Intelligent Search Engine Development in Designing the Multilevel Model of Academic Library

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Abstract
The directions of communication strategies formation of the academic scientific and technical library are determined grounds on the identified reasons of global proclivity to weakening the educative influence of library institutions. The substances of related works on the library services promotion is analyzed and lack of research completeness the library resources role in effect strengthening of professional career motivation and increasing the prestige of profile specializations the educational institution is shown. Pedagogical approaches for effective public presentation of students' professional accomplishment are substantiated and an original multilevel library model the qualification showcase of achievements in specialty is built within information portal of the academic library, which allowed defining and clarifying functional connections between main educational departments. The components are determined and the data structures are compiled, which are descriptors for further academy knowledge base content analysis; based on these introduced means the profiling of educational information flows has been expanded and bibliographic toolkit of search engine have been developed. The peculiarity of the designed intelligent technology is the inclusion of accepted competencies from education standard for specialty and the accumulation of failed queries for the correct comprehensive automation of communicative stage of prompt provision procedure of targeted professional content with dynamic definition of optimal filtering categories.

Keywords 1
library services, intelligent information technology, search engine, virtual environment, professional achievements, social communications, information literacy, museum pedagogy.

1. Introduction

For a long time, as repositories of intellectual attainment of humankind, recorded in material form, today libraries need to expand their social status. This state of affairs was primarily due to the rapid computerization of virtually all branches of human activity in the twentieth century. At that time, automated catalogues, search means of various flexibility, devices for viewing publications on film began to be widely used in library environments. Thus, at millennium end with Internet development, the library resources have gained a remote access. The types and forms of realization of the offered collections have also been expanded, in particular, requests for audiovisual publications, music tracks and video clips have become popular. Like this, modern cultural and educational media spaces offer systematized clusters of documentary sources in various formats. It is also an active practice to deploy communication platforms to widely engage readers of multifarious social groups and thus disseminate public knowledge. Effective integration of intelligent information technologies for provision of targeted educational services significantly expands the scope of library systems, especially with situational intensification of online education and distance learning during unexpected continued pandemic.

The combination of traditional material resources with digital collections has formed the so-called hybrid libraries, which, along with e-books in common computer formats, also offer facsimiles of particularly valuable edition, mainly in cross-platform postscript description, which is now the open standard. Prompt access to these sources is flexibly provided by the online catalogue controls from the library information portal.

Among stratification of libraries by purpose, the scientific and technical academic library attracts special attention. Library collections are considered an important component of any academic institution, and the quality of book funds and the library environment is one of the criteria for a generalized assessment of the quality of the educational establishment. The primary purpose of the academic library is to provide subjects of the educational process with learning oriented and scientifically researching content. Such support can be implemented directly in the library learning commons hall with unobstructed admission to wireless points and computing or multimedia devices with miracast function. Due to the spread of mobile devices among the end users of the library information product, academic libraries are actively working and involving the intelligent technologies to ensure targeted access to available resources and provided services in the training of highly qualified professionals in various specialties.

2. Analysis of last research and problem statement

Unfortunately, despite these technological efforts, even academic scientific and technical libraries fall under the global trend of declining interest in the use of library services. The main danger of this state of affairs is that without regular processing of bibliographically organized content in overwhelming majority young readers, especially students, do not developing the social and communication aspects of quality information activities, use of information in creating new knowledge, gaining experience in the effective application of information means. In further training, the lack of such basic competencies in information technology culture and absence of ability to analyze and predict the information needs of the subject area inevitably slows down or even eliminates the development of research skills in future professionals, their desire for self-realization, personal self-conscious progress and interest in the chosen field of work. And meanwhile, the intensification of social and informational student activity in the academic library environment is a reflection of the quality of pedagogical services provided by higher education institutions.

2.1. Review of related works

The authors are convinced that directions of communication strategies formation the academic scientific and technical library should be focused primarily on student-centeredness and comprehensive involvement the educational process subjects in obtaining of library resources. This state of affairs will certainly contribute to the activation of cognitive activity of readers and in general will determine their further professional suitability and innovative prestige of the educational institution in training of qualified specialists.

Profiling and assortment in the formation of collections is considered an effective means of popularizing the library department in researches [1-3]: in particular, attracts students' desire for open and accessible course content; the policy of development of library musters in cooperation with the advanced profile institutions and creation of partnership and strategic management systems is offered in [4-6] as a factor in updating the proposed content.

On the other hand, some scientists [7-9] decide to increase the attractiveness of library services through various technological and locational transformations in theirs media space. Thus, the methodology for deploying an interactive platform for creative teamwork widely set out in the sources [10-12]; in particular for blended learning by explorers [13-15]. Also as a complementary means of increasing student interest and attracting social investment through gamification techniques is considered in [16-18].

However, in adduce researches and other sources in full text open access do not pay much attention to the analysis of the problems of attracting available information resources of the academic library and the need to create original library products to enhance the professional career and prestige specializations acquired in this institution. Also, the features of professionally oriented navigation for existing knowledge bases and intelligent software engine for the formation of adequate search queries, which would correlate with the accepted competencies of the educational direction of the authenticated user, are not adequately covered.

2.2. Research of statistics the library services remote using

The library department of higher education institution performs the functions of a social information center to support the training and educative, scientific and pedagogical, administrative and publishing, scientifically and research components of establishment educational activities. In addition to the classic lecture space the academy library is increasingly enhancing its online presence by offering a variety of communication channels. Electronic information products and services of the academic library are centralized on the web portal, which effectively expands the intercourse area and complements traditional forms of service. The information portal is also the main navigation means for remote receipt of bibliographic services by authorized subjects of the educational process. Ease of use of the network resource is determined by the structure of the web portal, the topicality and appropriateness of the provided content, flexibility and sufficiency of hyperlinks.

At millennium beginning, the scientific and technical library of Ukrainian Academy of Printing provided automation of basic bibliographic processes through the inculcation of information system of integrated resource management from developer Ukrainian Stock House. Providing a user interface in browser, mobile and terminal versions, this integrated library system primarily assure real-time access to the electronic catalogue and further intensive work with existing digitized collections indexed in a relational database.

In the presented research by means of original monitoring script of search traffic and profiled attendance of the site topics [19] the statistics of operation of web resources of information portal of the scientific and technical library by authorized users during thirty academic months are analyzed, which is a sufficient sample size. The technique of processing the results includes the compilation and grouping of statistical material according to the job responsibilities of users based on their interest and the percentage of the total duration of processing the content of the main topics of the portal online. The entities of students, postgraduate students, teachers and other employees of the institution were singled out among the users as subjects of the educational process. The analysis of the obtained results (Table 1) showed that student entity, the most numerous among all and dominant in the student-centered educational system, is generally the most active in working with library collections and catalogue as navigation means.

Table 1
Sampling of users activity of library services

Subjects of educational process	Access to catalogue	Work with collections	Acquaintance with novelties	Visiting exhibitions	Feedback
Students	30	40	5	25	0
Postgraduate students	40	45	5	5	5
Teachers	50	23	10	15	2
Other employees	20	35	25	20	0

Also, the highest percentage of interest among other entities it was the students who found in the topic of virtual exhibitions as a powerful tool for educative activity of the library. An interesting result of the students' visit to virtual exhibitions page (apart from obvious subjective perception of calendar and anniversary events and personalized selections) was shown by the sampling of academic specialties (Table 2).

However, the volume of the general set of these specialties, and especially educational and professional programs is quite significant. Therefore, the statistical results were processed in such a way that it was possible to group them by educational directions for compactness.

Table 2
Interest of exhibitions topics in accordance with training areas

Virtual exhibitions topics	Computer Printing Engineering	Economy and Book Business	Publishing and Printing Information Technology
CAD is toolkit of demandable engineer	80	5	15
Copyright and information culture	30	40	30
Development of Slavic encyclopaedistics	15	60	25
Engineers, innovators, inventors	70	10	20
Entertaining facts about Slavic writing system	20	60	20
Evolution of printing means of production	80	10	10
From printing press to desktop publishing	40	25	35
Golden collection of Galician artists	10	20	70
History of the library: from antiquity to the present	15	70	15
Life devoted to the word	10	80	10
My future profession is publisher	20	60	20
Software is language of modern technologies	50	10	40
The art of market management	15	80	15
Unusual ideas of outstanding mathematicians	35	35	30

Table 1 shows that the educational interests of students coincide with their professional area and the greatest interest is caused by the actually around the subject matter. Accordingly, taking into account the results obtained, it is advisable to increase the student presence on the library portal by strengthening the relevant content. Therefore, in the presented study it was decided to focus on detailing existing and creating new professionally oriented web resources to the library information portal. And this in turn implies a sharp increase in the participation of library services in the main stages of professional development of a qualified specialist. So the virtual initiative of the academic library will not only stimulate the acquisition of new knowledge while simultaneous modeling the target educational trajectory, but also encourage students to scientific creativity and promoting the prestige of the chosen specialty.

3. Designing an information and communication platform for professional competencies promotion

Done researches have shown that the deployment of targeted interaction toolkit with the end user and active response to his requests in the library space, along with an adequate and sufficient intelligent system requires the implementation of merchandising technologies in promoting the student professional competencies. In the performing learning exercises process, term design work, on-the-job training, participation in student research, creative competitions, etc. at the leading departments accumulate a professionally oriented material resources that may be of interest not only to performers and scientific adviser. The contents of the explanatory note describing such resources as the bibliography used in their preparation should be available from the academic repository and ought to be indexed in profiled search procedures.

3.1. Substantiation the educational approaches to effective presentation of professional achievements

To promulgation the results of student professional creativity, which are accumulated at the faculties in the form of material artifacts (artworks) of a of one or another educational value, it is proposed to introduce into management system of the academic library [15] the original specialized module *SHOWCASE* with the appropriate item on the library information portal (Figure 1).
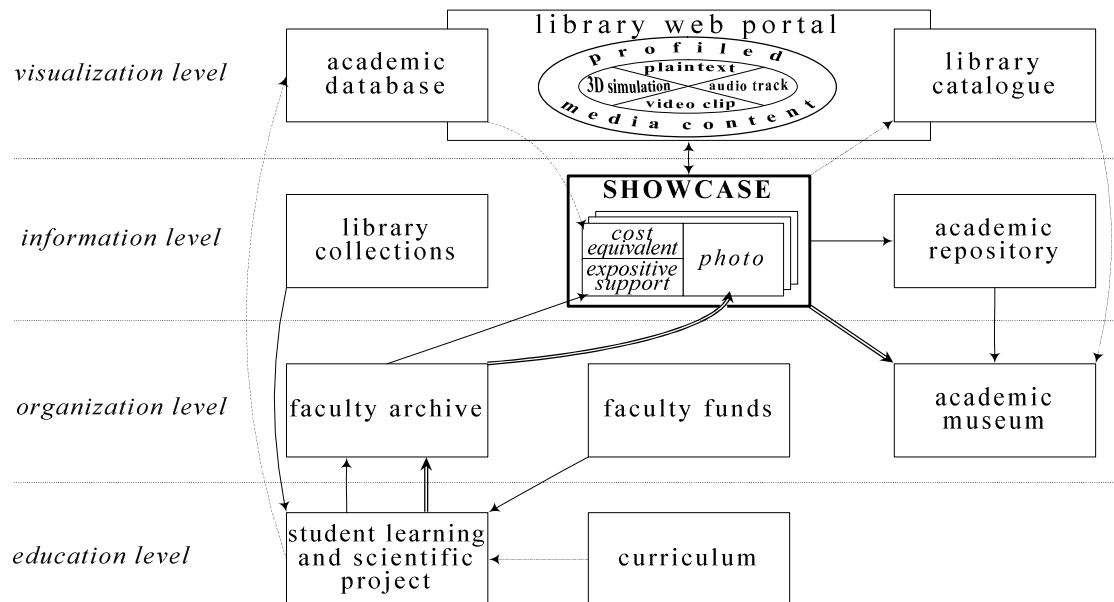

Figure 1: Conceptual library model of qualification showcase of professional achievements

The natural desire of the author to gain recognition for his work and see the possibilities of applying the results will encourage the search for new solutions in the demonstration of professional competencies and offering these solutions to the academic showcase. In addition to the general interest in the achievements of colleagues, such professional creativity will contribute to the promotion of this specialty within the educational institution. And the optimally selected assortment for showcase of professional achievements as an exclusive network product of the academic library will generally advertise the institution in the educational information space, attracting potential employers and entrants wishing to acquire the presented competencies.

It remains for the library staff to focus their activities on identifying ways for optimal interaction between available library resources and the means to implement student professional creativity. The motivational desire to make publish and the ability to present the results of their academic activities should be developed through accessible and flexible toolkit of accompanying decisions. For example, it is advisable to introduce feedback from the author and open discussion of the presented object, augmentation the original author's notice and reviews of potential evaluators, with the inevitable using of existing library collections. In case of special interest, the author can present a clip with the technological process of manufacturing the product, or hold a master class to improve the practical skills of recipients. Such a work, being a separate result of professional creativity, may itself be of educational interest.

In the suggest concept of professional achievements showcase with use of library resources the auction format with a possibility of acquisition of the presented unique author's products prepared by colleagues will bring a game context. To purchase the practical result of scientifically research and learning work of the student in accordance with its cost equivalent, there was a need to introduce a contribution bonus as universal academic exchange means. In the presented research it is offered to form such contribution bonus on the basis of results of activity of potential "buyers" in a public life of educational establishment, in cultural-mass or career guidance work, special successes in learning

and on achievements in sports and amateur performance of academic team and other occasions in the relevant Regulations of the institution. Usually, such bonuses can also be obtained through scientific-innovative (scientific, scientific-technical) creative activity as a result of offering one's own author's products or preparing a proper review of someone else's work. In addition to auctions, a wish mechanism should be provided when the customer describes the type and form of creative outcome he wishes to purchase. Thus, social communication of representatives of various spheres of professional activity is established. Therefore, it is especially momentous for future professionals to define complex professional priorities, mobility in mastering new technologies, the ability to quickly make optimal engineering decisions in a changing environment, the desire to improve professional competencies, using interdisciplinary contacts.

Particular attention is paid to the cataloguing and sorting of the presented material objects of student professional creativity, which should be carried out with a high level of detail to ensure proper fixation of the author's contribution and his further processing by the designed expert system. In addition to such a description of the product and keywords, the subject card form of the item of creative activity also includes links to reviews and accompanying clips with its production, which in turn are stored in the repository of the institution, thus expanding professionally oriented open access library collections. Consequently, for the integration of intelligent information technology for the targeted use of profiled resources in the presented project, the structure of the academic database and library catalogue was clarified and expanded.

3.2. Optimization of personalized information flows structure in the academic space

In passing of organizing the scientific and educational process, the academic environment operates with profiled, dynamically created data flows and target storages of knowledge. When designing a library model of a specialty oriented showcase of professional achievements, it became necessary to make significant changes to educational entities tables set, whose information is used in the presented *SHOWCASE* web module. First of all, the table *SR* of academic achievements of students should be supplemented with a category of identifiers for special results of student professional creativity *ESW*{*Id*}. These results in the form of artworks, which according to the decision of the department represent a particular educational value [20], are recommended for demonstration in the academic showcase. Thus, the information flow from the explanatory note of the creative work (Figure 1, «———▶») enters the faculty archive. Also here in the form of a material flow material artifact is temporarily stored (Figure 1, arc «═══▶»), the presence of which is appropriately recorded in the archival database in the modified table of control documentation Doc^m (1).

$$Doc^m = \{Doc, Lib\{Id_1 \dots Id_k\}, Ph, AddInfo\{context\}\}. \tag{1}$$

In addition to traditional fields of faculty archive *Doc* for especially valuable artwork it was decided to include identifiers of used collections of the academic library *Lib*{*Id*}, the photo *Ph* of material artifact and extended information *AddInfo* on geographical and situational features of public recognition of professional creativity example in context form for memorandum field.

Exactly this corresponding data record from the modified control documentation table Doc^m by the identifier *ESW*{*Id*} is indexed. Numerically expressed opinion of the scientific adviser about perform creative work in academic *mark* shape in the accepted rating distribution of points is reported (Figure 1, arc «------▶») in modified table of academic achievements of the author SR^m with the newly introduced structure student activity type *SAT* (2). Thus, the analytical apparatus of learning documentation service agent of the academic management system receives a sufficient amount of information for automatic generation of electronic journals and other reporting while providing a unified model of homogeneous documents types circulation in higher education establishment.

$$SR^m = \{SR, SAT_k\{ESW\{Id\}, AN, AD\}\}. \tag{2}$$

As follows, the name *AN* and the description *AD* of student activity constitutes the expositive support of professional achievement sample *ShC* presented in the showcase (3). Here, the rating *mark* from the table of academic achievements provides the cost equivalent for a humorous auction to students connect and engage [15, 21] and in the environment of the showcase is processed by the

original pedagogical mechanism of the point converter. Identifiers of existing educational-oriented clips to improve the practical skills *MC* and procedures of artifact making *PP* will facilitate attract attention and increase the popularity of product and its author. It was also decided to include shortcut to particularly successful user reviews *Rw* for the presented product in the created data package, which afford flexibility to search engine indexing items of the designed library intelligent system:

$$ShC = \{SAT, [mark], Ph, MC\{Id_1 \ldots Id_m\}, PP\{Id_1 \ldots Id_p\}, Rw\{Id_1 \ldots Id_r\}\}. \tag{3}$$

Together with the explanatory note file, these clips are stored in the academic repository, integrity united by the theme of the project. A shortcut of prepared reviews and master classes are recorded in the table of academic achievements of respective performers in the considered category of special results of student professional creativity *ESW* (2) with a default mark for such educational activity. Access to such information entity provides a descriptive type of data flow (Figure 1, arc « ⤏ ►») in the form of a structured record with bibliographic items found register, which decided to enter as a separate category for the modified library catalogue Ct^m (4):

$$Ct^m = \{Ct, ShC\{Id\}, Lib\}. \tag{4}$$

For users of library collections who are interested in the presented result of professional creativity, the possibility of direct access to the bibliography [21], which was involved in the preparation of a student learning and scientific project, will be especially convenient. In this manner in particular operational support of the educational process and student research activities is provided by means of convenient intelligent service of automated search of supporting information with the use of advanced bibliographic toolkit in dialogue mode, queries in which in natural language are formulated. As noted, references to the *Lib* sources used are provided from properly indexed faculty documentation database for record the relevant artifact (1).

And, finally, the original result of professional skill physically or virtually becomes an organic exhibit of the academic museum, which is a branch establishment of the museum network with the appropriate profiling of museum pedagogy and provision of relevant museum-educational services. Such man-made exhibits can be comprehensively used for comprehensive mastering of subject area in the process of training future professionals. Demonstrating the results of professional skills of previous students or associates in the academic disciplines is combined with refinement of acquired professional knowledge, and this approach includes educational and scientific components.

The above organization of the pedagogical process obviously cultivates respect for the creative work of colleagues and in general for the chosen profession. On the whole, direct contact better than any abstract lectures allows us to understand the greatness of engineering thought, which contributed to the creation and development of the relevant industry. This provides an understanding of how the chosen field of activity has a positive impact on modern society. Integration into the educational space of the results of student professional craftsmanship contributes to the intensification of the academic process, stimulating the scientific and technical creativity and raising the level of research projects.

The descriptive data package for current exhibit provided by the library catalogue can be used in the implementation of multimedia inserts in lectures and practical study within the adapted academic course, operational demonstration of working models and their basic projections with interactive author's support [15], etc. At independent work of students within the corporate educational network [21], these developed structural models (1) - (4) provide flexible toolkit for formulating a user search query in an intelligent system and further access to the general academic knowledge base. As a result of variable data analysis, the intelligent system ranks the profiled content in form of adequate links according to the end user's queries [22]. However, to obtain such a result, it is necessary to automate the selection of search queries that should be adequate to the educational direction of the recipient.

3.3. Search engine design for intelligent information technology

The development of effective model of the communicative web environment between end users and the academic library took place taking into account the priorities of modern social information processes in general and focusing on the efficiency of library resources in particular. It was decided to implement the communicative space of the professionally oriented showcase within the information portal of the scientific and technical library of the institution.

Software and technological implementation of the media platform in precise involves the use of intelligent search subsystem (Figure 2), which must be organically integrated into the academic knowledge base. To do this, you need to carefully record the results of professional skills and reviews of the attached products. Further recommendations of the intelligent system should be displayed using the accumulated data. When attaching an artifact or searching for ready-made solutions, the information and communication platform identifies and provides optimal filtering categories based on the title and keywords from the description of professional achievements (2) or accompanying information about the item of professional creativity (1).
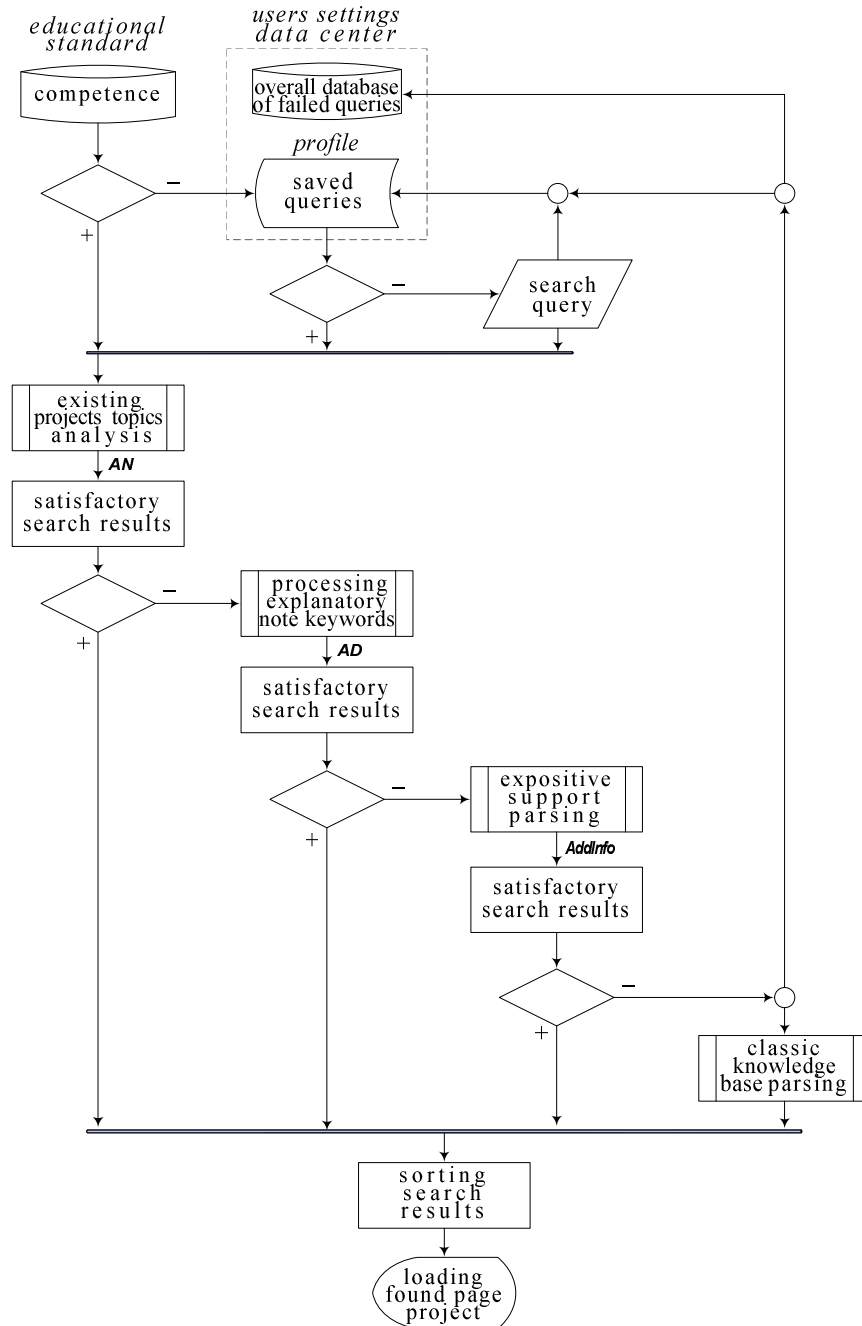

Figure 2: Algorithm of intelligent search the professional skill projects

At the same time, intelligent information technology accumulates search query statistics, while highlighting professionally oriented queries for an authenticated user profile who is a student of ascertain educational course. Professionally oriented queries are identified by the competencies defined by the educational standard of the recipient specialty. It is also advisable to provide the ability to expand the dialogue with user refinement of generated array of previous queries.

Made clarifications are arranged on server of library portal for end user's profile and promptly offered to him at next session. After entering the search query in user's natural language, the information intelligent system performs the fastest search of desired context in educational and research project name and provides an adequate topics sample among registered items of professional skill.

In case if generated result does not satisfy the recipient, this intelligent dialogue offers to continue the searching process among keywords of explanatory note of the project, indexed in control documentation of the faculty archive. The search amidst keywords array will be a bit longer, as semantic load of possible synonyms and homonymous constructions is analyzed. The controls of keywords search window allows to determine the specialization of project and the interdisciplinary links that are implemented in it. The conciseness of keywords to reflect an aspect of content of the explanatory note is determined by their relatively fixed list, but unfortunately the authors often do not follow it properly when registering a project in the relevant fields of the academic database. Such negligence complicates the work of the intelligent search engine and may not provide a sufficiently reliable result. On this to the user is offered the last context search dialogue by meaningful analysis of the accompanying text of the explanatory note as one of the publication apparatus components.

The proposed dialogue proposes to differentiate the search query and clarify it in a dynamic list of adequate qualification characteristics from the standard of higher education. The resulting deterministic list of search results can be accepted or rejected; in the event of rejection, the intelligent system will record the failed search context in the user's profile, as well as pass it to the overall database of failed queries. If in the process of further exploitation of library resources this request is considered successful, it is removed from the database of failed queries and previous users are informed about the found source. And in the presented algorithm (Figure 2) the operation of the search engine by default starts the procedure of the classic full-text corpus crawl directly in the content of explanatory notes and reviews with the analysis of phrases of adjustable length.

The final list of project names found is provided in a dialogue with limited toolkit. The priority of sorting the search output S_p is determined by the sum of entered coefficients of each current search result and after the determination performs sorting in descending order (5):

$$S_p = k_n \frac{S_t}{k_t} + g_{koef} \frac{1}{g_{loc}} + k_{mv} + k_{vs} + k_{ret} S_{ret}. \tag{5}$$

The search type coefficient is determined by the ratio S_t of search type, which characterizes the position in search output by type, to the importance coefficient k_t of search type, as well as the product with the availability k_n coefficient, which depending on the search mode (separate or compound) takes the values 0 and 1, respectively. The geolocation coefficient is determined by product of the geolocation importance coefficient g_{koef} and g_{loc} of the inverse distance of the geolocation position of the desired project (in the archive of the faculty) from the final recipient. The pre-visit coefficient k_{mv} characterizes the number of previous repeated successful queries with a similar output and depends on the number of saved queries. The coefficient of conformity of the specialty k_{vs} determines how close the specialty of the recipient is to the specialty of the query result: the closer the specialty is according to the list of correspondences adopted in the educational standard, the higher this coefficient is. To determine the coefficient of competence, the product of the rating of the author of the project from the search engine S_{ret} and the rating coefficient k_{ret} is used.

In general, there was only a sorting procedure, which determines the alternative choice of search results. Thus, next to the standard ordering categories by alphabet, date of submission, relevance, and cost equivalent, in the presented intelligent information technology also implements sorting by project specialization, by author and scientific adviser. The selected topic initiates the loading of the page of the eponymous project environment of the academic professional achievements showcase.

4. Experiment and results

The developed data structures (1) - (4) and the built intelligent search engine that takes into account competencies (Figure 1) are the basis of the environment of specialty oriented showcase of professional achievements. This environment is called from information portal main menu of the scientific and technical library the Ukrainian Academy of Printing (Figure 3).
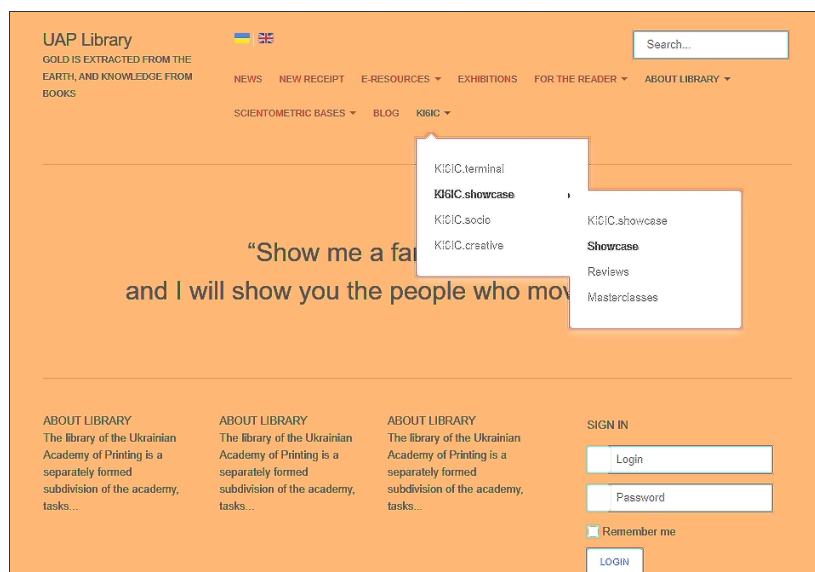
Figure 3: Information portal of scientific and technical library with showcase run menu

Depending on the type of authenticated profile (Table 1), the end user will be granted the appropriate privilege in the loaded homepage of the academic showcase (Figure 4).
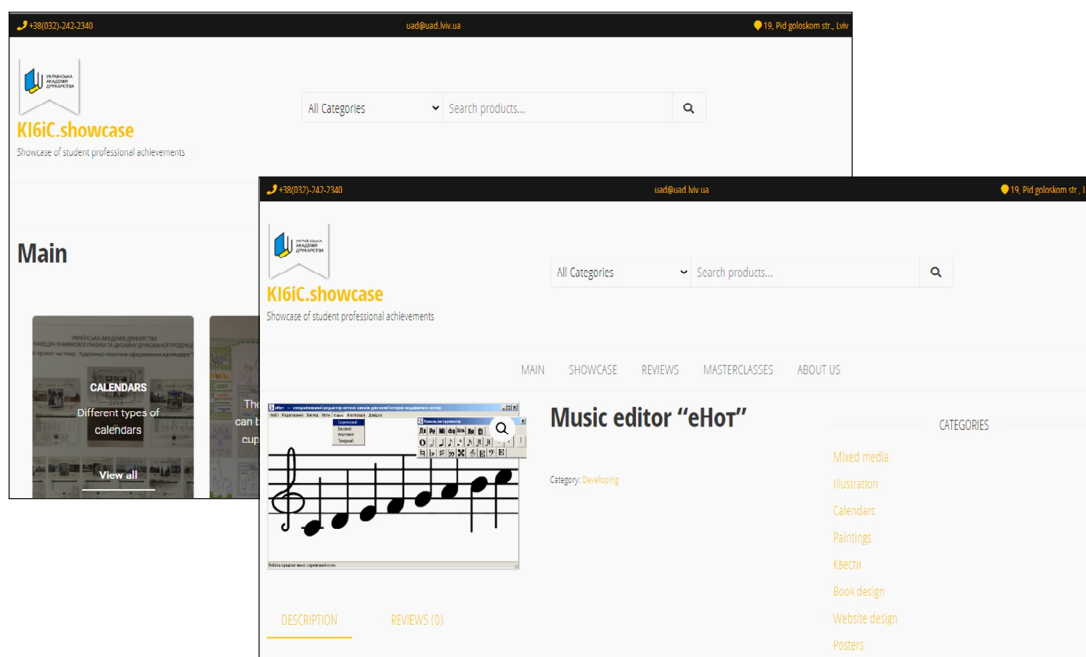

Figure 4: Pages of qualification showcase of professional achievements

Further monitoring of the library portal showed a rapid increase in its popularity among students after the integration of the developed showcase of professional achievements (Figure 5) in September 2019. In general, the monitoring results are situationally divided into three triads, separated by the period of academic vacations.

The two initial triads show a gradual increase in attendance of almost all key pages of the information resource since September, which coincides with the beginning of the academic year. The closer to the period of control measures and the subsequent summing up of the semester learning work, then torrentially is the growth of attendance. These local maxima on user activity for the pages of catalogs and library collections are particularly clearly illustrated.

Further there is a decline in activity during the winter holidays, when library services are used only by loyal readers. And again an attendance of the digital catalog and collections gradually increases with of spring semester beginning. Then there may be recessions due to the Easter holidays.
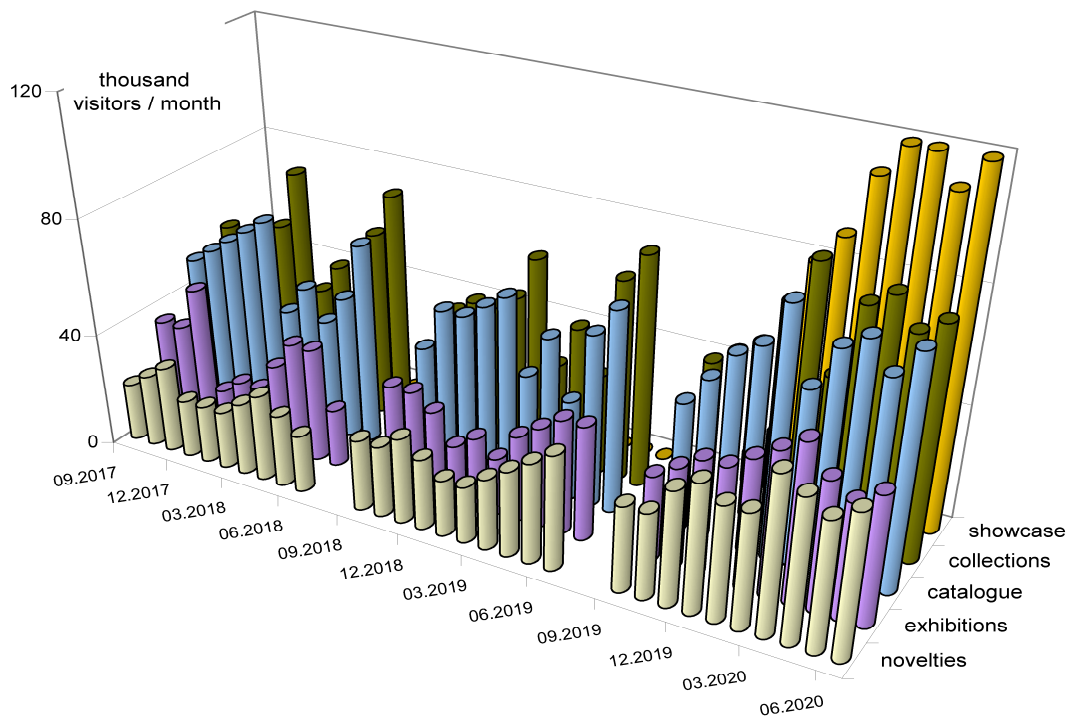
Figure 5: Monitoring the total attendance of main pages the library information portal

However, at the end of the spring semesters, the attendance rates on all pages are higher than in the same period of the autumn semesters. This is due to the growing activity of entrants who are looking for an education institution to obtain the chosen specialty and are naturally interested in the functioning of all academic departments. In the two initial triads, the level of attendance of student achievement showcase is kept at zero, because such a page did not exist at that time.

With the introduction of the academic showcase environment (the last triad) there was an intensive informing of portal visitors by sending messages in the enterprise network [21] and by means of information banner on the library portal home page. And in November 2019, the attendance of the showcase environment showed a local maximum, which was not observed for the entire previous monitoring period for other topics. Moreover, the above diagram evidence that attendance has increased not only for the pages of the attached module, but also for other key pages of the portal (Table 1). However, it is necessary to recognize the obvious growth in the portal popularity during the quarantine period associated with the introduction of distance learning in March 2020. Howsoever, despite such an involuntary and insignificant error of the experiment, the obtained results clearly reflect the effectiveness of the applied pedagogical solution for the presentation of student professional achievements and popularization of the chosen specialty together with the promotion of the academic scientific and technical library.

5. Conclusions

Accordingly, the expediency of promoting original professionally oriented web services to motivate scientific creativity and professional development of a qualified specialist was tested by studying the popularity of various library information resources among students. This allowed providing access to the concluded library model of qualification showcase of professional attainment in the site map of the academic library. By organically reconciling educational-oriented data flows between faculty archives, the academic repository, and library collections, the presented concept of the academic showcase provides a convenient opportunity to enhance professional competencies through interdisciplinary connections. A favorable feature of the created model is the encouragement of accompanying educational and scientific activity of students in the form of preparation of technological clips, author's master classes and evaluation reviews, which is fully provided

by presented analytical models of profiled information flows of the library environment. As noted, for this purpose, the structures in the academic database have been target modified which cover and link the faculty control documentation, the table of student academic achievements and library catalogue.

Therefore, along with the expansion and refinement of existing data structures in the academic information space introduced a separate new data structure to record the exceptional educational and scientific professional achievements of the student, the description and accompanying materials of which are stored in a carefully indexed repository. This state of affairs made it possible to expand the boundaries of professional experience transformation on basis of an interdisciplinary and polytechnic approach through the pedagogical process in condition of academic museum environment. The developed analytical models of support of indexed categories of educational process realize fast search of relevant documents on algorithmically selected search query and operative selection of professionally oriented content from academic base of knowledge which is realized by the integrated software engine. The self-sufficiency of this engine allows you to perform search functions and manage the content of the showcase site, which makes it a full-fledged core of the designed intelligent information technology.

Further amplification of the concept of craftsmanship showcase within the provision of library services should focus on improving and specialized the spelling filter for the stage of entering the search query, taking into instructions of adopted educational standards. Also, the formalization of search queries and their maximum approximation to natural language, considering the terminology of various specialties of the educational institution will expand the algorithm of the software engine operation and improve the interpretation of the found content. Further targeted improvement of logical and mathematical support for the connection of unoccupied educational departments will clarify the boundaries of interdisciplinary links implementation, increase the efficiency of educational-oriented resources use and allow applying comprehensively the presented intellectual information technology for exploration of network activity efficiency of web resources of the academic scientific and technical library.

6. Acknowledgements

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