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INFORMATION MODEL OF THE ELECTRONIC ENCYCLOPEDIA ENTRY (ARTICLE)

The article presents a formal description of the encyclopedic entry structure and provides a basic model of the encyclopedic article (entry). It is carried out its analysis and proposed the optimal approach and requirements.

Keywords: electronic encyclopedia, encyclopedic content, information model, encyclopedic entry

Introduction of Issue

Today, the Internet is the largest source of information for the majority of people. Despite the fact that there are offered a variety of information resources in the Internet not all of them are informative and do not respond properly to the needs of the user. Among them a worthy place takes the electronic encyclopedia as the standard of knowledge. Therefore, most of reference information refers to the electronic encyclopedias.

Encyclopedias are of various thematic directions, in particular, there are also electronic encyclopedia of higher educational institutions. Encyclopedia of educational institution is an educational resource that informs the stakeholders (university entrants, parents, lecturers, students, etc.) on educational services, scientific achievements, research, events, international cooperation.

Considering the appropriate content formation of the electronic encyclopedia of educational institution, the primary task is to establish the basic requirements for the creation of the encyclopedia articles as the essential components of the content.

Recent Research Analysis

The universal scheme of the encyclopedic concept interpretation contains the following information blocks [3, p. 17]:

- definition, which is normally accompanied by the etymological origin;
- detailed, extensive information about the nature and structure of the concept;
- characteristics of the component or objects falling within the scope of the concept, or within its influence;
- additional standard and nonstandard concept properties;
- information about the presence of the concept to be explained in different contexts (e.g., the application);
- modifications, versions;
- development prospects;
- information about the genesis and evolution of the concept;
- demonstration of the way through which the knowledge about the concept is received;
- discussions about the concept knowledge (for example, regarding the interpretation of the concept in various schools, directions and etc.);
- illustrations;
- examples.

Generally each encyclopedic article should conform to the following requirements:

- definition of the heading word or word combination; disclosure of the reality contents and coverage of all aspects;
- objective material (no emotional coloring and personal point of view);

- scientific quality (information from scientific and verified sources, in most cases from articles, manuals, books and appliances, monographs, occasionally from other encyclopaedias);
- consistency of the material presentation (maximally is provided by the prior design of the article structure on pre-defined categories);
- topicality of the information provided constant updates and additions;
- completeness of the material due to the maximum comprehension without further recourse to other literary sources except for the bibliographical references;
- a system of cross-references and bibliographical references that promotes the consistent and versatile covering of the defined topics (but a lot of cross-references within the same article contradicts the reference character of the information and simplicity of the encyclopedia);
- a wide range of information, including: text, graphs, tables, charts, various images, audio and video materials for the rapid information mastering;
- compliance with the target purpose of the encyclopedia (target audience of the edition and for what purpose users use it);
- encyclopedic style of the material presentation, which is characterized by briefness, conciseness, topic presentation without spoken words, copyright neologisms, known abbreviations, contractions of the term with its repeated use.

Encyclopedic entry material in the simplicity should be calculated for the amateur, while the depth of the disclosure of the article content – for the specialist in this or a related disciplines.

An integral part of every encyclopedic article is a hyperlink. The following hyperlinks are distinguished:
- contact (information required for the feedback);
- bibliographic (a reference to those information sources that are not used in the article, but enable to study the topic in different interpretations);
- hyperlink to the primary source of information (the author of the article is guided by the materials of the source and refers to it for detailed coverage of issue);
- navigational hyperlinks (navigation within the entry by sections);
- descriptive and illustrative hyperlink (a reference to the description of specific phenomena, events, etc).

In view of the foregoing, hyperlinks, in turn, set the following groups of links between the units of the hypertext:
- with more precise specification (hyperlink allows the user to explore the specific topic with the detailed amendments);
- the expansion of the topic (hyperlinks give the topic development in a different light);
- mixed group of links (combination of the previous two groups: clarifying and expanding of the topic);
- links that do not carry new information (the same information that is slightly different in wording or translation of the same information) [1].

To implement the above requirements it should be taken into account Dublin Core Metadata Initiative (DCMI). It is a format of the resource description on the Internet.

This standard contains 15 sets of metadata with the appropriate qualifiers and offers rules of the description of general characteristics of the electronic information resources. So, designing this standard for the electronic encyclopedia article, consider Table1 [4].

Table 1

Dublin Core elements in the context of electronic encyclopedia article

Description aspect	Metadata	Content
Resource content	Title	Title of the encyclopedic entry or heading word (word combination)
	Subject	Subject area of the encyclopedia / classifier (category)
	Description	Disclosure of the heading word (word combination) content and the most important aspects

	Type	Type of the encyclopedic entry (in particular it is distinguished: review article, reference article, commentary article and hyperlink article)
	Source	Information about secondary source, which is implemented using bibliographic references
	Relation	Identifier of the secondary resource and its link with the resource that is realized by means of cross-references
Intellectual property	Creator	A legal entity responsible for the content of the encyclopedic articles
	Publisher	In case of the electronic encyclopedia – developer – a legal entity responsible for the creation of the encyclopedia (primary intellectual responsibility)
	Contributor	Entities that are not the authors but made a significant intellectual contribution to the creation of encyclopedic articles (addition or editing of an existing article)
	Rights management	Approval and management of copyright
	Coverage	Spatial and temporal characteristics of the intellectual content of the encyclopedia article
State	Date	Date of the publication or editing of the particular encyclopedic entry (in available format)
	Format	Format of the electronic encyclopedia content (type of the software, type of the computer, other devices that may be needed for a functioning of the encyclopedia)
	Identifier	Domain name of the electronic encyclopedia
	Language	Language covered the encyclopedic content

Thus, the use of the Dublin Core allows to allocate a lot of potential information units to form the electronic encyclopedia articles and determine their characteristics.

There are four types of encyclopedic articles [2]:

1) review article (the largest by volume; thoroughly reveal the topic; detailed, with historical overview, statistical information, lists of recommended sources reveal the most important issues of the topic; the most suitable for the electronic encyclopedias as there are no restrictions on the volume of the articles);

2) reference article (covering narrower, more specific topics, mostly inform readers about the current status of the issue, avoid historical overview, does not always provide lists of recommended literature);

3) commentary article (is composed of two parts: the definition of the heading word and etymological reference if the word of foreign origin; rarely is accompanied by other reference materials);

4) hyperlink article (with auxiliary value; direct the reader to another article by cross-references).

Despite all the above requirements, the structure of the electronic encyclopedia article of educational institution is reduced to a single pattern which is an integrated information model of the encyclopedia article.

Aim of Paper

The aim of the paper is the development of an information model of the encyclopedic article with a projection to electronic encyclopedias, with all the necessary factors in the formation of different kinds of rubrics (classifiers) for the full functioning.

Fundamental Material

Electronic encyclopedia article is an integral part of the encyclopedia content, in particular, the encyclopedic dictionary, that is of scientific reference and objective nature, forwarded in text with a combination of illustrations, audio and video.

For a more detailed examination of the encyclopedic article let's develop its information model, id est a simplified set of information that completely cover all the relevant information about the article. There are verbal and symbolic information models. To clearly describe the electronic encyclopedia article it should be created a symbolic information model of the article as a scheme.

Considering the electronic encyclopedia of higher education, it should be noted that the information coverage on the institution should contain the following categories (classifiers): structure of the university; daily life of the university; human resource; activities (educational and research areas / specialties), buildings of the university, publications about the institution (newspaper and online publications) and terms (dictionary of specialized terms).

Every classifier contains articles on a defined topic that can be reduced to specific information entities (Table 2).

Table 2

Elements of classifiers of the educational institution electronic encyclopedia

Classifier (rubric)	Description aspect	Information entity
University structure	departments; centers; affiliates; divisions and laboratories – *contains the information about the structure / subdivisions; location and orientation*	**subdivision**
Daily life of the university	concerts; conferences; seminars; forums; exhibitions; competitions; circles – *contains the information about the place and time of the event; target audience; organizing and program committees*	**event**
Human resource	rectors; honorary doctors and graduates; teaching staff (full-time employees and the internal / external part-time employees) – *contains the information about a biographic data (family, education, career); scientific and teaching activities; political and public activities; awards; a bibliography (scientific contributions)*	**person**
Activities (educational and research areas / specialties)	educational institutions (faculties); doctoral and postgraduate studies; international cooperation − *contains the information about the educational specialties; directions of the scientific research (developments, awards); target audience; services; prospects of development; education and qualification preparation level; form of education; licensing amount of the education; studying fee; basic subjects of study; the conditions and the requirements for entry; potential employment*	**activity**
Buildings of the university	campuses and buildings (buildings, dormitories, libraries) − *contains the information about the history of the construction; architectural features; the departments; location and layout of the building; architects, construction and restoration; current status and target purpose; contact information*	**building / construction / landscape**
Publications about the institution	decrees; edicts; enactments; printed publications; Internet-sources − *contains the information about the source data (name, date of publication) target audience and distribution; versions of the document in foreign languages*	**document**
Dictionaries of the specialized terms	*contain the collective vocabulary / terminology for a cursory acquaintance of the reader with the terminology that is of interest to the reader, and refer simultaneously to the encyclopedic article for a detailed mastering of the material*	**terms**

Development of the electronic encyclopedia starts with the formation of dictionary of the specialized terms, and a separate encyclopedic article is based on these terms. Regarding terms, there are certain requirements for their submission. So, S.V. Gryniov-Grynevych taking into consideration semantic, contextual, stylistic, functional, paradigmatic, cognitive and anthropological peculiarities of the terms, gives the following main characteristics-requirements [5]:

- specificity of use (each term refers to a special field of knowledge);
- function of naming the concepts;
- scientific definition;
- precision of the notion that is set by the definition;
- contextual sustainability (the notion of the term is clear without context and does not only depend on it);
- stylistic neutrality (current vocabulary; without the emotional and expressive colouring);

- esoteric nature (the exact meaning of the term is only known to specialists of particular field);
- conventional nature (a purposeful nature of appearance);
- nominative nature (the term is usually a noun or phrase on the basis of noun);
- repeatability in speech (important for phrases).

Thus, for the electronic encyclopedia a terminological dictionary is subject to formation. This dictionary contains the terminology of one or more knowledge areas taking into account all of the above requirements.

Analyzing the content of each of the classifiers (rubrics), the information is summarized and reduced to 7 information entities: event, activity, person, subdivision, building / construction / landscape, document, and additional one − terms (dictionary of specialized terms). Each of these entities contains certain information blocks (Table 3). Thus, it enables to unify the presentation of the classifiers content and guide the reader in vocabulary in a particular field due to the dictionary of specialized terms.

Table 3

Unified formation of the classifiers content

Event	Activity	Person
Heading	Heading	Heading (name)
Type of event	Type of activity	Type of person
Time / term	Time / term	Time / term
Place (subdivision, building)	License / documents	Description (biography, scientific contribution)
Organizers (subdivision, persons)	Description	Type of activity
Participants (subdivision, persons)	Provider (subdivision, persons)	Type of subdivision
Description	Consumer (subdivision, persons)	Links to resources
Links to resources	Links to resources	

Subdivision	Building / construction / landscape	Document
Heading	Heading	Heading
Type of subdivision	Time / term	Type of document
Time / term	Description	Time / term
Description	Type of subdivision	Description
Head	Personnel (persons)	Connection with internal entities
Personnel (persons)	List of activities (type)	Translation into foreign languages
List of activities (type)	Contacts, address	Links to resources
Buildings	Links to resources	
Contacts, address		
Links to resources		

	Terms (dictionary of specialized terms)	

	Heading	
	Description	
	Links to resources	

Let us look at the structure of the article taking into consideration the received information entities:

- articles within the information entity «person» are represented by the review articles with more precise specification links;
- articles within the information entity «event» are formed by reference articles and hyperlink articles that direct the reader on the site of event organizers; relations between the units of hypertext are with the expansion of the topic;
- articles within the information entity «activity» contain the review articles with more precise specification links;
- content of the articles within the information entity «building / construction / landscape» contain review articles and hyperlink articles with the mixed group of links;
- articles within the information entity «document» are hyperlink articles with the expansion of the topic links.

Thus, we get 7 information entities, reflecting the main rubrics (classifiers) of the encyclopedia that are linked through the articles (entries) using cross-references. Schematically it is depicted in Fig. 1:
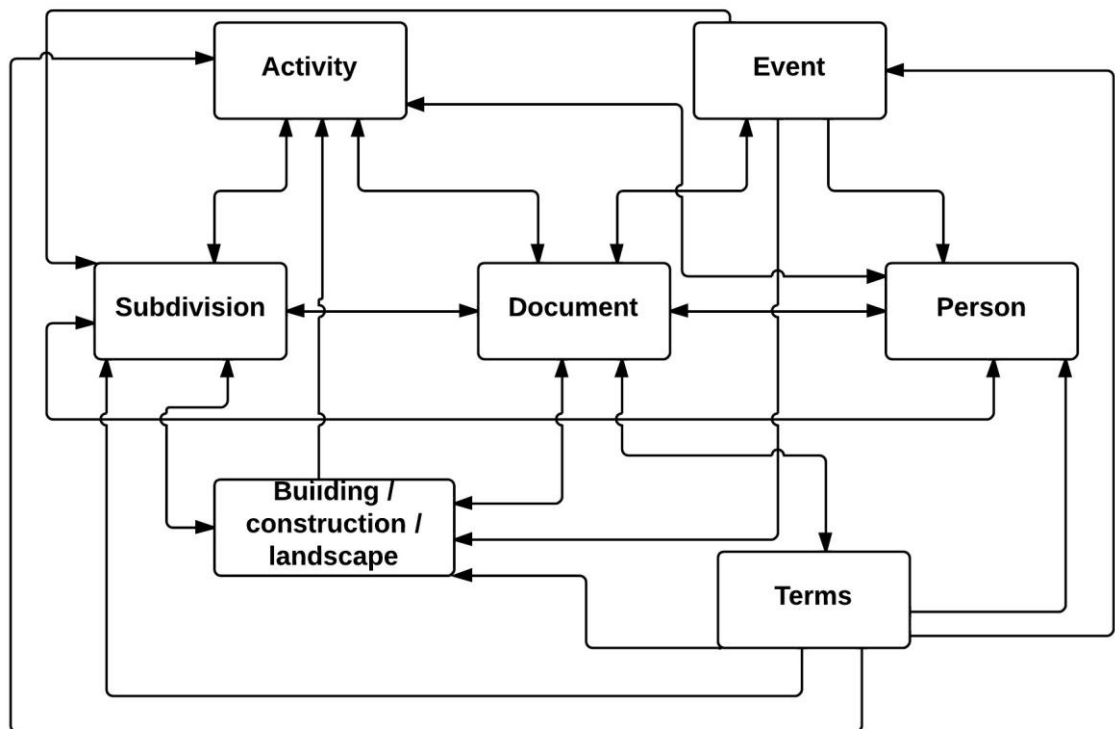
Fig. 1. Outline of the interlinks within electronic encyclopedia entities

Taking into consideration the information entities and their information blocks, the encyclopedic article is reduced to a single form of representation and thus unified the formation of each encyclopedic article. As a result, schematically the structure of the electronic encyclopedia article is presented in the following way (Fig. 2):
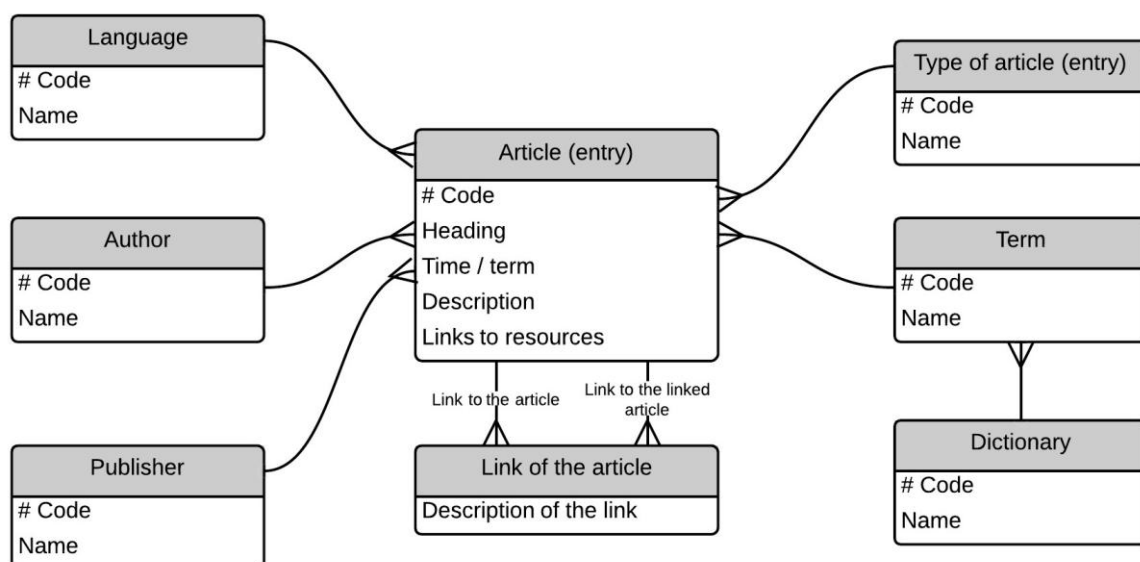
Fig. 2. Generalized information model of the electronic encyclopedia article

Therefore, the elements of the generalized information model of the electronic encyclopedia article are the following: article (actually encyclopedic article(entry)), article link (cross-references within the article), article type (according to the information entities), language (covering of the article content); author (person responsible for the content of the article); publisher (the person responsible for the publication of the article), and term (specialized term for a reader quick knowledge of the terminology with the possibility to switch over the encyclopedic article) and dictionary (field dictionaries).

Conclusions and Prospects for Further Research

The proposed scheme of the encyclopedic article enables:

- to unify a formation of the electronic encyclopedia of higher education due to the pre-defined classifiers (rubrics);
- simplify the approach to creating an article within the classifier providing the integrity of the edition perception with readers.

A formalized description of the article in accordance with the essential requirements secures a proper encyclopedic article and allows avoiding pseudoencyclopedic edition.

Prospects for further scientific research is to develop the effective approaches to improve the quality of the encyclopedic article and the electronic encyclopedia as a whole.

*1.	Романюк Ю.В. Гіпертекст як форма професійно орієнтованого англомовного тексту та його лінгвостилістичні особливості / Ю.В. Романюк // Вісник Київського національного лінгвістичного університету. Серія: Педагогіка та психологія. – 2009. − Вип. 16. – С. 117-124. 2. Черниш Н. І. Українська енциклопедична справа: історія розвитку, теоретичні засади підготовки видань. / Н. І. Черниш. – Львів: Фенікс, 1998. – 92 с. 3. Штерн І. В. Моделі репрезентації знань і структурування інформаційного простору в сучасних гуманітарних дисциплінах як прототипні конфігурації для проектування гуманітарних баз знань / І.В. Штерн // Наукові записки. Комп'ютерні науки. – К.: КМ Academia, 2000. – Том 18. –С. 14-18. 4. Ярмолюк Р. С. Основні типи та джерела помилок у записах електронного каталогу / Р. С. Ярмолюк // Вісник національного університету «Львівська політехніка». Інформаційні системи та мережі. – 2010. – № 689. – С. 348-357. 5. Демиденко О.П. Функціонально-семантичні особливості термінів із колоративним компонентом / О.П. Демиденко, Г.О. Матковська // Науковий вісник Волинського національного університету імені Лесі Українки. Розділ ІІ. Термінознавство. – 2011. − № 6 (ч. 2). – С. 141-143.*