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МОДЕЛИРОВАНИЕ ПРОЦЕССА КОМПЛЕКТОВАНИЯ БИБЛИОТЕЧНОГО ФОНДА

Постоянно возрастающий ассортимент литературы различных жанров и направлений, предлагаемых книжными издательствами, ставит перед руководством библиотек проблему выбора при закупке новых изданий, которая усложняется ограниченным финансированием деятельности библиотек. В связи с этим актуальна проблема качественного комплектования библиотечного фонда. Основной концептуальной идеей, положенной в основу решения возникшей актуальной проблемы, является максимальное удовлетворение информационных потребностей различных типов пользователей библиотечных ресурсов. Для реализации информационных предпочтений пользователей разработана общая математическая модель поддержки принятия решения в задаче оптимизации комплектования библиотечного фонда, позволяющая осуществлять его пополнение и обновление требуемыми источниками удовлетворения информационных потребностей пользователей библиотечных ресурсов и учитывающая ограниченность в финансировании по приобретению новых изданий. В качестве критерия оптимальности выступает востребованность библиотечных ресурсов. Предложен формализованный подход к процессу комплектования библиотечного фонда востребованными печатными изданиями. Для сокращения размерности пространства возможных решений построена модельная аппроксимация поставленной задачи оптимизации. В основе перехода от задачи оптимизации к её модельной аппроксимации положены идеи выявления наиболее важных признаков пространства возможных значений и сегментации читательской аудитории. При практической реализации построенной модели для определения значимых признаков в каждой задаче классификации применялись метод интеллектуального анализа данных, метод анализа стратегических альтернатив и теория нечетких множеств в соответствии со спецификой решаемой задачи. Построенная и апробированная на базе научной библиотеки Оренбургского государственного университета (ОГУ) модель позволяет учитывать не только влияние разных факторов на качество комплектования книжного фонда, но и ограничения, диктуемые ограниченностью финансирования деятельности библиотек.

Ключевые слова: задача оптимизации, комплектование библиотечного фонда, востребованность библиотечных ресурсов, информационные потребности пользователей, Data Mining, дерево решений, функция принадлежности, порог разделения, метод анализа стратегических альтернатив.

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MODELING OF THE LIBRARY COLLECTION ACQUISITION PROCESS

Constantly increasing assortment of literature of various genres and directions offered by publishers sets a problem for the libraries when purchasing new literature in the conditions of limited budgeting. In this connection, the task of the qualitative acquisition of the library stock is urgent. The main conceptual idea for the solution of the problem is the maximum satisfaction of the information needs of various

types of library resource users. To implement the users informational preferences, a general mathematical model of decision-making support has been developed in the task of optimizing library stock acquisition. It allows it to be replenished and renewed in order to meet the information needs of library resource users and takes into account the limited budgeting for acquiring new books. The demand for library resources is considered as the optimality criterion. A formalized approach to the process of completing the library fund with popular printed publications is proposed. To reduce the area dimension of possible solutions, a model approximation of the optimization problem has been constructed. The transition from the optimization problem to its model approximation is based on the ideas of identifying the most important features of the area of possible values and the segmentation of the readership. In the practical implementation of the constructed model, the method of data mining, the method of analyzing strategic alternatives and the theory of fuzzy sets in accordance with the specifics of the problem to be solved were used in determining each significant classification problem. The model, constructed and tested on the basis of the scientific library of the Orenburg State University (OSU), allows to take into account not only the influence of various factors on the quality of the library stock, but also the issues caused by the limited budgeting of libraries.

Keywords: optimization problem, library stock acquisition, demand for library resources, information needs of users, Data Mining, decision tree, membership function, separation threshold, method for analyzing strategic alternatives.

Introduction

One of the indicators of the nation's development level is its intellectual potential. Therefore, the problem of obtaining high-quality intellectual information is still relevant. Among the most well-known and common ways to solve this problem should be the use of library resources.

We will consider the activities of a library as providing the information services to the public. We aim to organize the process of serving readers in such a way that their information needs are satisfied as fully as possible. To achieve this goal, we should choose a competent approach to the formation of the library stock, carrying out its replenishment and renovation to meet the information needs of the library users and taking into account the limited funding for acquiring new publications.

Thus, the relevant scientific problem is to create a general mathematical model for completing the library stock based on information preferences of the library users and to create an intellectual method for controlling the library fund acquisition based on the information-analytical approach.

According to the methodology adopted in library science, the quality of the library stock is assessed by the degree of satisfaction of the users information needs:

$$k = \frac{Number\ of\ \ books\ handouts}{Volume\ of\ \ stock}. \qquad (1)$$

However, neither a decrease in the volume of stock, nor an increase in the number of book handouts contribute to the increase in the level of satisfaction of the information needs of the readership. Therefore, the quality of the book stock will be measured by the demand for literature [1].

The demand for books is an integral characteristic, dependent on many variables. The most important of them include: library characteristics of books (author, year of publication, publisher, etc.); the correspondence of the edition to the sections of the library thematic rubricator of information preferences of the readership; attitude of library users to the problem of satisfying information interests.

The increased educational level and awareness of users of library resources requires more careful attention to replenishing and renewing the library stock. The problems of increasing the efficiency of acquisition and use of the scientific libraries stocks were studied by the teams of the largest libraries in our country under the direction of Y.N. Stolyarova [2], V.I. Tereshina [3], N.I. Kovalenko [4]. Their research aimed at compiling the optimal core of the library stock. The modeling of stocks based on the study of information needs of subscribers was developed by A. Markina and G. Anisimova [5; 6]. According to the research results a problem thematic rubricator has been developed and a structural model of the library stock has been proposed. Other works [7; 8] consider the pecularities of the acquisition of national, specialized and regional libraries stocks taking into account changes in users flows and their information needs. The system of information and bibliographic services for specialists was analyzed. The scientists have chosen probabilistic statistical methods as the main research tool. The university library was the object of research in the works of T. Stukalova, P. Poll [9; 10]. Hierarchical structures of university libraries as subsystems of an educational complex have been proposed. Automated control systems based on the theory of mass service with calculation of the probability distribution function have been developed. Libraries in the Russian Federation mostly lagged behind other areas of the national economy (industry, banking sector) in the field of informatization. However, in recent years, the tendency to unite into consortia, and more specifically, into corporate information systems (CIS), has become quite distinct. Automating the library and bibliographic processes opens up new opportunities for research and creates favorable conditions for numerical modeling. Issues of development, implementation and design of automated library information systems are highlighted in the works of F. Voroisky, Y. Shraiberga, V. Boyko, V. Savinkova [11–13]. However, unlike other libraries, the library of the university as an object of automation has the following pecularities: textbooks acquisition in accordance with the curriculum; a large percentage of multi-copies educational literature; the seasonal overloading; remote access to the electronic catalog and information databases; protection against unauthorized access; information support of distance

learning. The research on integrated information systems and the use of automating the flow of library and bibliographic processes, including solving the problems of supporting the acquisition of library stock was conducted by P. Boldyrev [14], Y. Schreiberg [12]. These studies substantiate the need to create intelligent methods and models for evaluating library performance indicators based on the use of a fuzzy logic apparatus and the theory of neural networks and technologies for operational analytical data processing due to the fact that the tasks of evaluating library performance are considered to be poorly formalized. The development of the system of analytical support for control of the information and educational university's fund is represented in the research by A. Popkova, V. Kurovsky [15]. Researchers recommend using business analytics to conduct continuous monitoring of the university's information and educational fund. To ensure the effective execution of a large number of analytical queries, it is proposed to use business analytics based on OLAP technology with subsequent integration into a single data store of the university's quality system. Among foreign scholars who worked on modeling the library stock on the basis of the intellectual approach, the work of N. Moore and S. Elliot should be highlighted [16; 17]. Their field of research was presented by large public libraries. The main direction of optimizing the acquisition of the library stock was to bring them into full compliance with the structure of the institution.

The analysis of the research revealed the absence of fully formalized approach in existing publications on the acquisition of the library stock. Therefore, the purpose of the study is to build a general model of acquisition of the library fund. To achieve this goal, the following tasks have been solved:

– to formulate a mathematical formulation of the problem of completing the library fund with popular literature in the form of an optimization problem;

– to reduce the dimensionality of the problem of choosing a printed publication from a variety of alternatives offered by book publishers, construct a model approximation;

– to test the constructed mathematical model formulated in the form of an optimization problem of choosing printed publications from a variety of alternatives offered by book publishers.

At the same time, solving the second problem requires solving the following subtasks:

– identify the most significant features of printed publications;

– identify the most priority information needs of users;

– identify the most promising types of users;

– take into account the restrictions on financing the purchase of new printed publications.

1. Materials and Methods

To formalize the task, we introduce the following notations. Let $\mathrm{H} = \{h_1, h_2, ..., h_H\} = \{h_j\}$ be the set of libraries in the G region, $j = \overline{1, H}$ where H is the number of libraries in the G region. Each library $h \in \mathrm{H}$ has its stock. Let $\mathrm{A}^h = \{a_1^h, a_2^h, ..., a_{n_\alpha}^h\} = \{a_j^h\}$ be the set of books of the h library, $j = \overline{1, n_\alpha}$ where $n_{n_\alpha}^h$ is the stock volume of the h library and $A = \{a_1, a_2, ..., a_{d_\alpha}\}$ is the set of books offered by publishers. Any book a has standard library characteristics. Let $Z^a = \{z_1^a, z_2^a, ..., z_{\lambda_a}^a\}$ be the set of library characteristics of book a, where $j = \overline{1, \lambda_a}$, where λ_α is the number of library characteristics of book a of the stock of h library. The books stock of each library h is divided into thematic rubricator sections in accordance with its specialization. Let $\mathrm{R}^h = \{r_1^h, r_2^h, ..., r_{m_\alpha}^h\}$ is the set of thematic rubricator sections of library h, $j = \overline{1, m_\alpha}$, where $m_{n_\alpha}^h$ is the number of thematic rubricator sections of library h. Each library $h \in \mathrm{H}$ has its own readership – the users of library resources. Let $\mathrm{S}^h = \{s_1^h, s_2^h, ..., s_{k_a}^h\}$ is the set of the users of library h resources, $j = \overline{1, k_\alpha}$, where $m_{k_\alpha}^h$ is the number of the library h users.

To make a decision on the control of the library stock A^h acquisition from a variety of editions offered by publishers, we choose an edition $a \in A$, for which the demand function takes the maximum value, that is, we formulate criterion:

$$f(a) = f(\mathrm{z}^a, \mathrm{r}^h, S) \to \max, \quad (2)$$

where f is the modified function of demand for the book, $a \in A$, $\mathrm{z}^a \in \mathrm{Z}^a, \mathrm{r}^h \in \mathrm{R}^h, S \subset \mathrm{S}^h$.

Since the utility function in problem contains both internal and external variables, the optimization of the library stock acquisition process assumes the use of a set of mathematical models [18].

The solution of the optimization problem (2) for completing the library stock with the popular literature causes difficulties due to the high dimensionality of the space of possible solutions and the complexity of formalizing the

attitude of library users to meeting their information needs. In addition, the managerial decision on acquiring a book $a \in A$ is made by the library management on the basis of reading preferences that are unstable and difficult to predict [19]. Even with the correct interpretation of informational interests of users, there is a time lag in renewing the library stock associated with the funding of purchases and the selection of the required literature. Due to the vagueness of readers' preferences, the complexity of formalizing the attitude of users to meeting their information needs, there is no reason to verify the proposed library stock acquisition model as closed, in the strict sense [20].

To simplify the decision making process of completing a library stock A^h with an edition $a \in A$ let us turn to a model approximation of the proposed optimization problem (2), identifying the most important features of the space of possible solutions and segmenting the readership.

To formalize the identification of the most significant for the readership S^h features of the books, we divide the set Z^a of library characteristics of a book a into three classes. The first class of $Z_1^a = \{z_j\}, j = \overline{1, \lambda_1}$ includes library and bibliographic features that characterize the book a (author, publisher, year of publication, etc.). The second class $Z_2^a = \{z_j\}, j = \overline{1, \lambda_2}$ includes the characteristics of books related to their correspondence to the sections of the library thematic rubricator of the information needs of the readership of the library h (the number of the book editions, etc.) The third class $Z_3^a = \{z_j\}, j = \overline{1, \lambda_3}$ includes the attributes of books, which characterize the attitude of library users to the satisfaction of their informational interests [18].

When identifying the most significant features of books, it should be noted that most of the characteristics (author, edition, etc.) relate to qualitative features, which greatly complicates the use of traditional statistical methods. In addition, the volume of data processed is quite large, since the volume of the library stock and the number of library h users are expressed by sufficiently large numbers even for a small region G.

Localization of significant features of books can be achieved by applying Data Mining methods [21]. To simulate the assessment of the most significant characteristics of the literature of the library h stock, we use the method of decision trees.

The application of the method of decision trees to the problem of classifying the books characteristics allows to reveal the most significant features $Z^a = \left\{ z_i^a \right\}, 1 \le i \le \lambda_a$ for satisfying information needs of the publication $a \in A$.

Due to the limited budgeting for the acquisition of new library stock, we will divide the sections of the thematic rubricator into groups in accordance with the information preferences of library resource users. The division of sections of the thematic rubricator into classes is a rather difficult task due to the fact that the strict formalization of the information interests of the readership to different sections is associated with the complexity of describing a person's attitude to the objects of satisfying information needs [22]. Therefore, an indication of the threshold value of the boundaries of the division into classes of demand from the readership will be required [23]. Taking into account the instability and vagueness of the reader's demand for certain thematic sections of the library *h* literature and the vagueness of the conditions under which the publication is assigned to a specific section, the use of methods and models of the theory of fuzzy sets and fuzzy logic is justified [19]. One of the ways to solve the problem of dividing sections of a thematic rubricator according to information requests is the adaptation of the Leung model of division into trade zones in fuzzy conditions [24].

The modification of the Leung model in the task of dividing a thematic rubricator into groups of informational preferences of library resources users gives reason to unite the sections of the rubricator of the library h according to the degree of importance of information characteristics, presenting the set $\mathcal{R}^h$ in the form:

$$\mathrm{R}^h = \left\{ r_j^h \right\} = \mathrm{R}_1^h \cup \mathrm{R}_2^h \cup ... \cup \mathrm{R}_{\mu_\alpha}^h = \left\{ r_j^i \right\}, \qquad (3)$$

where $j = \overline{1, m_\alpha}, i = \overline{1, \mu_\alpha}, 1 \le \mu_\alpha \le m_\alpha$, $\mathrm{R}_i^h \cap \mathrm{R}_j^h = \varnothing, i \ne j$.

The number of groups μ_α depends on the structure of the library stock, the conjuncture of the library users, as well as the attitude and ways of satisfying the information needs of the readership. Each set R_i^h is a combination $C_{m_\alpha}^k$ of a different number of elements $1 \le k \le m_\alpha$ of the set R^h depending on the information preferences of users.

Dividing sections of the thematic rubricator R^h of the library h stock allows us to aggregate the internal variable r^h. This significantly reduces the

dimension of the decision-making area in the task of optimizing the acquisition of the library stock through acquiring popular library publications $a \in A$.

To preserve the library contingent of the library h, we will make segmentation of the set $\mathrm{S}^h = \left\{ s_j^h \right\}$ into types of users, in relation to which the same library stock acquisition strategy will be used in accordance with the attitude of library users to the problem of satisfying information interests.

Given the competitive nature of the services provided by the library h, method of analyzing strategic alternatives is applied to the task of segmentation of the readership into classes, which makes possible to present the set S^h as

$$\mathrm{S}^h = \left\{ s_j^h \right\} = \mathrm{S}_1^h \cup \mathrm{S}_2^h \cup \mathrm{S}_3^h \cup \ldots \cup \mathrm{S}_{\gamma_\alpha}^h = \cup \mathrm{S}_i^h, \qquad (4)$$

where $j = \overline{1, k_\alpha}, 1 \le \gamma_\alpha \le k_\alpha, \mathrm{S}_i^h \cap \mathrm{S}_j^h = \varnothing, i \ne j$.

Class S_j^h is formed by users s_j^h with the j the way of dealing with the problem of satisfying information interests. The number of classes γ_α may vary depending on the category of library service users and the information attractiveness of the library h, as one of the options for meeting information needs. The introduced classes of the users of library stock S_j^h make it possible to structure a set S^h according to the position of users in relation to the satisfaction of their information interests for a certain period of time. This, in its turn, makes it possible to draw certain conclusions about the potential of readers in consuming the resources of the library h. Using the method of analysis of strategic alternatives in the task of classifying users of the library h in accordance with the relation to the satisfaction of information requests allows us to predict the set S of the most perspective library h users.

On the basis of the conducted merger according to the features similarity and the following identification of the most significant characteristics of books, affecting the function of demand f, we leave one of the most significant features in each group of factors. For the function $f(\mathrm{z}^a, \mathrm{r}^h, S)$ in the task (2) of completing the library stock, the transition to a model approximation will simplify the procedure for making the decision on how to compile the library stock with a book $a \in A$ and will lead to a significant decrease in the dimension of the decision-making area. Thus, the task of acquiring a library stock with literature that satisfies the information needs of users of

library resources can be reduced to the task of optimizing the relevance of a book publication $a \in A$. The modified demand function F depends on the most significant factors representing the formed classes and depending on the most significant features.

$$f(a) = f(z^a, r^h, S) \approx \mathrm{F(z,R,S)} = \mathrm{F}(a), \quad (5)$$

where F is the modified function of demand for the book $a \in A$, $\mathrm{z} \in \mathrm{Z}^a, \mathrm{R} \subset \mathrm{R}^h, \mathrm{S} \subset \mathrm{S}^h$.

The process of a library stock acquisition involves the acquisition of not one, but a sufficiently large number of publications offered by publishers to satisfy the informational interests of readers. In this regard, it is appropriate to designate the *i* th book being acquired, where is the number of titles of the literature being acquired as $a_i, a_i \in A$, where $i = \overline{1, v_\alpha}$ is the number of books acquired. Each edition being acquired $a_i, i = \overline{1, v_\alpha}$, we denote as n_{a_i}. The proposed formalized approach to solving the problem of optimizing the library collection $\mathcal{A}^h$ from the standpoint of maximum satisfying the information needs of different types of users S^h of the library h with popular publications a_i allows us to select a subset $A_0 \subset A$ satisfying the condition:

$$A_0 = \left\{ a_i \in A \middle| \mathrm{F}(a_i) \to \max \right. . \quad (6)$$

When finding the set A_0 in the problem of optimization, in addition to the condition of maximizing the objective function of the relevance of the book a_i, it is necessary to consider the limits imposed by the limited budgeting of the library h. These limits are expressed in the form of conditions for limiting the number of books purchased that meet the largest number of reading preferences on the part of users with the maximum degree of satisfaction of their information needs S^h.

Let $\mathcal{P}$, is the amount of budgeting for the acquisition of the library stock, p_{a_i} is the price for which the library h buys one book a_i, then the limits in the optimization problem will take the form:

$$\sum_{i=1}^{v_\alpha} n_{a_i} \cdot p_{a_i} \le P . \quad (7)$$

Thus, the proposed formalized approach to the task of optimizing the acquisition of the library stock leads to a general mathematical model (5) –

(7) supporting the control decision to replenish the relevant books resources meeting the information needs of different types of users while taking into account the limited budgeting of the library. The task of the process of acquiring library stock that satisfies the information needs of library users is reduced to task of optimizing the relevance of acquired books with funding restrictions.

2. Results and discussion

We use the scientific library of the Orenburg State University As an experimental platform for approbation of the constructed complex model of library stock acquisition, taking into account information preferences of various types of users.

Comprehensive automation of the educational and organizational process allows us to get complete information about all areas of the university, in particular about the library and bibliographic processes.

The most valuable information includes data on educational materials issued, the number of copies of a textbook. The data obtained served as an information base for solving the problem of identifying the characteristics of a demanded textbook by method of data mining.

The task of assessing the relevance of educational literature relates to the task of classification. Localization of factors of demand for educational literature can be achieved by applying data mining methods [21].

To identify the most significant characteristics of popular textbooks, all factors affecting the demand for textbooks are conventionally divided into three groups: bibliographic, educational and organizational, as well as factors related to the attitude of users to the library as a way of obtaining information. When applying this method, it was found that among the compared bibliographic factors the highest priorities are: information about the author (22 %), publishing house (20 %), purpose of the textbook (15 %) and place of publication (13 %); among educational and organizational factors – the recommendation in the curriculum (40 %), the presence of questions for self-study in the curriculum (30 %) and the discipline cycle (19 %). Among other factors, all factors but storage locations have quantitative characteristics, which means that statistical methods can be used to evaluate them. As a result of building a decision tree in the Deductor, it is obtained that only three factors are significant: the number of textbooks (41 %), the year of publication of educational literature (22 %) and the discipline cycle (17 %). These results indicate the need to purchase additional literature, taking into account the year of publication and the place of discipline in the curriculum.

To solve the problem of classifying informational preferences of library users, the Leung model of the distribution of a trading zone in fuzzy conditions has been adapted, taking into account the significant factors affecting the relevance of educational literature [1]. In connection with the constantly changing curricula of specialties and areas of training, which have one general tendency to reduce the share of classroom disciplines by increasing the share of independent work, as well as the specifics of training and the number of students in each department, certain additional requirements are imposed on the subject and number of copies of educational literature. In addition, the motives that guide students when ordering textbooks in the library are very vague. Therefore, the choice of a textbook by students of different faculties to study the same discipline can be viewed as a task set in fuzzy conditions [23]. In this regard, the use of the fuzzy logic tools for its solving is justified [18]. If we introduce the following designations in the modified Leung model: $X = \{x_1, x_2, x_3\}$ – a set of students, $Y = \{y_1, y_2, ..., y_p\}$ – a set of factors influencing the choice of a textbook, $Z = \{z_1, z_2, ..., z_m\}$ – a set of disciplines studied, then $\Phi_R : X \times Y \to [0,1]$ is a membership function of a fuzzy binary relation R, for all $x \in X$, and for all $y \in Y$ $\Phi_R(x, y)$ is priority degree of the feature *y* in the assessment of students of the faculty *x* in determining the importance of the discipline, the threshold value of the priority area of disciplines was calculated to be $l \approx 0{,}837$, which allows defining the boundaries of priority areas of the disciplines studied [1].

The software implementation performed in the Delphi programming environment made it possible to determine the priority levels of the disciplines, that is, to make a ranking of disciplines, educational literature on which should be acquired first. To obtain actual data on the issued educational literature, the software product «The Demand for Educational Literature» was used. The unstable economic and demographic situation in the country forces universities to be competitive. In turn, this is reflected in the activities of their libraries. Since the issue of building a corporate strategy for a scientific library is being considered, the method of analyzing strategic alternatives has been applied to identify faculties that are perspective in terms of compiling the library stock with educational literature in the first place. The activity of students was characterized by the number of books given per student.

In the task of identifying prospects for the use of library resources, all faculties of the OSU were considered: the Faculty of Information Technologies (FIT), the Mathematics Faculty (MF), the Aerospace Institute (AI), the

Transport Faculty (TF), the Faculty of Geology and Geography (FGG), the Faculty of Physics (FPh), Faculty of Philology and Journalism (FPhJ), Faculty of Architecture and Construction (FAC), Faculty of Food Production (FFP), Faculty of Economics and Management (FEM), Faculty of Chemistry and Biology (FChB), Faculty of Electric Power Engineering (FEPE), Faculty of Humanities and Social Sciences (FHSS), Finance and Economics Faculty (FEF), Faculty of Law (FL). Figure shows a bubble diagram of the analysis of strategic alternatives based on the data on issued educational literature.

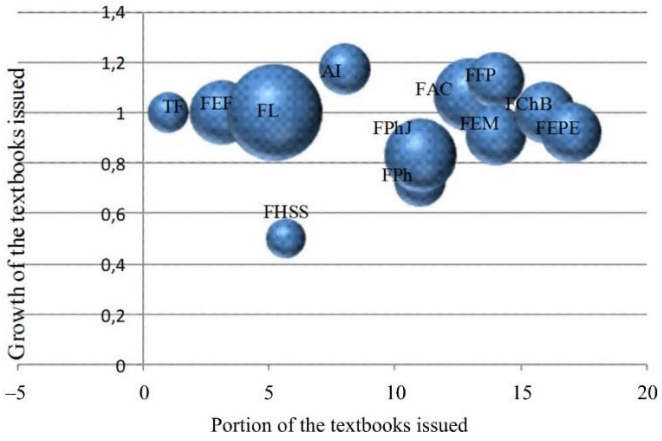

Fig. Diagram of the method of analyzing strategic alternatives

The revealed significant features of the textbooks in demand indicate the need to purchase additional literature, taking into account the year of publication and the place of discipline in the curriculum.

According to the results of the program implementation of the Leung model, it can be concluded that literature in all disciplines, with the exception of psychology, is in demand in all the considered faculties. Literature on psychology is in demand only in the physical and chemical-biological faculties, i.e. this discipline is characterized by scarce demand, which means that the purchase of textbooks on this discipline can be made last.

The analysis of strategic alternatives allows us to conclude that FHSS takes a small market share and has a low growth rate of the use of library resources. That is, this faculty is not perspective for the library, and the most relevant strategy is to acquire textbooks for FHSS last. Faculties of TF, FEF, FL, MF, FGD and AI are characterized by a low market share in the rapidly growing markets of popular educational literature. They require support for the acquisition of additional literature and are perspective in the acquisition

of the library stock. All other faculties, including FAC, FEM, FFP are among the leaders in the rapidly growing market. The educational literature acquired for these faculties will be guaranteed to be in demand. This means that the acquisition of textbooks at the request of teachers of these faculties should be carried out first. No departments with a high market share and low rates of growth in the use of textbooks have been identified among the faculties of the OSU. On the whole, at the university, as a result of applying the methodology of analyzing strategic alternatives, it was found that textbooks are in demand by all faculties.

Conclusion

The library as a socio-economic system that provides services to meet the information needs of the population needs the intellectualization of the control of its processes. As a result of the research, a new approach to the library stock acquisition process was developed. This approach is completely formalized, based on the analysis of information preferences of users and takes into account the limited budgeting for acquiring new publications. A new model of the task of optimizing the demand for acquired library publications has been built. Methods and algorithms have been developed to identify the most significant characteristics of publications and groups of information preferences of the readership. To solve a optimization problem, the most important characteristics of the area of possible values were identified. The method of decision-making support in the control of the library stock is proposed. It allows using the information resources of the library to the fullest extent and satisfying the information preferences of various types of library users as fully as possible.

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