Formation of a system of sustainable education for the young generation of the Republic of Belarus: necessity and practical implementation

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Abstract. The well-being of an individual, his family and society as a whole is determined by their ability to manage resources and follow the principles of sustainable development. For this, it is necessary to have an appropriate knowledge base, which can be formed only when developing a unified approach, i.e. the development of a sustainable education system. Sustainable education involves three-way education: economic (financial), social and environmental. Within the framework of this work, the necessity of creating a unified sustainable education concept for the younger generation in the Republic of Belarus is assessed, and its practical implementation is proposed through the development of the Trinity mobile application for educational institutions. The Trinity mobile application will allow organizing the educational process and optimizing the work of all stakeholders (government, educational institutions, business, pupils, students) in the field of sustainable development through a single environment of knowledge and achievements.

1 Introduction

The concept of "sustainability" arose in the 1970s and 1980s in response to the awareness of global development problems, limited natural resources and environmental disasters. Then, along with the term "sustainability", the term "sustainable development" began to be actively used.

The definition of sustainable development as a separate economic category was proposed by the International Commission on Environment and Development in 1989, where it was noted that it is a development that meets the needs of the current generation, but does not jeopardize the ability of future generations to meet their own needs [1].

In 2015, the UN General Assembly developed the Sustainable Development Goals, which includes 17 goals and 169 specific targets. Their implementation was to be completed by 2030, and for this purpose the Agenda for the period up to 2030 was approved. These Goals came into force in 2015 and led to a change in economic growth patterns in the countries that adopted them. They are an integral part of understanding the concept of sustainability and are necessary to assess progress in this area [2].

Each of the Goals is an integral goal of sustainability, having a balanced development of

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each element the opportunity to get a functioning ecosystem of sustainable development.

However, the presented goals can be ranked according to the priority stages of their implementation. Consequently, the achievement of the Goals that fall into the first group is the foundation for the formation of overall sustainability (Figure 1).
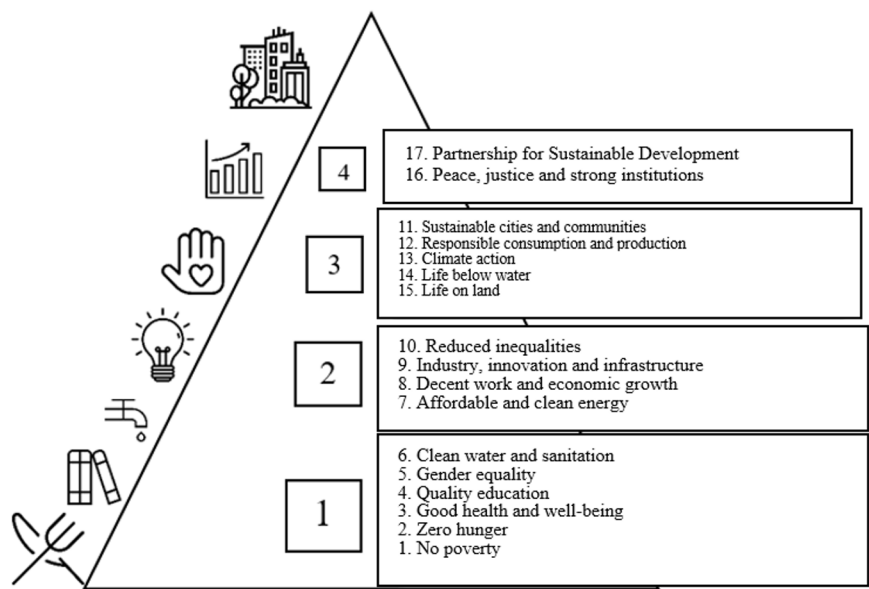

Fig. 1. The Sustainability Pyramid. Source: compiled by the authors based on [2].

At the first stage of the implementation of the Goals, the basis of the well-being of the entire world society is presented. One of these goals is quality education (Goal number 4).

Affordable and high-quality education for all formed the basis of a new concept of world education, which recognizes the crucial role of education as the main driving force for the development of global society, and which is a condition for achieving the other 16 Sustainable Development Goals.

The introduction of education as the fourth special Goal is connected with the crisis in the global education system, which received an additional impetus from the coronavirus pandemic in the period from 2019 to 2022. The previous problems in the global educational system were already profound: 617 million children did not have reading and writing skills due to lack of access to education. Currently, every fifth child between the ages of 6 and 17 does not attend school, and every third primary school student does not receive a full-fledged subject education, as indicated in the report of the UN Commission on Education. Also, about 750 million adults in the world are illiterate. Due to restrictive measures taken by the Governments of many countries, 147 million schoolchildren missed more than half of the school year and did not receive full-time classes. According to UN estimates, 24 million of them will not return to school [3].

Currently, there is an international set of documents that serves as a basis for the development of education in the context of sustainable development, and which educational institutions focus on in their activities. Among these documents, the following can be distinguished:

a) World Declaration on Higher Education for the Twenty-first Century: Vision and Action;

b) Draft international action plan for the Decade of Education, developed by the UN International Commission on Sustainable Development;

c) The outcome document of the UN Conference on Sustainable Development held in Rio de Janeiro in 2012 entitled "The Future We Want" [4].

These documents represent important guidelines for educational institutions that seek to integrate the principles and goals of sustainable development into their educational practices and programs, which led to the emergence of the concept of "sustainable education".

2 Materials and Methods

Sustainable development issues are raised at all levels of the world community, discussed at international assemblies and are the main topics at conferences around the world. Many scientific papers have been written on this topic, and the main principles and fundamentals are discussed at the level of national governments.

However, only the community in which it is created can create a balance of sustainable development of the entire world space. This indicates the need to teach each individual the principles and methods of sustainable development, i.e. the creation of a system of sustainable education.

Sustainable education is an approach to learning that seeks to develop in students the knowledge, skills and values necessary to understand and solve the problems of sustainable development. This approach to education causes a lot of discussions and scientific research [5, 6, 7, 8, 9].

Sustainable education involves three-way development: economic (financial), social and environmental. A lot of attention is paid to individual issues of sustainable development, but there is no comprehensive teaching methodology. All this indicates the need to implement a project to work with the younger generation in the field of sustainable development.

In the Republic of Belarus, the issues of sustainable education still have the status of discussion, and the development of a unified system for different age groups of the population, including pupils and students, is theoretical in nature.

Sustainable education is becoming important in the modern world, because it affects aspects necessary for the formation of a full-fledged society:

1) Development of sustainable thinking: Sustainable education helps people develop the ability to consider problems and solutions taking into account their impact on the environment, social aspects and economic sustainability.

2) Social justice: Sustainable education is designed to make education more accessible and evenly distributed.

3) Environmental conservation: Sustainable education teaches respect for nature and the application of more environmentally sustainable approaches in life and work.

Therefore, scaling up the importance of the concept of sustainable development is the way to balance the ecosystem of society, which is possible when forming a sustainable educational system through educational institutions that will convey the importance of observing the principles of sustainable development to the younger generation.

Educational institutions play a key role in the formation of values among young people. The introduction of sustainable principles into curricula will help students develop an understanding of the importance of sustainability and its impact on the world around them.

Thus, sustainable education in educational institutions will create a holistic educational ecosystem that will cover different levels of education. This will make it possible to create a consistent line of study, starting from elementary grades and ending with higher education, which will contribute to an in-depth understanding and assimilation of sustainable principles.

It should be noted that the quality of education is influenced by the methods of the chosen training.

The teaching method is a way of interaction between a teacher / educator and pupils / students, as a result of which the transfer and assimilation of knowledge, skills and abilities

provided for by the content of the training takes place.

Modern teaching methods are based on the following principles:

– emphasis on the development of skills and competencies, not on the assimilation of information;

– individualization of training;

– the use of information technology.

Special attention should be paid to such a method of modern learning as games. Role-playing and business games are often mentioned as effective teaching methods. Role-playing games are learning from their own experience with the help of modeled situations in a certain way, which means that in the process of learning, students take on certain roles, and the teacher comes up with a game situation, plot and controls the game process. Business games, in turn, are a combination of case analysis and role-playing games – this is a simulated professional situation in which participants who have accepted certain professional roles must find a solution to the problem. Both methods differ in real efficiency and are part of such a concept as gamification [10].

Gamification is the process of introducing game elements into non-game situations. In the context of education, gamification is used to increase the motivation of students, involve them in the learning process and create a more exciting and effective learning environment.

Gamification can be implemented using:

– score and levels system;

– motivation and reward systems;

– competitive elements;

– game mechanic.

To date, these methods are best used in the context of the implementation of gamification processes. This is possible through the creation of various kinds of educational mobile games. Mobile games as a learning tool have a number of advantages, namely: increase student motivation; improve student engagement; create a more exciting learning environment; increase learning efficiency.

Thus, to create a unified system of sustainable education, a unified approach using modern teaching methods is needed.

3 Findings and Discussion

The most innovative ways of informing and educating the younger generation are the use of information technologies, in particular mobile applications, because they have become an integral part of the life of a modern person. Creating an educational mobile application in the form of a game can help you gain basic knowledge on sustainable development in a playful and competitive way.

In order to form a unified sustainable education system for the younger generation of the Republic of Belarus, it is proposed to implement a project to develop a Trinity mobile application for unified education of pupils and students within the framework of the implementation of the concept of sustainable development in the Republic of Belarus.

Objectives of this project:

- to form knowledge about the concept of sustainable development among the younger generation of the country;

- to develop the concept of unified learning using modern tools;

- to create a sustainable development community among the younger generation of the country.

The Trinity mobile application will allow to unite (rally) into a common work all stakeholders in the country interested in the sustainable development of society (the

government of the country as the main customer; educational structures as performers; business as the customer and organizer of individual application blocks; children and youth as the main moving force of the project).

The use of the application will be carried out in additional lessons on sustainable development in schools and on curatorial hours. Conducting hours of sustainable development will be delegated to classroom teachers and curators of groups.

In the Trinity mobile application, gamification will be introduced within each block, communication will be provided, the opportunity to share experiences not only among their classmates and coursemates, but also all participants. In addition, a quarterly demonstration of their success will be held among all users, ratings will be compiled and winners will be awarded.

The mobile application has the following functionality:
– entertainment and educational in the field of economic sustainability;
– entertainment and educational in the field of social sustainability;
– entertainment and educational in the field of environmental sustainability;
– user cabinet of pupils and students;
– user cabinet of curators.

Thus, this software is intended for pupils and students of schools, technical schools, lyceums, universities and other educational institutions of the country.

At the moment, a project outline has already been created, exclusively by the authors of the article, now the process of creating an MVP (minimum viable product) is underway.

The following programming languages and development environments were selected for the development of the mobile application:

– Unity is a cross-platform game development environment that allows to create 2D and 3D applications for many platforms. It includes a graphic editor, C# and JavaScript programming languages, as well as tools for working with animation and physics.

– C# is a powerful object-oriented programming language used to create mobile applications on iOS, Android and Windows platforms. It has extensive capabilities, such as multithreading, working with databases and much more.

– Realtime Database Firebase is a real-time cloud database that allows to store and synchronize data between different devices and platforms. This means that any changes to the data in the Firebase database will be automatically displayed on all connected devices without the need to update the page or application. The Firebase database can be used to store various types of data, such as text messages, images, audio and video files, as well as to create real-time applications such as chats, online games and others.

Unity is one of the most popular and powerful cross-platform game development environments in the gaming industry:

– Cross-platform: Unity supports the creation of games for a wide range of platforms, including iOS, Android, Windows, Mac, Linux, Xbox, PlayStation and many others. This allows developers to create games for more users and expand their potential market.

– Ease of use: Unity has an intuitive user interface that makes it accessible to novice developers. In addition, it supports programming languages such as C# and JavaScript, which allows programmers to use technologies with which they are already familiar.

– Large community: Unity has a large community of developers and users who can help each other with problems and share their knowledge and experience. This community also provides many free resources such as training aids, video tutorials, scripts and more.

– Rapid prototyping: Unity allows developers to quickly prototype games, which simplifies testing and debugging.

– Built-in tools: Unity includes many tools for creating games, such as an animation editor, particle system, physics system and many others. These tools simplify the game creation process and allow developers to create high-quality games.

– Many plugins: Unity has a huge number of plugins and add-ons that allow developers to expand the functionality of the program and add new features to games.

In general, Unity offers developers all the tools and resources necessary to create high-quality games on various platforms. Its cross-platform nature, ease of use, large community of programmers and many built-in tools make it one of the best choices for game development.

The software product under development involves the use of a database where question pools, quizzes and tasks in three blocks, the results of their implementation and the ratings of participants will be stored.

Thus, the Trinity is an educational mobile application that will provide an opportunity to spread the ideas of the concept of sustainable development in a game format, aimed at representatives of the younger generation, but with the possibility of adaptation for absolutely all age groups.

4 Conclusions

The formation of a unified system of sustainable education is a necessity of the modern world, because to implement the concept of Sustainable Development, it is advisable to create a knowledge base for society and offer innovative ways of informing and teaching. Within the framework of this work, emphasis is placed on the younger generation and the importance of developing a unified system of sustainable education in the Republic of Belarus is substantiated. The practical implementation of the project consists in the development of a Trinity mobile application for teaching pupils and students in order to promote among them the ideas declared within the framework of the concept of Sustainable Development. The project participants are all interested stakeholders: the state, educational institutions, business, pupils, students. All school educational institutions, higher educational institutions, vocational and technical educational institutions and others operating on the territory of the Republic of Belarus will be able to participate in the project.

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