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MANAGEMENT OF INTERACTION IN THE EDUCATIONAL COMMUNITY NETWORK

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Abstract

The aim of the study is to develop the concept of a knowledge management system that integrates educational content into a single environment of university knowledge using an extensible mathematical model of the subject area of university knowledge in the form of an ontology. The study is being carried out as part of the development of a pilot project on the development of business education at the Institute of Business of the Belarusian State University, and a project in the State Research Program "Methods for updating the content of education based on semantic technologies" (state registration number 20212245). The

research methodology is based on the development approaches to modeling knowledge areas of the network educational community of the Institute of Business of Belarusian State University and the ontological model of the subject area of business education. As a result, the architecture of the educational content management system was developed within the framework of the knowledge management system of the university. This proved the effectiveness of online educational communities in business education, a significant increase in the quality of content through the use of a learning content management system.

Keywords

Business Education, Network Educational Community, Educational Content, Model, Technologies, Educational Process, Ontology

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1. Introduction

Over the past years, business education has remained one of the most popular areas among students around the world. Keeping up with new trends and modern market requirements is essential for business education and graduates who want to successfully find employment immediately after graduation (UNECE Strategy on Education, 2015).

The Republic of Belarus is consistently included in the group of 30 most developed countries in the world in terms of indicators in the field of education according to the UNDP Human Development Report - 2020 (“Report on the results of the work of the UN in Belarus", 2021).

In the ranking, Belarus took 53rd place, retaining its place in the category of countries with a very high level of human development. The decrease by three positions compared to the previous result (50th place) is not associated with a change in the qualitative indicators of the country's development, which either remained at the same level or increased, such as, for example, gross national income.

In terms of "Expected years of schooling" Belarus has a value of 15.4 years and ranks 27th among 189 countries, in terms of "Average years of schooling" - 12.3 years and 10th.

According to the results obtained by the World Bank in the course of calculating the human capital index, Belarus ranked 36th among 174 countries of the world. The human capital index for Belarus is 70 percent, and for girls it is 73 percent, which is significantly higher than for boys - 67 percent. The overall human capital index in Belarus is higher than the average for

Europe, Central Asia and upper middle-income countries. Education in a Belarusian school lasts 13.8 years (counting 3 years in kindergarten for elementary school). On a single test, students score 488 on a scale where 625 is advanced and 300 is minimal. At the same time, the indicator for boys is 486, and for girls - 490.

The Council for the Development of Business Education of the Republic of Belarus unites 25 members, including 14 representatives of the business community and the professional community of participants in the business education market (State Program "Education and Youth Policy" for 2021-2025, 2021).

The BSU Business Institute is one of the founders of the Business Education Association. The Association solves the following tasks (“Institute of Business of the Belarusian State University, 2021):

- Assistance in the creation and development of business education institutions in order to: train specialists, improve the qualifications of the teaching staff, improve teaching methods, develop international contacts, research and evaluate the quality of training programs;
- Coordination of the activities of business schools in the field of educational, methodological, research and other activities;
- Organizing and implementing advanced training programs, conducting research and assessing the quality of program education;
- Organization of internships for management personnel, teachers and students of business schools abroad;
- Publication of specialized publications on the problems of training managerial personnel in accordance with the current legislation;
- Conducting marketing and other research in the interests of its members;
- Organization of international conferences and seminars on business education;
- Creation of a scholarship fund for promising young teachers and entrepreneurs for the purpose of their education in the Republic of Belarus and abroad;
- Assistance in the creation of foreign language training centers for entrepreneurs and managers;
- Ensuring the interaction of business education institutions with the personnel services of enterprises and organizations.

In 2021, the Council for the Development of Business Education considered a number of

fundamental issues for the development of the business community, including the ("Work Plan of the Republican Council for the Development of the Business Education System", 2021):

Preparation of a professional standard for the type of economic activity "Consulting on business activities and other consulting on management issues" (business coach, business school teacher);

Updating educational standards for the group of specialties "Enterprise Management" taking into account foreign experience and the requirements of the professional standard "Management of a commercial organization";

Attracting international technical assistance in the field of business education;

Ensuring the legal regulation of the educational process in a remote form, the use of information and communication technologies for the provision of business education services in a remote mode;

On the organization of the adjustment and updating of the educational program for the retraining of executives and specialists in the specialty "Business Administration".

2. Research Issues

The constant exchange of data, information and knowledge in the process of communication in educational communities through forums, social networks, videoconferencing leads to an increase in the volume of content. Such content can be called "promising educational content" because it can potentially be used in content management systems to create or update e-learning courses.

The strategic objectives in creating e-learning courses for business education were:

- Ensuring a high level of relevance, reliability and promptness of access to the existing educational content for participants in the educational process with the possibility of choosing alternative sources of knowledge;
- Determination of the adequacy and value of the content of education for the development of the required competencies;
- Proper systematization of promising educational information resources generated by educational communities.

The article provides examples of organizing joint work in the educational communities of the Institute of Business of the Belarusian State University.

2.1. Research Aims and Objectives

We have identified promising areas for managing digital educational content - the formation and dissemination of new models of work of organizations in the field of higher education, which are based on a combination of continuous professional development, new digital services and tools, infrastructural and organizational conditions for the implementation of changes, support for participants, in the development of new roles and working methods.

The world experience has been studied and key areas of digital educational content management have been identified - the development of digital services; modernization of infrastructure; Data management; Human resources management. The main direction of using digital services has been determined - personalization of learning and overcoming the digital divide, and in the context of the COVID-19 pandemic, the relevance of digital services in higher education has increased significantly. A modern trend in the development of digital online education services is outlined - the use of artificial intelligence technologies.

The main direction in the field of modernization of the education infrastructure has been studied - the active development of electronic forms of education, the use of tools for planning development and monitoring the educational process. A barrier to the development of this area has been identified - inequality in the use of digital technologies of educational institutions, manifested in overcoming the technological and digital divide.

2.2. Research Novelty and Relevance

Under the network educational community as a form of organization of education at a university, we mean an educational group in which the subjects of the educational process support communication and conduct active joint educational activities to achieve pedagogical goals using digital technologies.

E-learning using collaborative technologies and social networks has been identified as a separate segment of the educational market. According to forecasts, the global EdTech market will double by 2027 compared to 2021, will be 19.9% of the average annual growth rate and will reach $404 billion (“Educational Technology Market Size”, 2021).

Within the framework of the State Program "Digital Development of Belarus" for 2021-2025, the main directions in the field of education have been determined - the development of interactive educational information resources using remote access technologies, as well as the

development of electronic and educational services (State Program "Digital Development of Belarus", 2021.).

Particular attention is paid to solving the issues of innovative and inventive activity by students, students and teachers, developing their competencies and skills necessary for doing business, implementing start-ups in business incubators, team implementation of high-tech projects ("Entrepreneur's Guide", 2021).

2.3. Literature Review

According to the works (Kornilova L.V., 2021), (Torshinin M.E., 2021) and (Solovyeva Yu.A., 2018), we consider the network educational community from two positions - a community of teachers engaged in educational activities aimed at achieving result, and students interacting via the Internet, mastering the content of educational subjects. For learning in communities, online distance technologies are used, which provide students with the necessary content of the material being studied through the interactive interaction of students and teachers, as well as the opportunity to carry out independent activities to master the material being studied.

Analysis of scientific works (Kondratieva E.A., 2021), (Kalendzhyan S.O., 2021), (Kozhaev Yu.P., 201), (Sharova S.V., 2018), (Korsakova A.V., 2016), (Klevetova T.V., 2021), (Glebov V.V., 2021), (Belogash M.A., 2020), (Karpenko A.S., 2021), (Leshchenko E.M., 2021) to study the educational opportunities of online communities showed that their use in teaching helps to solve the following didactic tasks:

- Contributes to the personal development of students;
- Stimulates the motivation of educational and cognitive activities and increases responsibility for collective educational work;
- Increases the cognitive interest of students in the studied disciplines;
- Expands ways to control the educational activities of students;
- Enriches the experience of collective learning;
- Leads to the integration of personal and educational experiences of trainees in a social context;
- Gives practical and professional orientation to the educational process;
- Promotes the joint acquisition of new knowledge.

Researchers (Derindag O., 2021), (Kalinin A.F., 2021), (Oskina A.V. 2016), (Kuznetsova I.V., 2020), (Deev M.V., 2020) note that online learning is a modern direction of digitalization of

education and provides wider interaction and obtaining new information through multimedia technologies.

The use of online learning technologies in the mode of massive open online courses allows you to create a situation of choice for students (Deev M.V., 2020). This means that students can independently choose the pace of the course, decide on the form of work and even partially determine the content training, which should be familiar in the process of studying the materials proposed by the authors of the course. This approach takes the principles of individualization and personification of the educational process to a new level.

3. The Concept of Knowledge Management at The Institute of Business of Belarusian State University

Learning activities in online communities provide an opportunity to gain access to a variety of information and experience of other participants in the educational process, which contributes to improving the quality of education. In the course of such training, the experience of joint activities is formed and new knowledge is acquired.

The process of creating and developing educational and methodological content in the online community involves the individual activities of experience owners, the exchange and publication of best practices, joint discussion of published practices, finalization of initially published materials using the tools of joint work of all community members. Thus, the original content has been reworked by many authors and is the result of joint creativity (Sergeeva, 2020).

One of the most controversial issues in knowledge management is the personification of authorship in online communities. Modern methods of organizing joint work with educational and methodological content in online communities make it possible to personalize intellectual property at any stage of content creation. Used Web-technologies imply free voluntary exchange of available data, information and knowledge between members of the network community. Thus, the concept of alienation (exchange) of knowledge is accepted by us as a theoretical basis for knowledge management. The alienation of knowledge is characteristic of the knowledge economy and means one of the ways to exercise the powers of the owner of knowledge to dispose of the components of their formalized and non-formalized information resources and their property.

- Alienation of personal knowledge (between people);

- Alienation of shared knowledge (within or between groups of people);
- Alienation of expert knowledge (involvement of external experts);
- Alienation of corporate knowledge (using corporate rules);
- Alienation of state knowledge (using state standards).

The educational process of the Institute of Business of BSU is an exchange of knowledge between teachers and students (Figure 1).

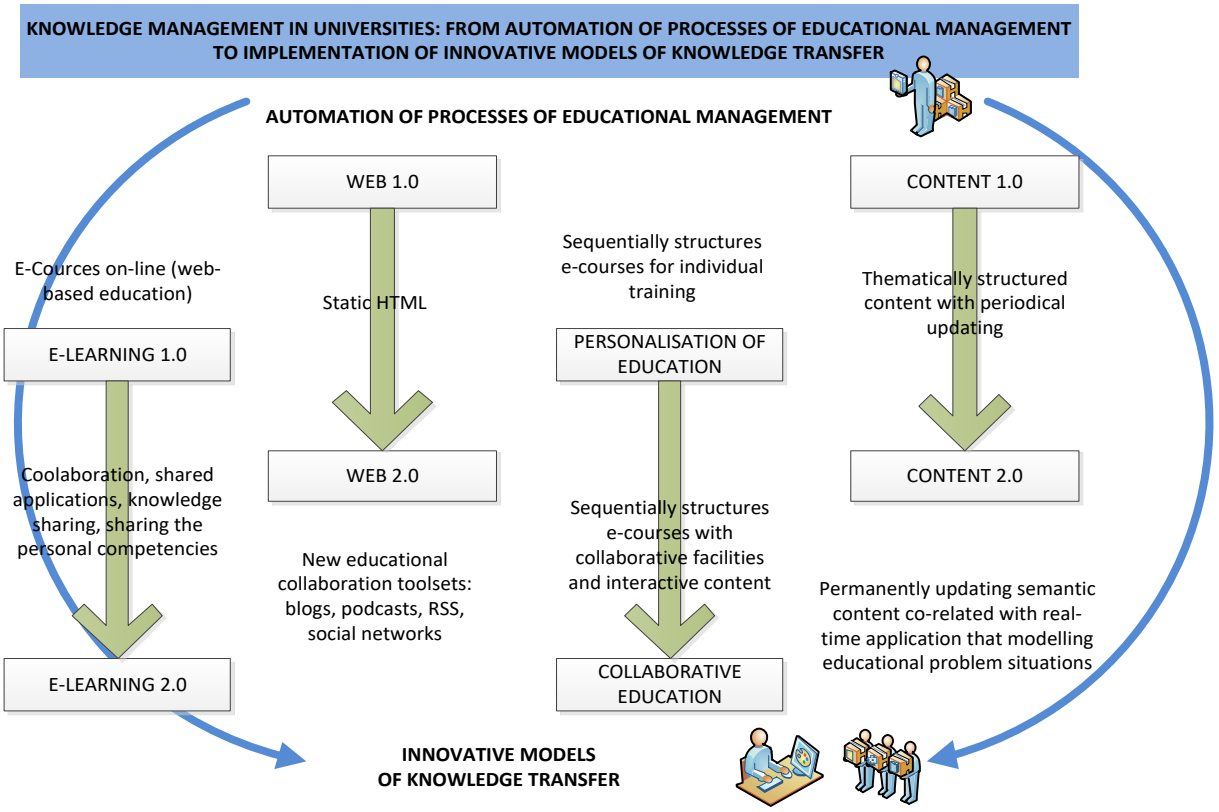

Figure 1*: Knowledge management in universities: from automation of education management processes to the introduction of innovative models of knowledge transfer*

(Source: Self)

This exchange is organized in formal and informal educational communities. The main goals of the network educational community are: meeting the need for the development of personal competencies based on work with internal and external sources of knowledge; the collective improvement of general knowledge and the application of community knowledge to create educational and training content required by the educational market. However, as the

educational network community grows, the problem of managing the download of produced educational content becomes very important for its sustainable development.

4. Development Methodology Network Educational Community

The effective growth of an educational network community means a quantitative and qualitative increase in the number of community members who can share their professional knowledge that is in demand by the community to develop the personal competencies of other members.

In the context of the development of a networked educational community and the appeal to the principles of sustainable development, it is necessary to ensure effective cooperation with other communities within the framework of a professional infrastructure (Esina, 2015). Compliance with this requirement depends on collaboration with other online communities at the social media level. The basic groups of network educational communities of the Institute of Business of BSU are defined:

—The first group - "students"; "leaders of student self-government", "undergraduates";

—The second group - "teachers"; "curators"; "Methodists"; "librarians";

—The third group - "heads of structural divisions";

—The fourth group - "parents-households";

—The fifth group is “partner enterprises”.

We have developed a functional diagram that includes interaction levels and components that reflect relationships within the network community of the BSU Business Institute (Figure 2).

With regard to the strategic goals of universities, evaluative information resources generated by online communities must be properly managed for the sustainable development of educational content. In Belarus, the state regulates the minimum scope of student competencies. However, these regulatory and educational standards have a rather long period of updating. Thus, the content of education must be balanced between the requirements of the state and the requirements of the labor market and students to the content of the competencies provided by teachers.

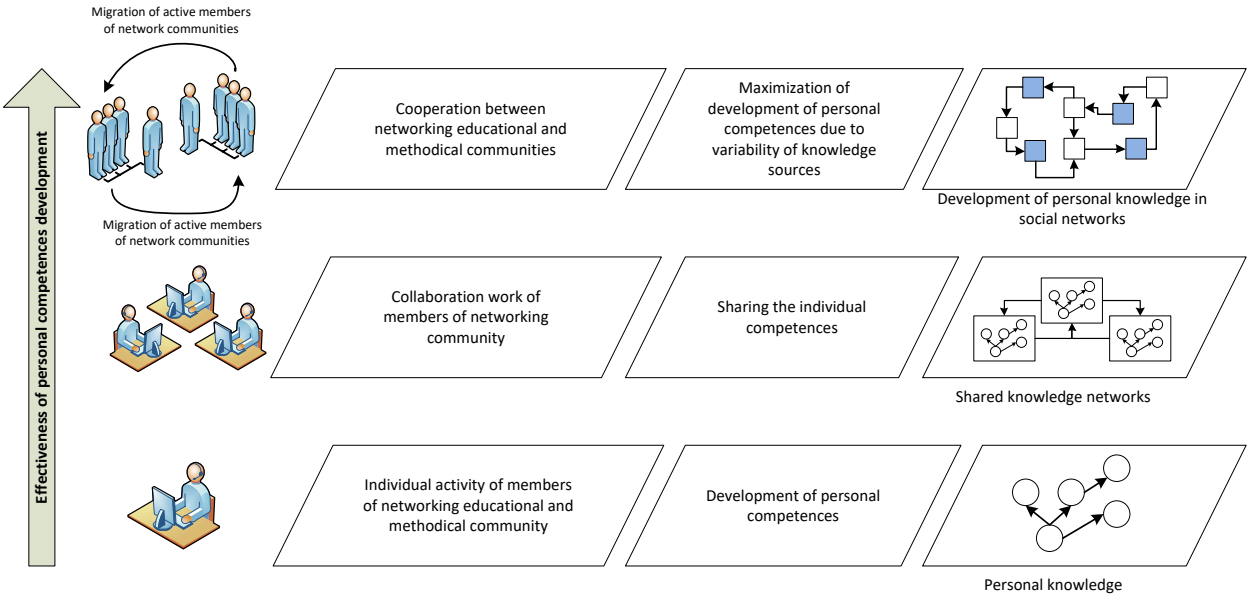

Figure 2: *Levels of interaction between participants in the network educational and methodological community in the development of personal competencies.*

(Source: Self)

We consider the modeling of knowledge areas of network communities as an effective tool for their sustainable development. Such models are integrated into the ontological model of the subject area of business education. Ontology plays a structural role in the management of educational content using metadata for interdisciplinary integration. It also helps students and teachers work with external sources of knowledge. The ontology of the subject area of university knowledge is based on state educational standards but is extensible and can be updated as needed.

Another important role of ontology is the management of personal competencies of participants in networked educational communities. Establishment of quantitative and qualitative relationships between ontology units and personal assistance of members of online communities allows finding the most active specialists in the required areas of research.

5. Results and Discussions

The current knowledge management system (KMS) tools allow for quick updates of the text part, but the multimedia part, which has become extremely important, especially for teaching, is updated very infrequently.

We studied the results of the analysis of the best world practices and proposed methods

for managing educational content. These methods are based on a competency-based approach and continuous updating of educational content using KMS collaboration tools. These methods make it possible to implement a sustainable development strategy within the framework of lifelong learning and provide high-quality content for all levels of education (Sergeev A.N., 2020), (Desnenko S., 2020).

The decrease in the relevance of the educational and methodological content of an academic discipline depends on the volume of its theoretical part in accordance with its methodological program. Thus, different objects and elements of e-learning can be updated at different times in accordance with internal regulations and the needs of business education. Text elements of electronic courses are fully indexed by the search engine, which allows you to quickly update all thematic content. However, multimedia elements have longer refresh periods. This situation is caused by higher labor costs for editing multimedia content and the complexity of indexing for multiple publication of updates in thematically related online courses.

The creation and updating of the educational and methodological content of business education is organized in the network communities of the Institute of Business of the Belarusian State University, where cooperation between teachers in certain areas of education is established - bachelor's, master's, retraining and advanced training. education. A special repository has been created to accumulate promising information resources of the university. The repository also includes student research related to the general online community indexing system. To prevent duplication of content and borrowing, it is reasonable to include an anti-plagiarism module in the system.

The identification of educational areas in online communities combined the capabilities of teachers, resulting in a workspace with constant updating of text and multimedia objects of the university repository. The activities of various community actors are adjusted using the business education domain model in the form of an ontology (Nosulenko V.N., 2017).

To implement the interaction of participants in the transfer of knowledge, it is necessary to develop an information model of a distributed knowledge base of the university, which will allow integrating the ontology of the educational programs of the university and the professional competencies that are in demand on the regional labor market and the ontology of the scientific knowledge of the university. Semantic Web technology is used to develop an ontological

information model and process information resources. To create ontologies, knowledge is accumulated.

Ontology is an attempt at a comprehensive and detailed formalization of a certain area of knowledge using a conceptual scheme. To formalize the accumulated knowledge, ontology acts, which performs the formalization of knowledge. Knowledge from the ontologies of educational programs of the university, scientific knowledge and professional standards constitute a distributed knowledge base.

To provide the user with a single view of data from a distributed knowledge base, data integration is required. Data integration systems can provide data integration at the physical, logical and semantic levels. The main tools for ensuring the integration of information resources: data converters that integrate data models, data model mapping mechanisms, object adapters, intermediaries, ontological specifications, schema integration and ontological specification integration tools.

The problem of semantic integration of knowledge from various sources is solved with the help of KMS tools. KMS provides distributed flexible access to various knowledge sources of teachers, students and employers.

The organizational aspects of the introduction of subject ontology in the development of the innovation cluster of the Institute of Business are closely related to the economic aspect of reducing the cost of updating the content of business education. One of the promising areas of research is the development of methods for individual and joint work of users of the knowledge management system with external sources of knowledge to update the content of the university. This makes it possible to search for inconsistencies in the existing educational information resources and form promising sources of information for the innovation cluster within individual projects and distributed groups. Promising sources of information can be discovered in two ways:

- a project approach that takes into account the identification and implementation of the results of current research in the educational process of the university for rational and cost-effective updating of content using external sources of knowledge. It is effective for updating the content of special disciplines in the curriculum.

- A distributed resource approach that takes advantage of the content update grid system and requires checking and organizing updated data and information from various students and

faculty. This method becomes effective with a large number of correspondents and the use of modern data processing tools.

It is proposed to combine these approaches within the framework of a dual approach to knowledge management, integrating educational content into a single university knowledge environment using an extensible mathematical model of the subject area of university knowledge in the form of an ontology. The task of reducing the cost of updating content will be solved by expanding the technological functionality of KMS through the development of collaboration tools that integrate elements of the information environment and orient KMS users to instant updates and development of educational content (see Fig. 3).

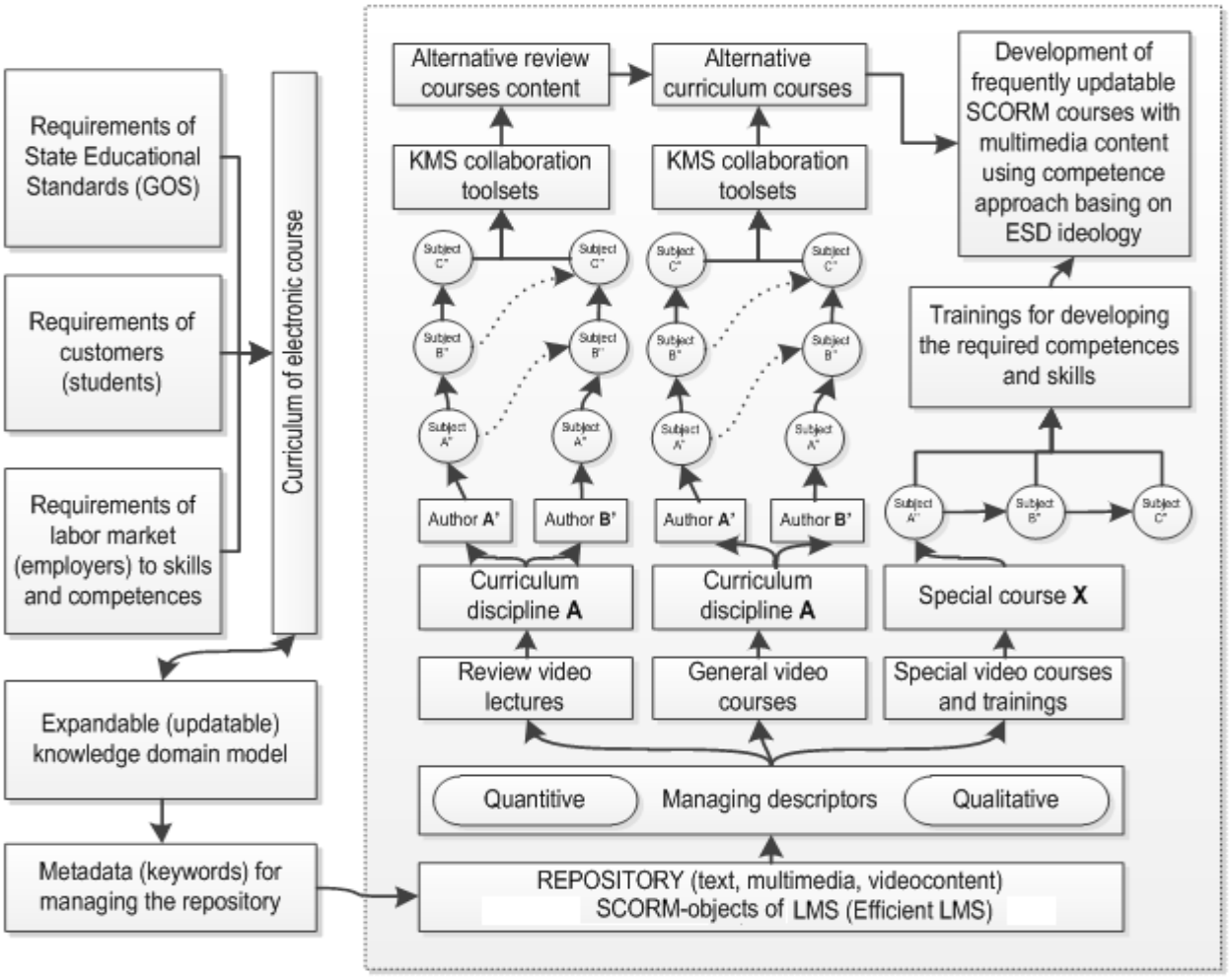

Figure 3: *The proposed architecture of the educational content management system within the KMS of the university*

(Source: Self)

The use of different authors to produce content provides the flexibility to combine courses to translate needed skills and develop competencies. It also solves the problem of alternative lectures delivered by multiple lecturers.

6. Conclusions

This article describes the benefits of using an online community approach to creating and updating content for university sustainability. The proposed methods of content creation were tested to constantly update the multimedia content of business education using the field of knowledge at the Institute of Business of the Belarusian State University.

As a result, the following main conclusions were drawn:

1. Creating online communities to develop teachers' personal skills and collaboratively create learning content has proven to be effective. However, more research is needed to develop creative tools at the social media level. The main directions of such research are: development of methods for analyzing the effectiveness of interaction between groups of the network community; methodological content management tools that use the community domain model to connect methods applicable to different disciplines; personalization methods needed to manage online community member profiles and personal skill maps;

2. The introduction of an object-oriented method of managing educational content and its thematic decomposition made it possible to improve the quality of content through its constant updating through the interaction of online communities. This unifies approaches to the project and distributed resources, integrating current and future content into a single university knowledge environment using an extensible ontology of the university subject area. This approach has been applied to the constant updating of multimedia content as a special element of e-learning, ensuring the sustainable development of knowledge and skills demanded by students and teachers.

6.1. Scope of Future Research

Future research is determined by the plan for 2021-2025 of the State Research Program "Methods for updating the content of education based on semantic technologies" (state registration number 20212245) and includes the following steps:

Development of an ontological model of the subject area and a methodology for determining the degree of compliance of the elements of curricula with the requirements of professional standards;

Development of a methodology for searching for relevant educational content from the database of academic disciplines and electronic courses;

Development of a methodology for object-oriented content management of digital interactive objects in the educational field.

6.2. Research Limitations

The limitations of the study are general methodological limitations and the lack of complex research in the field of architecture of the educational content management system and the development of a model of the subject area of business education in the form of an ontology in Belarus. This topic is the focus of the authors' research in 2021-2025 within the framework of the State Scientific Research Program “Methods for updating the content of education based on semantic technologies” (state registration number 20212245).

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