The social design of a science (e)-infrastructure

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Introduction

Social sciences play a key role in enabling the wider uptake of e-infrastructures for research. In the context of a major collaborative initiative on moving biodiversity research communities to the Web, called ViBRANT, a social science approach is applied to the design and implementation of this ICT platform.

A good understanding of the organization and dynamics of biodiversity research will support the technical design and the institutional implementation of the e-infrastructure so it mirrors best its user needs. General analyses of the collaborative work practices of the field, an investigation of barriers to the use of the e-infrastructure, survey data on motivation or reluctance to use Open Access and Open Data, a study of the actual use and a socio-economic impact of the e-infrastructure - should all contribute to this objective.

Below we listed an example of the kind of output that we plan to generate. The example is based on a study on collaborative patterns among a group of Natural History Institutions in Europe, the main research centers in biodiversity sciences. Our work with this research community has started in December 2010 and will continue until December 2013.

Virtual biodiversity research communities

Table 1. EDIT institutions. Publications and EDIT co-authorships between 2005-2008 (based on ISI-WoS papers)

	Institution name	Total number of papers	Number of co-authorships in EDIT network	EDIT co-authored papers as % of total number	Number of pairs (e.g. MNHN published with 21 institutions)
1	Muséum National d'Histoire Naturelle (MNHN)	2071	153	7	21
2	Natural History Museum, London (NHML)	2202	174	8	18
3	National Museum of Natural History, Smithsonian Institute, Washington (UNSM)	1215	69	6	17
4	Zoological Museum, National Museum of Natural History, Denmark (UKBH-NHMD)	469	36	8	12
5	National Herbarium Netherlands (NHN)	256	35	14	12
6	Royal Belgian Institute of natural Sciences, Brussels (RBINS)	461	48	10	12
7	Hungarian Natural History Museum (HNHM)	235	17	7	11
8	Zoological Institute of Russian Academy of Sciences (ZINRAS)	474	56	12	11
9	Museo Nacional de Ciencias Naturales (CSIC-MNCN)	831	39	5	10
10	National Natural History Museum Naturalis (NHM)	237	28	12	10
11	Royal Botanic Gardens, Kew (RBGK)	581	70	12	9
12	Staatliches Museum for Naturkunde Stuttgart (SMNS)	104	18	17	9
13	University of Amsterdam- Zoological Museum Adam	200	19	10	8
14	Missouri Botanical Garden, (MO)	384	51	13	8
15	National Botanic Garden of Belgium (NBGB)	99	15	15	6
16	Institute of Botany, Poland (IBPAN)	148	11	7	6
17	Museum für Naturkunde (MfN)	296	24	8	6
18	Royal Museum for Central Africa, Tervuren (RMCA)	182	16	9	5
19	Museum and Institute of Zoology, Poland (MIZPAN)	162	28	17	5
20	Institute of Botany, Slovakian Academy of Sciences (IBSAS)	154	11	7	5
21	Komarov Botanical Institute of Russian Academy of Sciences (BINRAS)	146	7	5	5
22	Centraalbureau voor Schimmelcultures (CBS)	358	8	2	4
23	Botanic Garden and Botanical Museum, Berlin (FUBGBM)	64	10	16	4
24	Comenius University, Bratislava (CUB)	190	7	4	4
25	Institut National de la Recherche Agronomique (INRA)	261	20	8	4
26	Society for management of European biodiversity data (SMEB)	0	0	0	0
27	Species 2000	0	0	0	0
	TOTAL	11780	970		222

* Data of 25 institutions has been analyzed. Species 2000 and SMEBD did not have ISI- listed papers for 2005-2008, The papers of Real Jardin Botanico, part of the CSIC, were not considered in the sample. During the data collection phase the Royal Botanic Garden Edinburgh had not yet joined the consortium.

Co-authorships in biodiversity research*

We investigated scholarly communication practices of a network of 27 Natural History Institutions, called EDIT. We used co-authored papers with at least two authors from EDIT institutions for the years 2005-2008 to map a relational network of EDIT partners. One of the questions studied involves the number of connections each partner has in the network ("degree centrality", see Fig. 1 and Table 1). Note that the most central institution is not necessarily the institution with the highest number of co-authored publications. From Table 1 we learn that the MNHN is the most central partner but has fewer co-authored papers (153) than the NHML (174). Between the years 2005-2008 the MNHN co-authored with 21 EDIT institutions versus 18 for the NHML. We computed 2-dimensional network graph (Fig. 1) of the collaborations. Each node colour indicates a different level of "degree centrality".

* Full report of this study "Report on social network analysis and bibliometrics to map actors in taxonomy" is available at http://bit.ly/fz7awD

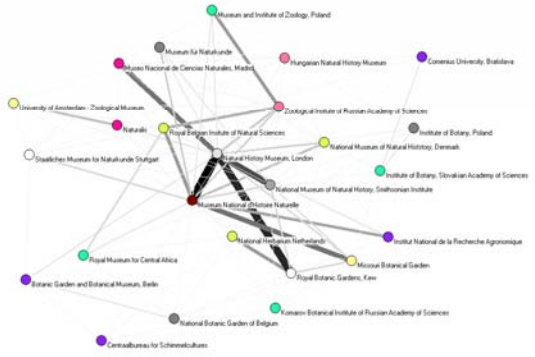

Figure 1. Degree centrality. Co-authorships in EDIT network for the years 2005-2008**.** All the nodes with the same number of connections to other nodes are all coloured the same (in network are 25 actors, 970 co-authorships, based on ISI-WoS data).