
LEARNING LOSSES: THE COMPLEXITY OF PROBLEM IN THE CONTEXT OF WAR IN UKRAINE



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Abstract. *The article deals with the problem of learning losses. The study is theoretical. The authors used the methods of comparative analysis and theoretical generalisation of modern approaches in educational science and practice to the causes of and conditions for overcoming learning losses, studying and interpreting the results of surveys of students and teachers of general secondary education institutions in Ukraine. The authors emphasised that in times of war, learning losses, together with psychological losses, losses at the level of infrastructure, teaching staff, etc. form a set of losses that are considered as losses of the educational system. It is stated that in Ukraine there is a process of developing procedures for studying the war times learning losses,*

as well as mechanisms for minimising them. The article describes the achievements of researchers of the Institute of Pedagogy of the National Academy of Educational Sciences of Ukraine on overcoming learning losses in primary school and at the level of general secondary education. Based on the research results the authors substantiate key principles that should determine the mechanisms/programmes for minimising and catching up with students' learning losses: child-centredness: programmes for catching up with learning losses should meet the age and personal needs of students; safe educational environment, which should be physically and emotionally safe and child-friendly; integration of academic subjects to ensure the implementation of state standards aimed at developing key competencies; support for teachers in terms of security, psychological assistance, and professional development, taking into account martial law; consideration of regional and local specifics: the location of an educational institution in the frontline zone, in the occupied territory, in a relatively safe region, and the financial situation of the community. The authors conclude that the experience gained by international organisations and foreign countries in the context of the COVID-19 pandemic is valuable for Ukraine. At the same time, the factors that cause the suspension of the educational process and the work of schools in wartime are of a completely different nature. Given the complexity of learning losses in wartime, it is important to think about a holistic national strategy that would offer multiple and flexible mechanisms for their compensating and overcoming.

Keywords: *learning loss, war times learning loss, educational loss, minimisation, overcoming, general secondary education, international experience, war, Ukraine.*

INTRODUCTION, PROBLEM STATEMENT

Learning loss as a loss of academic knowledge or skills previously acquired or a pause in academic advancement (Law Insider, n.d.) is a topical scientific issue. The problem of learning losses due to summer holidays, the consequences of such losses and compensation mechanisms have been well studied by researchers. In particular, studies have shown that learning losses due to summer holidays show strong differences in summer learning loss between children from different socio-economic backgrounds and between pupils with learning difficulties and pupils with strong learning abilities (OECD/Hanushek & Woessmann, 2020). It is stated that students' achievement typically slows or declines over the summer months, declines tend to be steeper for math than for reading, and the extent (proportionally) of loss increases in the upper grades (Kuhfeld & Tarasawa, 2020). At the same time, as emphasized in the OECD study, in reading students from disadvantaged backgrounds also suffer a pronounced loss of skills (OECD/Hanushek & Woessmann, 2020).

The COVID-19 pandemic has brought to the fore the consideration of learning losses through the prism of global social upheavals and emergencies that cause unplanned suspension of the educational process. This means the complete and/or partial closure of educational institutions for up to several months during the school year and the transformation of education into an online format. Learning loss is broadly interpreted by the international community (UNESCO, UNICEF, World Bank) as any loss of knowledge or skills and deceleration of or interruption to academic progress, most commonly due to extended gaps or discontinuities in a student's education (World Bank Group, 2021).

While there are many studies on the issue of educational loss in the context of the COVID-19 pandemic, researchers continue to develop the issue in terms of the long-term consequences and the impact of students' family backgrounds (Birkelund & Karlson, 2023).

The experience of countries in overcoming learning losses is a valuable source for reflection. On March 11, 2021 President Biden signed the American Rescue Plan Act into law, an unprecedented \$1.9 trillion package of emergency assistance measures. The ARP provides a historic investment in America's preschool through twelfth grade (P-12) schools in response to the COVID-19 pandemic to keep schools safely open, tackle learning loss and mental health (The White House, 2022).

The German Federal Government initiated the national programme “Catching up after the Crown” (Aufholen nach Corona) with a total funding of EUR 2 billion. The funds were made available to federal state governments to finance and implement compensatory measures aimed at reducing the level of knowledge gaps in mathematics, German and English. The support was aimed at organising individual lessons and small group classes during the summer holidays and at the beginning of the new 2021/2022 school year, with a special focus on students from migrant families (BMFSFJ, n.d.).

Compensatory measures, such as extending the school year and organising summer schools, were also used in Austria to overcome the effects of the pandemic in education (Helm & Huber, 2023).

Since the outbreak of the Russian war against Ukraine in 2014 in eastern Ukraine – in the Ukrainian Donbas – and after the full-scale invasion of Ukraine by the Russian Federation on 24 February 2022, the problem of learning losses has become particularly relevant. Both the concept of learning losses in wartime, which differs from the concept in the context of the COVID-19 pandemic, and the mechanisms for minimising and overcoming them need to be studied and developed.

LITERATURE REVIEW

The problem of learning loss is one of the most relevant areas of scientific research in the global research space. This is evidenced by 4,890,000 entries on this topic when searching on Google Scholar (Google Academy, 2023). The analysis of published works makes it possible to identify the following areas of research:

- study of educational losses in the context of global challenges (Ahlgren et al., 2023; UNESCO/UNICEF/World Bank, 2021);
- economic impacts of learning losses (OECD, 2020);
- learning losses terminology (Collins English Dictionary, 2023; Ferrier, 2021);
- minimising/compensating for learning losses (UNESCO, 2021; World Bank, 2021).

Thus, Kuhfeld (2019), Huong & Na-Jatturas consider the content of learning losses and their causation by long gaps and interruptions in learning (Huong & Na-Jatturas, 2020). Gyöngyvér & Zoltán have experimentally substantiated the existence of a negative impact on the quality of the educational process of both long-term and short-term closure of secondary education institutions caused by the COVID-19 pandemic and the transition to distance learning (Gyöngyvér & Zoltán, 2023). Liao, Ma & Xue note a significant decline in the academic achievements of students from certain social categories in distance learning due to the transfer of some of the functions of pedagogical supervision of the educational process from teachers to parents (Liao, Ma & Xue, 2022). Hanushek & Woessmann substantiate the economic effect of learning losses at both the individual and national levels (OECD/Hanushek & Woessmann, 2020).

While the works of foreign scholars consider learning losses in the context of the COVID-19 pandemic, Ukrainian scholars, comprehending the work of foreign colleagues, are working to develop a national concept of war times learning losses. These are:

- analysis of the destructive effects of war on the organisation of education (Topuzov, Bibik, Lokshyna, & Onopriienko, 2022);
- war times learning loss terminology (Lokshyna et al., 2023; Bychko & Tereshchenko, 2023);
- analysis of tools for measuring and compensating for learning losses (Naumenko, 2023; Topuzov et al., 2023).

In particular, Topuzov, Lokshyna, Shparyk et al. summarised international experience in overcoming learning losses caused by military operations (Lokshyna et al., 2022a); Naumenko, & Holovko; Burda & Vasylieva; Lokshyna & Topuzov; Topuzov, Bibik, Lokshyna, & Onopriienko presented the results of research on identifying learning losses in the Ukrainian general secondary

education (Naumenko & Holovko, 2022; Burda & Vasylieva, 2022; Lokshyna & Topuzov, 2021; Topuzov, Bibik, Lokshyna, & Onopriienko, 2022).

The authors of the Institute of Pedagogy of the National Academy of Educational Sciences of Ukraine have developed methodological recommendations for the diagnosis and compensation of learning losses both at the level of general secondary education (Topuzov (Red.) & Holovko (Ukl.), 2023) and for primary school (Topuzov (Red.) & Onopriienko (Ukl.), 2023).

The aim of the article is to analyse the concept of learning losses in war times and to substantiate the vision of the format of mechanisms for their diagnosis and compensation.

METHODOLOGY

The study is theoretical. The authors used the methods of comparative analysis and theoretical generalisation of modern approaches in educational science and practice to the causes of and conditions for overcoming learning losses, studying and interpreting the results of surveys of students and teachers of general secondary education institutions in Ukraine.

MAIN RESULTS

Among the long-term factors of negative impact caused by the war, UNESCO identifies the following: physical danger to students; damage to educational infrastructure; absenteeism; increased violence in educational institutions; reduced motivation to learn and mental health problems of students; loss of students and teachers as a result of hostilities; illegal persecution and detention of teachers and students; forced outflow of qualified teachers and managers abroad; insufficient provision of educational institutions with teaching staff; and disruption of the established mechanisms of training and retraining of teachers. The closure of schools as a result of their destruction or damage due to bombing and shelling, occupation; instability of online learning; lack/insufficiency of teaching and learning materials; psychological trauma of students and teachers characterise the state of education in modern Ukraine and lead to an increase in learning losses (Lokshyna et al., 2022b).

According to the Ministry of Education and Science of Ukraine, since the beginning of the full-scale war of the Russian Federation against Ukraine on 24 February 2022, 3798 educational institutions have been affected by bombing and shelling. 365 of them were completely destroyed (Osvita pid zahrozoiu, 2022). There are 894 general secondary education institutions and 71,800 students in the temporarily occupied territory (MON Ukraine/Institute of Education, 2023).

Even in safe (or relatively safe) regions, learning (both face-to-face and distance) is periodically interrupted, in particular in the event of an air raid. The quality of distance learning is also affected by power outages, as the gadgets used to deliver it stop working. For example, in the first quarter of the 2022/2023 academic year alone, a primary school in Kyiv lost more than 900 minutes of class time due to air raids (Nazarenko, 2022).

The full-scale war has displaced Ukrainian families from their places of permanent residence. The number of internally displaced students increased to 164.7 thousand at the end of the 2022/2023 academic year.

Almost 649,000 students from all regions of Ukraine have moved abroad (MON Ukraine/Institute of Educational Quality, 2023). Ignorance/poor command of the language of the host country leads to ineffective integration into the educational process and often the lack of synchronous online classes in Ukrainian schools. These are some of the challenges that cause educational losses for Ukrainian students abroad (*War in Ukraine ...*, 2023).

To estimate learning losses in Ukraine in 2022, Angrist, Djankov, Goldberg & Patrinos used data from the Harmonised Learning Outcomes database (Angrist et al., 2021). The researchers stated that Ukraine performs at par with its regional neighbours in eastern Europe, including Bulgaria and Cro-

atia, prior to the Covid-19 pandemic and the Russian invasion. Schools were closed or disrupted due to Covid-19 for 31 weeks in Ukraine, or about 7.75 months. The learning loss associated with school closures of this length are estimated to be around 20 points, based on OECD averages of learning per year. The researchers add another two months due to the war to-date. In making the prediction, the researchers write that learning losses in Ukraine can amount to over one year, due to a combination of extended pandemic-related closures and the war. Estimates of harmonized Learning Outcomes due to this length of school closure could fall from 481 to about 451 points, below the lowest performing countries in Europe, Moldova, and Armenia. The long-term effect could be substantial, with future earnings losses of more than 10% a year per student (Angrist et al., 2022).

The PISA-2022 results, released at the end of 2023, demonstrated the real level of educational losses in Ukraine. Commenting on Ukraine's results, the Ministry of Education and Science of Ukraine stressed that Ukraine was the only country to conduct PISA 2022 in a time of war. Educational institutions conducted the test in the face of massive shelling and prolonged air raids in October 2022. Despite the difficulties caused by the full-scale invasion, Ukraine managed to gather resources and organise the study in 18 of the country's 27 regions, although it was not representative in these conditions.

Ukrainian students received 441 points in mathematics, 450 in science and 428 in reading.

In mathematics, Ukrainian students showed the lowest level of educational loss among all the areas studied. Compared to the previous cycle, these results have deteriorated by 12 points. 58% of Ukrainian students reached the basic level, the second of six, of mathematical literacy, and 32% of students reached level 3 and above. In mathematics, the difference between Ukraine and OECD countries is approximately one and a half years of study according to PISA standards (1 year of study = 20 test points).

The highest results in the 2022 cycle were achieved by Ukrainian students in the natural sciences. Compared to the 2018 cycle, the results decreased by 19 points. The basic level of literacy on the PISA scale was reached by 66% of Ukrainian students. At the same time, 36% of students reached level 3 and higher.

The biggest drop in results in the PISA 2022 cycle was in reading. In reading, Ukrainian students scored 38 points lower compared to the 2018 study. 59% of students reached the basic level in reading, while 29% reached level 3 and above. On average, Ukrainian students lag behind OECD students in reading by about two and a half years of study according to PISA standards (Tereshchenko & Klymenko (eds.), 2023).

Overall, Ukraine scored higher in all three areas than Bulgaria, Moldova and Georgia. At the same time, Estonia, Poland, and the Slovak Republic scored higher.

The acuteness of the problem of learning losses makes it important to find effective mechanisms to minimise and overcome them. A necessary step is to develop the national concept of war times learning losses. In addition to the loss of acquired academic knowledge/skills or a pause in a student's academic development, there are other losses within the educational system in Ukraine today, such as upbringing and psychological losses. The researchers at the Institute of Upbringing Problems of the National Academy of Educational Sciences of Ukraine interpret upbringing losses as a violation of the personal and social development of a growing personality that occurs as a result of a systemic disruption of the purposeful educational process, which leads to deformation of personal values and behavioural patterns (Verkhovna Rada of Ukraine/Komitet z pytan osvity, nauky ta innovatsii, 2023). Bychko & Tereshchenko believe that learning losses should be considered only one component of a broader category of losses, along with such components as upbringing losses and a slowdown in personal development (Bychko & Tereshchenko, 2023).

The psychological losses of students are manifested in depression, increased fear, anxiety, and worry, loss of motivation to learn, apathy, confusion, and inattention (Verkhovna Rada of Ukraine/Komitet z pytan osvity, nauky ta innovatsii, 2023).

It is obvious to Ukrainian researchers that learning losses of students are a consequence of losses at the level of the education system. Kohut, Nikulina, Sirbu, Zherobkina, & Nazarenko highlight:

- Human losses: deaths of teachers, students and parents;
- Losses in educational infrastructure: damage/destruction of educational institutions;
- Losses in the educational environment (furniture, equipment, teaching aids, etc.);
- Loss of study time/loss of study days): forced holidays; loss of the opportunity to study during the occupation or in the process of forced change of residence; deprivation of the opportunity to study due to air raids and threats of artillery shelling, power outages, problems with mobile communication and the Internet, etc. (Kohut et al., 2023).

Lokshyna, Dzhurylo, Maksymenko & Shparyk write about the complexity of the concept of educational losses in the context of the war in Ukraine. Learning losses are a component and result of the losses of the entire national education system, including losses at the level of educational infrastructure, organisation of the educational process and educational environment, loss of human resources, etc. (Lokshyna et al., 2023).

The conclusion made at the hearings of the Verkhovna Rada (Parliament) of Ukraine Committee on Education, Science and Innovation on the topic “Educational Losses and Educational Gaps at the General Secondary Education Level: Measurement and Mechanisms for Overcoming”, which took place on 7 June 2023, was important for the national discussion. The Recommendations that were adopted as a result of the hearings emphasise that the concept of “educational loss” should not be equated with “learning loss” as it is much broader. The document notes that educational loss can have a significant negative impact on both individual development and the future well-being of entire societies; it deepens inequalities in education by widening existing learning gaps; can lead to serious economic consequences in the future, including a decrease in gross domestic product; have a cumulative effect, i.e. a tendency to accumulate and deepen, in the absence of timely and effective measures to identify and overcome them (Verkhovna Rada of Ukraine/Komitet z pytan osvity, nauky ta innovatsii, 2023).

The document states that Ukraine has no established procedures for studying the level of learning losses and learning gaps at the level of general secondary education, and no mechanisms for overcoming them. In order to identify general trends in learning losses under martial law, assess them and develop mechanisms to overcome them, researchers at the Institute of Pedagogy of the National Academy of Educational Sciences of Ukraine conducted a survey of teachers and students of general secondary education institutions using Google Forms technology. The study, conducted by the scholars of the Department of Mathematics and Computer Science Education, covered 550 mathematics teachers and 560 students from 24 regions of Ukraine. The analysis of the survey results showed that 89% of students in grades 5-6, 62% of students in grades 7-9, and only 40% of students in grades 10-11 who took part in the survey systematically complete the homework assigned by their teachers in the context of distance learning. At the same time, about 20% of students systematically miss classes for various reasons. At the same time, almost 12% of mathematics teachers were unable to systematically check students’ learning, 40% of teachers were behind in the curriculum, and 45.7% had no time left to repeat the material at the end of the year (Burda & Vasylieva, 2022).

A survey of science teachers conducted by the Department of Biological, Chemical and Physical Education, which covered more than 7,000 teachers, showed that about 50% of them noted a significant decline in students’ academic achievement. More than 75% believe that distance learning complicates the development of practical skills and abilities, and that it does not contribute to the achievement of the goal of school science education. The control and evaluation activities of teachers have also undergone significant changes, which affects the quality of the educational process.

A survey of more than 38,000 teachers in Ukrainian schools conducted by the Department of Monitoring and Evaluation of the Quality of General Secondary Education showed that about 70% of teachers conduct current assessments in synchronous mode, and about 50% conduct summative

assessments. At the same time, less than 50% of students complete tasks within the allotted time, which significantly affects the objectivity of the assessment. According to about 80% of teachers, parents and relatives help students with their assignments. More than 50% of teachers note a decline in students' academic achievement during distance learning under martial law compared to learning during quarantine restrictions. Among the main difficulties in organising the assessment of students' learning outcomes, teachers note the lack of high-speed Internet, imperfect technical equipment, and insufficient digital competence among students and teachers (Naumenko & Holovko, 2022).

For the subjects of the natural sciences, the most significant learning losses occur in the formation of experimental skills, since not all students have the opportunity to work with real equipment. While such learning losses are minimal in face-to-face learning and are primarily due to insufficient material and technical support of educational institutions or methodological training of teachers, they increase significantly in distance learning, especially in asynchronous mode. In the absence of the Internet and electricity, the main source of educational information is the textbook and the student's own study guides.

According to the observations of primary school teachers, children's learning outcomes in Ukrainian and foreign languages, mathematics, and literary reading have deteriorated. At the same time, schools in rural areas have a lower educational level. A decline in students' performance in the Ukrainian language was noted by 57% of surveyed teachers in villages, 44% in cities, 52% and 47% in foreign languages, and 45% and 40% in mathematics, respectively (Topuzov (Red.) & Onoprienko (Ukl.), 2023).

Therefore, there is an urgent need for Ukraine to develop effective mechanisms to compensate for learning losses at the state level. International experience shows that the key to minimising educational losses is to resume the educational process. "Education can help to protect children and youth from death, injury and exploitation; it can alleviate the psychological impact of armed conflict by offering routine and stability and can provide links to other vital services", says the Safe Schools Declaration (2015).

UNICEF's RAPID (Reach & Retain, Assess, Prioritise, Increase, Develop) framework for learning recovery includes the following actions:

- Reach every child and retain them in school;
- Assess learning levels;
- Prioritise fundamentals;
- Increase catch-up;
- Develop psychosocial health and well-being (UNESCO/ UNICEF/World Bank, 2022).

UNESCO offers generalised tools to compensate for learning losses. These include the following: consolidating curriculum; extending instructional time; improving the efficiency of learning (targeted instruction, structured pedagogy programs, small-group tutoring programs, self-guided learning programs) (UNESCO/ UNICEF/World Bank, 2021).

It is obvious that the framework mechanisms proposed by the international community should be adapted to Ukrainian realities. The work of scholars at the Institute of Pedagogy proves that the key principles that should determine the mechanisms/programmes for minimising and catching up with pupils' learning losses should be:

- Child-centred approach: the catch-up programmes should be appropriate to the age and personal needs of the students;
- Safe educational environment, which should be physically and emotionally safe and child-friendly;
- Integration of academic subjects to ensure the implementation of state standards aimed at the formation of key competences;
- Support for teachers in terms of security, psychological assistance, and professional development, taking into account martial law;

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- Taking into account regional and local peculiarities: the location of the educational institution in the frontline area, in the occupied territory, in a relatively safe region and the financial situation of the community.

CONCLUSIONS

Thus, the full-scale war of the Russian Federation against Ukraine after 24 February 2022 has actualised the development of the national concept of learning losses, in particular, the war times learning losses. Obviously, the experience gained by international organisations and foreign countries in the context of the COVID-19 pandemic is valuable for Ukraine. At the same time, the factors that cause the suspension of the educational process and the work of schools in wartime are of a completely different nature. These include air raids that interrupt the educational process, bombings and shelling that damage school equipment and school buildings, loss of teachers due to death, travel abroad and a decrease in their professional level due to psychological trauma and lack of martial law skills, instability/absence of the Internet for distance learning due to the destruction of critical infrastructure after bombings, etc.

The multidimensional nature of the terminology is obvious. Learning loss is seen as a component and result of educational loss.

Given the complexity of educational losses in war times, it is important to think about a holistic national strategy that would offer multiple and flexible mechanisms for compensating and overcoming them. Adjustment of the duration of the school year (continuation of the full educational process in June for the entire educational institution or for individual classes or study groups, in certain subjects, etc.); development and implementation of programmes to catch up and correct learning losses (short-term additional specialised curricula (electives, elective courses, individual classes) for students of certain categories, implemented simultaneously with the traditional educational process); accelerated learning programmes, etc. Adaptability to a rapidly changing context and openness to change should be the key guideline.

Although the state plays a leading role in compensating for learning losses by providing appropriate socio-economic, material and technical conditions for quality education, all participants in the educational process, i.e. students, teachers, heads of educational institutions and parents must make their contribution. Therefore, the full restoration and development of education in Ukraine depends on their motivation and positive emotional and value perception, as well as cooperation between educational institutions and the community. Work, cohesion and faith will ensure Ukraine's victory!

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