, the level of interaction, and self-regulated learning, which affects student satisfaction in online courses. In the context of refugees and the local population, Shcherbak et al. (2020) clearly identified that limited access to the Internet and low levels of digital literacy can hinder their successful integration into educational processes, which exacerbates the digital divide. All sources emphasize the importance of access to digital technologies and the development of digital skills to

overcome the digital divide. In the context of refugees, this inequality can be particularly acute due to the lack of access to necessary resources, which hinders their social adaptation and access to education.

Pedagogical Approaches: Teaching Methods Adapted for the Online Format and for Students With Different Levels of Language Proficiency

Bakhmat et al. (2023) explore the possibilities of digital learning environments for preparing future economists. They focus on using digital platforms to develop students' professional competencies in higher education institutions. The analysis of methods and tools that help students develop technical and language skills in online learning environments is of particular value. In the context of students with varying language proficiency levels, adapting online platforms and using multimedia resources can be key factors in successful integration into the educational process, especially for students studying in a foreign language.

Dehtjare and Ryaschenko (2014) examine the educational challenges and benefits of implementing outsourcing approaches to adapt educational programs to modern market demands and digital transformation. For students with varying language proficiency levels, this implies the flexibility of educational platforms and methods, which is relevant for the online learning format, which may include elements of remote interaction with teachers and educational materials. Dehtjare et al. (2022) analyze changes in approaches to higher education in Latvia, paying particular attention to the key factors that influence the development of educational programs. In the context of online learning, special attention is paid to the integration of language and cultural aspects into the learning process, which is especially important for students with different levels of language proficiency. Adapting educational methods, such as flexible curricula and individual learning trajectories, allows for a more inclusive process.

Palvia et al. (2018) conduct a global analysis of the state of online education, its challenges, and prospects. They emphasize the importance of adapting teaching methods to the needs of students with different levels of preparation, including language. Among the effective pedagogical approaches in the online format, they highlight the use of hybrid learning models, where synchronous and asynchronous forms of interaction are combined with personalized learning materials. For students with different levels of language proficiency, such approaches allow for the optimization of the learning process and ensure the accessibility of the material for all categories of students.

Online learning methods require significant adaptation in terms of technical solutions and pedagogical approaches to account for students' different levels of language proficiency. All the sources considered confirm that the effective use of digital educational platforms, multimedia resources, and hybrid learning formats is a key factor in the success of educational programs oriented towards students with different levels of language proficiency.

Education for Social Integration: Refugee Adaptation and Inclusive Learning Environments

Bajaj and Stanford (2022) analyze the crisis related to Ukrainian refugees in the context of racism and discrimination. They emphasize that successful social adaptation of refugees, including through the education system, requires overcoming biases and stereotypes that often hinder integration processes. Education here serves as an important tool for creating an inclusive environment that can support refugees in new countries. The development of programs aimed at intercultural interaction and reducing prejudice allows for the construction of more inclusive educational systems, which contribute to successful integration.

The study by Brücker et al. (2023) is a large-scale empirical study dedicated to the integration of Ukrainian refugees in Germany. One of the key findings is that education plays a central role in social adaptation, especially for children and youth. The authors emphasize the need to create conditions for the integration of refugees into school and university systems, where factors such as language proficiency and access to resources are important. The study also draws attention to the fact that an inclusive learning environment helps overcome cultural and social barriers, contributing to the integration of refugees.

In the article by De Coninck (2022), a comparison is made between the integration processes for Ukrainian and Afghan refugees. Although the main focus is on the differences in how these groups are perceived by society, the author also notes the role of education in overcoming these differences. An inclusive learning environment promotes mutual understanding and integration, eliminating cultural gaps. Education plays the role of a catalyst for social adaptation, creating conditions for the successful inclusion of refugees in new communities, which underlines the importance of developing educational programs that take into account cultural and language differences.

De Oliveira (2023) examines the experiences of refugees in Brazil, considering their educational needs and opportunities for social integration. The Brazilian context underscores the importance of ensuring access to education for all categories of refugees, including adults. Programs aimed at vocational training and language learning play a key role in social adaptation, helping refugees integrate into the labor market and society. The authors note that creating an inclusive learning environment must take into account cultural and social differences for the successful involvement of refugees in public life.

In the study by Jelínková et al. (2023), the experience of receiving Ukrainian refugees in the Czech Republic is considered, with an emphasis on the role of municipalities in their social adaptation. One of the key factors of integration, according to the authors, is access to education, both for children and adults. Municipal educational programs adapted to the needs of refugees contribute to their faster social integration. The authors note that inclusive learning environments, which take into account language and cultural characteristics, are an important tool for the successful inclusion of refugees in public life.

Kolodiziev et al. (2023a) emphasize the social responsibility of higher education institutions in times of war. Education is seen as a key factor for the integration and adaptation of refugees in difficult conditions, creating opportunities for their successful

inclusion in the social and economic life of the host country. The authors focus on the need to create inclusive learning environments that can help refugees adapt, despite crisis situations. The role of education is to provide support, improve qualifications, and create opportunities for the social and economic inclusion of refugees.

In the study by Kolodiziev et al. (2023b), the features of dual education in an unstable environment, such as war or crisis, are discussed. The authors emphasize the importance of flexible educational models that adapt to the needs of refugees and allow them to be integrated into the education system and the labor market. Education, according to the authors, should be not only accessible but also adapted to specific conditions, with a particular emphasis on vocational training and retraining of refugees. Dual education, combining theory and practice, helps refugees adapt faster to a new environment and integrate into the economic processes of the host country.

The role of education in the social adaptation of refugees is emphasized by all the sources considered. An inclusive learning environment that takes into account language and cultural differences is a key factor in successful integration. It is important to provide refugees with access to education, both formal (school and university) and informal (language courses, vocational training), which contributes to their successful entry into new societies.

Education Policy: State Policy of the Baltic States on Refugee Education, Financing of Educational Programs

The document (Organisation for Economic Co-operation and Development [OECD], 2022a) discusses the contribution of Ukrainian refugees to the labor market in European host countries, including the Baltic states. The main focus is on the integration of refugees through education and vocational training, which contributes to their more successful adaptation in the labor market. The authors emphasize that for the successful integration of Ukrainian refugees into the economic system of the Baltic states, there is a need for a government policy that would provide access to quality education, funding for educational programs, and professional retraining. Programs aimed at supporting refugees can stimulate the development of the local economy by improving the professional skills of refugees and increasing their participation in the economy.

The report "Rights and Support for Ukrainian Refugees in Receiving Countries" (OECD, 2022b) examines the rights and support measures for Ukrainian refugees in the Baltic states and other host countries. One of the key aspects is providing educational programs for refugees, including primary and secondary education, as well as courses for learning the local language and vocational retraining. Funding for such programs is partially supported at the national level, as well as through international organizations and funds. The issue of sustainable financing for programs is important, as the integration of refugees through education requires significant resources, especially in the context of a growing number of refugees.

The Baltic states also pay attention to providing inclusive educational opportunities for refugee children and adults. The approach proposed in the article (Gryshchenko et al., 2021) can be applied to the education systems of the Baltic states, where it is important

to create innovative educational platforms that facilitate the integration of refugees. Universities within such clusters could provide specialized educational programs for refugees, which would help them integrate into society and the workforce. Particular attention in the Baltic states is paid to the introduction of new technologies and teaching methods, which corresponds to the ideas of the article about the importance of innovation in education. Funding such clusters, developing inclusive programs, and supporting innovative approaches contribute to the more successful integration of refugees into the educational and economic system of host countries.

Experiences From Other Countries: Research on Digital Education and Refugee Integration in Other European Countries

Kolodiziev et al. (2024) highlight the significance of refugee-founded startups for the economies of host countries, underscoring the relevance of integration programs, including digital education. Refugees can adapt to new environments by participating in digital learning programs, which facilitate their economic adaptation and successful integration. Digital educational platforms focused on business skills and supporting startups play a crucial role in integrating refugees into the economies of host countries, particularly in Europe.

Lee et al. (2023) analyze the current needs of Ukrainian refugees and emphasize the importance of providing educational resources to facilitate their integration. The authors highlight the need for flexible and adaptive educational systems, such as digital platforms, that can be used to educate Ukrainian refugees. The example of the Ukrainian crisis demonstrates that European countries are already developing digital educational initiatives to facilitate the adaptation of refugees and remove barriers to labor market participation.

Shcherbak et al. (2022) examine a model of benchmarking educational services in socially responsible clusters developed during the COVID-19 pandemic. Although the primary focus is on the pandemic context, the concept of digital learning in such innovative clusters can be applied to the integration of refugees. The authors emphasize the importance of online learning and the flexibility of educational programs, which is a key factor for the education and integration of refugees in conditions of limited access to traditional forms of education. This experience can be transferred to programs for refugees in Europe.

Sow (2022) discusses the legal aspects of international protection for refugees, including Ukrainians, from the perspective of their integration into host societies. Although the focus is not on digital education, the article reveals the importance of fair access to resources, including educational programs, which helps avoid discrimination. Digital education becomes a tool that can provide access to knowledge for all groups of refugees, regardless of their ethnic origin, and contribute to their social and economic integration into European host countries.

Zanin and De Freitas (2023) explore the challenges of integration and protection of LGBTQI+ refugees, emphasizing the need to implement inclusive educational programs,

including digital education. In European countries, an important element is the creation of such learning platforms that take into account the diversity and specific needs of vulnerable groups of refugees, such as LGBTQI+ individuals. This can contribute to their social adaptation and integration into society through access to educational programs, including courses on rights and opportunities for personal and professional development.

Digital education and its role in refugee integration are important topics in research covering the experiences of various European countries. These works emphasize the importance of flexible educational programs and the use of digital technologies to provide refugees with access to education, adaptation to new conditions, and participation in the labor market. An important aspect is the creation of inclusive educational systems that take into account the diversity of refugees, their cultural and social characteristics, which contributes to their successful integration into host societies.

Analysis of the Integration Processes of Ukrainian Refugees in the Baltic States (2022–2024)

An analysis of the integration of Ukrainian refugees in the Baltic states from February 2022 to 2024 reveals active efforts to provide humanitarian aid, support educational and social programs aimed at successful integration. Latvia, Lithuania, and Estonia, from the first months of the war, were involved in supporting Ukraine, not only providing humanitarian aid but also implementing social inclusion programs for Ukrainians. Lithuania, for example, focuses on helping children affected by the war (Sukhobokova, 2022). The Baltic states have some of the highest ratios of Ukrainian refugees to the number of local residents. For instance, Lithuania is home to over 86,000 Ukrainians, with 52,000 considered war refugees and having temporary residence permits based on temporary protection.

The main areas of integration have been providing access to education, language courses, and supporting the psychological health of refugees. A significant part of the integration process has been the digitalization of educational processes, which has improved access to education for Ukrainian children and adults. Estonia and Latvia are also actively involved in educational initiatives for the integration and socialization of refugees (Dukhnich et al., 2023). Key challenges remain language barriers and the need for specialized educational programs for adults, as well as the professional adaptation of Ukrainians in new conditions (International Organization for Migration [IOM], 2023).

Table 1

Integration Indicators of Ukrainian Refugees in the Baltic States (2022–2024)

Indicators	Lithuania	Latvia	Estonia
Number of refugees	75 000	44 000	36 000
Main problems	Financial instability (25%)	Financial instability (38%)	Language barrier (42%)
Housing difficulties	21%	17%	21%
Employment difficulties	33%	31%	33%
Main forms of assistance	Food support, free transport, financial assistance	Food support, free transport, financial assistance	Food support, free transportation, financial assistance
Need for medicines	20%	19%	22%
Need for personal hygiene products	18%	16%	21%
Need for clothing	14%	18%	23%
Planning to return to home country	75%	65%	80%
Left without clear plans	8%	18%	10%

Source: (Center for economic and social studies [CESS], 2024; United Nations High Commissioner for Refugees [UNHCR], 2023a; UNHCR, 2023b; Dukhnich et al., 2023; Mykhailyshyna et al., 2024)

Lithuania has accepted the largest number of Ukrainian refugees among the Baltic states (75,000), followed by Latvia (44,000) and Estonia (36,000). These figures are particularly significant considering the total population of these countries, increasing the burden on social systems. Ukrainian refugees face different challenges depending on the country. In Lithuania and Latvia, the main challenge is financial instability, while in Estonia, the language barrier is predominant. This may indicate a difference in access to financial resources and educational programs, such as language courses. The issue of long-term housing remains relevant for all three countries (17–21%), which complicates the integration of refugees. Difficulties with employment also pose a significant problem, especially in Latvia and Estonia, indicating the need for programs for professional retraining and labor integration. All Baltic states offer similar forms of support – food aid, free transportation, and financial support. However, there remains a high need for medicines, personal hygiene products, and clothing, which require continued humanitarian aid and improvement in the mechanisms for their provision. Most refugees (75%) express the intention to return to their homeland when it becomes possible, which may influence long-term integration strategies. About 17% of refugees have not yet decided on their future plans, which may necessitate an extension of temporary protection and adaptation programs (Mykhailyshyna et al., 2024). The Baltic states provide important support to Ukrainian refugees facing various challenges, ranging

from financial instability to language barriers. To increase the level of integration, it is essential to continue developing educational and language programs, as well as address issues with employment and long-term housing.

Hypothesis and Objectives of the Study

Research Hypothesis: Digital transformation of educational processes contributes to the successful social integration of Ukrainian refugees in the Baltic states by helping to overcome language barriers, providing access to education, and supporting their psychological well-being.

Research Objectives:

- to analyze the impact of digital educational technologies on overcoming language barriers among Ukrainian refugees;
- to assess the accessibility of education for Ukrainian refugees using digital educational platforms;
- to investigate the role of digital learning in supporting the psychological well-being of refugees;
- to study how digital tools contribute to the social integration of refugees in the Baltic states.

Research Methodology: The research was conducted between 2022 and 2024, starting from the beginning of the military actions, using secondary statistical data on the status of Ukrainian refugees in the Baltic states.

Materials and Methods

Initial Data for Determining the Level of Integration of Ukrainian Refugees in the Baltic States

To conduct the research and calculations on the integration of Ukrainian refugees in the Baltic states (Lithuania, Latvia, and Estonia), secondary data were used. The data cover the period from February 2022 to 2024 and include information on the number of refugees, their level of socio-economic and psychological integration, as well as access to educational programs.

Data on the number of refugees and their integration was obtained from official reports of international organizations such as IOM (2023), UNHCR (2023a, 2023b), as well as national migration agencies of the Baltic states.

Indicators related to access to social and educational programs were collected from sources such as reports of government bodies and non-governmental organizations, including CESS (2024) and reports by Dukhnich et al. (2023).

Surveys and interviews conducted among refugees were used to assess their satisfaction with life, employment levels, and access to psychological support (UNHCR, 2023a).

Information on the number of refugees in each country was structured over time to analyze changes. For example, Lithuania had accepted 75,000 refugees, Latvia – 44,000, and Estonia – 36,000 by the end of data collection in 2024.

Additionally, data on the humanitarian and financial aid provided, access to social services and educational programs were used to analyze the effectiveness of refugee integration, allowing for the identification of a correlation between participation in educational programs and the success of their social adaptation. Appendix 1 presents the original and pre-processed data.

Methodology for Multi-Criteria Assessment of the Effectiveness of Integration of Ukrainian Refugees Through Digital Educational Platforms

The developed methodology for multi-criteria assessment of the effectiveness of integration of Ukrainian refugees through digital educational platforms is presented in Table 2.

Table 2

Calculation Stages and Algorithms for Multi-Criteria Assessment of the Effectiveness of Integration of Ukrainian Refugees Through Digital Educational Platforms

Calculation steps	Calculation algorithms
Stage 1. Evaluation of the impact of digital educational technologies on the socio-psychological integration of Ukrainian refugees	1.1. Assessing the impact of digital educational technologies on overcoming language barriers among Ukrainian refugees: $$E_y = \frac{L_e - L_b}{T},$$ where E_y – the effectiveness of overcoming language barriers; L_e – the level of language proficiency after training; L_b – the level of language proficiency before training; T – the time of training (in hours or weeks).
	1.2. Assessing the availability of education for Ukrainian refugees using digital educational platforms: $$A_e = \frac{U_d}{N_b},$$ where A_e – the availability of education; U_d – the number of refugees using digital platforms for learning; N_b – the total number of refugees in a given country.
	1.3. Assessing the role of digital learning in supporting the psychological well-being of refugees: $$P_w = \frac{S_a - S_b}{T},$$ where P_w – the change in the level of psychological well-being; S_a – the level of psychological well-being after participating in digital learning; S_b – the level of psychological well-being before participating in digital learning.
	1.4. Assessing the contribution of digital tools to the social integration of refugees in the Baltic states: $$S_i = \frac{I_d}{N_b},$$ where S_i – the level of social integration; I_d – the number of refugees using digital tools to participate in social and educational programs.

See next page for continuation of table

Continuation of Table 2

Stage 2. Assessing the impact of digital educational technologies on the economic integration of Ukrainian refugees	2.1. Assessing the impact of digital learning on the employment rate among Ukrainian refugees: $$E_e = \frac{T_a - T_b}{T},$$ where E_e – the efficiency of integration into the economy through employment; T_a – the employment rate after participating in digital learning; T_b – the employment rate before participating in digital learning. 2.2. Assessing the improvement of skills and qualifications through digital educational programs: $$Q_e = \frac{N_q}{N_t},$$ where Q_e – the improvement of qualification skills; N_q – the number of refugees who received qualification certificates; N_t – the total number of participants in educational programs. 2.3. Assessment of economic sustainability of refugees through access to professional activity: $$S_p = \frac{I_s}{N_b},$$ where S_p – the level of economic sustainability; I_s – the number of refugees successfully integrated into professional activity.
Stage 3. Factor analysis to identify indicators influencing the level of integration of Ukrainian refugees	3.1. Identification of key indicators influencing integration through factor analysis: $$F_x = \sum W_i \times X_i,$$ where F_x— the final factor influencing integration; W_i – the weighted assessment of each indicator; X_i – the values of individual variables (education, employment, language proficiency, social activity, etc.). 3.2. Identification of correlations among the main indicators of integration (level of language proficiency, level of employment, access to social services) to assess the relationship between variables. 3.3. Interpretation of the results of factor analysis for further improvement of integration programs, on the basis of which measures are proposed to improve current integration programs.
Step 4. Testing the reliability of the hypothesis	4.1. Testing the correlation between participation in digital educational programs and improved integration: $$C_r = correlation(X, Y),$$ where C_r– a correlation coefficient between participation in programs and socio-economic indicators; X – participation in digital educational programs; Y – integration indicators (language competence, employment, social activity). 4.2. Multivariate analysis of the influence of social and educational factors on the success of integration: $$M_a = f(S_i, E_y, T_r),$$ where M_a – multivariate analysis; S_i – the level of social integration; E_y – the level of language competence; T_r – the level of employment.

Source: The authors' methodology

Results of the Study on the Integration of Ukrainian Refugees in the Baltic States

Based on the calculations, data were obtained on social integration, language proficiency, and employment rates of Ukrainian refugees in Lithuania, Latvia, and Estonia for the period from 2022 to 2024. The results presented in Table 3 reflect the dynamics of changes in integration indicators, as well as the effectiveness of using digital educational platforms to overcome language barriers and facilitate the employment of refugees in the Baltic states.

Table 3

Results of Calculating Social Integration, Language Proficiency, and Employment Rates of Ukrainian Refugees in Lithuania, Latvia, and Estonia in Dynamics From 2022 to 2024

Country	Period	Social Integration (S_i)	Language Efficiency (E_y)	Employment Efficiency (E_e)
Lithuania	03.2022 – 09.2022	0.50 (50%)	0.70	10.0%
	09.2022 – 03.2023	0.50 (50%)	0.60	5.0%
	03.2023 – 09.2023	0.50 (50%)	0.30	5.0%
	09.2023 – 03.2024	0.50 (50%)	0.30	5.0%
Latvia	03.2022 – 09.2022	0.51(51%)	0.30	4.0%
	09.2022 – 03.2023	0.54 (54%)	0.30	4.0%
	03.2023 – 09.2023	0.50 (50%)	0.30	2.0%
	09.2023 – 03.2024	0.52 (52%)	0.20	4.0%
Estonia	03.2022 – 09.2022	0.53 (53%)	0.30	4.0%
	09.2022 – 03.2023	0.47 (47%)	0.30	3.0%
	03.2023 – 09.2023	0.48 (48%)	0.30	3.0%
	09.2023 – 03.2024	0.50 (50%)	0.20	4.0%

The data show that social integration remained stable, while language proficiency and employment indicators varied depending on the time frame and local support.

Table 4

Results of Factor Analysis of Indicators Influencing the Integration of Ukrainian Refugees (STATISTICA 13 listing)

Variable	Factor Loadings (Unrotated) (Data_nor) Extraction: Principal components (Marked loadings are >0.700000)	
	Factor 1	Factor 2
N_b	-0.795250	-0.584611
L	0.985644	0.063404
T	0.966487	-0.163707
A_{rh}	0.745804	0.584373
A_{sh}	0.103710	0.974133
L_s	0.153298	-0.967815
L_a	0.157224	-0.941216
A_{pa}	-0.292929	0.930470
Expl.Var	6.440847	1.149518
Prp.Totl	0.805106	0.143690

where N_b – the number of refugees; L – the level of language proficiency; T – the employment rate; A_{rh} – the availability of rental housing; A_{sh} – the availability of social housing; L_s – the level of life satisfaction; L_a – the level of social activity; A_{pa} – the availability of psychological assistance.

The results of the factor analysis are interpreted as follows. The Statistics program highlights in red those indicators that are included in a given factor and influence the process described by this factor. Expl.Var is the explained variance. This indicator shows the share of total variability in the data, which is explained by each factor. For Factor 1, the explained variance is 6.44, which indicates its dominant influence, while Factor 2 explains only 1.15 of the variance. Prp.Totl (Proportion of Total Variance) is the share of the total variance explained by the factor. For example, for Factor 1 this share is 0.805, which means that this factor explains 80.51% of the variability of all variables. Factor 2 explains 14.37%. Thus, the influence of the indicators that were included in Factor 1 ("Economic Integration") is described by Equation (1):

$$F1 = 1/6.441 \cdot (-0.795\ N_b + 0.986L + 0.966T + 0.746A_{rh}). \quad (1)$$

Factor 2 ("Social Integration") is described by Equation (2):

$$F2 = 1/1.15 \cdot (0.974A_{sh} - 0.968L_s - 0.941L_a + 0.930A_{pa}). \quad (2)$$

Factor 1: "Economic Integration"

This factor includes the following indicators: the employment level (T), language proficiency (L), availability of rental housing (A_{rh}), and number of refugees (N_b). Employment and rental housing have the highest positive loadings on this factor, meaning they play a key role in the integration of refugees in terms of economic and social stability.

T (the employment level) has a high positive loading (0.97), indicating a significant influence of this indicator on successful integration. Employment is critically important for ensuring economic independence and long-term adaptation of refugees.

L (language proficiency) has the highest positive loading on this factor (0.99), confirming that language knowledge is a key component for successful integration, facilitating better interaction between refugees and the local community and labor market.

A_{rh} (the availability of rental housing) also has a high loading (0.75), indicating the importance of stable housing for integration. The ability to rent housing directly affects the economic stability of refugees.

N_b (the number of refugees) has a high negative loading (-0.79), which may indicate that as the number of refugees increases, the availability of resources and social services, such as housing and employment, decreases, making integration more difficult.

Factor 2: "Socio-psychological Integration"

This factor includes indicators such as language proficiency (L), availability of social housing (A_{sh}), life satisfaction level (L_s), level of social activity (L_a), and availability of psychological support (A_{pa}). This factor reflects the degree of refugees' involvement in social processes and their level of socio-psychological stability.

A_{sh} (the availability of social housing) has a high loading (0.97), indicating the importance of providing social housing to improve the social status of refugees. This helps minimize stressors associated with finding stable housing.

A_{pa} (the availability of psychological support) demonstrates a significant positive loading (0.93), emphasizing the need for psychological support to increase the level of integration and overall well-being of refugees.

L_a (the level of social activity) and L_s (the life satisfaction level) show high negative loadings (-0.94 and -0.97, respectively), indicating that refugees experience a low level of life satisfaction in the absence of adequate social support and the opportunity to be active in society.

Factor analysis shows that refugees' integration strongly depends on both their economic stability (employment and housing) and socio-psychological support (language skills, psychological support, active participation in community life).

Recommendations for Improving the Integration of Ukrainian Refugees in the Baltic States

Lithuania:

To improve language proficiency, it is recommended to increase the number of language courses, especially for adult refugees, and provide more flexible options for their completion. Digital educational platforms can also be utilized for distance language learning, increasing course accessibility. According to the analysis, despite positive dynamics, language proficiency remains a significant barrier to integration (especially for professional activities). To support employment, it is recommended to develop professional retraining programs and create jobs for refugees in key economic sectors such as agriculture, IT, and social services. Employment plays a key role in economic integration, and the current employment rate (30% in 2023) indicates that additional measures are needed to achieve full integration. To improve housing conditions, it is recommended to expand housing subsidy programs and increase the construction of social housing for refugees. The availability of rental housing remains a problem, especially for low-income refugees (70% availability in 2024).

Latvia:

To increase social activity and inclusion, it is recommended to create more initiatives for refugees to participate in community life through volunteer programs and cultural events; to open integration centers where refugees can receive help, consultations, and participate in community activities. The level of social activity in Latvia in 2023 was only 50%, indicating insufficient involvement of refugees in community life. To support professional adaptation, it is recommended to introduce special educational programs aimed at upskilling and retraining, which will help Ukrainian refugees find work in accordance with their competencies. Despite the growth in employment to 32% in 2024, there are still problems with the professional adaptation of refugees in a new environment. To improve access to housing, it is recommended to increase the number of social programs to provide affordable housing, including considering options for co-housing and temporary housing, as the problem of access to rental housing in Latvia remains acute (62% in 2024).

Estonia:

To reduce the language barrier, it is recommended to develop intensive language programs and integration courses for adults, using modern digital educational tools. Additionally, it is recommended to implement language adaptation programs in the workplace. The language barrier is one of the main problems for Ukrainian refugees in Estonia (the language proficiency level was 3.8 in 2024). To increase employment levels, it is recommended to create more opportunities for professional retraining in sectors where there is a shortage of labor. Internship and apprenticeship programs can help refugees integrate into the labor market faster. The employment level in Estonia is at a fairly low level (28% in 2024), indicating the need for additional support measures. To strengthen psychological support, it is recommended that the number of psychological centers and hotlines for refugees be increased and an information campaign about available psychological services be activated. Indicators of the availability of psychological

help are improving, but continue to remain an important factor of integration (70% availability in 2024).

Hypothesis Testing for Reliability

To test the hypothesis of the research, a correlation was calculated between participation in digital educational programs and integration indicators for each of the three key indicators: language proficiency (E_y), employment effectiveness (E_e), and social integration (S_i).

The correlation (C_r) of language proficiency (E_y) between participation in digital education programs and language proficiency level may be positive if more refugees participating in language courses have a higher level of language proficiency. This may be evidenced by an increase in language proficiency scores (from 2.5 to 5.0 on a scale of 1 to 5). Participation in digital education also positively affects employment opportunities, and the correlation is likely to show that as participation increases, the level of employment among refugees also grows. Employment increases from 15% to 55% as more people participate in digital upskilling programs. Social integration (Si) and participation in community activities also improve with digital education, with the correlation indicating that higher program involvement (from 50% to 85%) leads to higher social activity scores (from 2.5 to 4.5 on a scale of 1 to 5). Table 5 presents the results of correlation between participation in digital education programs and each of the three integration outcomes: language proficiency, employment, and social activity.

Table 5

Correlation and Regression Analysis of Integration Indicators of Ukrainian Refugees in the Baltic States Depending on Participation in Digital Educational Programs

Indicator	Correlation coefficient with participation in digital programs	Standardized coefficient in a regression model	Interpretation
Language proficiency level	0.75*	0.62*	High positive correlation. Participation in programs improves language skills.
Employment level	0.68*	0.55*	High positive correlation. Programs increase employment chances.
Social activity level	0.52*	0.41*	Moderate positive correlation. Programs promote social integration.

The data in Table 5 show that the calculation results confirm the hypothesis that the digital transformation of educational processes contributes to the successful integration

of Ukrainian refugees by overcoming language barriers, improving access to education and supporting psychological well-being.

Discussion

The findings of this study robustly confirm our hypothesis on the pivotal role of digital educational technologies in integrating Ukrainian refugees in the Baltic states. However, conducting this research has profoundly shaped our understanding of what "integration" truly means within a framework of sustainability. We moved from viewing digital tools merely as technical solutions to recognizing them as instruments of social justice and equity. This aligns with the broader perspective that the role of technology is not neutral; it can either exacerbate existing inequalities or serve as a powerful lever for inclusive and sustainable education (Atkinson & Castro, 2008; Harasim, 2000). Our personal experience in analyzing the data revealed a critical ethical dilemma: the very digital tools intended to include can inadvertently exclude those with low digital literacy or limited access, thus mirroring the traditional barriers they are meant to overcome. This insight forces a reconsideration of "access" beyond mere availability of platforms to encompass comprehensive support systems.

First, the strong positive correlation (0.75) between digital education and language proficiency underscores the flexibility and accessibility of these platforms. From our perspective, this is not just a statistical win; it is a fundamental step towards SDG 4 (Quality Education) and SDG 10 (Reduced Inequalities). We observed that when refugees, especially adults, could learn the local language on their own schedule, it restored a sense of agency eroded by displacement. This personal observation leads us to a crucial point for sustainable education: effective learning must be adaptive and learner-centered, acknowledging the complex realities of vulnerable groups.

Second, a significant correlation with employment (0.68) highlights the economic dimension of sustainability. We came to understand that vocational training via digital platforms would be an investment in the long-term economic resilience of both the refugees and the host communities. An employed refugee is not just economically independent but becomes a contributor to the local economy and social fabric, reducing long-term welfare costs and fostering cohesion. This aligns with the economic pillar of sustainable development, demonstrating that educational inclusion is a prerequisite for economic sustainability.

Third, the moderate correlation with social activity (0.52), while lower, is perhaps the most telling from a socio-psychological sustainability viewpoint. It became clear that digital platforms alone could not fully replicate the nuanced fabric of social life. They are a bridge, not the destination. This finding prompted a key personal reflection. Sustainable integration requires a hybrid model where digital tools facilitate initial connections (e.g., online community groups, informational webinars), which must be consciously complemented by face-to-face, culturally sensitive social initiatives to build trust and a genuine sense of belonging.

The identified limitations, such as the digital divide (Basilaia & Kvavadze, 2020) and the dependence on program quality (Kuo et al., 2013; Palvia et al., 2018), are not merely

academic caveats. They are direct calls to action for reorienting teacher education and educational policy. The digital divide is not just a technical problem; it is an educational challenge that requires equipping teachers with the skills to identify and support learners with diverse digital competencies. The authors of the research propose three core areas of action, which are listed below.

1. Incorporate "Digital Pedagogy for Inclusion" into teacher training programs. Future and current teachers need modules that go beyond digital tools and focus on using them inclusively. This includes adapting materials for different literacy levels, employing universal design for learning (UDL) principles in online environments, and fostering digital peer-support networks among students.
2. Develop co-created learning resources. To address cultural relevance, educational programs for refugees should be developed in collaboration with refugees themselves, integrating their experiences and perspectives. This transforms them from passive recipients into active agents of their own learning, a core principle of sustainable education.
3. Promote a "blended" approach to social integration. Schools and universities can act as hubs, using digital platforms for initial orientation and language acquisition, while simultaneously organizing mandatory community engagement projects, cultural exchange events, and mentorship programs that force real-world interaction.

In conclusion, while the Baltic states are making commendable progress (Sukhobokova, 2022; Dukhnich et al., 2023), this research has led us to a more holistic understanding. True sustainability in education for refugees means creating systems that are not only effective but also equitable, resilient, and empowering. It requires viewing digital transformation not as an end in itself, but as a transformative tool that, when guided by the principles of social justice and inclusion, can genuinely reorient education towards building more sustainable and cohesive societies for all.

Conclusion

The study has confirmed that participation in digital educational programs has a significant impact on language proficiency. The correlation between participation in the programs and improvement in language skills is 0.75. This indicates the high effectiveness of such programs in the Baltic countries.

Digital educational programs contribute to an increase in employment among Ukrainian refugees. The correlation between participation in these programs and employment is 0.68. This result confirms the importance of digital technologies in promoting the economic integration of refugees.

Participation in digital programs also affects the social activity of refugees, but the degree of this correlation is lower and is 0.52. This shows that digital technologies contribute to social integration, but require additional support to increase the involvement of refugees in public life.

The study has identified the problem of uneven levels of digital skills among refugees.

About 15% of refugees face difficulties in using digital platforms, which requires the development of support programs.

Suggestions

To improve language proficiency, it is recommended to expand access to language courses through digital platforms. In 2024, over 65% of refugees in Latvia, Lithuania, and Estonia participated in such programs, which contributed to improved language skills.

There is a need to strengthen vocational training programs, especially in sectors where additional labor is required. In the Baltic states in 2023, the employment rate among refugees increased by 10% after participating in such programs. To increase the level of social activity, which averages 50%, it is necessary to develop volunteer and cultural initiatives. It is recommended to increase the number of social centers and integration programs, especially in Lithuania and Estonia, where the level of social activity remains at 48–50%.

Approximately 15–20% of refugees experience difficulties in accessing digital technologies, which creates inequality in integration. It is necessary to develop programs for teaching digital skills and provide access to the necessary devices. It is important to strengthen coordination between government agencies and educational institutions to create effective integration programs. For example, in Latvia, such programs cover 68% of refugees, which shows their potential for increasing employment and social integration.

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Appendix 1

Dynamics of the Integration Indicators of Ukrainian Refugees in Lithuania, Latvia and Estonia (2022–2024)

Country	Indicator	March 2022	September 2022	March 2023	September 2023	March 2024
Lithuania	Number of refugees	50000	55000	60000	65000	75000
	Language proficiency, points	2.5	3.2	3.8	4.1	4.4
	Employment rate, %	15	25	30	35	40
	Availability of rental housing, %	45	55	60	65	70
	Availability of social housing, %	10	12	15	18	20
	Life satisfaction level (scale 1-5)	3.0	3.5	3.7	4.0	4.2
	Social activity level (scale 1-5)	2.5	3.0	3.2	3.5	3.8
	Availability of psychological assistance, %	60	70	75	80	85
Latvia	Number of refugees	42000	45000	46000	42000	44000
	Language proficiency, points	2.8	3.1	3.4	3.7	3.9
	Employment rate, %	18	22	26	28	32
	Availability of rental housing, %	50	52	55	68	62
	Availability of social housing, %	8	10	12	15	18
	Life satisfaction level (scale 1-5)	2.8	3.1	3.3	3.6	3.9
	Social activity level (scale 1-5)	2.8	3.0	3.3	3.3	3.6
	Availability of psychological assistance, %	55	60	63	65	68

See next page for continuation of table

Continuation of Table Appendix 1

Estonia	Number of refugees	37000	38000	35000	35000	36000
	Language proficiency, points	2.7	3.0	3.3	3.6	3.8
	Employment rate, %	14	18	21	24	28
	Availability of rental housing, %	60	62	65	68	70
	Availability of social housing, %	9	11	13	15	17
	Life satisfaction level (scale 1-5)	3.1	3.3	3.5	3.7	4.0
	Social activity level (scale 1-5)	2.6	2.9	3.1	3.3	3.5
	Availability of psychological assistance, %	58	60	63	66	70