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Planning for Sustainable Development through the Integration of Pedagogical and Psychological Technologies for Language Learning in the Context of Digitalization

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ABSTRACT

The main purpose of the article is to model the integration of advanced education into strategic planning for the sustainable development of a particular region with pedagogical optimizations. The object of the research is the system of sustainable development of one the region and they education system. The modern methodology of modeling was applied to achieve the set goal. A basic integrated model of the introduction advanced education into the system of sustainable development of a single region was formed. Each of its stages and processes is detailed. Additional integrated models have been developed to characterize each stage of ensuring sustainable development with modern technologies of advanced education. The results of the study made it possible to ensure the sustainable development of education in the region through the proposed stages and processes according to the model. Further research should be devoted to the analysis of the results obtained as a result of the integration of advanced education for its improvement.

1. INTRODUCTION

Sustainable development is systematically managed development. The basis of its manageability is a systematic approach and modern information technologies that allow you to quickly simulate various options for development directions, predict their results with high accuracy, and choose the best one.

Education for sustainable development is becoming a process of learning how to make the decisions necessary to ensure the long-term future of the economy, ecology, and social justice. One of the main levers of sustainable development has been and is environmental science and education, which is a tool for greening human activity, improving production, and environmental management, taking into account the capabilities of the biosphere. A high level of environmental knowledge and science today is the main factor in improving the quality and safety of life, and preserving and renewing the potential of nature. The innovative potential of environmental science and education is a strategic resource for all companies, countries, and transnational companies. Identification and effective implementation of the potential of environmental science is the key to the environmentally safe development of any country. Thus, we mean that it is education that plays one of the key roles in the sustainable development of the entire region. That is, the idea is that by improving the educational process, it is possible to make sustainable development possible.

It is expedient to determine the main goal of advanced education to promote the formation of a comprehensively educated, socially active person who understands new phenomena and processes of social life, has a system of views, ideological and moral principles, and norms of behavior that ensure readiness for socially responsible activities and continuous education in a rapidly changing world. Combining advanced education with a sustainable development strategy involves the formation of appropriate life strategies and behavior patterns of the individual, focusing on high-quality and effective forms of building the future. Proactive education for sustainable development is seen as a process of learning how to make the decisions necessary to ensure the long-term future of the economy, ecology, and social justice. The development of thinking focused on a sustainable future and the corresponding life-meaning values and priorities is the key task of education in the 21st century. So, the concept of advanced education for sustainable development involves the creation of conditions for education to perform the functions of a leading factor in social change, the integration of the principles, values, and practices of sustainable development into all aspects of education and upbringing.

Proactive education requires the transfer of the educational process to a technological level, by choosing individual learning routes. Especially productive among them are personality-oriented pedagogical technologies. Their effectiveness depends on the extent to which the life potential of the student is realized, and how his age and individual psychological characteristics are taken into account.

The essence of the concept of advanced education for sustainable development is to restructure the educational

process at all levels of the education system in such a way that it becomes capable of timely preparing people for new conditions of existence, to give them such knowledge and skills that would allow them not only to successfully adapt in the new social and information environment but also to actively influence it in the interests of preserving and further harmonious development of human society.

The main purpose of the article is to model the integration of advanced education into strategic planning for the sustainable development of a particular region.

The structure of the study presented in the article includes a review of the literature, a description of the methodology, coverage of the main results of the study, a discussion of the results, the formation of conclusions, and prospects for further analysis.

As a result, according to the current structure of the article, all the tasks for each of its parts were achieved. Summarizing the results obtained, we presented in the maximum possible form, in our opinion, a description of what we achieved as a result.

2. LITERATURE REVIEW

Today, one of the main trends in the sustainable development of modern education is globalization. This process reflects the formation of a single social, informational, and educational space on a global scale, in particular, through the activities of the media, and Internet communication. An important element of the globalization of modern education is global education, that is, a set of certain forms and technologies of education focused on the dissemination of aspects of globalization in all spheres of public life. Its components are environmental education and upbringing, the development of tolerance and multiculturalism in the field of social science education, and the increase in the informatization of education. Education for sustainable development in a certain sense is a form of global education [1-3].

As noted by Wen et al. [4] and Lardjane et al. [5], in connection with the resource and economic crisis that is currently being experienced in most countries of the world, including Ukraine, and As well as the general deterioration in the health of the population and pollution of the natural environment, there was an urgent need to consider constancy as the main priority for the development of society, as well as all its spheres, among which education plays the role of a leading factor in building the value and worldview foundations of a sustainable development society. Today, the sustainable development strategy is the leading strategy for the further existence of the information (post-industrial) society. There is no reasonable alternative to sustainable development, and the entire world community is taking certain steps to switch to a new strategy for its sustainable development in the 21st century. This process can be accelerated by the formation and functioning of a new system of education – education for sustainable development.

According to Jiang et al. [6] and Tabucanon [7], today the main dimension of educational activity should be the formation of a person who can fully live and actively act in the new world, constantly improve himself, adequately respond to changes in the conditions of modern information. - technological revolution and civilizational breakthroughs. It is through education that it is necessary to educate a person who creates and perceives changes and innovations. We are talking about changes in technology, information, knowledge, and the circumstances of life. In order to prepare a person and society for an innovative type of life, it is necessary to reform education and make it innovative in nature.

Summarizing the opinion of scientists and information on scientific and practical literature [8-10], advanced education is aimed at the problems of the future post-industrial civilization, the development of human creative abilities, the formation of independent and creative thinking, the ability to make responsible decisions in difficult situations of uncertainty. The essence of this concept is to restructure the content and methodology of the educational process at all levels of the educational system in such a way that it becomes able to prepare a person for new conditions of existence in a timely manner, to give them such knowledge and skills that would allow them to successfully and effectively operate in the information, environment, as well as influence social processes in the name of preserving humanity and the natural environment.

The issue of organizing the right model for teaching the principles of sustainable development is described in the work of Lim et al. [11]. But it is worth noting that, despite the authors' comments about the complexity and versatility of this issue, in their work, all the advice and comments are presented in an unsystematized manner. In our opinion, in the context of solving this issue, the systematizing techniques and modeling processes that were used in our study play a key role.

As Ashford [12] as well as Steiner and Posh [13] note, the school of advanced education is aimed at achieving a new quality of education based on the mastery of the basic principles and ideas of sustainable development by the individual, the formation of core competencies that allow him to successfully integrate into society, be mobile and competitive, capable of self-organization of lifelong learning, self-realization, unlocking creative potential, making conscious life choices and making responsible decisions.

However, the main aspects of integrating advanced education into the system of sustainable development are new for many regions and require a new scientific and methodological approach. This updates our study.

3. METHODOLOGY

The modeling method will be the key method of the article. The model gives a holistic view of the operation of the system as a whole and allows you to understand the relationship between all its components. As a result of the analysis of the model, it may turn out that information processing and resource use are inefficient, important information does not reach the appropriate place, etc., therefore, the result of a critical assessment of the model should be the redirection of information flows and process improvements in the new model, which should be used to ensure the sustainable region of a single region.

One of the most famous and widely used methodologies in the field of process modeling is the methodologies of the IDEF family. The IDEF family appeared in the late 60s. XX century called SADT (Structured Analysis and Design Technique) It now includes the following standards. Using the methodology of the IDEF family, one can effectively reflect and analyze models for ensuring the sustainable development of a wide range of complex socio-economic systems. At present, the

IDEF0 and IDEF1 (IDEF1X) methodologies, which contain the status of federal standards in the USA, are the most widely used and used.

The sustainable development modeling standards provide only recommendations that define the requirements for models of organizations and their parts (domains). Users are forced to choose methods and language tools for modeling. When modeling, it is enough to use standardized IDEF methods and notations (IDEF0, IDEF1X, IDEF3 DFD) that cover the needs of modeling to create the most important representations of its model. It is expedient to use the methods supported by IDEF modeling automation environments as effective technologies for modeling sustainable development.

IDEF0 is a function modeling methodology. It is used to create a functional model that reflects the structure and functions of the socio-economic system, as well as information flows and material objects linking these functions.

IDEF0 can be used to model a wide class of socio-economic systems. For new systems, the use of IDEF0 is aimed at defining requirements and specifying functions for further development of a system that meets the requirements and implements the selected functions. In relation to already existing systems, IDEF0 can be used to analyze the functions performed by the system and display the mechanisms by which these functions are performed. The result of applying IDEF0 to a system is a model of that system, consisting of a hierarchically ordered set of diagrams, documentation text, and dictionaries linked to each other through cross-references. The two most important components from which IDEF0 diagrams are built are functions or activities (blocks) and data or objects (arcs) that connect activities and reflect the interactions and relationships between them.

Model development in IDEF0 is a step-by-step, iterative procedure. At each step of the iteration, the developer proposes a variant of the model, which is subjected to discussion, review, and subsequent editing, after which the cycle repeats. This organization of work contributes to the optimal use of the knowledge of a system analyst who has the IDEF0 methodology and technique, and the knowledge of specialists - experts in the subject area to which the modeling object belongs.

A functional representation (a model in terms of structure) is synthesized iteratively based on the analysis of all available information about a limited subject (domain). It is interrelated with other aspects of organization descriptions. The activity model in the IDEF0 notation (structures) answers the question: what are functions supposed to do and what entities they are connected by, what is the functionality of the activity system?

The synthesized functional model becomes dominant in relation to other representations since it determines the set of necessary interconnected functions (works). If available, it becomes clear what the socio-economic system (domain, limited subject) does as a whole, what components it contains, how its components are connected, and which system should be reflected in models of other aspects.

In our case, a certain region should be chosen as a separate socio-economic system and the proposed methodological approach should be applied to integrate advanced education into its sustainable development system. Such a region could be the Administrative region of Brittany, where some of the co-authors of the article live and work on sustainability projects.

According to the proposed methodology, we will form the key goal of the synthesized functional model for the Administrative region Brittany (Table 1).

Table 1. The main goal of the formation of a synthesized functional model of sustainable development

Characterization of the given modeling parameters
A0. Integration of advanced education in the system of sustainable development of the region A1+A2+A3+A4

All description of further actions of applying the methodical approach described here will be presented further in the text, in the form of the results of the study.

4. RESULTS OF RESEARCH

First of all, it is necessary to form a context diagram of achievement A0 «Integration of advanced education in the system of sustainable development of the region» (Figure 1).

Achievement A0 «Integration of advanced education in the system of sustainable development of the region» involves the following steps:

A1 - Introduction of advanced education in the region. The essence of advanced education lies not only in its focus on ensuring the sustainable development of the region, but also in its focus on the prospects for the development of industrial, scientific, technical, and technological spheres; in the need to ensure the accelerated sustainable development of the education system in comparison with other factors that determine the socio-economic, scientific, technical and cultural development of society. Advanced education plays a key role in the organization of language learning, given that this area of pedagogical science is complex and multicomponent, while advanced education will simplify this entire process.

A2 - Formation of a new high-quality specialist in the region. The main goal of advancing education is to form the implementation of such pedagogical mechanisms, in which a new high-quality specialist will be formed, characterized by such professional and personal qualities as systemic thinking; ability for independent activity and decision-making in conditions of uncertainty; the ability to effectively manage others; responsibility for the work done; information, communication, ecological, legal and linguistic culture.

A3 - Sustainable development of the social partnership. An important function of advanced education should be the function of mitigating social tension in the labor market. The implementation of this function is achieved through the resumption of social partnerships between educational institutions and enterprises and improving the quality of education. In the context of increasing competition in the labor market, the formation of a certain educational and qualification level through modern pedagogical mechanisms and the competent characteristics of graduates of educational institutions are the guarantor of their successful employment.

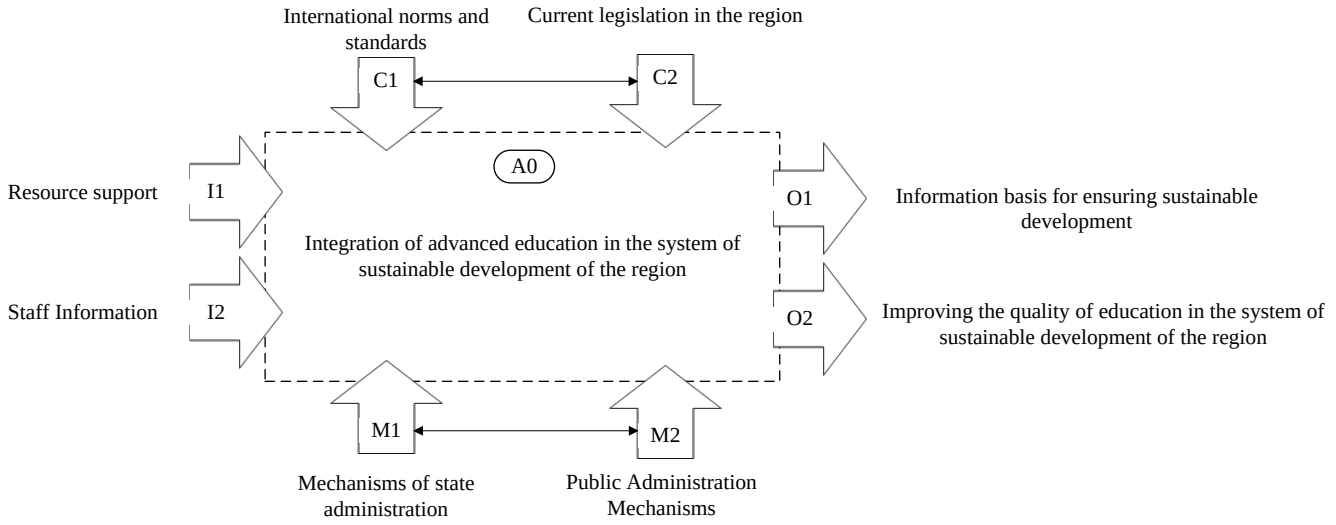

Figure 1. Context diagram of achievement A0 «Integration of advanced education in the system of sustainable development of the region»

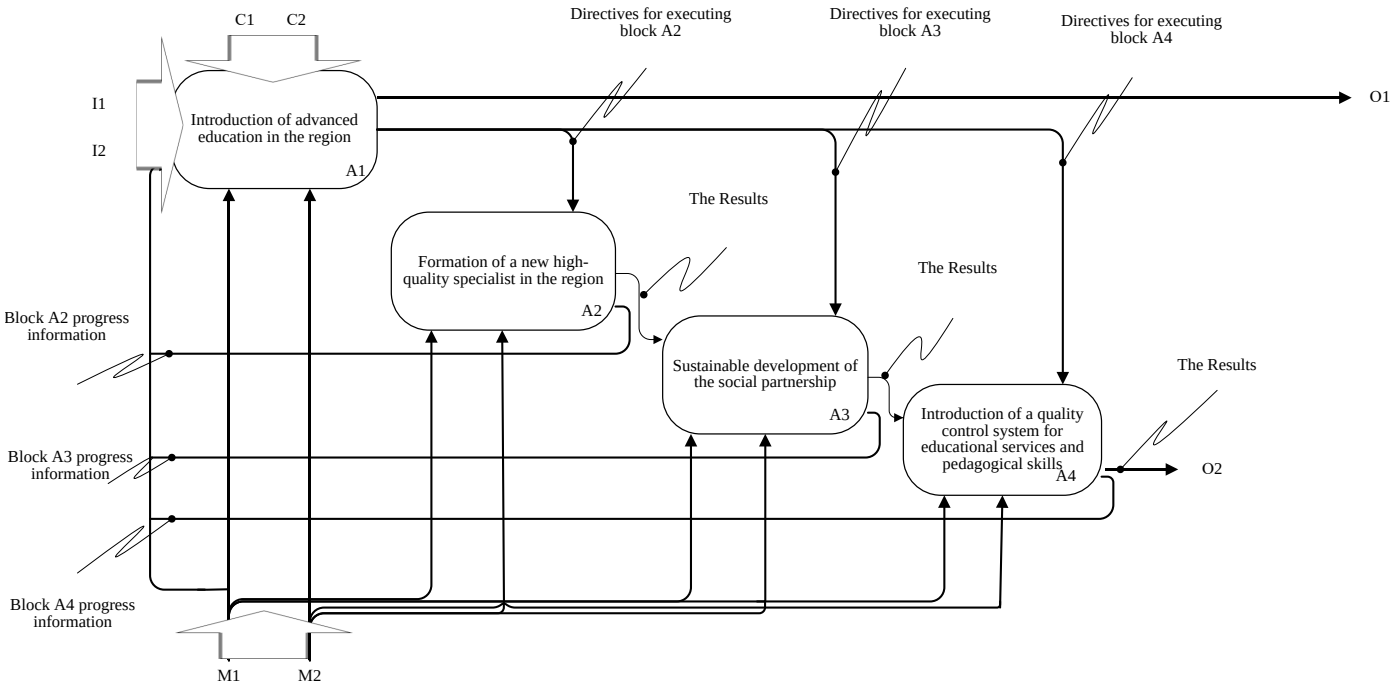

Figure 2. An integrated model for ensuring sustainable development of the region through the implementation of A0 «Integration of advanced education in the system of sustainable development of the region»

A4 - Introduction of a quality control system for educational services and pedagogical skills. The leading direction of improving the quality of education for sustainable development is the introduction of a quality control system for educational services based on a combination of external quality control of educational activities and its internal assessment by the educational institution itself. Today, external assessment of the quality of educational services is the prerogative of the state and is implemented through the mechanisms of attestation, accreditation, licensing, and educational standards. By exercising external control without involving representatives of industry, and potential employers, the state appears in the public mind as the only user of educational services. For the purpose of sustainable development of public control over the quality of educational services, it is advisable, along with the state assessment, to introduce an independent assessment conducted with the participation of employers and graduates. Internal assessment

of the quality of educational services at the level of an educational institution in the Administrative region Brittany should be aimed primarily at assessing the quality of the educational process (content, organization, and methodology of the educational process) (Figure 2).

To achieve A1 «Introduction of advanced education in the region», the following steps should be completed:

A11-Fundamentalization of education in the region. Translations of knowledge, characterized by the constancy of key concepts and theories to ongoing changes, have a low aging rate; focusing on the study of the fundamental laws of nature and society in their modern understanding. The fundamentalization of education should contribute to improving the quality of pedagogical training of personnel in educational institutions of all types through the formation of scientific forms of systemic thinking; high level of knowledge of languages; the priority of knowledge in the fields of cybernetics, synergetics and other branches of knowledge that arise at the intersection of sciences and form a worldview that harmoniously combines the achievements of the natural and human sciences; introduction of new training courses focused on the formation of a holistic and objective picture of the world.

A12- Openness of education in the region. The focus of the education system and theory is the sustainable development of the personality of students; creating conditions for the full realization of one's potential; formation of a single educational space and their integration into the global educational space; empowering students to choose their own educational trajectory; development of distance education.

A13- Universality of education in the region. Ensuring the study of a complete list of disciplines that will provide basic training in the unity of professional and general cultural components (Figure 3).

To achieve A2 «Formation of a new quality specialist in the region», the following steps should be completed:

A21- Implementation of adaptation mechanisms. Providing a person with mechanisms of adaptation to new conditions of life in the social and information environment.

A22- Proactive management of sustainable development. Preparing a person for advanced management of the development of the external environment (natural, social, economic, etc.) in order to prevent and overcome crises and disasters.

A23- Building adaptive capacity. Formation of the adaptive potential of individuals by increasing their educational qualification and socio-psychological readiness for activities in a rapidly changing external environment (Figure 4).

To achieve A3 «Sustainable development of social partnership», the following steps should be completed:

A31- Organization of good industrial practice. It helps them consolidate the theoretical knowledge gained in the learning process in practice and, accordingly, will form the skills for the practical performance of labor functions in the chosen field of professional activity.

A32- Involvement of employers in the development of training programs. Involving employers in the development of training programs, qualification requirements for workers and specialists with higher education, and the content of work experience, which will allow training in accordance with the current and future requirements of modern high-tech products for the quality characteristics of the workforce in the Brittany Administrative region.

A33- Introduction of the practice of concluding strategic partnership agreements. Such contractual relations will make it possible to develop long-term training programs for basic enterprises, taking into account the prospects for the development of the industry, to provide internships for students (students), to help strengthen the material and technical base of educational institutions in the Administrative region of Brittany (Figure 5).

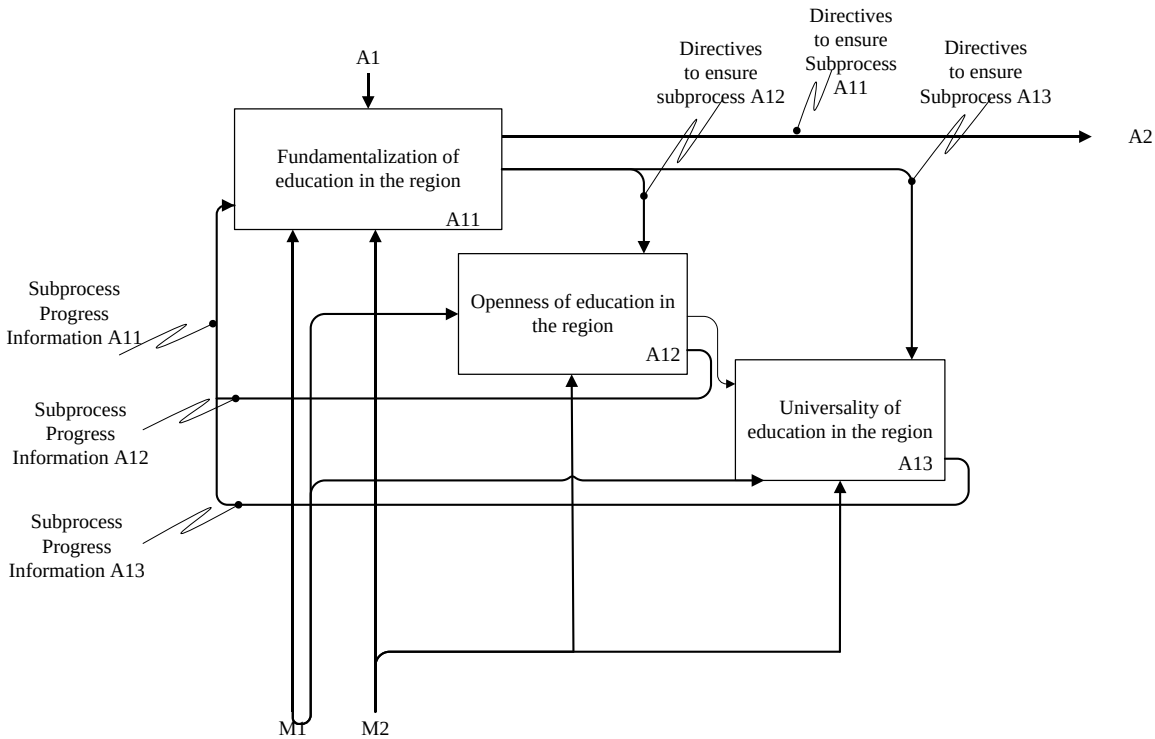

Figure 3. An integrated model for ensuring sustainable development of the region through the implementation of A1 «Introduction of advanced education in the region»

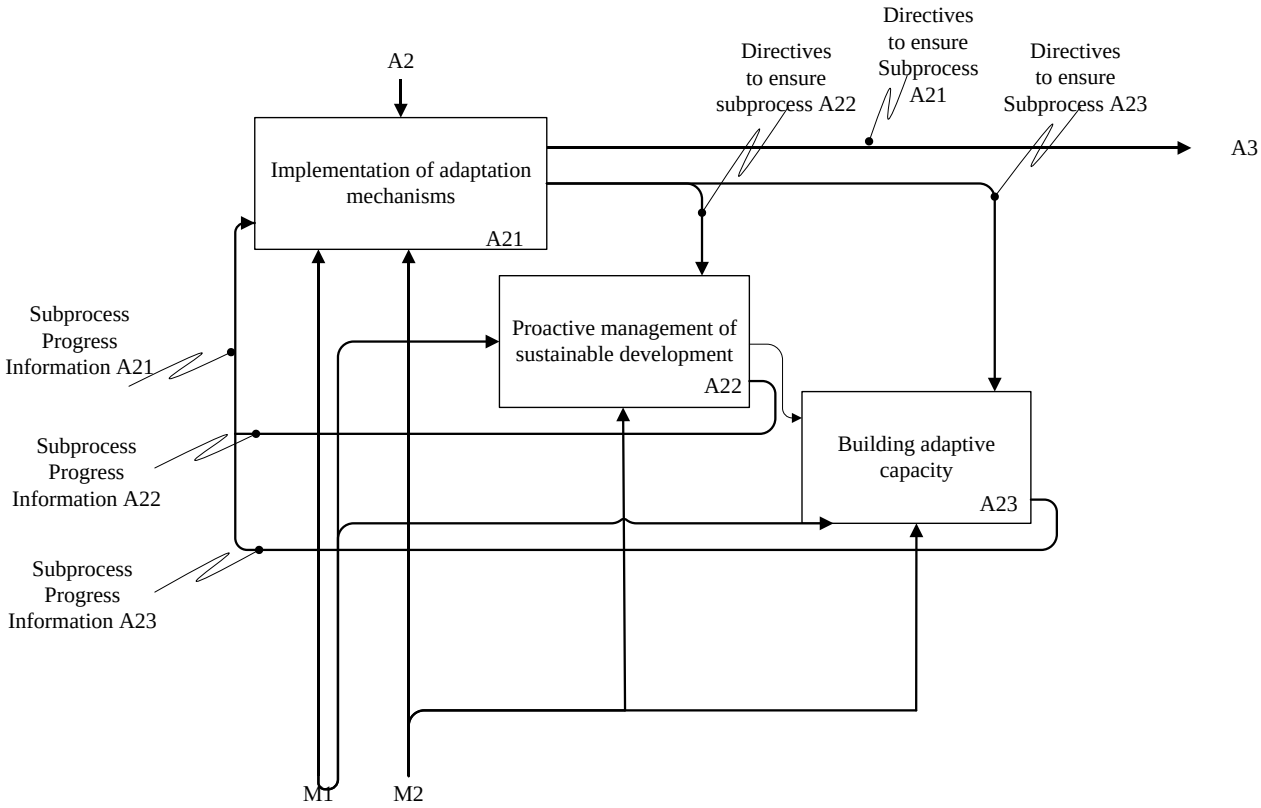

Figure 4. An integrated model for ensuring sustainable development of the region through the implementation of A2 «Formation of a new quality specialist in the region»

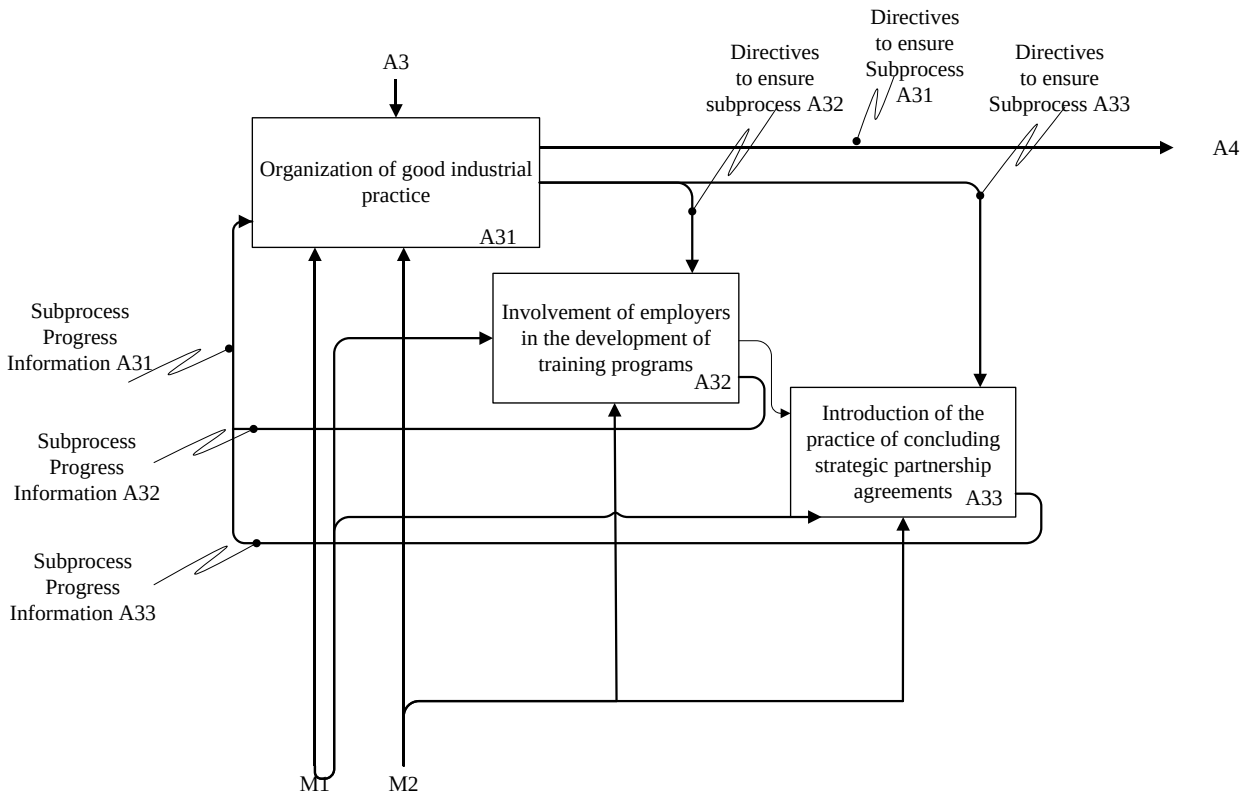

Figure 5. An integrated model for ensuring sustainable development of the region through the implementation of A3 «Sustainable development of social partnership»

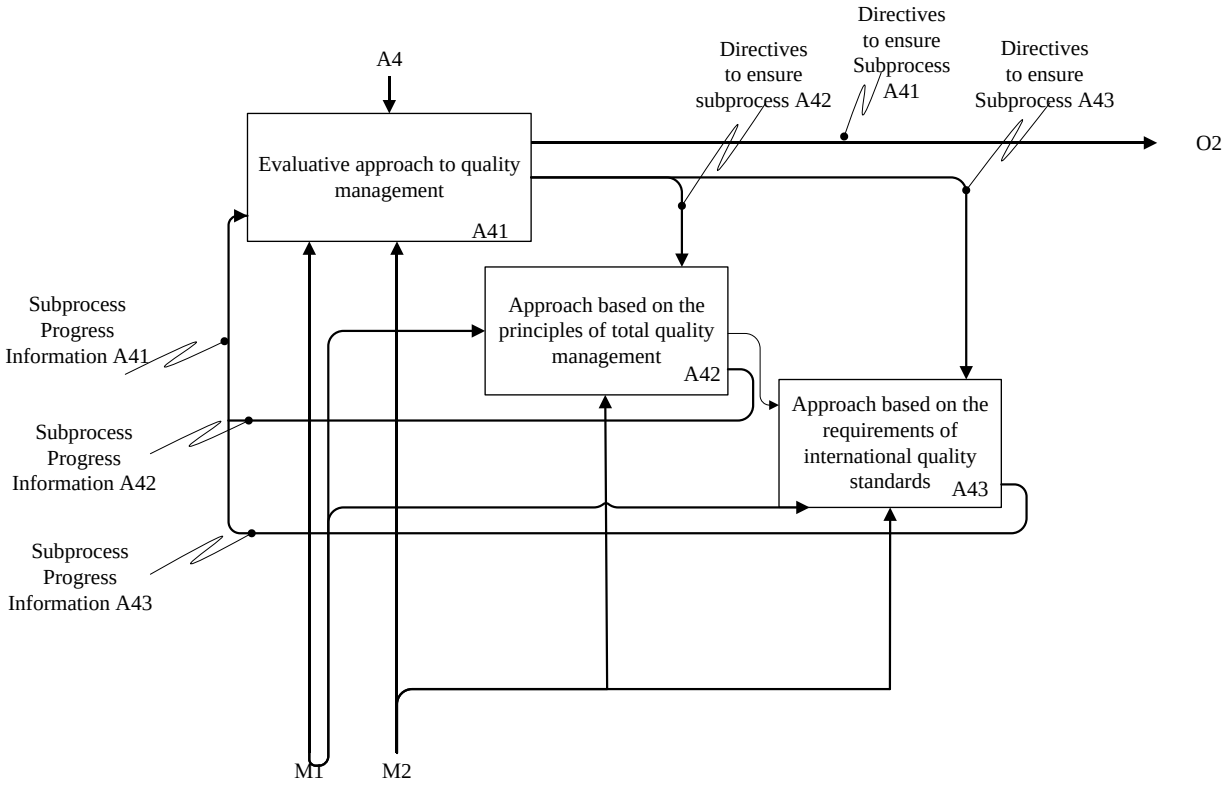

Figure 6. An integrated model for ensuring sustainable development of the region through the implementation of A4 «Introduction of a quality control system for educational services»

To achieve A4 «Introduction of a quality control system for educational services», the following steps should be completed:

A41- Evaluative approach to quality management. Provides for a systematic self-assessment to identify the strengths and weaknesses of the educational institution, as well as the positive and negative factors of sustainable development. The results of this assessment are the basis for developing a system of measures to eliminate problematic situations and improve the quality of educational services in the Administrative region of Brittany.

A42- Approach based on the principles of total quality management. It provides, like the preliminary approach, a systematic assessment, but based on a deeper analysis of the activities of the educational institution as a producer of educational services. The introduction of this approach requires the development of the mission and strategic goals of the institution based on preliminary studies of its external environment, as well as the use of a process approach to assessing the performance of the institution in the Administrative region of Brittany.

A43- Approach based on the requirements of international quality standards. It is based on the requirements of international quality standards ISO 9001, which involves a process approach to quality assessment, the main tool is a documented quality management system through enterprise standards, and instructions (Figure 6).

The value of the model lies in the fact that it is based on the use of a flexible methodological approach, which makes it convenient to easily change the main stages and edit them according to the specifics of education in a particular region.

Thus, we have proposed a methodical approach to the integration of advanced education to ensure sustainable development in the example of one region. The proposed models are theoretical and methodological in nature and can be used in the system of public administration of regional sustainable development.

5. DISCUSSIONS

The emphasis on design and modeling while ensuring sustainable development on this topic is emphasized by most scientists and practitioners [14-17]. The transition to competence-oriented education necessitates the development of conceptual, design, and technological foundations for the transfer of various types of schools from the mode of operation to the mode of advanced sustainable development of pedagogical systems, as well as the mastery of the theory and methodology of design and project culture by teachers. The socio-pedagogical design comes to the fore as a process of building open dynamic educational systems, and the implementation of innovative technologies and projects. The main characteristics of the social design are: focus on the transformation, formation, and development of innovative forms of activity; appeal to the needs of the future, and socio-cultural foundations of education.

The results of the study by Ashour [18] as well as Denham and Khemka [19] characterize that advanced education requires the transfer of the educational process to the technological level, according to the choice of individual learning routes. Especially productive among them are personality-oriented pedagogical technologies. Their effectiveness depends on the extent to which the life potential of the student is realized, and how his age and individual psychological characteristics are taken into account. Hence the priority of subjective semantic learning in comparison with informational learning, the focus on developing a

multifaceted, non-stereotypical approach to educational material in students, diagnostics of personal development, situational design, and the inclusion of learning tasks in the context of life issues.

On the ecological aspect of advanced education in the system of sustainable development, Farris and McCreight [20] as well as Chen and Peng [21] were considered. Among the main tasks of environmental education for sustainable development, the actual moment is the formation of a new system of moral and ethical values of ecological culture, which would contribute to the corresponding changes in the mentality of modern man and the establishment of a new morality - the morality of a sustainable development society. Environmental education is not only the acquisition of relevant knowledge in educational institutions but also a system of continuous multi-stage environmental information and propaganda. The result of environmental education is the formation of a person's conscious perception of the environment, a sense of personal responsibility for activities associated with the transformation of nature, and confidence in the need to respect it.

However, it should be noted that our study involves the application of a methodical approach to the integration of elements of advanced education to ensure the sustainable development of a particular region.

6. CONCLUSIONS

In the context of sustainable development, a new type of economy based on knowledge and innovation is being updated. We are talking about the information economy, in which an effective mechanism is investment in education, and, in particular, professional education, which ensures the preparation of future specialists for professional activities, the formation of skills for assessing and solving the problems they face, as well as values consistent with sustainable development. Under these conditions, vocational education is increasingly acquiring signs of continuity, fundamentality, diversification, openness, information content, virtuality, and autonomy in management. Accordingly, the need to take into account the subjective, cultural, competence, integrative, marketing, etc. is determined. approaches in shaping the content of vocational education, designing a personality-developing, information-educational environment. Given this, the issue of studying the integration of advanced education into the system of sustainable development is especially relevant today. All analyzed studies form only a theoretical basis for the implementation and improvement of our process, while almost always ignoring the practical aspects of this issue.

It can be summarized that thanks to the proposed methodological approach, we have achieved the goals set and formed our own scientific and practical vision of integrating advanced education into the sustainable development system of a particular region. The key aspects of such integration are characterized.

Our study has limitations and they are not able to take into account all aspects of advanced education in the system of sustainable development. Proactive education is a very broad concept and covers a significant number of elements in the sustainable development system. In addition, the restrictions also affected the very specifics of the regions. We considered only one such region.

Summing up, it should be noted that based on the main goal of advanced education for sustainable development - teaching young people how to manage their quality of life, an educational institution should create an educational space in which this concept is a conscious need and a measure of education achieved through the development of a common culture of participants in the educational process , the method of activating the intellectual potential, the development of creative activity, the growth of the level of competence of the individual. This should be the focus of further research.

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