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# Infrastructure and information environment of Digital Humanities from the perspective of scientific analysis

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Digital Humanities (hereafter - DH) recently became almost the most dynamically developing direction in the Humanities despite the Humanities crisis and scaling-down of Humanities studies in universities and academic centers all over the world. It is not only the transformation in Humanities that leads to this. Significant improvements in algorithms and computational tools that are being used for complex data, as well as social connections via new understandings of language, culture, and history also influence these phenomena. These up-to-date technologies, in addition to appealing to the natural sciences and mathematical knowledge, enhance the status of DH among the scientific community and broaden the opportunities for its rapid development.

At the same time, we still witness heated debates about the opportunities and perspectives of DH as a research field (Gold and Klein, 2016). The papers published in 2015-2016 emphasize the DH research priorities such as data analysis and data visualization, studying the creative process of software developers and so on.

Striving for a clear picture of DH development, one should study how dynamic the development of the DH

infrastructure and its information environment are. That is the objective of the present study.

To collect the data for the study we performed the search queries in the Internet engines with the key word “digital humanities” in 6 European and 4 Eastern languages using some automated frameworks. This linguistic diversity the result of preliminary research that has shown that many DH units have their web sites in a national language alone. We processed 4000 search results via content analysis with the help of «Statistica v6.1.Ru» specialized software, Microsoft Access and MySQL databases, and ArcGIS. As a result, we have defined 430 science and education organizations these results lead to. These organizations/ units are active in various areas in Humanities and declare themselves as those related to DH (or we have defined them as such having analyzed their websites).

This DH information environment study is based on the analysis of the types of information interactions that appear in DH and form its information environment.

An analysis of the verified empirical data allowed the authors to define the organizational forms of the DH science and education units, the main research directions, and localize these units connecting them to the map of the world. The [map](#) (open for update) has been designed via an open online tool Google My Maps (Department of Informatics Problems of the Humanities, 2017)

Before designing the interactive map, we developed the DH centre database including such fields as title, address, abstract, and information about the unit head, website, contacts, and date of foundation. ArcGIS allows us to automatically process the data on the map according to the database fields and visualize the search results, providing an understandable picture of the digital humanities across the globe.

The results of the preliminary study performed in 2015 have been published earlier (Mozhaeva et al, 2016). In the present paper we focused on DH units rather than on papers, extended the data and updated it (as of August 2016). We have extended the number of resources, languages and DH units, finished an interactive map of DH centres and a catalogue of open access software for DH studies that are going to simplify the search for new partners, developing network projects.

Those 430 units in 42 countries that we have found are spread over the world (Figure 1):

- in Europe: 174 units, mostly in Great Britain (27), France (25), Germany (21) and Russia (17);

- in Asia: 65 units, mostly in Japan (33) and China (16);
- in North America: 9 units, including 7 in Brazil and 2 in Argentina;
- in Pacific basin countries and Australia: 17 units (11 in Australia and 6 in New Zealand);
- in Africa: 5 units (Republic of South Africa).



Figure 1. Interactive map of DH centres (screenshot)

The mostly widespread unit types are centres (139 units that is 32%), laboratories (67 units i.e. 16%), institutes (59 units, 14%) and university units (departments, subdivisions, faculties, schools) (57 units, 13%). There are 14 “groups”, 13 “initiatives” and 13 “societies” that give 3% of the general number of units that have been found.

The dynamics of creating the DH units shows that about 20% of them have been created in the 1960-80’s at the major universities as centres for the Humanities research that were positioned as DH units in 1990-2000. About 25% of the studied units have been created in the 1990’s, 39% – in the 2000’s, 16% – in the 2010’s. A steady increase in the number of DH units is observed since the mid 2000’s. In the 2010’s there is active institutionalization of DH: permanent organizations, educational and research units (centre, laboratory, institution, department, chair, school) at major universities, research institutions, etc. are being established. Among the studied 430 DH units such units amount to more than 75%. At the same time, the number of temporary units and teams (projects, groups, initiatives, etc.) created to solve specific problems is being reduced.

There is a growing attention to the educational activities in the field of DH (masters and postgraduate programs, short-term training and courses), which is typical for 26% of the studied DH units. The applied developments are becoming more and more important:

- 22% of the studied units develop and introduce new digital tools, methods and models;
- 27% of units provide a variety of digital resources, services and platforms, mobile applications, multimedia systems, 3D-models, GIS objects, etc.;
- 7% of units develop online tools for learning.

The analysis of the main directions of scientific and educational activities in the field of DH found that in the number of the DH units the focus is not only on the use of digital tools, but also on the study of the results of their application, the impact on the transformation of learning processes in the field of the Humanities and social sciences.

We spotted researchers’ consolidation in the framework of this research field, as well as the development of common principles, methods and scientific digital tools. We revealed 28 network associations (association, network, platform, consortium, alliance) that are both national and international, mostly continental and transcontinental (Mozhaeva et al, 2016).

The development of DH network infrastructure goes along with the extension of information interactions among specialists from diverse DH units worldwide. The infrastructure of DH centres reflects the units of the DH information environment. The increasing trend of centres comes with the trend for extension of the information environment and of those information interactions that build it.

Another trend in DH is intercultural information interactions that might become real during face-to-face meeting at the international conferences, workshops, seminars and so on, or continue virtually via the Internet technologies video presentations, webinars, forums, social networks, blogs and others. It is worth mentioning that virtual communication is very common for DH (it is possible via virtual research environments, communities, networks and associations, specialized online resources, services and platforms, Skype, blogs, forums, publications and discussions in social networks). Studying that type of interactions allows us to model the DH information environment and forecast the perspectives of this multidisciplinary field.

An example of today’s indicator of the intense and effective information interactions in DH environment is for instance a growth in number of blogs, e-journals and pages devoted to the DH, as well as number of subscribers to these editions. The social networks analysis (Twitter, Facebook, LinkedIn, Instagram, YouTube, VK) shows that the most popular and ever-growing platform for DH is Twitter. The number of subscribers

to @DHQuarterly and @DHNow on Twitter is 7,034 and 23,6 thousand people accordingly in August 2016.

The study that we performed allowed us to see the scale of the extension of digital humanities, visualize and localize 430 DH units, classify the major directions of their activity. The interactive map of DH centres extends the opportunities for research communication, facilitates setting the conditions for integrative processes in the development of Digital Humanities, as well as launching multidisciplinary and international research and educational projects. We consider the growing number of DH centres, as well as the qualitative change in their activity and expansion of the information environment, as evidence of the dynamic development of this field.

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