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## **An online multilingual dictionary as a technology platform for heritage studies and development**

**Monika BOGDANOWSKA**

Department of Drawing, Painting and Sculpture, Faculty of Architecture, Krakow University of Technology, Kraków, Poland

E-mail: [leksykonia@wp.pl](mailto:leksykonia@wp.pl)

### **Abstract**

Given the pace of change in science and technology and the increasingly rapid flow of information generally, the creation of multilingual dictionaries of terminology deserve high priority. The shortage of multilingual thesauri hampers international scientific contact and causes problems with translation. Trailblazing research is a source of important new experiments and discoveries, but the development of science influences language and professional terminology. For this reason, once up-to-date dictionaries quickly become outdated.

During the project at Cracow University of Technology, we have developed a ground-breaking multilingual dictionary designed for professional use. Structuring the database was the initial step, while the main task was to add professional terminology. We focused on heritage studies, because of its interdisciplinary and cross cultural character, with an emphasis on terminology used in painting restoration in English, Polish, German, Italian and French.

The result is a freely accessible website with search engine and numerous facilities to enable constant exchange of concepts between users. As the final version is planned to be released this year, the paper will discuss the project, difficulties faced and problems overcome during the three year programme, along with possible enhancements we would like to explore in the future.

**Keywords:** heritage studies, multilingual dictionary, terminology

### **1. State of the Art**

Various projects aimed at developing a database for heritage studies terminology have been carried out for over a dozen years. Starting with the ARGOS project initiated in Italy [1] to a systemic database being developed by the Getty Institute [13] to numerous programmes undertaken in various academic centres, museums, to glossaries developed by individuals [12]. The foregoing is evidence of overwhelming demand for such studies on the one hand, while on the other it is also a consequence of the proliferation of new technologies which enable the online construction of databases [8] and, as a result, ensure the worldwide reach and unrestricted availability of such sources.

An analysis of the materials in the English language proves that this task can be approached in a number of ways. Online resources include very general terminological databases for heritage studies [5] and art restoration [4], but also highly specialised glossaries developed by teams of international experts [6], individual specialists, amateurs or devoted fans of a particular field. The resources are usually of a monolingual nature, but one can also come across materials that offer equivalents in other languages. In the latter case, European languages prevail: apart from English we may encounter Italian, French or German.

The thematic range is fairly broad, but it seems that the dominant fields are related to heritage studies

theory, heritage protection in the context of the rules of protection, legal systems, organizational and administrative issues, etc., as well as the restoration of architectural structures. There is a relatively sizeable pool of studies with lists of the various substances used to produce a work of art (pigments, bonding agents), while some of them mention major damaging factors (weathering) and key procedures (consolidation).

Online heritage studies terminology databases appear in various forms. In some, terms are displayed hierarchically, whereas others offer alphabetical lists or thematic sections. One special form of lexical studies consists of pdf documents published online. Most dictionaries equipped with a search engine offer – apart from the term itself – an explanation in the search language.

## 1.2. Summary

The key aim pursued by the authors of multilingual dictionaries of heritage studies is to standardize concepts and terms. Consequently, certain terms are accompanied by a definition written in the source language and translated into other languages. Yet another, more professional solution, is the development of a glossary (where definitions are agreed jointly by the authors) by a panel of experts representing various countries. Nonetheless, whenever this approach – correct in view of international conventions, studies, legal activities – is adopted, we lose the diversity of approaches to handling historic artefacts that has developed across the world and that relies on local artisanship or the development of restoration treatments which have not been widely discussed, also due to the fact that the terminology relating to these procedures is, in a way, untranslatable [7]. In consequence, we face a vital challenge involving the organisation and translation of “local” terminology into other languages. The only viable solution in these cases is the development of a glossary and its translation. What is more, it should be emphasized that **issues related to the protection of tangible and intangible cultural objects are crucial to all cultures. Meanwhile, each of them has developed its own theory, methodology and procedures, as well as an original conceptual grid. The untranslatability, or ambiguity, of these terms, should not hinder intercultural cooperation – on the contrary: we should strive to include them into the bloodstream of global heritage studies** [9]. This task is of key importance, because if an obligatory, top-down terminological standardization is imposed, cultural diversity will suffer and to protect this diversity, paradoxically, is the very purpose of the protection of the heritage of humanity and the rationale for the existence of heritage studies as a science.

Consequently: a multi-lingual dictionary of heritage studies must allow for the preservation of terminology typical of a variety of cultural areas (for various languages).

Heritage studies is interdisciplinary and as such combines terminology from various fields – from craftsmanship to biological sciences or art; it relies on terms from the areas of botany or chemistry, wood processing, the history of painting, practical physics and, last but not least, vast areas related to practical conservation-restoration in various specialties: the restoration of paintings (on various supports e.g. wooden panels, paper, textiles), the restoration of sculpture (executed in a variety of materials e.g. stone, wood, ceramics), the restoration of architecture (brick, stone, concrete), etc.

Consequently: a multilingual dictionary of heritage studies must take account of the immense diversity and complexity of those disciplines; as a result, one needs to allow for a non-homogenous structure of sections and develop the right algorithm for the dictionary structure [3].

It is also worthwhile to analyse the resources available online from the prospective (target) user's perspective, who may not necessarily be a specialist in a specific sub-field – for instance a geology student, a history student not familiar with medieval wooden panel technology, a practicing restorer looking up the meaning of an acronym, such as GF ASS. It may also happen that the user **does not know** the term they are looking for – this is a relatively frequent case e.g. when it comes to terms from the field of architecture. Using currently available resources it is quite hard to find a term concerning, for instance, a specialist technique, such as gilding (e.g. applied relief brocade) or art restoration practice itself, especially if the term pertains to a procedure referred to only with the use of jargon expression or purely practical nature or a specific collocation (e.g. flattening warped panel)

Consequently: a multi-lingual dictionary of heritage studies should be user friendly and should enable the user to find a term the name of which the user does not know. The dictionary structure must facilitate the database search – this means that the entries should be organized in the form of a thematic dictionary. Due to the very broad scope of issues related to art restoration practice, which includes the area of heritage studies, it is essential to include certain common nouns in the dictionary, such as the names of activities and procedures (nouns derived from verbs), which, though available in general dictionaries, are also applied in art restoration in specific contexts (e.g. coating, tapping).

## 2. Project description

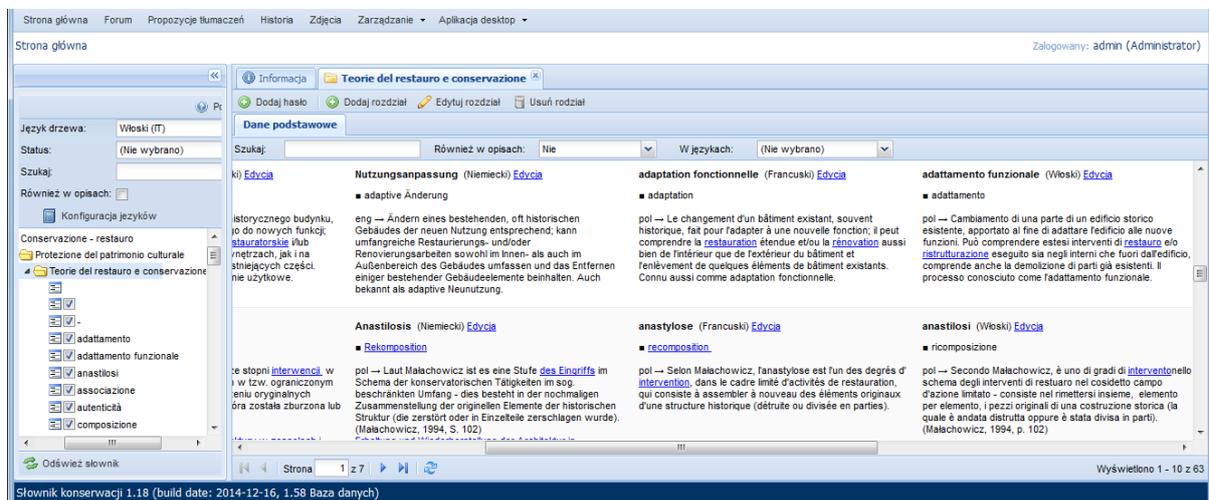
The multi-lingual art restoration dictionary project conducted at the Cracow University of Technology was mainly research-based. Its main objective was to look for terminological equivalences in the specified areas of the discipline, i.e. the restoration of easel paintings and wall paintings between English, Polish, German and, in selected chapters, also French and Italian. It was agreed that the database would include up to 10,000 terms (for the first three languages), divided thematically and obtained on the basis of corpus research. The key sources included two studies of crucial importance for these conservation areas, which have also been translated into other languages [10], [11].

The work was divided into three stages:

- the development of a database structure which could be modified if necessary with the use of database construction software; the specification of useful and desirable functions; ensuring collaboration during research for several editors at the same time;
- filling the database with entries: the first stage included the entry of English terms, followed by looking for Polish and German equivalents (alternative process: German terms with Polish and English equivalents). (Polish was the source language for one chapter only). The second stage involved translation into French and Italian. The preparation of drawings, selection of illustrations and uploading illustrative material;
- proof-reading, editing and subject matter consultations.

## 2.1. Database structure

The database building software was customised to meet the needs of the project from the perspective of usefulness in dictionary making. The dictionary was developed on the basis of an online application: this feature made it available to all editors who could follow changes on an ongoing basis, exchange comments and make corrections. As agreed in the preliminary assumptions, the dictionary has a hierarchical structure which, in this case, is represented by thematic chapters: main chapters, sub-chapters and sub-sub-chapters, depending on the degree of specialization of terms in a specific area. The assumed rule was that in one thematic chapter one term may have only one equivalent in the other languages. These terms form the so-called main entries, visible as a list. The list is displayed in the language specified by the user. Apart from the main entries, the software offers the option of adding content in the so-called descriptive fields where, depending on the nature of the chapter, additional data is placed, including: related terms, synonyms, collocations, definitions, examples of use in full sentences, links to other entries and to illustrations (Fig.1).



**Fig. 1:** The structure of the dictionary database (editors' application). The hierarchy of the chapters on the left with the list of terms in Italian below, on the right – entries in horizontal arrangement (various languages), with bold main entries, synonyms following a square and translation of the definition below.

## 2.2. Filling the database with terminology

The methodology assumed that **no new definitions** would be developed for the purpose of the dictionary. If a term requires a brief explanation, it includes a reference linking to a specific editor of the dictionary. The vast majority of entries with explanations include either quotes or paraphrased quotes from reputable published sources. Apart from explanations, entries include fragments of sentences illustrating the use of the main entry, collocations, synonyms. The works used as terminological corpora included two publications on the conservation of easel and wall painting,

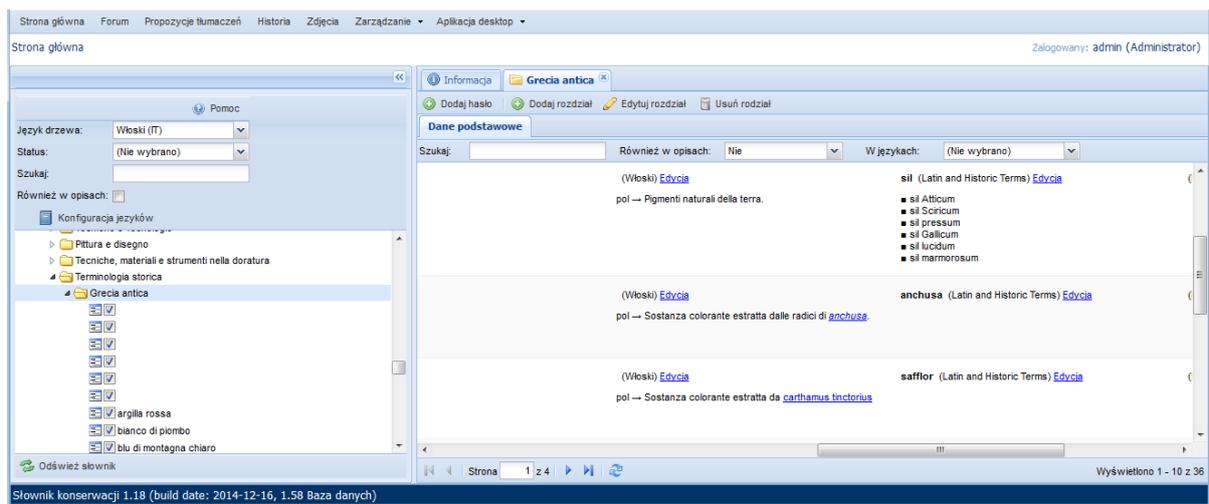
published in English and other languages. Specialist chapters were developed on the basis of terminology extracted from specialist articles, books, professional journals, etc. Terminological resources are mostly based on English sources, and, to a lesser degree, on sources in Polish and German. French and Italian terminology was based on translations of these sources made by licensed translators, with the reservation that in certain chapters a published French translation of the book included in the corpus resources was used, while the Italian section relied also on the original version of a book on wall painting conservation. Every translation of a definition, quotation or paraphrase was marked with an arrow specifying the source language. The illustration in Figure 1 presents a translation made from Polish.

The only chapter where the source language was Polish was a chapter dedicated to a unique procedure which is not known in other countries and, as a result, has no equivalent terminology. This is why it was necessary **to suggest** the translation of key terms (and to translate definitions) related to this procedure into English, German and French. This procedure involves the separation of two layers of a painting made one after another in different periods, i.e. repainting of the (easel) painting in such a way, that the removed secondary layer is transferred to another support and, once the procedure is completed, forms a separate painting [2]. From a technical perspective, this procedure is similar to the transfer applied to wall paintings. Based on the Polish terminology, the suggested English term is: "Painting layers separation treatment [7]". This chapter, from an academic perspective and in view of the research task carried out within the grant, is one of the most important ones. It may be used as a basis for further exchange of experiences with scientists – art restorers from other areas - and, at a later stage, adjustments to the suggested terminology and the dissemination of this unique procedure (which, nevertheless, should be used only in exceptional cases). From this perspective, this chapter is similar to the one dedicated to nanotechnology. Also in this case the terminology is developed on the basis of Italian and English, and, in consequence, it is necessary to start by collecting terms and a terminology list divided into topics, to subsequently develop translation into other languages.

Another specific chapter is the chapter dedicated to gilding. It was developed by a gilding master, who had been gathering terminology inherent to this field for years, in cooperation with the editor of the German section – an art restorer who holds a gilding technician diploma. This chapter may form a separate gilding dictionary: it was developed in three languages and probably is the first trilingual glossary offering such a vast range of entries. Some sub-chapters have been also translated into French. It is important to note that in the case of areas related to craftsmanship the variety and abundance of terms are immense. Artisan traditions, tools and techniques were developed locally and semantic connections between them are often hard to find. Some of the terms have multiple equivalents across languages, others in turn have none because the techniques were little known or became forgotten once a specific craft became extinct.

The chapter "Conservation biology" inspired a lot of questions. Although the initial assumption was that the Latin interlingua would facilitate translation into other languages, serious problems and inconsistencies related to binominal names and taxonomy appeared. For instance, many sources rely on common names of fungi which are difficult to classify into specific species. Moreover, many species have local "endemic" variations, and thus also names the equivalents of which can be hardly found in other languages.

The work on wall painting triggered the development of a very interesting chapter. Many of the terms appearing in old sources have been forgotten, are no longer used or defined in a number of manners. Based on the available sources, the chapter covering a selection of these terms was prepared. The main entry in this chapter is the historic name, without any equivalents in other languages, while the descriptive fields include brief explanations. In consequence, it may be the only dictionary where these rare terms can be found (Fig. 2).



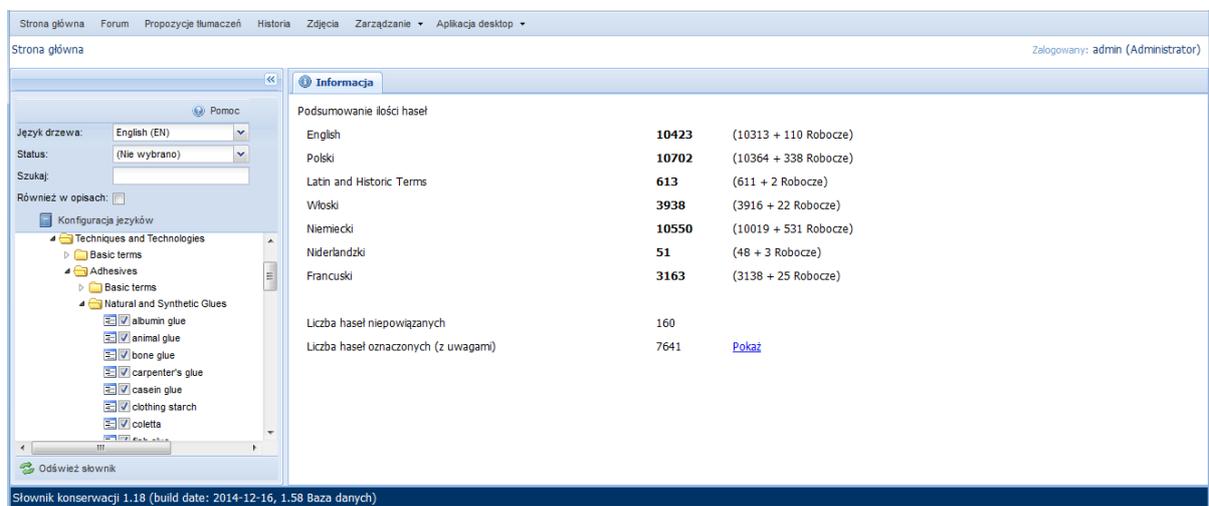
**Fig. 2: One of the chapters dedicated to historical terminology with exemplary terms and their explanation (Italian and historic name).**

### 2.2.1. Dictionary organisation

The dictionary was divided into three main chapters: Conservation-Restoration, Techniques and Technologies of Painting, Associated Disciplines. What is more, there are two additional chapters (acronyms and bibliography, with reservation that the sources were classified according to languages and further into publications and websites). The first chapter includes, among other things, subchapters dedicated to the conservation theory, conservation research, documentation and painting conservation generally, with particular focus on easel painting (with the use of traditional techniques). Due to the broad range of issues covered by the “restoration treatments” umbrella term, the category has been divided in compliance with the commonly recognized technical classification into types of supports (wooden and textile). Particular technological layers (support, ground, paint payer, varnish) have their chapters divided into types of damage, causes of damage and treatment methods. Professional practice, storage and transport of historic objects have their own, special sections. The issues related to wall painting with respect to historic techniques, damage and treatments are included in a separate chapter.

The second main chapter covers painting techniques and technologies. Relevant subchapters list terminology on Tools, devices and materials, Techniques and technologies (lists of pigments, oils, balsams, consolidants, insecticides etc.), Painting and drawing (e.g. Theory& Practice, various techniques).

Auxiliary disciplines whose key terminology is listed in the third chapter include: architecture and building, biology, chemistry, physics, petrography and art history – with numerous subchapters (Fig.3).



**Fig. 3:** Hierarchical structure of the dictionary; entries count on the right.

### **2.2.2. Special solutions**

An exceptional solution was applied to the chapter dedicated to conservation and restoration: it is a “cross-translation” of definitions, where definitions from publications in the English language were translated into Polish, whereas definitions from Polish sources were translated into English. This is why certain terms have several definitions – the user will decide whether the understanding of the term in the target language matches its meaning in the user's language. During these works multiple cases of inconsistency in the “cross understanding” of terms were revealed, both in the intralingual context (various authors provide different definitions of basic terms) and in official translations of laws, documents (for instance, the study has disclosed serious discrepancies in the translation of the Venice Charter into other European languages).

At the stage of editorial work, the dictionary may be printed in bilingual view for any languages selected, which significantly facilitates proofreading and corrections. The editors found it important to offer this function also to future users, however, legal problems involving the publication and the printing of materials prevented the implementation of a similar solution. However, it was assumed that the users will be able to download printouts from **selected chapters** (limited to approx. 30% of entries) for their private use. In consequence, the user will be able to use a reference glossary including terms from the selected chapter. One should emphasise that none of the available online dictionaries offers such a possibility (apart from ready pdf files, which are available for download).

## **3. Conclusion**

The risk of failure or the need to verify original assumptions are inherent to every research project. However, all failures are of crucial importance, since they enable us to identify the areas that need to be reconsidered or require special solutions. Each of the members of a project team consisting of more than ten people contributes their individual knowledge, but also suggestions which are not always acceptable to the others. For instance, one of the significant problems consultants found difficult to accept was the fact that the dictionary is only a pool of terminology, and not a handbook listing only correct and recognised procedures applicable to objects subjected to restoration treatments. A frequently repeated charge was that the sources used to extract terminology for the dictionary were to some extent obsolete, especially given the dynamic development of a specific discipline. Meanwhile, these sources were selected purposefully due to the fact that they met the criteria for corpus sources. What is more, the editors of the dictionary concluded that the dictionary must also include terms that are no longer used but may be encountered in publications or documentation of conservation works. Likewise, they believe that the terminological database should be developed in the future, to include state of art achievements in the discipline.

A critical assessment of the entire project identified significant areas to be verified if the dictionary project is to be continued:

- sub-dictionaries (specialist terminological dictionaries from specific disciplines) must be developed by specialists from these areas. The participation of translators in these works should be of limited scope: e.g. proof-reading, consultations, translation support.
- the problem of equivalence across several languages should be addressed. Two solutions have been suggested: the specification of the source language for translation and a “vertical” subdivision of the chapters, instead of the “horizontal” layout (where one term has an unlimited number of equivalents), i.e. the application of the bilingual layout (but for any number of languages).
- the inclusion of hyperlinks to “external sources” (i.e. terms outside the database) leading to selected websites.
- with respect to terminology, historic art terminology which may be collected using a corpus of historic treatises offers an interesting research area worth pursuing. Such documents contain a vast

variety of names relating to pigments, chemicals and treatments.

- all the dictionary chapters require further extension, conversion and correction. This is why the user interface for the dictionary version will offer the possibility of information exchange (a forum) between registered users.

The multilingual dictionary of heritage studies should be co-created by editors coming from diverse cultural backgrounds. Its main task is to provide a platform for the exchange of opinions and presentation of individual, culturally determined concepts. Only then can the dictionary become an area where the abundance and diversity of tangible and intangible (terminological) heritage are fully protected.

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