Methods for forming an informational image of a higher education institution

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Abstract

The paper is dedicated to the issues connected with the informational activity of a Higher Education Institution. The methods of acquiring and maintaining a complete informational image of a Higher Education Institution are devised. The ways of a Higher Education Institution positive informational image protection are elaborated. The following stages of an informational image forming are considered: forming of the catalogue of Higher Education Institution units that perform informational activity, forming of the comprehensive thematic description of a Higher Education Institution, forming of the comprehensive register of information potential of a Higher Education Institution, search and identification of information an image generators and existing information image fragments, forming of the structure of the social and informational interfaces system, planning the entrance in generators, preparation of informational resource, entering in generators, realization of social and informational interfaces system, permanent informational activity, comprehensive verification of results.

Keywords

Introduction

Development of the informational society has great influence on various aspects of our life. Information activities penetrated all spheres of our life. It is of great importance for HEI (Higher Education Institution) to provide prompt, up-to-date, accurate, unambiguous, objective, and comprehensive information about its scientific and educational activities. In the modern era when news can travel at the same speed as light, it is critical to have guidelines for faculty, students and staff who deliver HEI business related information to the media and the general public. It is significant for a HEI to gain competitive advantage and become respectful and reference of a decent. Widespread public recognition will benefit a HEI in multiple ways. Therefore, obtaining a complete informational image is paramount for university as it is bedrock for successful informational campaigns and popularity of a Higher Education Institution.

As a result arose a problem of bridging a gap between the Higher Education Institution employees and members interested in HEI's current events, policy, development directions, etc. Considering the great deal of communication that happens by means of the Internet, social networks were decided to be the perfect platform for accomplishing information conveying tasks. Entering social networks to ensure information a dynamically delivery of information to the interested. The process of forming the complete informational image of a Higher Education Institution is scrutinized and elaborated. When put into practice, methods presented in the paper ensure that Higher Education Institution's informational image is complete, consistent and straightforward.

Stages of building the complete image of a Higher Education Institution

The informational image of a Higher Education Institution (Korzh & Peleshchyshyn, 2013a) can be formed in a natural way, without any interference in the process. However, one of the negative outcomes of Higher Education Institution's inactivity is incompleteness of the image. The image is complete, when it contains components for every unit, which possesses an information potential. Put it differently, to obtain a complete image of a Higher Education Institution all gaps in its activities directions should be closed.

The process of HEI's complete image forming is multistage and continuous. It involves units performing information activities in communities (Peleshchyshyn et al., 2014), administration accomplishing project management as well as technical and communication services for a project support. Among the factors that influence the process and determines its stages are:
- o general characteristics of a Higher Education Institution;
- o sufficient number of highly qualified personnel;
- o presence, authority and resources of administrative and support units;
- o existence of a common opinion of a Higher Education Institution;

existence of hostile and aggressive to a Higher Education Institution groups in social communities. Despite the peculiarities of every Higher Education Institution, in general the process of a complete image forming consists of the following key stages:

- Forming of the catalogue of Higher Education Institution units that perform informational activity (Korzh et al., 2014)
- Forming of the comprehensive thematic description of a HEI as a system of units
- Forming of the comprehensive register of Higher Education Institution information potential
- Search and identification of information image generators and existing information image fragments
- Forming of the structure of social and informational interfaces system
- Planning the entrance in generators
- Preparation of informational resource
- Entering in generators, realization of social and informational interfaces system
- Permanent informational activity (Korzh & Peleshchyshyn, 2013b)
- Comprehensive verification of results

Different realization of every stage are possible, thereafter exist different strategies of the whole algorithm. Each stage is affords-consuming, therefore it is reasonable to make the process partially automated and in this way to improve the quality of interim result and decrease routine actions. We will provide full characteristic of each process later, but in brief:

- Stages of **forming the catalogue of units** and **forming the comprehensive description of a Higher Education Institution** are preliminary. On these stages an assessment of organizational structure of HEI considering its informational activity is carried out.

- Stages of **search and identification of generators, forming social and informational interfaces, planning entering them** are stages, when the comprehensive plan of particular measures in an informational image forming are designed. On these stages the search of generators in the Internet is carried out, as well as basic features of generators are determined. The gained information compared with the HEI structure is the input data for algorithms of finding quasi-optimal ways of assignment practical tasks between units.

- The stage of **information resource preparation** is an interim between stages of planning and direct communication. On this stage are taken measures on preparing to existing on units potential to readiness to place in social communities. Opposite to previous stages the task is solved be the brighter circle of unit`s employee according to an agreed upon plan.

- The stage of **entering generators of information content** is a key stage of HEI`s communicative activity organization. On this stage the communication between units representatives takes place (according to approved on previous social communities. Generators, which were successfully entered, acquire status of social and informational HEI interfaces.

- The stage of **permanent information activity** is the greatest stage of a Higher Education Institution complete image forming. In terms of duration at this stage all competences are involved; the operations are carried out according to assigning social and informational interfaces.

- **Comprehensive verification of results** is an end stage of a general circle of an information activity in HEI lifecycle. On this stage the effectiveness of information activity is checked and figures of the formed informational image. The verification results are taken into

account when moving to initial stages to clarify or completely re-design the existing scheme of informational activity.

The general duration of the general cycle of the Higher Education Institution informational activity is less than 1 year. In reality they could vary in 1, 2 or 3 years.

The protection of an informational image of a Higher Education Institution in terms of its forming
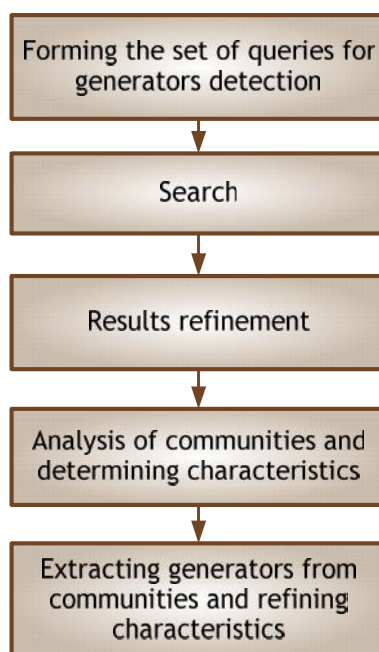
The protection of the HEI informational image belongs to tasks of protection subject from discrediting. Taking into account factors, the optimal method of an informational image protection is the early planning of forming a resistant to malicious acts image with continuous monitoring of external space, designed to detect hazards on early stages and fast and effective reaction on them. Protection from aggression is a comprehensive multistage process, which has following stages:

o detection;
o analysis and establishment of priority;
o resistance;
o monitoring.

The process of protection from aggression corresponds to the process of informational image forming of the Higher Education Institution. Taken the process of forming of informational image of a Higher Education Institution as a basic, we can match some elements of the mentioned about processes.

Search and identification of generators and existing fragments of an informational image

The goal of this task is to form a catalogue of generators of an informational image and detect existing mentioning of Higher Education Institution, which could be treated as fragments of informational an image. An important step in this stage is determining communities' characteristics according to their formal modal. The main stages are presented in the Figure 1.

Figure 1. The stage of search and identification of generators and informational image elements

Formation of the set of queries and search

Generators detection is based on the model of thematic of units of Higher Education Institution, which form required for search queries base. There are two ways of search realization:

  o using of specialized search engines belonging to a Higher Education Institution or hired ones;
  o using of global search engines or systems for search in social networks with forming specific extended queries.

Considering technological complexity and high development costs of the first class systems implementation and operation, it is reasonable for most HEIs to use for search existing global search engines. As stated above, the peculiar feature of critical information on universities is high levels of dispersion within web communities (Peleshchyshyn et al., 2012). Thus, unlike professionally-oriented thematics, thematics of studying at a university is typical for most forums with general thematics (in Ukraine there are thousands of such forums) and for online mass media (with the possibility of commenting) and blogs.

The principal restrictions on the usage of currently available search tools, namely the general ranking of all results according to indices of formal citation with the limited number of results (no more than 1000) causes the loss of more than 90% of valuable links. Similarly, comments to mass media usually "settle" in the archives, which lead to losing positions in the first thousand results.

To avoid this restriction, it is necessary to exploit an extended queries language to search engines with the possibility of search restrictions, communities identification, etc. In practice, such systems are an efficient instrument (in terms of quality and volume of the results) provided we use formal approaches to search requests construction, with the predefined structure and sources for the separate components of such requests. In other words in case of presence of:

  o certain templates, which are filled with certain content;
  o thematic description of a Higher Education Institution, which is the source of parameters for queries content.

Such conditions make possible not only formalization and algorithmization of the queries forming process, but also an automatic queries generation. The overall scheme of search queries forming is depicted in the Figure 2.
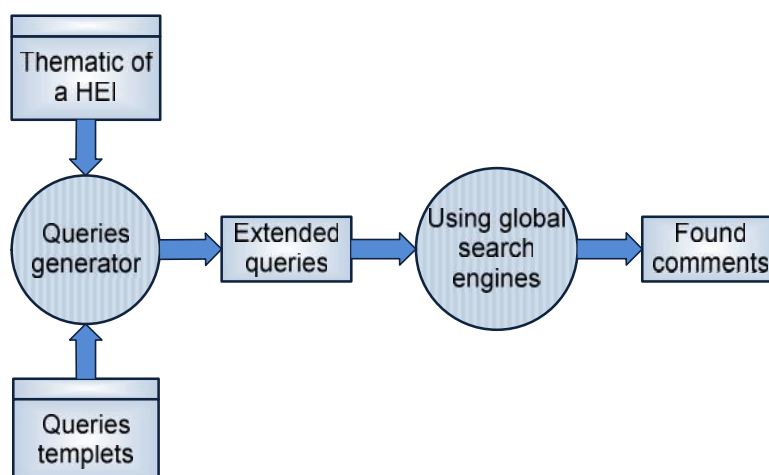
Figure 2. The overall mechanism of generators search in the Internet

Thematics of a HEI is formed from the following characteristics "General thematic section," "Refined thematic section" and "List of relevant terms" in the formal model of HEI units. Global search engines usages does not completely substitute development and usages of special software, which main functions are:

- o accounting and accumulation of search terms;
- o automatic generation of queries for search by means of global search engines;
- o interaction with of global search engines;
- o parsing and storing of results.

Search results refinement

The result of the search for communities that could be generators of an informational image of a HEI, is an array of Internet addresses of different kinds of pages, which are relevant to the thematic of a HEI, but significant share of results (in practice - prevailing) is unnecessary, in particular because of:

- o duplicating of a found source;
- o existence of pages that are not pages of communities;
- o existence of pages that contain search terms in different context;
- o existence of search spam;
- o technical peculiarities and mistakes in search engines algorithms;
- o ambiguity of requests forming.

At the current stage of search engines development the presence of unnecessary results is imminent. Amount of information noise can be reduced by formulation of search queries with more precisely defined search area and additional search parameters. The correct strategy is to increase the number of specified requests instead of using a small number of requests without proper specification. Theoretically, the increase can be in dozens of times, but lead would lead to similar information noise reduce.

Provided the formulation of specified request is carried out according to formal construction procedures the affords consumption is much lower than when removing information noise from the search results.

*For example, to search for communities thematically close to the "Accounting" educational direction, can be used search phrases based on the phrase "**financial statements**". However, it is better to use as a basis for query the phrase "**statement of comprehensive income**", "**cash flow statement**", "**report on equity**" as they are more specialized.*

Similarly, to search for communities with the telecommunication thematic (relevant to educational direction "Telecommunications") instead of search queries based on the term "router" it is better to use specified phrases that include the manufacturer name, router model or network standard.

Communities analysis aimed at determining their characteristics

The next step is in the process of generators detection is the analysis of communities and determination of their characteristics. Definition of indicators should be carried in expert way on the basis of a unified methodology for each type of community platform (Fedushko, 2014; Syerov et

al., 2013). Expert determination process is quite efforts consuming, however given that in practice the number of relevant communities does not exceed a few hundred, it is not impossible to be fulfilled manually.

Some indicators can be detected automatically by means of computer analysis separate pages of the community (parsing). In particular this concerns identification of volume and intensity characteristics (Fedushko et al., 2013). For the parsing it is enough the existing software and software libraries of texts processing, but is also necessary the formation of search templates (patterns), which are used in the process of extracting relevant information from texts. Nowadays it is reasonable to use templates of regexp format, described in the documentation of PERL language and are used practically in all high-level languages and specified software. Patterns are formed for each community platform separately. For proprietary and rare platforms forming templates and automated determination is not reasonable.

Extracting generators from communities

As a result of fulfilling preceding steps is obtained a set of communities that could be used as platforms for forming an informational image of a HEI. However, as it was stated above, for large communities it is necessary to determine the segment for informational activity, in other words determine the generator of the HEI informational image. This step requires software for systematization and storing large volumes of text data and functions that are listed in the description of the previous stage. The sequence of steps for determining generator is presented further:
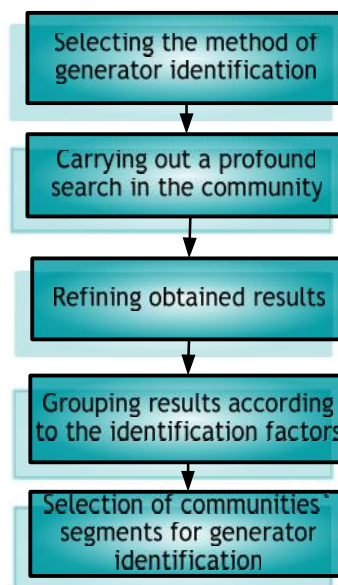

Figure 3. Determining the generator in a community

Selection of the method of generator identification is carried out by an expert according to the type of platform and the platform on which a community operates and other, less formal characteristics of the content and methods of navigating for guests.

Conducting a profound search in a community provides the detection of majority of discussions, which could be constitutes of an informational image of HEI and their storage in a database. Such a search can be carried out by search means of communities, or specialized search engines, or using technology of deep localized on site search by global search engines using the appropriate software.
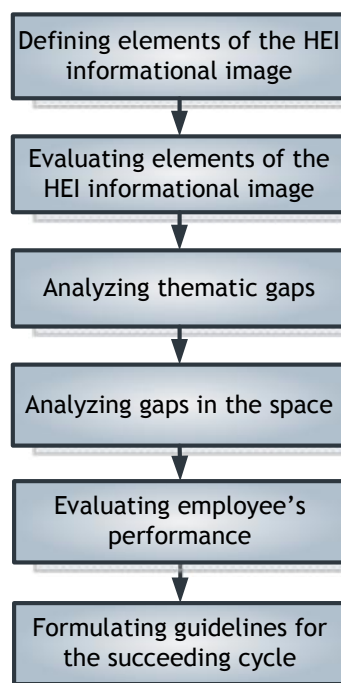
Refining the obtained results should provide removal of secondary pages (can be done automatically) and discussions are irrelevant to universities and entered selection accidently (for partial automation stage required specialized software for semantic analysis of texts).

Grouping results is carried out by the determined identification feature. Each group corresponds to a segment of the community. This allows in the next step to make the **selection of the community segments to identify generator**. The segments:
- o   correspond to those results groups, which have a large amount of discussions;
- o   the relevant discussions should constituted a large part of segment.

Comprehensive verification of results

At the stage of comprehensive verification of results is exercise control of informational activity efficiency and of formed informational image indices. The verification of results ends the general cycle of the HEI informational activity and takes place a transition to initial stages in order to refine or re-engineer an existing scheme of informational activity.

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┌─────────────────────────────┐
│ Defining elements of the HEI│
│     informational image     │
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              │
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┌─────────────────────────────┐
│   Evaluating elements of the│
│   HEI informational image   │
└─────────────────────────────┘
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              ▼
┌─────────────────────────────┐
│   Analyzing thematic gaps   │
└─────────────────────────────┘
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│  Analyzing gaps in the space│
└─────────────────────────────┘
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┌─────────────────────────────┐
│     Evaluating employee's   │
│         performance         │
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┌─────────────────────────────┐
│  Formulating guidelines for │
│    the succeeding cycle     │
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Figure 4. The stage of comprehensive verification of results

Defining the elements of the informational image of a Higher Education Institution lies in registration of discussion that constituted an informational image this is achieved by:
- o   registering discussions, where representatives of units act in assigned to them generators;
- o   search for discussions, in which issues are conferred without HEI's representatives.

Evaluating elements of the HEI informational image for every discussion involves:
- o   evaluation of a discussion tonality in terms of communicative activity of the representative of a Higher Education Institution;
- o   valuation of a discussion tonality in terms of assessing HEI performance.

It is reasonable to conduct **evaluation of tonality** with the help of specialized software of opinion and sentiment analyze. Although, due to the complexity of determination of the context of the

tonality it is impossible to provide a high level of automation of the process, predetermined tonalities decreases the amount of the mundane work of operators to a large extent.

Analysis of thematic gaps is necessary for identifying insufficiently covered thematic areas of a HEI within its informational image. Thematic areas referred to as insufficiently covered are characterized with:
- o absence of informational image elements related to frequently used terms;
- o effective discussions slightly cover the discussed issue.

The first characteristic feature of thematic gaps can be indicated by means of automated search in online communities. The second one, only in case of a thorough analysis conducted by a specialist. Therefore it is reasonable to apply it selectively (for the most popular terms of every thematic for approximately 10% of discussions). Analysis of gaps in space is exploited for identifying relevant online communities with a high level of importance, in which a HEI does not carry out informational activity. The major problems of such gaps are:
- o shortcomings in units performance (unaccomplished tasks of entering a generator and acting in it). In this case taking administrative measures towards a unit is necessary;
- o arising of new significant communities. If so, the analysis and new assignment of responsibility areas is obligatory.

Analysis of gaps is realized by means of automated search in online communities. Virtually search for communities is carried out on the previous step and on this step presence of Higher Education Institution representatives in communities is controlled.

Evaluation of employees performance is accomplished by the HEI administration (namely by PR-unit). Taking into account considerable amount of materials, that could be checked, evaluation can be carried out selectively. Certain aspects can undergo automatic evaluation by means of opinion mining and sentiment analysis software class. The performance is analyzed from the following perspectives:
- o productivity of material publishing – evaluation of the fraction of informational potential that transforms into the image (capability and efficiency of an employee is assessed).
- o informational efficiency – value of consultations for the community, its adequacy, completeness and quality (employees competence is assessed).
- o Communicative efficiency – the attitude to a representative, absence of negative estimations of his/her actions (employees ability to communicate is assessed).

Evaluation of results is the basis for the formation of guidelines for changing employees or sending on training (in the case of low estimations), or rewarding them and providing with bonuses in case of high estimations. Formulating guidelines for the succeeding cycle determines the character of HEI actions to the initial stages of a new cycle. Guidelines refer to each stage separately and complement the input information of the previous stage. There are following classes of guidelines:
- o refining – necessity to develop certain direction or fulfill a task more thoroughly (for instance restricting the list of certain thematic terms);
- o modification – need to change some interim task, yet make no changes in the main task (for example changing terms of a thematic as a result of technologies update);
- o elimination – removal of tasks or interim tasks (for instance removal of a community from the set of generators because of its degradation, removal of the thematic due to lose of its significance for the society).

Conclusion

In this paper stages of the process of forming HEI informational image are determined and suggested methods of their realization. Besides, the issue of stages of the process of protecting an informational image of a Higher Education Institution is considered. The stages are classified into preparatory stages, planning stages, permanent informational activity and comprehensive verification of results. The whole multistage process has a cyclic nature. An approximate duration of the one general cycle of the Higher Education Institution informational activity lasts more than a year. In practice it could also continue for 1, 2 or 3 years. Interaction between the units of different types (administrative, PR-service and basic) and the degree of interaction with social networks in the Internet are the characteristic features of every stage. The informational interaction between stages themselves and formal model as well is demonstrated.

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