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MONITORING RESEARCH COMPETENCIES OF STUDENTS AS A COMPONENT OF OVERCOMING EDUCATIONAL LOSSES

A The article substantiates the relevance of monitoring the educational losses of students of general secondary education institutions to find ways to improve the quality of students' knowledge. Based on the analysis of current regulatory documents, the components of students' research competencies, which are consistent with their key competencies, were selected. The peculiarities of diagnosing educational losses of students based on test tasks developed by the MriyDiy Educational Foundation as part of a project by the United Nations Children's Fund are considered. Based on the online panel discussion of the participants of the educational process, suggestions on ways to increase the level of development of research competencies of schoolchildren were analyzed. According to the results of the online discussion with teachers, it was established that among the directions of overcoming educational losses, the administration of educational institutions determines the renewal of the material and technical base: the use of modern electronic boards, digital equipment, and STEM laboratories. Among the directions of overcoming educational losses identified by teachers, the following are highlighted: the creation of individual study plans, which are determined by different learning rates and the peculiarities of information perception; and differentiating tasks so that everyone can work at their own pace and succeed. In general, students' parents consider their children's work on homework to be effective; stimulating the child's reading and cognitive activity; and strengthening communication between the school and the family by holding regular parent meetings, where issues of education, upbringing, and development of children are discussed. It is noted that the following ways of overcoming educational losses are effective for students: an individual approach to learning by adapting to their pace and learning styles; strengthening the practical component of education through work on projects that allow them to combine knowledge from various subjects, conducting experiments and engaging in research.

Keywords: educational losses; research competencies; monitoring; general secondary education institution

МОНІТОРИНГ ДОСЛІДНИЦЬКИХ КОМПЕТЕНТНОСТЕЙ УЧНІВ ЯК СКЛАДНИК ПОДОЛАННЯ ОСВІТНІХ ВТРАТ

С Обґрунтовано актуальність моніторингу освітніх втрат учнів закладів загальної середньої освіти з метою знаходження шляхів підвищення якості знань школярів. На основі аналізу чинних нормативних документів обрано складники дослідницьких компетентностей учнів, які узгоджуються з їхніми ключовими компетентностями.

Розглянуто особливості діагностування освітніх втрат учнів 1–4-х і 5–9-х класів на основі тестових завдань, розроблених Освітньою Фундацією MriyDiy у рамках проєкту від Дитячого фонду ООН (ЮНІСЕФ).

На основі панельної онлайн-дискусії учасників освітнього процесу проаналізовано пропозиції щодо напрямів підвищення рівня сформованості дослідницьких компетентностей школярів.

Ключові слова: освітні втрати; дослідницькі компетентності; моніторинг; заклад загальної середньої освіти

Relevance of the problem in general and its connection with practical assignments. The problem of overcoming educational losses, caused by the COVID-19 pandemic and martial law, is relevant in today's conditions for secondary schools. Limiting education seekers' access to the offline form of education has affected the quality of students' knowledge, skills, and abilities, which is revealed by the surveys of educational process participants and the cross-sections of knowledge, carried out by secondary school in accordance with annual work plans.

Analysis of previous research and publications. Studying the issue of overcoming educational losses is not new. For example, according to the studies of O. Topuzov, M. Golovko, O. Lokshina [8, p. 7], the mentioned issue affects the prospects of economic development of the society, which involves providing the labor market with highly qualified specialists in the future, especially in the conditions of the post-war reconstruction of the country. We agree with the opinion of Yu. Nazarenko [5, p. 4] that determining the level of educational losses is directly related to education standards – the State Standard of Primary Education, approved by the Resolution of the Cabinet of Ministers of Ukraine, dated 21.02.2018 No. 87 [3], the State Standard of Basic Secondary Education, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.09.2020 No. 898 [1]. In accordance with the specified regulatory documents [1; 2] the purpose of teaching secondary school students is the development of their key competencies. Among the most important, within the scope of our research, are the following: mathematical competence, which allows modelling processes with the application of mathematical knowledge; competences in the field of natural sciences, engineering and technology, aimed at the practical application of the ability to explore the surrounding world; information and communication competence, demonstrating the digital literacy of students; entrepreneurship and financial literacy, reflecting the developed skills to implement innovative ideas in practical activities. These competencies are the components of students' research competencies, which are important in the context of the New Ukrainian School (NUS) formation, according to the concept of which a graduate of secondary school is an innovator, who is capable of changing the surrounding world, developing the economy according to the principle of sustainable development, competing in the labor market and learning throughout life [6, p. 6]. Therefore, comparing students' competencies with the expected results, defined in current regulatory documents [1; 2], in order to identify educational losses, is a relevant issue today, which requires the use of an effective scientific and methodological monitoring toolkit.

Highlighting previously unresolved parts of the general problem which the indicated article is devoted to. There are modern diagnostics among the individual types of tools and methods for the secondary school students' educational losses, based on the usage of test assignments, mainly in mathematics (fig. 1) and the Ukrainian language (fig. 2) for 1–4 and 5–9 years' students (input and output diagnostics), developed by the team of the MriyDiy Educational Foundation as a part of the project from the United Nations Children's Fund (UNICEF) [7].

It should be noted that in accordance with the conditions of participation of secondary schools in the All-Ukrainian MriyDiy project, in order to overcome educational losses, 1–4 and 5–9 years' students are involved not only in extracurricular classes in mathematics and the Ukrainian language, but also in project management classes. However, based on the results of cooperation with the MriyDiy Educational Foundation team, it was found that, unlike mathematics and Ukrainian language, the usage of students' input and output testing is not provided for the teaching of project management. Among the reasons for the lack of appropriate monitoring of students' competencies, we see:

- 1) project management is not included as a separate academic discipline in the 1–4 and 5–9 years curricula;
- 2) there is a lack of diagnostics which not only determine the levels of students' research competencies development, but also meet the requirements for students' knowledge, skills and abilities, defined by the Standard Educational Programs for grades 1-4 and the model educational programs for grades 5–9;
- 3) disregarding the opinions of practicing teachers, the secondary school administration, parents and students on ways to overcome educational losses in current conditions (martial law) - a combination of offline and online students' education.

Formulating of the objectives of the article. The purpose of the research is to determine the peculiarities of monitoring of the 1–4 and 5–9 years' students' research competencies, based on the identification of directions for overcoming educational losses, specified by the General Educational Standard.

Presentation of the main research material. To achieve the defined aim, we will analyze the proposals of the administration of Odesa Lyceum 85 and Chernihiv Gymnasium 35, which were considered online during a panel discussion (fig. 3) as for the directions for overcoming educational losses, because the peculiarities of education under martial law have a direct impact, in their opinion, on the choice of tools for diagnosing students' research competencies.



1. Виконай обчислення виразів. Обведи найбільше число – відповідь.

$$43 + 25 = \underline{\hspace{1cm}}$$

$$30 + 59 = \underline{\hspace{1cm}}$$

$$87 - 54 = \underline{\hspace{1cm}}$$

$$59 - 42 = \underline{\hspace{1cm}}$$



2. Виконай порівняння іменованих чисел.

$$30 \text{ см} \square 4 \text{ дм}$$

$$70 \text{ см} \square 7 \text{ дм}$$

$$2 \text{ м} \square 18 \text{ дм}$$

$$12 \text{ см} \square 1 \text{ дм}$$



3. Розв'яжи задачу, попередньо склавши скорочений запис до неї.

Купили 4 пакети яблук, по 3 кг в кожному, і 2 пакети мандаринів, по 2 кг в кожному. Скільки всього кілограмів яблук і мандаринів купили?

Fig.1. Fragment of a math test assignment for 3-year students (input diagnostics)



І рівень

Завдання 1-12 мають чотири варіанти відповіді, серед яких лише один правильний. Обери правильний, на твою думку, варіант відповіді. Кожна правильна відповідь оцінюється в 1 бал. Тобто всього ти можеш отримати 12 балів за завдання першого рівня.

1. Усі слова вжито в переносному значенні в рядку:

- А м'який характер, срібна ложка
- Б золоте серце, гостре слово
- В світлий розум, крутий спуск
- Г залізна леді, важка валіза

2. У якому рядку всі слова НЕ є синонімами?

- А різнокольоровий, квітчастий, барвистий
- Б унікальний, неперевершений, винятковий
- В вада, хиба, дефект
- Г оригінальний, справжній, сучасний

3. Літеру «и» пишемо на місці пропуску в обох словах рядка:

- А ч..збургер, т..рамісу
- Б д..алог, ч..пси
- В пр..оритет, ч..зкейк
- Г ген..ально, д..зель

Fig. 2. Fragment of a test assignment in Ukrainian for 6-year students (input diagnostics)

REASON that led to the educational losses	Proposals for solving the problem		
	Country	Administration	Educational process participants
Martial law in the country	The victory	Creating safe conditions according to the available possibilities	Unity, support, together to victory
State social support of the education sector	Revision of salaries, support of young teachers	Attracting additional funds through grant programs	Changes in the mode of the educational process (if it is possible), reduction of the distance format in the educational process
Material and technical base	Adequate funding and updating of the material and technical base	Timely submission of requests to education authorities and cooperation with charitable foundations	Return to a paper diary for organizing students' independent activities, especially considering the limitations of using the Internet resource
Decreased motivation of all educational process participants	1. Increasing the number of psychologists and their involvement in schools 2. Raising the status of teachers in society 3. Revising the parental responsibility regarding their children's attitude to education, implementing the rules of conduct at school at the legislative level	Increasing forms of moral encouragement for the educational process participants (awards, effective implementation of the "TOGETHER TO VICTORY" program)	Creation of creative groups to develop local projects within the general "TOGETHER TO VICTORY" with subsequent testing and approval by the council

Fig. 3. Results of the management/expert group members' panel discussion

According to the results, obtained from the results of the online discussion, it was established that among the directions for overcoming educational losses, the secondary school administration identifies the following: updating the material and technical base (the usage of modern electronic boards, digital equipment, STEM laboratories, etc.); increasing the level of students' independence when they perform practical tasks; determining a rational correlation between teaching students online and offline. The indicated directions of overcoming educational losses are directly related to the following components of students' research competencies: the ability to use modern measuring devices, independently recognize and solve practical problems, related to real life; if it is necessary, use modern electronic educational resources to conduct research. Accordingly, as *the first feature of monitoring* students' research competencies, we choose to involve students in solving research tasks of a practical nature, which involve the usage of modern equipment, including digital measuring devices, which is described in more detail in our publication [3, p. 51–58].

Let's analyze the results of Odessa Lyceum 85 and Chernihiv Gymnasium 35 teachers' online panel discussion on the directions of overcoming educational losses (fig. 4).

According to the results, obtained from the online discussion, it was determined that teachers identify the following ways for overcoming educational losses: creating individual curricula, which are caused by different learning rates and characteristics of information perception; differentiation of assignments so that everyone could work at their own pace and achieve success; the

usage of adaptive technologies that allow creating interactive assignments, which are automatically adjusted to the students' level of knowledge; involving parents in the educational process by inviting them to lessons, joint projects, parent universities; individual consultations for students who have difficulties while adapting to learning or have emotional problems; organization of trainings to develop students' communication skills, stress resistance, and self-esteem. According to teachers, a comprehensive approach to overcoming educational losses, which includes all the listed directions, will allow to provide effective support for each student and create conditions for their successful learning. The indicated directions for overcoming educational losses reflect the formation of the following components of students' research competencies: offering solutions for solving technical, design or everyday problems; studying objects or phenomena, based on independently developed research models.

Accordingly, as *the second feature of monitoring* students' research competencies, we define the selection of components of students' research competencies, which can be "measured" in order to determine the level of their formation both for all students in the class and for those who are involved in inclusive education, which is described in more detail in our publication [9, p. 1–16].

Parents, as active participants of the educational process, play an important role in overcoming their children's educational losses. Their observations and suggestions could significantly enrich school strategies.

REASON that led to the educational losses	Proposals for solving the problem		
	Country	Administration	Educational process participants
Online education	Providing technical teaching aids for all participants in the educational process, the availability of stable communication, Internet connection	To observe and provide assistance in solving various issues, systematic work aimed at creating a favorable environment	Parental support - involvement in the educational process, monitoring the educational process and preparing for the lesson; Consultations for parents
Martial law (the psychological condition of educational process participants)	Increasing shelters	Creating of a psychological microclimate in the collective	Providing psychological support. Creating conditions for emotional recovery
Burnout and overwork of the teacher	Salary increase	Conducting trainings on various issues	Cooperation of students and parents with teachers
Difficulty of adaptation to new realities of the educational process	Returning to offline form of education Number of children in classes	Information companies, cooperation with other organizations, trainings, dissemination of information among students, parents	Individual and group consultations for students. More creative tasks. Multi-level tasks. Repetition of the material in a game form

Fig. 4. Results of the teachers' panel discussion

According to the results, obtained from the online discussion, it was established that parents identified the following ways of overcoming educational losses:

- working together on homework; stimulating the child's reading and cognitive activity;
- strengthening communication between school and family by holding regular parents' meetings, at which issues of children's education, upbringing and development were discussed;

- expanding opportunities for individual learning by conducting additional classes in individual subjects for students who had learning difficulties, engaging children in online platforms for self-study and repeating the material, and providing students with the opportunity to receive individual consultations from teachers;
- supporting the child's psychological health by creating an atmosphere of trust and support in the family (fig. 5):

REASON that led to the educational losses	Proposals for solving the problem		
	Country	Administration	Educational process participants
Stress and Anxiety Adjustment Difficulties	Increasing the number of full-time psychologists	Creation of safe conditions for learning Conducting trainings, introducing art therapy tasks into the educational process Students	Students Active participation in learning. Asking questions: Not be afraid to express their thoughts and ask questions if something is unclear. Participating in discussions: Actively discuss educational material, express your point of view. Doing homework: Do homework regularly and check it for correctness.
Unstable internet connection Difficulty in organizing independent work	To develop effective strategies for overcoming educational losses.	Creation of locations in the educational institution, which are provided with Internet due to backup power sources.	Parents Creating a supportive learning environment at home Support of child's motivation Overcoming lack of attention
Overload with educational programs	Optimizing the directions of secondary schools	Consider the peculiarities of each student and provide him with the necessary support.	Teachers Development of individual educational plans psychological support

Fig. 5. Results of the parents' panel discussion

It should be noted that individual mastery of educational material through the usage of modern learning tools (electronic educational resources, technologies of full or partial immersion in the virtual world) is most relevant for participants of the educational process, which is described in more detail in our publication [10].

That is why it is important to understand that overcoming educational losses is a joint effort of the school, family and students themselves. Parents can make a significant contribution to this process by providing children with the necessary support and creating favorable conditions for learning. Accordingly, the indicated directions of overcoming educational losses involve the formation of the following components of students' research competencies: comparison, analysis, synthesis of information on the topic of research (also based on electronic educational resources); the usage of additional literature to formulate conclusions (including from the Internet); the independent choice of the topics of research.

Hence, *the third feature of monitoring* students' research competencies is the evaluation of the level of formation of

research competencies both by the students themselves (self-assessment) and by teaching staff, which is described in more detail in our publication [4, p. 185–187].

According to the results of the online discussion, the students of the mentioned secondary schools identified the following key directions for overcoming educational losses:

- an individual approach to teaching by adapting to their own pace and learning styles;
- strengthening the practical component of teaching through the work on projects which allow combining knowledge from different subjects, conducting experiments and research;
- increasing the number of interesting and creative assignments with the usage of games and quests for material consolidation, writing stories, creating presentations, drawing; improving the emotional state through the importance of creating a favorable psychological atmosphere in the educational institution;
- encouraging cooperation and mutual assistance; through informing parents about the child's achievements and difficulties, organizing joint events for parents and children (fig. 6):

REASON that led to the educational losses	Proposals for solving the problem		
	Country	Administration	Educational process participants
Online education	To provide only offline form of education	Observation	Motivation, goal achievement
Excessive education standards	Priority of topics	To provide the list of requirements	Peer interaction
Martial law	The victory	Support, loyal attitude to students	Volunteering

Fig. 6. Results of the students' panel discussion

Therefore, students accept the educational institution as a place where they are able to develop as individuals, acquire knowledge and skills, which are necessary for a successful life. To do this, it is important to create a favorable learning environment that takes into consideration the individual needs of each student. Accordingly, the indicated directions of overcoming educational losses provide for the formation of the following components of students' research competencies: the usage of Internet resources for solving practical tasks; participation in project activities individually and in groups; demonstration of a creative approach to problem solving research; exchange of research hypotheses with group members (including through the usage of online services and tools).

Thus, as *the fourth feature of monitoring* students' research competencies, we choose the determining the level of development of students' research competencies at different stages of their education with the aim of constant adjustment and monitoring the dynamics.

Conclusions of this research. The interaction of the educational process participants, based on a panel discussion,

dedicated to overcoming educational losses, made it possible to identify a number of important aspects, which required attention and systematic solutions, and to determine the features of monitoring students' research competencies: involving students in solving research practical tasks; choosing components of research competencies that can be "measured"; assessing their level of development; determining the level of formation of students' cognitive development at different stages of their education.

Prospects for further exploration. Overcoming educational losses is a complex and multifaceted task that requires the joint efforts of all participants of the educational process. Monitoring students' research competencies as a component of overcoming educational losses is an important diagnostic tool which will allow determining the effectiveness of teaching students during their involvement in project management. Accordingly, the identification of the components of students' research competencies and their "measurement" requires subsequent studies.

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