

SISTEMA DE INFORMAÇÃO DO COMPLEXO EDITORIAL E DE PUBLICAÇÃO DA UNIVERSIDADE: MODELOS DE PROCESSO

SISTEMA DE INFORMACIÓN DEL COMPLEJO EDITORIAL Y EDITORIAL UNIVERSITARIO: MODELOS DE PROCESO

INFORMATION SYSTEM OF UNIVERSITY EDITORIAL AND PUBLISHING COMPLEX: PROCESS MODELS

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RESUMO: O artigo descreve a metodologia de desenho de um sistema de informação para a implementação inter-relacionada dos processos de atividades editoriais, de revisão, impressão e publicação de uma organização educacional dentro do complexo editorial e editorial. O objetivo da pesquisa é combinar tecnologias de informação, algoritmos e ferramentas de software existentes para garantir uma interação coordenada, objetiva, holística e de alta qualidade de especialistas na esfera editorial no âmbito de uma organização educacional. Os objetivos da pesquisa na fase de desenho e modelagem da interação com um sistema de informação são a análise da área temática, a criação de modelos formais de todos os processos com uma descrição das capacidades funcionais dos objetos e sujeitos dos processos correspondentes. Os resultados obtidos permitem avaliar a qualidade da implementação do processo, a quantidade de recursos despendidos na sua implementação e todos os participantes que influenciam a sua implementação.

PALAVRAS-CHAVE: Modelagem. Design. Processo de negócios. Educação. BPMN. Software.

RESUMEN: *El artículo describe la metodología de diseño de un sistema de información para la implementación interrelacionada de los procesos de edición, corrección de pruebas, impresión, actividades editoriales de una organización educativa dentro del complejo editorial y editorial. El propósito de la investigación es combinar tecnologías de la información, algoritmos y herramientas de software existentes para asegurar una interacción coordinada, objetiva, holística y de alta calidad de especialistas en el ámbito editorial en el marco de una organización educativa. Los objetivos de la investigación en la etapa de diseño y modelado de la interacción con un sistema de información son el análisis del área temática, la creación*

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de modelos formales de todos los procesos con una descripción de las capacidades funcionales de los objetos y sujetos de los procesos correspondientes. Los resultados obtenidos permiten evaluar la calidad de la implementación del proceso, la cantidad de recursos invertidos en su implementación y todos los participantes que influyen en su implementación.

PALABRAS CLAVE: *Modelado. Diseño. Procesos de negocio. Educación. BPMN. Software.*

ABSTRACT: *The article describes the methodology of designing an information system for the interrelated implementation of the processes of editorial, proofreading, printing, publishing activities of an educational organization within the editorial and publishing complex. The purpose of the research is to combine existing information technologies, algorithms, and software tools to ensure a coordinated, objective, holistic, high-quality interaction of specialists in the publishing sphere within the framework of an educational organization. The objectives of the research at the stage of designing and modeling interaction with an information system are the analysis of the subject area, the creation of formal models of all processes with a description of the functional capabilities of objects and subjects of the corresponding processes. The results obtained allow assessing the quality of the process implementation, the number of resources spent on its implementation, and all participants influencing its implementation.*

KEYWORDS: *Modeling. Design. Business process. Education. BPMN. Software.*

Introduction

Publishing activity is an integral part of the scientific and educational activities of a higher educational institution (Sidorov, 2020). The creation, publication, and printing of educational, methodological, and scientific literature are complex and costly processes that require the participation of many specialized specialists (Ostapenko, 2016; Szlachta, 2019). Each of these publications should be indexed in scientometric systems. Such indexing should be carried out accurately and constantly to maintain a high rating of the university. This requires a selective approach to the implementation of both publication activity and editorial and publishing activities. Competent organization of such processes allows getting not only a high-quality paper or electronic publication but also effective interaction of each participant in the corresponding process (Kublitskaya, 2017; Vargola, 2017). To obtain such a result, it is necessary to develop an information system of the university editorial and publishing complex (UEPC), which allows for the interaction of all specialists to realize their capabilities within the framework of editorial and publishing activities.

Currently, heterogeneous systems are used in educational organizations to ensure the publication of any type of literature (Kervenov, I.A., Samarin, Yu.N., Kovaleva, 2020; Lopez, Ortuno, 2019). For example, with authors (both internal and

external), the process of communication and exchange of documents is carried out via e-mail, and some materials shall be duplicated in paper form, using delivery services. Professional software solutions that implement interaction within the editorial and publishing complex may not be used in an educational organization due to their high cost and lack of need for their wide functionality (Vinokurova, Shibarova, 2016; Niyonsaba, 2018). Thus, the information system being developed should combine the possibilities of remote interaction with the authors, as well as interaction within the ecosystem of the complex. Therewith, the resulting information system should include modern technologies of the industry, and not duplicate them completely or partially.

This research has **theoretical significance**, allowing to formalize the processes of editorial, proofreading, printing, publishing activities of an educational organization. The results are presented in the form of graphical models that correspond to the design methodology and create a theoretical basis for conducting other research in the relevant subject area.

The practical significance lies in the unification of the processes of editorial, proofreading, printing, publishing activities of an educational organization, systematization of the accumulated experience in this subject area, redistribution of the load on the specialists involved to reduce labor costs and other resources necessary for the implementation of these processes without losing the quality of the final result.

Methods

The creation of any information system corresponds to a certain life cycle model. Such a cycle shows different states of the system for each moment. The system states can include processes, actions, tasks, objects, and subjects that are carried out at the appropriate stages of the life cycle (Logachev, 2020; Logachev et al., 2020). Process modeling allows building specific models of the problem area to assess the organization of interaction of all objects and subjects, taking into account the features of data transformation as a result of each of the processes (Vinokurova, Kopyrinam 2018; Zintsov, 2017). The results of such an assessment serve as the basis for creating requirements for the project.

We used **structural and functional modeling** methods that allow describing all processes of any complexity using graphical notations to create models. The process elements obtained in this way made it possible to obtain software modules of the UEPC information system.

The creation of such modules was carried out according to the selected structural features of the subject area, which correspond to the editorial and publishing process. The result of the applied method was a **diagram** of the structure of the information system of the UEPC.

BPMN notation was used to describe the interaction of users with the designed information system. This notation clearly and in detail demonstrates the sequence of actions of performers and the generation of information flows that arise during their work.

The resulting BPMN models use a single standardized language that is understandable for all project participants, allowing for an unambiguous interpretation of each graphic element. The following elements are used in the developed BPMN models:

- events that trigger the actions of performers (for example, simple events, message events, and timer events);
- instances, divided into the task and collapsed subprocess (sequential execution of a certain number of actions that have hidden details);
- logical operators that demonstrate the decision points in the process to determine the further functioning of the process or the synchronization of several control flows;
- message flows between process participants when interacting with an information system;
- artifacts that show the need for certain information, on which the execution of an action in the process depends.

Results

The functional analysis of the subject area carried out showed that the main processes of editorial and publishing activity at the university are:

1. Acceptance of materials for the implementation of editing and proofreading of author's materials for subsequent printing and publication in open access (textbooks, methodological recommendations, scientific journals, conference collections, etc.).
2. Checking the author's materials for incorrect borrowing (plagiarism).
3. Organization of the review process by independent specialists of the materials received for publication.
4. Interaction with the author at every stage of working with his/her materials.

5. Import of published materials into specialized information systems with open access for the popularization of materials and the university.

6. Printing orders without editing and proofreading (for example, work reports, reference materials, bachelor's papers, master's theses, etc.).

Thus, the structure of the UEPC information system can be represented as shown in Fig. 1.



Figure 1. Modules of the UEPC information system

Users of the UEPC information system include:

1. **Customer.** Customers include students, faculty members, and other university employees who want to print a document for use for their purposes. The model of their interaction with the information system is shown in Fig. 2.

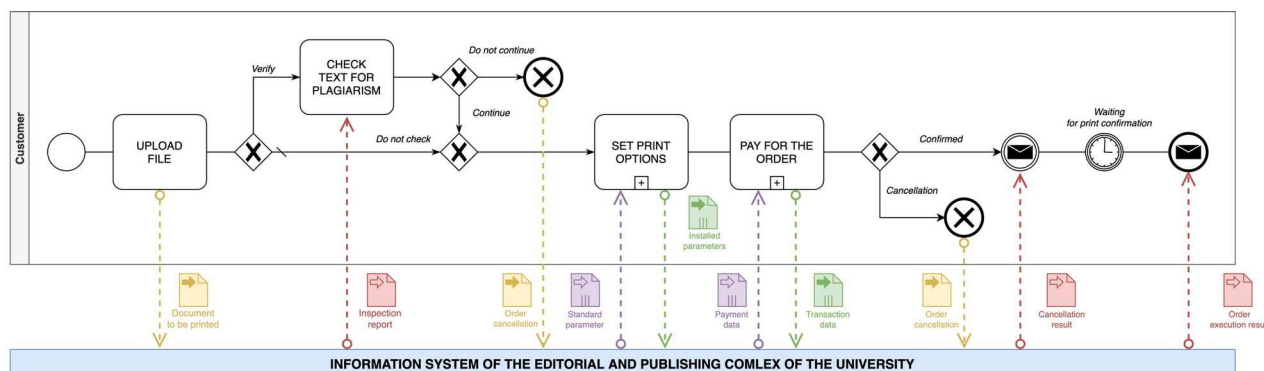


Figure 2. The model of the process of interaction of the customer with the UEPC

Any customer can perform the following actions using the UEPC information system:

- upload a file at any time,
- set the settings for printing,
- calculate the cost of printing,

- pick up the printout after receiving the appropriate notification.

2. **Dispatcher.** A specialist who monitors the printing process. His/her duties include keeping the equipment in working condition, monitoring the quantity and quality of consumables (toner, paper), and forming an order after printing it. The model of the dispatcher's interaction with the information system is shown in Fig. 3.

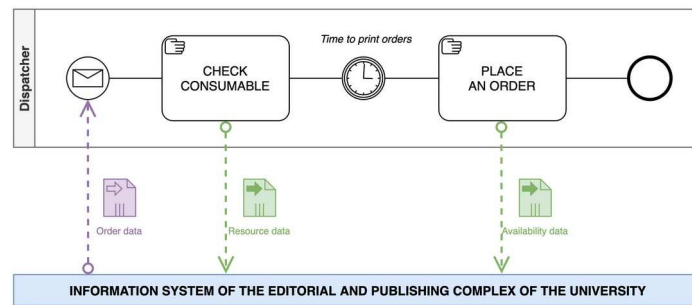


Figure 3. The model of the process of interaction of the dispatcher with the UEPC

3. **Author.** Authors have the opportunity to publish their educational or scientific work. To do this, they are given the opportunity to upload their work to the system for further verification for incorrect borrowing, blind reviewing, as well as full editorial and publishing support in remote mode. Therewith, it is possible to refuse to implement the order at certain stages. A model of the process of such interaction is presented in Fig. 4.

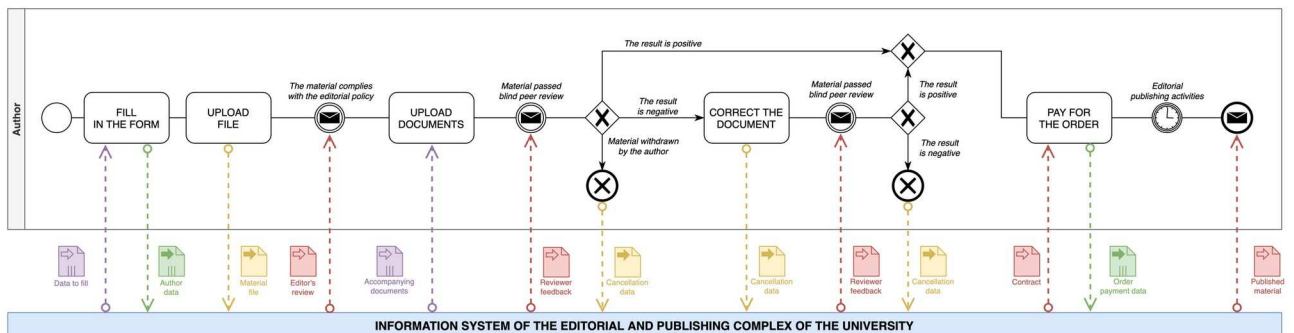


Figure 4. A model of the author's interaction with UEPC

4. **The reviewer.** An expert in a certain field to carry out a blind review of materials submitted for publication. Such materials include scientific articles, educational and methodological publications, monographs, collections, etc. The reviewer is appointed by the editor or is selected automatically by the information

system according to the coincidence of his/her professional field with the specified topic in the evaluated material. The model of the interaction process between the expert and the UEPC information system is shown in Fig. 5.

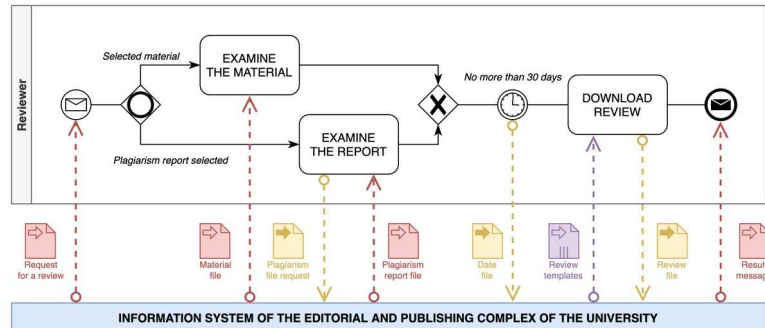


Figure 5. Model of the process of interaction between the reviewer and the UEPC

5. **Editor.** A specialist who prepares publications and determines the nature of the review, editing, proofreading, and publication process. Each editor has its type of work, which is associated with a certain type of publication. Figure 6 shows a model of his/her interaction with the information system.

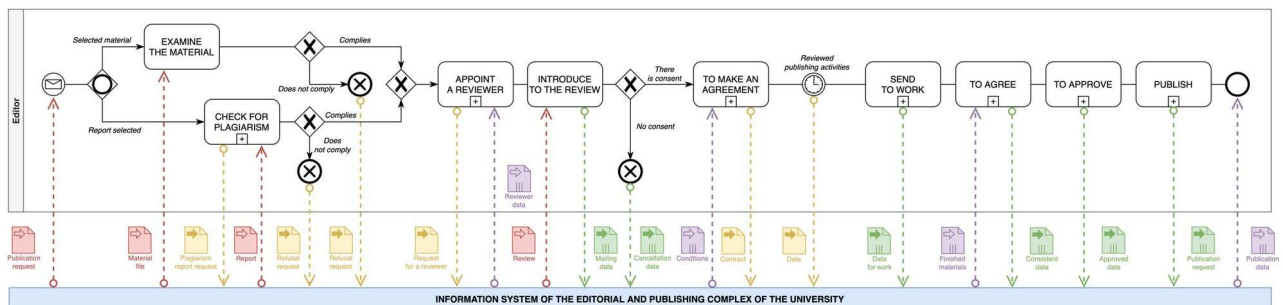


Figure 6. A model of the process of interaction between the editor and the UEPC

With an increase in the load on UEPC, the duties of the editor can be redistributed with the introduction of an additional role "**Editor-in-chief**". A specialist with such a role in the system can coordinate and decide on the approval and acceptance of the order.

6. **Proofreader.** A specialist who checks the content of upcoming publications for printing.

7. **Administrator.** A specialist responsible for the smooth functioning of the UEPC information system. His/her duties include the maintenance of the system during its operation:

- database server administration,
- adding or removing user roles,
- changing the functionality of the user role,
- error correction,
- advising users on working with the system, etc.

Discussion

The results obtained during the study are reliable since the stated research methods were used correctly. The results are reproducible when changing the set of analyzed data (for example, using a medium-sized publishing center instead of an educational organization as a platform for implementing the information system being developed).

The developed modular structure of the information system allows for a scalable nature of implementation into the organization's ecosystem. The functionality of its modules is used both in educational organizations and publishing centers. For example, such functionality should include the interaction of the editorial office with the author in a remote format, checking manuscripts for incorrect borrowings. Therewith, such systems exist separately and are not integrated into the general ecosystem of the organization (Ethier, Lefrancois, 2020).

It should be noted separately that the developed model of the system does not violate the generally accepted and understandable mechanisms of interaction between specialists of both an educational organization and publishing centers in the field of publishing and printing customer materials (Oorzhak, 2016). The developed structure of the system allows consolidating the processes of proofreading and editorial interaction and interpolating them into similar processes of organizing scientific and publication activities in an educational organization (Mikhailenko, 2019; Mikhailenko, Bagmet, 2016; Benmessaoud, Buzelin, 2018).

The developed information system reduces the burden on the employees of the educational organization involved in the preparation, review, and layout of publications of various types, allows students to be involved in this process. In addition, the information system combines several heterogeneous software products and integrates

them into the ecosystem of an educational organization, which entails ordering the necessary resources, reducing the burden on specialists by reducing the number of software products.

The undeniable advantage of such a system is to reduce the number of face-to-face interactions between different specialists when working with orders, the authors, or their colleagues during the modern pandemic. Therewith, the quality of the work carried out is not reduced but is streamlined and made open and accessible to a large number of specialists.

Conclusion

The analysis of the subject area made it possible to obtain an accurate description of the structure of the information system with the allocation of all the key roles of its users. The study provides a detailed description of all its possible functional capabilities for each such role. Based on this, accurate and universal models of the process of interaction between users and the processes that arise as a result of their interaction have been created.

The results obtained correspond to the modeling methodologies. They allow getting accurate instructions for specialists involved in creating an information system at the development stage.

Process models created at this stage of the life cycle of an information system make it possible to demonstrate the relationship between the execution of each task and the resulting data and control flows.

The structure of the developed information system is modular, which allows fast processing of data or control flows, promptly adjusting various parameters depending on changes in the state of the subject area or external changes occurring in the entire ecosystem of an educational organization.

The developed information system has the following main advantages:

- provides an opportunity for the operational management of the processes of preparation, publication, and printing of scientific, educational, and other resources of an educational organization;
- provides an opportunity for customers to print materials with the possibility of remote ordering and independent configuration of printing parameters;
- allows estimating the labor costs for the implementation of the order of each employee involved.

Thus, the results obtained in the course of the study have theoretical and practical significance, the tasks set have been fulfilled, the goal has been achieved.

REFERENCES

BENMESSAOUD, S., BUZELIN, H. **Publishing houses and translation projects.** Routledge Handbook of Translation and Culture, pp. 154–176, 2018.

ETHIER, M.A., LEFRANCOIS, D. Review of editorial activities. **Revue Des Sciences De L Education, 1(46), 1–2. (2020).**

KERVENOV, I.A., SAMARIN, YU.N., KOVALEVA, V.V. Osnovnye etapy vnedreniya ASUPP na poligraficheskom predpriyatii [The main stages of the implementation of an automated control system at a printing enterprise]. **Studencheskii vestnik, v. 2-5, n. 100, pp. 13–15, 2020.**

KUBLITSKAYA, O.V. Pravovoe regulirovanie izdatelskoi deyatel'nosti v sisteme vysshego obrazovaniya [Legal regulation of publishing in the higher education system]. **Leningradskii yuridicheskii zhurnal, v. 3, n. 49, pp. 135–142, 2017.**

LOGACHEV, M.S. **Informatsionnye sistemy i programmirovaniye. Spetsialist po informatsionnym sistemam: Vypusknaya kvalifikatsionnaya rabota** [Information systems and programming. Information systems specialist: Final qualifying work]: ucheb. Moscow: Infra-M, 2020.

LOGACHEV, M.S., KOZHEVNIKOV, E.V., BRUSENTOVA, L.S., MUDARISOV, R.Z. Problem of quality of educational programs: Automated assessment method. **Revista Inclusiones, v. 7, pp. 312–321, 2020.**

LOPEZ, A.G., ORTUNO, P.A.H. Communication Strategies of Literary Publishing Houses in Spain. **Investigacion Bibliotecologica, v. 33, n. 80, pp. 57–71, 2019. DOI: 10.22201/iibi.24488321xe.2019.80.57982.**

MIKHAILENKO, T.D. Nauchnoe retsenzirovaniye kak glav'naya sostavlyayushchaya nauchno-izdatelskoi deyatel'nosti [Scientific peer review as the main component of scientific publishing]. **Vestnik Rossiiskoi tamozhennoi akademii, n. 1, pp. 133–139, 2019.**

MIKHAILENKO, T.D., BAGMET, N.P. Organizatsiya nauchno-izdatelskoi deyatel'nosti v otraslevom vysshem uchebnom zavedenii [Organization of scientific and publishing activities in a sectoral higher educational institution]. **Vestnik Rossiiskoi tamozhennoi akademii, n. 4, pp. 136–143, 2016.**

NIYONSABA, T. **Metody i algoritmy upravleniya tekhnologicheskimi protsessami s neizvestnymi zavisimostyami parametrov** [Methods and algorithms for controlling technological processes with unknown dependencies of parameters]: abstract of a thesis of PhD in Technical Sciences. Tver, 2018.

OORZHAK, M.S. Izdatelskaya deyatelnost nauchnykh i obrazovatelnykh uchrezhdenii Respubliki Tyva: sovremennye problemy [Publishing activity of scientific and educational institutions of the Republic of Tyva: modern problems]. **Bibliosfera**, n. 1, pp. 26–31, 2016.

OSTAPENKO, R.I. Kontsepsiya razvitiya redaktsionno-izdatelskoi deyatelnosti Voronezhskogo gosudarstvennogo promyshlenno-gumanitarnogo kolledzha [The concept of development of editorial and publishing activities of the Voronezh State Industrial and Humanitarian College]. **Perspektivy nauki i obrazovaniya**, v. 1, n. 19, pp. 49–52, 2016.

SIDOROV, O.G. Osnovnye vekhi razvitiya Izdatelskogo doma NEFU (50 let izdatelsko-poligraficheskoi deyatelnosti universiteta) [Major milestones in the development of the NEFU Publishing House (50 years of publishing and printing activities of the university)]. **Vestnik NEFU**, v. 1, n. 75, pp. 135–139, 2020.

SZLACHTA, A. The Role of Student Editorial Practice in Journalism Degree Programs. **E-MENTOR**, v. 5, pp. 27–33, 2019.

VARGOLA, M. Research and publishing activities of the museology and cultural heritage section at the Comenius University in Bratislava. **Muzeologia A Kulturne Dedicstvo-Museology and Cultural Heritage**, v. 2, n. 5, pp. 183–189, 2017.

VINOKUROVA, O.A., KOPYRINA, A.V. Blok avtomatizirovannoi otsenki ekspluatatsionnykh pokazatelei oborudovaniya v protsesse vypolneniya poligraficheskogo zakaza [Block for automated assessment of equipment performance in the process of fulfilling a printing order]. **Izvestiya vysshikh uchebnykh zavedenii. Problemy poligrafii i izdatelskogo dela**, n. 3, pp. 9–22, 2018.

VINOKUROVA, O.A., SHIBAROVA, E.V. Bezopasnost promyshlennykh informatsionnykh sistem, vidy ugroz i obshchie printsipy zashchity informatsii [Safety of industrial information systems, types of threats and general principles of information protection]. **Vestnik MGUP imeni Ivana Fedorova**, v. 1, pp. 18–21, 2016.

ZINTSOV, K.S. Napravleniya povysheniya effektivnosti izdatelskoi deyatelnosti vuza [Directions of increasing the efficiency of the publishing activity of the university]. **Vestnik REA im. G.V. Plekhanova**, v. 2, n. 92, pp. 110–116, 2017.