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Assessing impact of digital library services

An exploratory study at the University of Camerino

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Assessing impact of digital library services
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Digital libraries (DL) serve communities of people and are created and maintained by and for people. People and their information needs are central to all libraries, digital or otherwise. *All efforts to design, implement, and evaluate digital libraries must be rooted in the information needs, characteristics, and contexts of the people who will or may use those libraries*.

Marchionini, Plaisant & Komlodi (2003)

Table of contents

Acknowledgements		**v**
Declaration		**vi**
Plagiarism disclaimer		**vi**
Permission to copy		**vii**
List of illustrative materials		**vii**
Abbreviations		**viii**
Abstract		**ix**
1.	**Introduction**	**1**
1.1	Presentation and general research statement	2
1.2	Background	4
1.2.1	The University of Camerino	5
1.2.2	The University Library System and digital services	7
1.3	Broad research plan	7
1.4	Purpose of the study	8
1.4.1	Aims	8
1.4.2	Objectives	8
1.4.3	Research questions	9
1.4.4	Significance of the study	9
References		10
2.	**Literature review**	**13**
2.1	The role of digital libraries in education and research	14
2.2	Digital library services and evaluation	16
2.2.1	The evaluative approach to digital libraries	19
2.3	Standard terms and definitions	20
2.3.1	Definition of digital library	21
2.3.2	Definition of impact in library services	22
2.4	Why impact assessment?	24

2.4.1 Barriers and concerns 25
2.5 What to assess? Useful areas of investigation 26
2.5.1 A framework for impact measures and indicators for DLS 27
2.5.2 Assessment methodologies and data collection techniques 30
2.5.3 Features of impact indicators 31
2.6 Major findings 32
2.7 Future directions and deficiencies in the studies 34
References 34

3. Methodology 46
3.1 Preliminary considerations: the research paradigm 47
3.1.1 The approach to the research 50
3.1.2 The research strategy 51
3.2 The research process 52
3.2.1 Literature review 53
3.2.2 Research proposal 54
3.3 Qualitative research techniques for data collection 55
3.3.1 The search for impact 57
3.3.2 Open-ended questionnaire with experts 59
3.3.2.2 Purpose 59
3.3.2.3 Advantages and limitations 60
3.3.2.4 Sampling procedures 61
3.3.2.5 Open-ended questionnaire design 62
3.3.3 Focus group with ULS practitioners 63
3.3.3.1 Purpose 63
3.3.3.2 Advantages and limitations 63
3.3.3.3 Sampling procedures and design 64
3.3.4 In-depth interviews with key-informants 65
3.3.4.1 Purpose 65
3.3.4.2 Advantages and limitations 65
3.3.4.3 Sampling procedures 66

3.3.4.4 Interviews design 67
3.5 Data analysis and interpretation of all collected data 68
3.6 Validation of findings 69
3.7 The researcher 70
3.8 Limitations of the research 70
3.9 Ethical issues 71
References 72

4. Analysis 75
4.1 Open-ended questionnaire with experts 76
4.1.1 Aims 76
4.1.2 Foreword 76
4.1.3 Analysis 77
4.2. Focus group with ULS practitioners 85
4.2.1 Aims 85
4.2.2 Foreword 86
4.2.3 Analysis 86
4.3 In-depth interviews with key-informants 98
4.3.1 Aims 98
4.3.2 Foreword 99
4.3.3 Analysis 99
References 108

5. Findings 109
5.1 Assessing DLS impact at UNICAM 110
5.2 The model 111
5.2.1 The methodological perspective of the model 112
5.2.2 Contents 114
5.2.3 Recommendations for the ULS 120
References 122

6.		**Conclusions**	**123**
	6.1	Summing up	124
	6.2	Recommendations for further research	126
7.		**Reflective review**	**127**
8.		**Bibliography**	**131**
9.		**Appendix**	**a**
	1.	Open-ended questionnaire with experts	a
	1a.	Endorsement letter	a
	1b.	Questionnaire	b
	2.	Focus group with ULS practitioners	d
	2a.	Endorsement letter	d
	2b.	Focus group questioning route	d
	2c.	Provisional synopsis of impact measures and indicators	e
	3.	In-depth interviews with key-informants	h
	3a.	Endorsement letter	h
	3b.	Interviews questioning route	h

Declaration

The opinions expressed in this dissertation are solely those of the author and acceptance of the dissertation as a contribution to the award of a degree cannot be regarded as constituting approval of all its contents by the Division of Information & Communication Studies.

This dissertation is the sole work of the author, and is developed from a research proposal submitted by the author as part of the second year of the Master in Information Studies.

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List of illustrative materials

Table 1	UNICAM ULS digital resources and services	6
Table 2	Synopsis of research aims, objectives, data sources and collection tools	56
Table 3	Draft of a tentative impact evaluation model	58
Table 4	Conceptual map of the relations working in DLS impact assessment	59
Table 5	Uses, categories of use, reasons for use of DLS	81
Table 6	Provisional synopsis of impact measures and indicators	e
Table 7	Impact assessment methodology	113
Table 8	Students' learning: criteria and quantitative measures and indicators	116
Table 9	Teaching: criteria and quantitative measures and indicators	118
Table 10	Research: criteria and quantitative measures and indicators	119

Abbreviations

ACRL	Association of College & Research Libraries
ARL	Association of Research Libraries
CIBER	Coordinamento Interuniversitario Basi Dati & Editoria in Rete
CILEA	Consorzio Interuniversitario Lombardo per L'Elaborazione Automatica
COUNTER	Counting Online Usage of Networked Electronic Resources
DL	Digital Library
DLF	Digital Library Federation
DLIB	Working Group on Digital Library Metrics
DLS	Digital Library Services
EDNER	Formative Evaluation of the Distributed National Electronic Resource
EIS	Electronic Information Services
ELIB	Electronic Libraries Programme
EMIS	E-Metrics Instructional System
FOLIO	Facilitated Online Learning as an Interactive Opportunity
ICOLC	International Coalition of Library Consortia
ICT	Information and Communication Technologies
IFLA	International Federation of Library Associations and Institutions
IMA	Information Management Associates
IMLS	Institute of Museum and Library Services
ISO	International Standards Organization
LIRG	Library and Information Research Group
MINES	Measuring the Impact of Networked Electronic Services
NeLH	National Electronic Library of Health
NISO	National Information Standards Organization
NSDL	National Science Digital Library
SCONUL	Society of College, National & University Libraries
ULS	University Library System
UNICAM	University of Camerino

Abstract

For my dissertation I have chosen to investigate the issue of digital libraries in Italy, my focus being the assessment of digital library services impact on academic library users. This is an academic work, whose eventual outcome rests on the improvement of services and evidence-based practice.

Research has started by reviewing international and Italian literature. It emerged that studies on impact and outcomes measurement of digital library services, as part of an exquisite user-centred and solely qualitative evaluation process, are sparse, because of the difficulty of translating qualitative criteria of impact into quantifiable measures and indicators, and partly because the process is so very much time-consuming.

The aim of this research is to build an evaluation model, focused on impact assessment of digital library services offered to users by the Library System of the University of Camerino, workplace of the researcher, to produce recommendations for the organisation and hints for further research. The prototype-like model will be put to the attention of the local library management as assessment tool to become an eventual future reinforcement to the measurement activity already in place.

The study is roughly designed to go through the following three phases:

1. Italian experts in digital library issues are called to give their opinions on the matter with the intent to devise evidence of impact on users;
2. results are fed to a group of local library practitioners, whose task is to confront data against the context they work in and serve;
3. collected data are, then, discussed in depth with local key-informants to possibly find further insight and finally validity of the model.

The research takes the form of an exploratory study. It exploits qualitative methods and techniques originated from the social sciences.

The evaluation model resulting from the analysis of data is exposed according to academic users activities and groups. It comprises both qualitative and quantitative measures and indicators and the suggested methods of data collection are in accordance.

Recommendations are made to the University Library System about how to start a DLS impact assessment activity.

1. Introduction

1.1	Presentation and general research statement	2
1.2	Background	4
1.2.1	The University of Camerino	4
1.2.2	The University of Camerino Library System and digital services	5
1.3	Broad research plan	7
1.4	Purpose of the study	8
1.4.1	Aims	8
1.4.2	Objectives	8
1.4.3	Research questions	9
1.4.4	Significance of the study	9

References 10

1.1 Presentation and general research statement

Recent global developments in ICT[1] have brought radical changes in the way information is produced, distributed, accessed and used (Chowdhury & Chowdhury, 2003). In the academic environment scholarly communication, users' information seeking behaviours, learning and teaching styles have radically changed by consequence (Kwak *et al.*, 2002) and so has the way libraries, as information mediators, are coming to terms with their traditional role.

"The need for the definition of new models, practices and standards, able to respond to the pressure of a changing environment" (Young, 2001a), where users are the ultimate centre of interest (Marchionini, Plaisant & Komlodi, 2003), goes side by side with a necessarily different approach to the activities of assessment and evaluation of the academic library digital environment (McClure & Lopata, 1996; Everest & Payne, 2001).

Traditionally, assessment and evaluation activities have been recognised as "change agents", the more so they "are needed to manage the new library" (Lakos, 1999) and to respond more effectively to users' new demands and needs. They back and give evidence to the values of the service-oriented library profession and help show its commitment to the institutional goals of its parent organisation (Gratch-Lindauer, 1998). Still, what to assess, by what methods and how to find evidence that effects of any kind, short and long-term changes are produced, remain important research questions to be addressed about digital libraries[2] (Borgman *et al.*, 2000).

The above-mentioned aims and achievements of evaluation activities only come full-circle if they are focused on people. The material inconsistency and remoteness of digital library services[3] make their impact assessment on people's lives, careers, personal and professional growth, rather than technical performance or resources measurement, a major evaluation undertaking, even if this approach is almost new to the library profession and has not made its way in Library and Information Sciences research thoroughly yet (EDNER+, 2004; Poll, 2005b; Poll & Payne, 2006).

[1] Information and communication technologies.
[2] Hence DL.
[3] Hence DLS.

On the one hand, literature reviewing proves that, in spite of a growing interest, testified by the exponential development of interesting and valuable projects in the last few years (Brophy, 2005; Poll & Payne, 2006), studies on DLS impact assessment, as part of an exquisite user-centred and mainly qualitative evaluation process (Dalton & McNicol, 2004), are either partial or hardly suitable for generalisation and standardisation (Saracevic, 2005). This is due to the intrinsic difficulty of assessing intangible assets, translating qualitative criteria of impact into quantifiable measures and indicators, isolating impact "from the broader environment" (Brophy, 2005), and it is also a very much time-consuming process (Poll & Payne, 2006).

On the other hand, the urgency and the importance of "gauging", on a regular basis, the impact produced by DLS in terms of changes on people's personal and professional life and on academic organisations is widely acknowledged. It also emerges that as far as the Italian setting is concerned, research on DLS evaluation is mainly concentrated on producing usage statistics and measuring performance (Gargiulo, 2003; Maffenini, 2003; Dellisanti, D. & Balducci, 2004; Toni, 2005).

Moving within the grounds provided by literature reviewing, the researcher finds it worth investigating more deeply inside this little explored issue from the point of view of an Italian academic library context. The intent rests in the development of a context-related evaluation model, focused on impact assessment of DLS as offered by the University of Camerino Library System[4] in Italy. Thanks to the authoritative insight of Italian DL experts, who provide the basic theoretical frame through the definition of processes and contents, the researcher rejects to transpose already-made solutions, born in unknown contexts, distant from her own reality, and seeks to explore the feasibility of a practical and fit-to-purpose evaluation framework from the inside of her own organisation, also with the fundamental and valued help of local stakeholders.

The operational goal is set towards the local academic community, that is, to provide a tool that may eventually be used to "develop insights into the different responses and needs of different user groups" (Brophy, 2005) to better serve them, but also, indirectly, to create an opportunity for reflection and learning inside the organisation itself (Dixon, 2000) and to act in conformity with the parent institution.

[4] Hence UNICAM ULS or simply ULS.

The research takes the form of an exploratory study, based on a qualitative approach, which is judged as best suited to get "familiar with the phenomenon in question" (Powell & Connaway Silipigni, 2004, p. 85), to understand and "to describe complex circumstances that are unexplored in literature" (Marshall & Rossman, 1999, p. 33).

1.2 Background

1.2.1 The University of Camerino

The University of Camerino [5] is a small academic institution at the heart of central Italy. It is one of the oldest universities in the country and its foundation dates back to the 14th century. It has a considerable tradition of research and didactic activities in the Humanities and Sciences. Today, the university has about 10,000 students distributed among four campuses, settled in four different towns. The academic staff consist approximately of 350 units, including full professors, associate professors and researchers; technical and administrative staff consist of 300 units.

The university is organised in 5 faculties (Architecture, Law, Pharmacy, Sciences and Technologies and Veterinary Medicine), 12 departments and 3 post-graduate schools. It offers 20 undergraduate and 13 postgraduate courses, 3 five-year unbroken-cycle courses and 12 PhD courses. Seven among the undergraduate courses are also offered by distance and, according to the university leadership commitment to internationalisation, they are destined to grow. All departments are actively engaged in research programmes, which foster and enrich the teaching activity, and cooperate with other Italian and international universities and research institutions.

UNICAM mission statement reads, "the job of the institution is to work with the future and for the future". The community of people (students, academic and non-academic staff), who make the institution, are both at the centre of any undertaken action or decision and personally committed to the accomplishment of this mission. The dedication to the growth of individuals in their wholeness, by fostering culture,

[5] Hence UNICAM. See on the Internet http://web.unicam.it .

knowledge and critical thinking, represents the contribution of the institution to the growth of society at large.

The strategic plan for the years 2004-2008 sets to work towards three main objectives:

1. enhancement of evaluation activities, accreditation and accountability for research and teaching;
2. partnership with public and private organisations in the territory;
3. international cooperation and international students outreach.

To the attainment of its mission, in 2005 UNICAM invested 44% of its annual budget on research and 33% on education and almost 10% on self-administration[6].

Referring to the years 2000-2003, consolidated data about the student population draw the following picture: the university shares the lowest percentage of residential students among the four universities of the region, only 37% to 39% on an average 65% to 70%, while first-year residential students oscillate between 47%-49% in the same period (CNSVU, 2005)[7].

The high percentage of non residential and remote students is posing challenges about the provision of quality education and services to these users, too. The implementation and management of ICT tools and devices proves strategic to the development and support of a virtual learning environment and corollary digital services.

UNICAM ULS, as provider and mediator of information services, is then called to put into action any strategy, which may enhance this ongoing implementation process, by providing, managing, monitoring and evaluating digital information resources and services.

1.2.2 The University of Camerino Library System and digital services

UNICAM ULS is made of nine libraries, distributed among three of the four campuses and three service points, with twelve professional librarians, eight of whom

[6] All information is extracted from the rector's annual reports for the years taken into account. All documents are provided by the administration and publicly available on the Internet.
[7] This trend is confirmed by statistics provided by the local authorities for the year 2005.

work by themselves, respectively in eight branch libraries, and eight non-skilled staff members.

The system is organised in a library service centre, made of three librarians with technical expertise (serving also part-time in branch libraries) and an IT staff member. It provides administrative, technical support to branch libraries, control over the library management software system, acquisition of all bibliographic materials, implementation and access to digital resources and services for the entire organisation, projects of enhancement of the digital information environment for the academic community of users and its dissemination. The organisation as such manages a paper-based collection of 350,000 volumes and 4,000 journals, growing at the rate of almost 5,000 new items each year.

As far as the digital information environment is concerned, the approximately 40 subscribed databases and 6,000 e-journals are the backbone around which, in time, a series of services have been developed. The aggregation of primary and secondary information resources in a one-stop digital environment has been the first step. Digital reference services, support to the institutional virtual learning environment by the provision of selected, high-quality digital resources and collections, online tutorials, disciplinary virtual reference desks, electronic document delivery, SDI and RSS services have been added as a result.

The DLS, that have been developed, represent the purposeful aggregation of electronic networked information services, which function as an operational DL sustaining and serving the academic activities of the parent institution.

Table 1: UNICAM ULS digital resources and services

Resources	**Services**
E-books	OPAC
E-journals	ICT appliances
Databases	ULS portal
Lecture notes	Link resolver
CD-Roms	Online tutorials
E-prints (dissertations, thesis, articles)	Information literacy

	Online reference services Remote access SDI RSS feed Personalisation (My digital library) Promotion of e-services Link to e-learning platform

1.3 Broad research plan

A broad provisional plan has been designed as a reminder to assist the progression of the research project and to guide the investigation through the following steps:

1. to build an initial DLS impact assessment framework, embedded in the wider perspective of DLS performance measurement, intended to lay the foundations of the research and give it an authoritative background, based on literature reviewing;
2. to draw together a panel of experts to gather their opinions on the focused issue of DLS impact assessment in an academic setting, in order to collect further insight, confront the points in question and set additional approaches;
3. to confront collected data with local academic library practitioners and set them against a specified context;
4. to collect local stakeholders' views and opinions to back indirectly the feasibility and practical validity of the model, grounded on their practice;
5. to draw a possibly final evaluation model, resulting in a set of procedures and a provisional taxonomy of academic DLS impact measures and indicators, tailored to the contextual needs of the ULS;
6. to propose the application of the model in the organisation.

1.4 Purpose of the study

The stimulus to conduct this study arises from the recognition of a need. Various digitally-based library services are provided to patrons by the ULS. This is a recent, but consolidated reality, which has been growing steadily and positively for the last decade. The investments, heavy in terms of both human and economic resources, are recognised fruitful by UNICAM management. Data about number of accesses and use of DLS, grounded on periodic usage statistical surveys, partly confirm the goodness of this choice. Nonetheless, there is no actual evidence in the organisation about the impact that these services are having on patrons' academic performance, the effects produced, the changes in attitudes and behaviour, skills and competences DLS bring in their lives (Poll & Payne, 2006) and no methods are known or applied yet.

That being so, intent of the researcher is not to assess impact in the given context of her organisation, but to make available an evaluation model, focused on impact assessment. Aims and objectives are listed below.

1.4.1 Aims

Aims of this research are:

1. to improve value and benefits of DLS for users;
2. to lay the foundations of a culture of DLS assessment in the organisation.

1.4.2 Objectives

To pursue its aims, the research intends to work through the following objectives:

1. to gather and analyse previous research on DLS impact assessment;
2. to develop a DLS evaluation model and provisional contextual measures and indicators to help find evidence of DLS impact on the local academic community of users;

3. to look for consensus among UNICAM library practitioners about measures and indicators to be used to evidence DLS impact on users and the contribution of the organisation to institutional goals;
4. to explore the suitability of the model in the organisation and the feasibility of its implementation.

1.4.3 Research questions

This research intent is to answer the following questions, which address two specular and interdependent areas of investigation, i.e. to provide a reliable, ready-to-use evaluation tool to assess DLS impact on UNICAM community of users and, indirectly DLS contribution to parent institution goals and objectives:

1. how are users changed as a result of their contact with DLS (ACRL, 1998)?
2. how to assess DLS impact on academic users and their activities?
3. how can academic digital librarians tell if they are making a difference (Burroughs, 2000; Rudd, 2002; Payne, Crawford & Fiander, 2004)?
4. how do DLS contribute to library and parent institution goals and objectives?

1.4.5 Significance of the study

This research finds its motivation and starting point in the personal and professional interests of the researcher, who in her own institution, is involved in the implementation and management of electronic resources and digital services and in evaluation activities, concerning mainly input and output measurement of library performance.

The recognition that any library evaluation undertaking is a means to an end, identifiable first in users and secondly in the organisation, has brought the researcher a step further in the direction of impact assessment issues to find out that, especially as regards DL, "a set of parameters, and standards and universal benchmarks […] have not yet appeared" (Chowdhury, Landoni & Gibb, 2006, p. 659) and that the issue itself has not been taken into account by the Italian professional literature yet. This study will

hopefully be a small contribution to the existent body of literature from the point of view of an Italian academic library, its staff, its specific groups of users and their activities, and a hint for reflection among Italian practitioners (Dixon, 2000).

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2. Literature review

2.1	The role of digital libraries in education and research	14
2.2	Digital library services and evaluation	16
2.2.1	The evaluative approach to digital libraries	19
2.3	Standard terms and definitions	20
2.3.1	Definition of digital library	21
2.3.2	Definition of impact in library services	22
2.4	Why impact assessment?	24
2.4.1	Barriers and concerns	25
2.5	What to assess? Useful areas of investigation	26
2.5.1	A framework for impact measures and indicators for DLS	27
2.5.2	Assessment methodologies and data collection techniques	30
2.5.3	Features of impact indicators	31
2.6	Major findings	32
2.7	Future directions and deficiencies in the studies	34

References 34

2.1 The role of digital libraries in education and research

The opportunities offered by DL to the enhancement and innovation of education and research in universities, their potential and factual uses in these contexts have been readily recognised from the early stages of development and implementation. It is assumed as implicit value that DL facilitate the thorough access to information, thus fostering learning augmentation, supporting subject matter autonomy, and new teaching methods (Marchionini, 2000; McDowell, 2002) and for these reasons they are synonymous with better education and better academic research (Sharifabadi, 2006).

The introduction of DL into higher and further education processes proves valuable in support of both traditional on-campus and distance-independent learning (Borgman *et al.*, 2000), conveying newness of approach to the first and showing as "natural complements to digital learning environments" (Roes, 2001; Markland, 2003) as far as the second is concerned.

DL ease time and provide independent information services. The outstanding criteria, which designers try to respect, are to make DL adaptable, efficient, powerful, flexible tools, readily available from anywhere, anytime (Borgman et al., *ibid.*; Marchionini, *ibid.*). The features of this new technology, employed in education, encourage the use of more active learning styles, student-centred teaching methods, and facilitated scholarly communication.

According to Roes (*ibid.*), two main approaches can be identified in this respect. The first one takes course and module design and teaching staff needs linking digital learning environments with DL as starting point, while the second one primarily focuses on the aggregation of vast centralised corpuses of learning resources [1]. Although apparently differing, both approaches look at end-users as independent, information literate learners, and future knowledge workers. An ideal chain seems to interconnect information needs, information acquisition, organisation, analysis and use to build new

[1] As exemplification, Roes reports respectively two UK projects, INSPIRAL and ResIDE (no more existent) and the US programme of the NSDL, National Science Digital Library by the National Science Foundation, but other projects (which will be later presented more thoroughly) may be added to the list, such as the Perseus project, the ADEPT project as part of the Alexandria Digital Library, or the DNER/IE programme funded by Joint Information Systems Committee (JISC) to support improved access to, and use of a wide range of quality-assured digital resources in UK higher and further education.

knowledge, critical thinking processes and problem-based learning (Rockman, 2002). Wallace, Krajcik & Soloway (1996) recognise that DL provide means and opportunities for a successful inquiry-based learning rather than traditional textbook learning. Borgman et al. (2005) reconcile learning, teaching and research issues by reporting how inquiry learning, a method of involving students in "scholarly practices so that they can gain deeper epistemological understanding of the discipline" (Sandoval & Reiser, 2003), is made possible by the applications of digital technology to the classroom, so that teaching and research are integrated to develop scientific thinking in learners. Yang (2001) adds how learning communities benefit from DL, which may provide the proper infrastructure to facilitate "collaborative and communicative activities", thus building distributed learning environments, where online interaction[2] would help both novices' introduction into the community and community reinforcement.

The applications of a DL environment also prove profitable for information seeking in support of teaching and research (see Jacobson & Ignacio, 1997). For evident reasons the approach of scholars and teachers to DL use differs from that of students, even if Borgman (*ibid.*) remarks that it is "a particularly under-studied topic", which calls for further investigation.

Zenios, Goodyear & Jones (2004) interestingly make the case of a networked learning environment and the chain of interconnections and reciprocal influences ideally in place between learners, teachers and providers of DL services, which partly explains the difficulty of looking at the role of DL in academic education and research from different complementary perspectives. Markland (2003) and Markland & Kemp (2004) provide other useful insight by studying the way tutors, students and researches approach and use digital resources in their teaching, learning and research activities, how their behaviour is changed and how their choices produce interdependent effects. McDowell (2002) adds the exploration of how tutors provide an integration of digital information resources into virtual learning environments and how students react.

[2] See the Stoa consortium, founded in 1997, as a side service of the Perseus Digital Library, "to create a venue for scholarly research and instructional support. Stoa (www.stoa.org) provides tools and advice for scholars creating electronic documents, develops standards for tagging and displaying these products, and offers an electronic publishing platform for sharing their work and eliciting scholarly feedback" (Marchionini, 2000).

Then, how all this impacts users, what kind of effects DL produce on the academic community, its groups and their activities is the focus of this literature review.

2.2 Digital library services and evaluation

Since the emergence of DL in early/mid 90s', their rapidly growing use and the newness of the field have made research efforts, funds, practical developments and implementations grow exponentially. Nevertheless, DL evaluation activities have been lagging behind. While stressing firmly the need for an ongoing development and maintenance of "coherent and pervasive evaluation strategies" (Bertot, 2004b, p. 12), both at a research and an operational level, it is, anyway, widely acknowledged that when getting at the issue of assessment in a DL environment, much has yet to be investigated (Saracevic, 2000, 2004; Shearer, 2002; Chowdhury & Chowdhury, 2003; Cullen, 2003; Barton, 2003; Bertot, 2004a; Chowdhury, Landoni & Gibb, 2006). In addition, Saracevic (2005, p. 2) remarks, "the meta or 'about' literature is larger than the object or 'on' literature, i.e. up to now there are more works that discuss evaluation than those that report evaluation", which means that an established corpus of studies to draw upon does not exist yet.

As "a fact-finding, evidence-based, value-measuring activity" (Dalton, Thebridge & Hartland-Fox, 2004, p. 113), evaluation should be embedded in DL planning and management. In this respect, a dual attitude in the library profession may be detected. One argues that evaluation and assessment activities belong to the pre-planning stages of any service programme or project, the other one sustains that only after some time existence, a programme or a project may be reliably evaluated and DL are considered relatively young to undergo either definitive formative or summative evaluation studies.

Further reasons for little research reside in the very nature of DL. Designed and developed by specialists coming from quite different fields and involving diverse economic, legal, social and management issues (Greenstein, 2000; Chowdhury & Chowdhury, 2003, pp. 267-268), DL are "emergent complex systems" (Marchionini, 2000, p. 326). The constant evolution and boundary-changing development make it

time-consuming to research appropriate models and methods of assessment (Peters, 2001, p. 221), which is destined to be an evolving process in the years to come.

Traditionally, assessment and evaluation activities have been recognised as "change agents", the more so they "are needed to manage the new library environment" (Lakos, 1999). If an evaluative approach to traditional library services is well settled in library culture (Poll, 2001, p. 244), now more than ever, it is essential to facilitate change, by fostering a customer-centred "culture of assessment" (Lakos, 1999; 2002), which he defines:

> an organisational environment in which decisions are based on facts, research and analysis, and where services are planned and delivered in ways that maximize positive outcomes and impacts for customers and stakeholders.

As Marchionini (2000, p. 311) points out "evaluation is a research process that aims to understand the meaning of some phenomenon situated in a context and the changes that take place as the phenomenon and the context interact". DL may comprise diverse perspectives in a manner consistent to different contexts and objectives, needs and priorities, which can be evaluated in a variety of ways, each asking for proper measures and methods, thus leading inevitably to the crucial issue of measurement modelling and methodology.

Evaluation and measurement (read also assessment) are two differing, but related concepts (Nicholson, 2004). In this respect, Hernon & Altman (1996, p. 16) highlight:

> the concept of measurement is closely related to evaluation; however, while measurement may lead to evaluation and evaluation may require measurement, the two processes differ. Measurement is the process of assigning numbers to describe or represent some object or phenomenon in a standardised manner. Evaluation, which may include the measurement process, adds components of the research process, planning and implementation strategies to change or improve the organisation or a specific activity.

Measurement is a core activity of the evaluation process, which can be carried out, it is assumed, according to a number of methodologies and techniques, responding to well-defined areas of research, ranging from input/output and impact/outcome to service quality assessment, aiming at scope and extent of either services, content or infrastructure (Powell, 2006).

Development and testing of measurement methods for DL show an evolution, from those paralleling the traditional library, those devising frameworks for ICT to the arising consciousness that a new methodology is needed to reflect the complexity of this environment. Under the wide umbrella of performance measurement[3], the notion of input/output measurement has been quite smoothly translated from the traditional library to DL in the last decade (Bertot, McClure & Ryan, 2001; Shim, McClure & Bertot, 2001). Nonetheless, DL are unquestionably changing the way information services are delivered to users and input/output measures are rightly judged no longer appropriate, if not backed by measures of impact (Dalton, Thebridge & Hartland-Fox, 2004, p. 117) and outcome (Bertot, 2004b).

Bertot (*ibid.*) underlines how there is a move towards service quality and impact/outcomes assessment approaches, which are more exclusively focused on users, the understanding of their needs and the effects that the provision of DL services may produce on them. Saracevic (2000, p. 368) clearly points out:

> the ultimate question for evaluation is: how are digital libraries transforming research, education, learning and living?

Poll (2005) adds how this means going a step further, because quantity and quality of performance do not prove that users have benefited from their contact with a service. Marchionini (2000) argues that the ultimate goal of DL evaluation is to assess impact on patrons' lives and on society at large. Even if differing substantially, this doesn't mean that more library-centred measurement activities are to be discarded. They can work effectively and interchangeably together and evaluation of impact should be "a natural part of the whole process of performance measurement within an organisation" (Craven & Brophy, 2004, p. 113). Input and output measures are also important when seeking

[3] This definition by McClure & Lopata (1996) is adopted "performance measures are a broad managerial tool that encompass measurement of inputs (indicators of the resources essential to provide service); outputs (indicators of the services resulting from the use of those resources); and impacts (the effects of these outputs on other variables or factors)". It also appears a debate in literature whether the activities correlated to impact demonstration are to be addressed as measurement or assessment (Poll, 2003, 2005; Powell, 2006). The two terms are drawn from the ordinary language as two synonyms and used by consequence. The matter is still unsettled and much is left to the realm of opinions and theory. While the definition by McClure & Lopata (*supra*) is retained, in this study the phrases "performance measurement" and "impact assessment" will be used to underline the difference between the nature of data produced: mostly quantitative, library-centred and referred to extensiveness and efficiency the first ones, mostly qualitative, user-centred and referred to effectiveness the second ones, The difference by which performance may be measured, while impact is usually assessed is here accepted.

evidence to show impact (Marchionini, 2000; Bertot, 2004b; Payne, Crawford & Fiander, 2004).

While methodologies, procedures and standards have found their way in the library profession both for traditional and DLS measurement, to date, research and practice on impact assessment still need common grounds and agreement on shared views and intents and there is no standard model for DL evaluators to be used (Chowdhury, Landoni, & Gibb, 2006).

2.2.1 The evaluative approach to digital libraries

Primary concern of any evaluative approach to DL is to get information from collected data to be used against a set of defined objectives, which Marchionini, (2000) and Bertot (2004a) gather as twofold, i.e. library-centred or system-centred, focusing on efficiency, which is prevalent till now, and user-centred, pointing at effectiveness, service quality and users' needs.

Warning against the search for the best methods or standards, Saracevic (2004) argues that only a particular set of circumstances define the best possible approach and in Saracevic (2005, p. 5) a systematic review is given according to the different goals and objectives pursued in the evaluation study. Usability, ethnographic, anthropological, sociological and economic-centred approaches are detected in addition. They relate in turn to studies of technical features, cultures, customs, communities, cost benefits and economic values.

According to Borgman (2004) DL evaluation may be: formative, used at the early stage of a project; summative, used at the end of a project; iterative, used throughout a project; comparative, used to compare similar systems. An interesting insight is provided by Marchionini, Plaisant & Komlodi (2003) who assert that any evaluative approach has to be customisable to the context taken into account and that "multi-faceted approaches" account for successful measurement. They propose a context-based DL model, where people, information and systems meet, where formative, summative, user-centred and systems-centred evaluation are employed. Seemingly, the

EDNER+ project[4] (2004a) adopts the "utilization-fused evaluation" proposed by Patton (1997; 2002), who suggests this perspective, "utilization-focused evaluation is a process for making decisions about these issues in collaboration with an identified group of primary users focusing on their intended uses of evaluation".

To conclude, the purposes of any evaluative approach to DL may be the same as those of a traditional library, but agreement upon definitions, employable methods, criteria and data collection is still a matter of concern, because of the environment and data themselves, their nature and features.

2.3 Standard terms and definitions

As already hinted, the agreement on terminology is not a side and ineffectual question. A consistent and uniform application of standard terms and definitions to DL is the first step to an adequate approach to measurement and assessment. Borgman (1999) states that ambiguity of terminology hinders the advance of research and practice and recognises that agreement on definitions provides focal starting points to work upon. Young (2002, p. 55) declares "definitional challenges related to standard terminology for digital library measurements do not admit of easy solutions", because of the rapid pace of change and the heterogeneous state of library technology infrastructures. Urgency of action to agree upon clear and unambiguous standard definitions and terms is widely recognised.

In DL evaluation literature there is still much use of different terms either as synonyms or with different meanings, according to the context they are used in (Cullen, 2003; Barton, 2004). Brophy & Wynne (1997) point out how one of the difficulties is that DL means different things to different people and Borgman (1999) adds that terminology is directly related to and determines any evaluative framework which is applied.

To enhance the evolution of measurement tools, dissemination of procedures, sharing of a common accepted conceptual framework, cooperation and benchmarking,

[4] The project aims to assess the impact of the JISC Information Environment (IE), designed to deliver networked information services to UK higher and further education, linking heterogeneous information resources with heterogeneous users (Brophy, 2004).

essential to development in a digital environment, it is imperative to clarify "context-involved terminology" and to strive for internationally agreed-upon definitions.

2.3.1 Definition of digital library

In spite of a decade of research and development, Borgman (2005) still defines *digital libraries* "an emerging concept". Reviewing definitions of DL, Borgman (1999, p. 229) finds they start as early as 1993 and indicates that "in general researchers focus on digital libraries as content collected on behalf of user communities, while librarians focus on digital libraries as institutions or services". The latter approach is the one of interest here.

The DLib Working Group on Digital Library Metrics (1998), first, proposed a comprehensive picture in the form of a summary of headings. It gives the following definition:

> The digital library is the collection of services and the collection of information objects that support users in dealing with information objects, and the organisation and presentation of those objects, available directly or indirectly via electronic/digital means.

The stress is put on the collection of content on behalf of user communities, who don't play a definite role yet. The concept is made clearer and a crucial step forward is set by the working definition of the DLF (1998):

> Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically for use by a defined community or set of communities.

The emphasis is on the synergy between the organisational institutional settings and collections, aiming at the provision and development of services and information resources for a community of users. The statement is broad and encompasses both the research community and the practical community definition (Saracevic, & Covi, 2000). It has been further clarified (DLF, 2004) to take in the concept of "digital library service environment", which reinforces the DL mediating mission between information resources and user communities by underlining how its profile is made of the range of online services, configuring access to a networked information space of which it manages only a part.

Beyond definitions, very early Borgman (1999, p. 231) recognises and helps to explain an attitude broadly detected in literature, concluding that apparently the term digital library[5] serves also as a convenient and familiar shorthand to refer to electronic collections and to electronic or networked information services at large.

2.3.2 Definition of impact in library services

Up to now there is no agreed-upon definition of *impact* in literature. "The notion of impact is often taken at face value" (EDNER+, 2004a). Researchers and practitioners usually formulate, accept or discard a definition according to the adaptability to the context they are going to use it.

In her guide to a practical implementation of performance measurement, Abbott (1994, p. 17) puts impact someway outside the library control in what she calls "less tangible areas of performance […] referred to as higher order effects". Underlining the difficulty of their assessment by means of performance indicators, effects are largely ignored and combined with the library strategic aims and mission. In a comprehensive learning technology evaluation context, Oliver & Harvey (2002, p. 25) only conclude that impact is "usefully ambiguous", in order to help library management to construe data as evidence for improvement!

Impact is commonly defined as "the effect or influence of one person, thing, or action, on another" (Poll, 2003, p. 5), or "any effects, intentional or not, of a user's contact with a service" (Thebridge & Dalton, 2003, p. 94), thus inferring that the concept of change is basically involved. EDNER+ (*ibid.*) clearly understands impact as "effects of activity resulting in changes in behaviour" and Brophy (2005) advises it helpful to think of impact in library services:

> as any *effect* of a service, product or other 'event' on an individual or group. It
>
> - may be positive or negative;
> - may be what was intended or something entirely different;

[5] Other terms, too, have been coined, such as "virtual library", or "library without walls", to refer to the concept of digital library (Drabenshott, 1994, cited by Sharifabadi, 2006, p. 390). The adjectives *electronic* and *digital* have often been used interchangeably. Nevertheless, they are not to be confused. Tammaro & Salarelli (2000, p. 105-108) highlight that the first term is referable to the traditional, but automated library using electronic tools to handle data, while the last to data features themselves.

- may result in changed attitudes; behaviours; outputs (i.e. what an individual or group produces during or after interaction with the service);
- may be short or long term;
- may be critical or trivial.

Wainwright (n.d.), speaking for the NCVO, restates impact as "any change resulting from an activity, project, or organisation. It includes intended or unintended effects, negative as well as positive, and long-term as well as short-term". Markless & Streatfield (2006) define impact as "the difference made to individuals or communities by a service". In relation to the use of networked services, McClure & Lopata (1996) simply equate impact to benefit or result of services, e.g. in terms of users' empowerment or improved quality of life.

Gratch Lindauer (1998) aligns impact to the direct effects that a library may have on institutional outcomes or how indirectly it contributes to those outcomes. This view is someway reaffirmed later by Poll (2005) and Poll & Payne (2006), because as part of an institution, "the impact of library services should support its institutional goals and strategic aims", whereas other authors prefer the term outcome to impact when referring to institutional goals (Thebridge & Dalton, 2003; eVALUEd, 2004).

The term impact is often paired with outcome or used interchangeably. Reasons may be found in the disindetermination of boundaries and pertinences of the two concepts, because they both relate to and are synonymous with effects and results. The prevailing view seems to refer impact to changes resulting from an action or a service, either intentional or unintentional, usually detectable over a long period, while outcomes are directly related to aims and objectives (McNicol, 2005), or as Cram (1999) specifies:

> The impact of an event or activity is the effect it has on other activities, or on the providers, recipients or beneficiaries of those activities. Outcomes […] are the *realised* benefits or detriments that flows from those impacts.

In their review of existing evidence on impact evaluation for museums, archives and libraries, Wavell *et al.* (2002, p. 7) settle the matter by defining impact as:

> the overall effect of *outcomes and conditioning* factors resulting in a *change* in state, attitude, behaviour of an individual or group after engagement with the output and is expressed as 'did it make a difference?'.

Generally speaking, there is a tendency to give an all-encompassing definition of impact, which includes the results of outcomes and outputs measurement and whose breadth asks for subdivisions and categorisation (Wainwright, n.d.).

2.4 Why impact assessment?

The exigency of developing DLS impact assessment and the adoption of its practice on a regular basis rests upon a variety of reasons. While the notion of impact may appear sometimes elusive or ambiguous to detect, why impact assessment of library services at large and DLS in particular should be undertaken, arise as quite evident from any impact study.

The first motivation seems to come up from inside the library profession just along with the starting of the digital revolution. By assessing the impact of DLS on users, in turn libraries demonstrate the impact they are making (NeLH FOLIO, 2006a), show their worth and value, assess the contribution to the strategies of the institutions they support (Payne, Crawford & Fiander, 2004), which are no more taken-for-granted prerogatives of the profession. The question here appears to be, ''how can we tell if we are making a difference to our users?''. It is shortly what Markless & Streatfield (2006) refer to as "the accountability culture". Payne, Crawford & Fiander (*ibid.*) identify another important driver for impact assessment in the support of the management of change libraries are experiencing.

A closer insight reveals a cascading effect and impact assessment is, then, taken as the response to manifold requirements. Drake (1989, p. 530, cited by Powell, 1992) states:

> We also have the opportunity to make a difference in people's lives. Technology has empowered librarians, but we must understand the difference between teaching and learning, means and ends. Our major task in academic libraries is to provide empowerment for the individual and to create the means for the development of curiosity, intellectual enquiry, intuitive thinking, and lifelong learning.

This is the other side of the approach to impact assessment. The core question is, "are libraries making any difference in people's lives?" (Powell, 1992). Menou (2001, cited by Johnson et al., 2004) considers that the answer to these two questions demands the

scientific speculation of "what information is and how it affects human behaviour", the managerial attention to "prove information as a critical resource" and the political commitment to provide a justification for policies and investments. The last remark is strongly stressed by Poll (2003; 2005) and Poll & Payne (2006) too, because expenses for new information resources and services are high and a careful human and financial resource allocation is needed.

Brophy (2005) summarises everything in: influence upon policy makers, both at local and national level, or potential collaborators of similar institutions; strategic management in order to identify areas of improvement, or to check the validity of past decisions and plan accordingly; operational management in order to identify areas of service where impact is to be improved; to understand better the needs of different user groups and to monitor the effects of change overtime thanks to comparative longitudinal data.

Childers (1989, cited by Powell, 1992, p. 248) writes, "if one sees the ultimate mission of the field as improving the state of the individual, impact on the person must be considered […]". Impact assessment basically shows that the individual is always at the centre of any undertaking and for this reason it is somewhat revolutionary.

2.4.1 Barriers and concerns

There are a number of issues of concern, related to impact assessment, the more so of DLS impact, that call for consideration, because they can affect the production of measures and indicators and are accountable for the diverse tentative approaches found in literature.

The possibility itself of assessing impact is doubted in the first place by some researchers. Poll & te Boekhorst (1996, p. 21) object that "one cannot separate knowledge derived from library use from that from other sources", a concept repeated by Powell (1992), Bertot & McClure (2003), Brophy (2005) and Poll (2006), who rightly argue that library services do not exist in a vacuum. If the ever-changing nature of DLS services and the infrastructures supporting them is then considered, it becomes clear why almost all Library and Information Science impact studies start off with a statement of difficulty and uneasiness (Everest & Payne, 2001; Poll, 2003; Payne,

Crawford & Fiander, 2004). Bertot & McClure (2003) point out how complex is the DL environment, only partly controlled by the physical library, presenting differing types of access and content range, requiring different skills and management approach, which makes it more composite to investigate impact.

Poll (2005, p. 6) and Poll & Payne (2006) identify a set of problems to be encountered while assessing impact of new library services: the already tested methods are time-consuming; many relevant data may not be available because of data protection rules; data are not easily comparable; long-term effects cannot be assessed if the users are no more available; impact can be different according to different user groups and the disciplines they study or teach (EDNER+, 2004b); it changes over time and vary by stakeholders (Cullen, 2004).

These pitfalls do not hinder research, but they must be a matter of careful consideration for researchers and any practitioner starting an impact assessment programme of DLS.

2.5 What to assess? Useful areas of investigation

The questions at the basis of the motivations leading to accept the challenge of impact assessment, make the attention to change in users and potential users fundamental to investigate. Where and how it occurs, what to look into are imperatives both for researchers and for practitioners. There are interesting approaches to the definition of key areas of study where to find evidence for impact both in public and academic settings and useful remarkable correlations between them can be made.

As far as the public sector is concerned, there is an inclination to relate DLS to social and economic aspects. Johnson et al. (2004) find that evidence for impact may be searched in "personal development, social cohesion, community empowerment, local culture and identity, and health and well-being". Durrance & Fisher-Pettigrew (2003) name, among others, personal efficacy, work-related, educational aspects, civic participation, technological literacy. Craven & Brophy (2004) speak of skill learning, people contact, social inclusion, general information.

Somewhere in-between the requests peculiar to the public and the academic environment can be placed the considerations made by Poll (2005; 2006) who identifies

that impact can be assessed against the following fields: knowledge, information literacy, academic or professional success, social inclusion, individual well-being and, generally speaking, skills, competences, attitudes and behaviours (NeLH FOLIO, 2006a).

In academia the interests for impact assessment of DLS commonly concentrate on the long-established activities of the academic community, i.e. students' learning, teaching and training, research and the changing behaviours and attitudes induced by the use of new media, producing changes in the learning process, teaching practices and research results (EDNER, 2002a, 2002b; Hiller & Self, 2004; *eVALUEd*, 2004; Poll, *ibid.*; Poll & Payne, 2006).

Although appearing simpler and more straightforward, a closer inspection reveals that the areas of impact investigation pertaining DLS and the academic community are studied from various, individual and context-bound perspectives, giving way to a proliferation of measures and indicators, not yet brought together under the same standards (Saracevic, 2005; Poll, 2006).

2.5.1 A framework for impact measures and indicators for DLS

The scrutiny of individual results and an attempt to gather some recurrent components would hopefully lead to the identification of a general reference framework. The searched-for intent is to make impact measures and indicators flow consequently and so evidence to be collected.

The literature reveals a double-faced, mutually dependent approach towards the three above-mentioned key areas of investigation of DLS impact, which must be taken into account in any DLS impact assessment undertaking:

1. impact is institution-focused, that is correlated to parent institution mission and outcomes (Gratch-Lindauer, 1998). Attention is given to the contribution the academic library offers through the realisation of objectives meeting the needs of the institution it supports (McClure & Fraser, 2002; Rubin, 2003; Payne & Conyers, 2005). Markless & Streatfield (2006) determine them as "success criteria", reflecting achievement or success as regards the identified objectives. The concentration is on the library and its new services, and how it is called to

document its active participation to good institutional educational programmes and research achievements.

2. impact is user-focused. The library is proactive in addressing the needs and concerns of its users (NeLH FOLIO, 2006a). The focus is on services and the effects they may eventually produce on users.

Issues of interest where to find evidence of possible impact are: changes in awareness and knowledge, skills and competences, attitudes and behaviour, social inclusion, success in research, study and job (Burroughs, 2000; Bertot & McClure, 2003; Poll, 2003, 2005, 2006).

1. Students' learning

The increasingly learner-focused academic environment demands a new active role from the library (Corrall, 1995). In this context, DLS are central to learners' support, their differing needs and learning styles; and so it is the communication between the library and academic staff about the supply of digital services and resources entering students' curriculum planning (eVALUEd, 2004). Both positive and negative effects of DLS on users may be under scrutiny.

How students' academic performance, how their chances of achieving professional success are improved, how their knowledge and understanding are enhanced and how use and awareness of DLS contribute to the acquisition of many different skills, develop their analytic ability to value information resources and promote their social inclusion and individual well-being are valid issues to be taken into account (ACRL, 1998; Gratch-Lindauer, 1998; Bertot & McClure, 2003; Poll, 2003, 2006; Markless & Streatfield, 2006; Poll & Payne, 2006).

2. Teaching and training

The effects that DLS produce on the quality of teaching and training may find their evidence in the adoption or the updating of different teaching methods and materials to be used in the classroom, in the help given to teaching staff to keep up to date with new developments in their field (McClure & Lopata, 1996; eVALUEd, 2004), thanks to a new distribution and access to teaching resources and tools, like virtual learning/teaching environments, online tutorials, virtual reference desks (McDowell,

2002). Other interesting issues may be observed in the way communication and factual collaboration occur between the library and academic staff about the selection of digital resources and services, their integration in course planning and delivery and ultimately in the contribution to effective teaching resulting in high graduation rates or high grades in examinations (Poll, 2006; Poll & Payne, 2006).

The integration of training courses on DLS into academic curricula, other forms of online support to teaching, enhancing search skills and facilitating the evaluation of the digital information environment are also important, both for the academic teaching staff and the library training staff, let alone the impact that all this may have on students (eVALUEd, 2004).

3. Research

Production, dissemination and access to scholarly works have been unreservedly changed by digital technology. The provision of and access to digital resources, the way primary and secondary source data are collected have transformed the process of research and scholarly communication by improving research skills, and encouraging new ways of conducting research (eVALUEd, 2004).

DLS are proving significantly important to the enrichment of and support to academic research activities. Digital services assist researchers effectively and rapidly in accessing information, and disseminating their achievements by the provision of powerful research tools and a wider range of formats for the production of scholarly works, which is most valuable in an environment where research assessment is becoming more and more externally dependent and research funding more selective (Corrall, 1995, p. 38; Bertot & McClure, 2003).

Tips to evidence impact are an improved awareness of digital information tools and research services among researchers, improved effectiveness of desk-based research, a close collaboration with academic departments, support to researchers and high quality of provided resources resulting in renown of research results and funding (Nelson et al., 2006).

Noteworthy are some attempts of modelling impact and sieving further evidence through:

1. the identification and assessment of different levels of engagement[6] from utter hostility to changed action. Brophy (2005) suggests that this is a useful way of detecting and characterising impact and that it proves particularly employable in learning technology applications and distributed electronic services.
2. the attention to disciplinary differences. "Disciplines are a contextual influence affecting teaching and learning" (EDNER+, 2004b). The way they affect the academic work organisation, the relationship to knowledge and knowledge gain is worth exploring in relation to the use of digital resources and the effects they produce on users (McDowell, 2002; Jones, Zenios & Griffiths, 2004). A variety of user groups with peculiar needs and prerogatives are also described by disciplinary differences, and this appears particularly effectual in impact assessment.

2.5.2 Assessment methodologies and data collection techniques

"It is imperative to ensure efficient and effective data collection", (Walton, 2003, p. 4), but Brophy & Woodhouse (n.d.) also warn, "when we attempt to assess impact we are nearly always forced to use surrogates measures", that's why methodology must be as rigorous as possible when coming at assessment. Authors generally agree to the adoption of both quantitative and qualitative methods, the last drawn from the social sciences (Tammaro, 2000; Galluzzi, 2001; Wood 2001; Barton, 2004; Dalton, & McNicol, 2004 as examples), because of the complex nature electronic networked services (Bertot & McClure, 1998) and DLS and the many variables involved when impact is under scrutiny. Brophy & Wynne (1997) consider that the qualitative management perspective is particularly valuable if concerning impact.

Kyrillidou & Giersch (2004) talk properly about "rich methods" as a way to provide a better and more reliable picture of the complexity of digital services. They provide a more powerful methodological approach, which by "the use of multiple data

[6] Originally applied as part of the EDNER project (EDNER+, 2004a), this approach is drawn from teacher education research, concerned with the adoption of innovation. It is based on the SoC (Stages of Concern) and LoU (Levels of Use) representation of learning, developed by the CBAM (Concerns Based Adoption Model) in the UK to ascertain different levels of response to new stimuli by learners or users of new services or technology (Brophy, 2005; Brophy & Woodhouse, n.d.).

collection techniques may allow the evaluator to cross-check the results and increase credibility and reliability" (Ryan, McClure & Bertot, 2001, cited by Kyrillidou & Giersch, 2004). While a quantitative approach may help the building-up of dependable statistics and illuminate the qualitative one (Conyers, 2006), the latter aids the attentive reading of those data and explores further the whys and hows of behaviours, competences, attitudes and skills.

Impact data collection techniques, applicable to electronic network services and extendable to the whole of DLS, are:

1. qualitative: case studies to explore selected communities; critical path analysis to explore users' interaction with services and resources; individual and small group interviews (Bertot, McClure & Ryan, 2000); focus groups; observation; suggestion boxes; individual user surveys (Craven & Brophy, 2004; Brophy & Woodhouse, n.d.); assessing users' opinions; asking academic teachers; asking library staff (eVALUEd, 2004; Poll, 2005; 2006); user-written diary/protocol placed at the workstation (ISO 2789).
2. quantitative: in her comprehensive review, Poll (2006) lists test, performance monitoring, analysis of bibliographies in users' papers, library use compared to academic success, but also frequency and location of use, increasing or decreasing of use and changes in the user's structure; network traffic use statistics, such as access points, server loads, web downloads times, and web server log files analysis[7] (Bertot, McClure & Ryan, 2000; Poll, *ibid.*). New valuable techniques allowed by technology developments, whose use must be very careful as to accuracy or depth of data.

2.5.3 Features of impact indicators

Studies also evidence the need to select some prescriptive or recommended features as proper to the indicators against which assessment is performed. They have

[7] Jones, S. *et al*. (2000) explain how it becomes important to investigate how users interact with digital library systems in practice. Transaction logs are a most appropriate source of usage information. They confide information on user behaviour can be drawn from them both automatically (through calculation of statistics) and manually (by examining query strings about searching strategies, like the use of operators and search options to understand search motivations).

usually been created and adopted according to compliance with these features and testing always looks back on to them, because regarded as assurance to successful employment and good results.

Also listed with slight differences by Abbott, (1994, adapted from Ford, 1989), the features selected by Poll & te Boekhorst (1996, p. 18) for a traditional library, but certainly transferable to a digital one, are:

1. appropriateness or validity for what the indicator is supposed to measure;
2. reliability or accuracy, that is, consistent production of the same results under the same circumstances;
3. reproducibility;
4. helpfulness or usefulness in decision-making and showing users' needs;
5. practicality or user friendliness to further its acceptance.

Features put forth by the international standard ISO 11620 (2003, p. 6) differ in some points. ISO 11620 names differently helpfulness, changing it in informative content, and reproducibility in comparability, but retains the meanings. It, then, separates appropriateness from validity, adding a new criterion, because appropriateness is meant according to the purpose of the indicator itself and validity remains for what the indicator is supposed to measure.

NeLH FOLIO (2006b) suggests that a proper indicator is: direct, objective; adequate; quantitative, where possible (qualitative indicators are defined descriptive observations, i.e. an expert opinion or a description of behaviour); disaggregated, where appropriate; practical and reliable.

2.6 Major findings

A number of projects and initiatives to draw upon for benchmarking have been undertaken over the past years. They give an important contribution to the development of the matter and the enhancement of studies. Nevertheless, they present themselves as individual efforts responding to context-related issues and needs.

Notable impact studies have been produced in relation to the implementation of educational DL in the United States, such as the Perseus Digital Library (PDL), the Alexandria Digital Library (ADL), followed by the Alexandria Digital Earth Prototype

(ADEPT) and the National Science Digital Library (NSDL). They are ten, twelve-year-old projects, allowing longitudinal research, congenial to impact assessment (Borgman, 2005; Chowdhury, Landoni & Gibb, 2006). For instance, Leazer, Gilliland-Swetland & Borgman (2000) examine how ADEPT impacts teaching and learning by intensive analyses of individual users and large-scale studies of entire classrooms to understand learning processes. Borgman (2004), Borgman et al. (2005) investigate how the use of ADEPT reinforces the links between learning, teaching and research. Impact evaluation of PDL sheds light on teaching and learning augmentation, community development and user support (Marchionini, 2000; Yang, 2001).

In the United Kingdom much interest is shown for the development of test-beds and toolkits for impact assessment of operational DL, considered as electronic information services per se and integration to virtual learning environments. Most notable in the academic setting is the eVALUEd project, an online toolkit to ease e-libraries qualitative evaluation, which encompasses a wide-ranging prospect of issues, measures and indicators (McNicol, 2004; Thebridge, 2004); the EDNER and EDNER+ projects that represent the formative and summative evaluation of the teaching and learning aspects of the JISC Information Environment, whose results guarantee an in-depth insight into the impact of online information resources in an academic environment (Markland, 2003; Humphreys, Kemp & Jones, 2004). The LIRG/SCONUL Impact Implementation Initiative, whose scope is to measure impact in relation to established success criteria of individually chosen aspects of library activities (Payne & Conyers, 2005). Among the project participating institutions the University College Chester particularly focuses on the impact of electronic resources (Peters & Fiander, 2005) and their findings are of assured interest.

As for the collection of statistical data for the electronic and digital environment, which have been found profitable adds-on to impact studies of DLS, an important contribution to the production of stable measures and indicators is given by current standards, namely ISO TC46/SC8, section of the International Standards Organization (ISO 2789 and ISO 11620), which integrate the latter two and designate purposeful indicators for the digital environment, and other projects like Equinox (2000), E-measures (Conyers, 2004a; 2004b) and the ARL New Measures Initiatives, like the E-

Metrics project (Shim et al., 2000; Shim, McClure & Bertot, 2001), or MINES for Libraries (Franklin & Plum, 2004).

2.7 Future directions and deficiencies in the studies

"Impact measures will need further consideration and development" (Poll, 2006, p. 141). What the future calls for DLS impact studies rests in what is recognised as deficient today, which is identified in:

1. need for standardised definitions and methods. Agreement on definitions and protocols of research will ease impact evaluation and help build common grounds for comparison and benchmarking;
2. enhancement of research in practical cases and evidence of impact;
3. development of DLS impact research in the Italian Library and Information Science environment.

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3. Methodology

3.1	Preliminary considerations: the research paradigm	47
3.1.1	The approach to the research	50
3.1.2	The research strategy	51
3.2	The research process	52
3.2.1	Literature review	53
3.2.2	Research proposal	54
3.3	Qualitative research techniques for data collection	55
3.3.1	The search for impact	57
3.3.2	Open-ended questionnaire with experts	59
3.3.2.2	Purpose	59
3.3.2.3	Advantages and limitations	60
3.3.2.4	Sampling procedures	61
3.3.2.5	Open-ended questionnaire design	62
3.3.3	Focus group with ULS practitioners	63
3.3.3.1	Purpose	63
3.3.3.2	Advantages and limitations	63
3.3.3.3	Sampling procedures and design	64
3.3.4	In-depth interviews with key-informants	65
3.3.4.1	Purpose	65
3.3.4.2	Advantages and limitations	65
3.3.4.3	Sampling procedures	66
3.3.4.4	Interviews design	67
3.5	Data analysis and interpretation of all collected data	68
3.6	Validation of findings	69
3.7	The researcher	70
3.8	Limitations of the research	70
3.9	Ethical issues	71
References		72

3.1 Preliminary considerations: the research paradigm

Research in Library and Information Studies is generally categorised as social research and this study is to be configured in this domain. Social research strategies and methodological procedures and techniques find their justification in a corpus of philosophical assumptions, which represent their theoretical reference framework, thus accounting for an embedded system of ideas that guide research of social reality.

Social research (and scientific research at large) aims at answering three fundamental questions, all concerning the discovery of *truth*, the building of *knowledge* and the application of related research *strategies*, i.e. in other words: essence or ontology, knowledge or epistemology and method (Corbetta, 2003, pp. 17-18). The ontological question is about the "what", the nature and form of social reality, that is the general philosophical question about the being of things and the external world. The epistemological question is about the relationship between the "who" and the "what" and its outcomes, the knower and what can be known. The methodological question is about the "how", the way the researcher can get to know social reality, and the technical tools to be employed in the process of knowledge building (Corbetta, 2003, pp. 17-18; Creswell, 2003, pp. 4-5).

Central to research design is the position that the researcher intends to take and his/her awareness of the implications that the responses to the above-mentioned questions entail. The approach to one of these questions has a bearing on the others according to the philosophical assumptions, or set of beliefs and accompanying methods behind them, which social researchers commonly define as *paradigms* (Lincoln & Guba, 1985; Tashakkori & Teddlie, 1998; Corbetta, 2003; Creswell, 2003). The spectrum established by social research is, in this respect, ample and runs from the epistemological stance of objectivism to subjectivism, which call in, respectively, on the one end of the continuum the positivist paradigm and on the other the interpretivist one (Crotty, 1998; Corbetta, 2003; Creswell, 2003).

The positivist approach assumes social reality as "real", that is, where causes determine effects. Quantitative techniques of measurement and the empirical observation of phenomena convey theory deduction, the verification of hypotheses and

of unchanging natural laws. The researcher takes a detached objective standpoint, a position usually proper to hard sciences and the so-called "scientific method".

The interpretivist approach is, conversely, prone to "interpret" reality according to the meanings attributed to it, or constructed by individuals. The inquiry unfolds naturally, i.e. open to whatever emerges, unobtrusive and non-manipulative, "the researcher does not attempt to manipulate the research setting" (Patton, 1990, p. 39-40).

The research process is inductive and mainly conducted by qualitative techniques (Patton, 1990, pp. 35-63). The perspective is holistic, as the phenomenon under study is taken as a whole complex system the researcher tries to understand and illuminate thanks to the collection of qualitative data, entailing thick descriptions and in-depth inquiries. Phenomena are related to single unique cases, placed in social, historical and temporal contexts. As a result, the researcher empathically participates in the research and his/her objective is to understand the environment under study, while assuming "a non-judgemental stance toward whatever content may emerge" (Patton, 1990, p. 41).

In-between these two paradigms, pragmatism accepts the circumstance that no philosophical assumption is set as antecedent condition to research, that "knowledge claims arise out of actions, situations and consequences" (Creswell, 2003, p. 11). The lack of commitment to any system of ideas or reality discloses the research problem, the search for solutions and their potential applications. A pragmatist investigation assumes as most suitable a pluralistic methodological approach, using both quantitative and qualitative data.

The approach chosen by the researcher for this study is summed up by Patton (1990, p. 39), who favours a "creative and practical situational responsiveness", that is, a study design "appropriate for a specific inquiry situation", which calls in an approach to research in terms of strategic methodological choices, rather than strict "paradigm-dictated choices".

This research is deliberately operational and context-based. The intent of the researcher is to trace an appropriate evaluation model for the assessment of impact of DLS in a small academic community, based on evidence and rooted in practice.

> External researchers should be able to deploy a wider repertoire of methods to evaluate the impact of library services on teaching, learning and research. However, the transient nature of most

> external research interventions will not empower university library staff to continue to collect evidence and to learn about the issues over time (Markless & Streatfield, 2006).

The crossroad is to transfer already tested experiences in the field from other contexts and adapt them to her own reality, or, to attempt to make a DLS evaluation model originate from the people actually using those services and involved in evaluation, i.e. users and practitioners.

> […] the best people to generate evidence about what is possible, as well as about which approaches work well and why, are the practitioners themselves […] (Markless & Streatfield, 2006).

Likewise, literature widely acknowledges the elusive and tentative nature of impact evaluation in library services at large and in DLS in particular, because exclusively pertaining to contingency, i.e., the personal history, previous experiences of the individual, his/her background, and is easily confoundable with other concurrent sources of impact.

The researcher has neither hypotheses to test or prove nor theories to build, grounded on collected data or observed reality, but the pragmatic need to investigate a research problem, to look for practical solutions and potential applications, conscious that the definitive point of interest are the people and their "real world"[1].

The methodological justification to a user-centred, context-based, practical study is, therefore, found in the constructivist stance to investigation, here recognised as a utilitarian "discovery-oriented" approach, allowing the research process freely and flexibly flow according to needs and purposes (Patton, 1990; Gorman & Clayton, 1997; Tashakkori & Teddlie, 1998; Marshall & Rossman, 1999; Creswell, 2003). Ultimately, the sole accepted postulation is that this study is a construction deriving from the interaction of the researcher with the research participants.

Besides, this is not an impact evaluation study, but a meta-discourse on impact evaluation and its processes, evidenced through the search for functional measures and indicators, which, in the intent of the researcher, arise freely from the experience of users themselves and local library practitioners, attentive to the provision of services and their effects on them. An induced reflection on uses, functionalities, use priorities,

[1] The phrase is used according to Patton (1997, p. 38), when explaining the meaning of *reality testing* in evaluation "in its commonsense connotation of finding out what is happening", so that the real world is that intelligence of reality people have and not "some absolute, positivist construct […].

ideal services will eventually help establish an evaluation framework to be applied to understand DLS impact on users, to improve services, to influence decision-makers and to contribute to the parent organisation mission. In this respect, an unexpected, but illuminating convergence seems to work between a constructivist standpoint and what Patton (1997, p. 20) calls utilization-focused evaluation, that is,

> evaluations should be judged by their utility and actual use […]. Use concerns how real people in the real world apply evaluation findings and experience the evaluation process. Therefore, the *focus* in utilization-focused evaluation is on *intended use by intended users*.

Evaluation, Patton continues, is too important to be left to experts. It concerns people, their experience and use of programmes and services.

Intention of this research is to follow this thread and see where it takes.

3.1.1 The approach to the research

Any research problem calls for appropriate approaches. Hence, the questions that a study attempts to answer and the state of the art of existing studies, responding to that problem, help define the best possible types of intervention.

> The art of evaluation involves creating a design that is appropriate for a specific situation and particular action or policy making context (Patton, 1997, p. 249).

The critical factor, working as introductory posture and as reminder throughout this study, is that the researcher is taken in the mechanism of an evaluation study, even though only at the preliminary level of a model and a method construction.

This research aims at finding out how the effects produced by the use of DLS in a given academic community can be assessed. The nature of the questions behind the research problem, the awareness that little research, almost none in Italy, has been done on the subject, that no hard-tested impact measures and indicators have been produced yet and no standardisation has been generated, label this study as *exploratory*, according to the equation provided by Stebbins (2001, pp. 3-6) between exploration and discovery. On the one hand, exploration must be "as broad and thorough as possible" and on the other the area of research understudied or little known; even so, researchers "have reason to believe it contains elements worth discovering" (*ibid.*). Flexibility and open-

mindedness are the recommended attitudes all through the process of a successful exploration.

While it is commonly understood that qualitative research is exploratory per se, exploration is not synonymous with it, but Creswell (2003, p. 22), quoting Morse (1991) effectively adds,

> if a concept or phenomenon needs to be understood because little research has been done on it, then it merits a qualitative approach. Qualitative research is exploratory and is useful when the researcher does not know the important variables to examine. This type of approach may be needed because the topic is new, the topic has never been addressed with a certain sample or group of people, or existing theories do not apply with the particular sample or group under study.

Even if not taken as a predetermined superstructure, the latter-mentioned approach is believed appropriate for the needs and purposes of this research. Meaning and results, which cannot be prefigured in advance, will eventually arise from the narrative of people involved in the study. At the same time, to be useful and exploitable, data must also be funnelled into a set of measures and indicators, if identified, to be agreed upon by library practitioners and reflected by key-informants of the local academic community.

The research strategy and the data collection tools are chosen in relation to their compliance with the theoretical framework and the research approach exposed.

3.1.2 The research strategy

The primal intents and guiding principles of this research have been recognised in the following set of actions:

1. break new ground in the field of DLS impact evaluation in an Italian academic library context;
2. bear in mind the general rule that an evaluation activity is made for and by the users of the programme or service to be evaluated and is orientated to consider the use that will be done of it in due course (Patton, 1997).

Accordingly, the exploratory cut given to the study and the qualitative approach devised, develop, at an application level, a strategy of inquiry that comes near the *case*

study, where "the researcher explores in depth a program, an event, an activity, a process…" (Creswell, 2003, p. 15), using a variety of data collection procedures, and findings of one procedure are expanded into another. This is judged the suitable strategy to widen and enrich meaning in this research project, where the building up of an impact evaluation model is explicitly and fundamentally entrusted to primary intended users, not to evaluation experts and preconceived good-for-all-seasons models.

This context given, the role of the researcher is that of participator in the first person, because personally involved, eager to stimulate involvement of participants in turn, prone to build a relationship based on credibility, intellectual rigor, trustworthiness and objectivity by carefully documenting all procedures (Patton, 1990, pp. 472-482; Creswell, 2003, pp. 181-182). The researcher plays also the role of facilitator, whose task is to allow meaning to emerge from participants without restraints.

The circumstances and context of inquiry, the process of investigation are conceived as a sequential and iterative strategy, so that data collection, interpretation and analysis get richer and stay focused along the way. Data collection is entrusted to qualitative methods.

For exploratory purposes, data gathering first entails the contribution of experts, not part of the context under study, but in the privileged position of bearing a deep knowledge of the problem (Corbetta, 1999, p. 420), it is then commended to local library practitioners, who are called to give their contribution through the focus group technique. To close the circle, also of data validation, end users are involved in the study and interviewed to get "indirectly" from them those data which would eventually help enucleate indicators to assess evidence of impact.

3.2 The research process

Once the research problem has been formalised, the approach to the research delineated and a strategy designed, a step further is taken into the actual design of the study. However, in a qualitative method approach this process cannot be established a priori, because the levels of formalisation and standardisation are relatively low.

While staying focused and maintaining a reflective attitude, it is crucial for the researcher to keep a flexible, open-minded stance in order to be ready to change course, whether necessary, and to make the research process a learning opportunity.

3.2.1 Literature review

The review of the literature has been conducted at the beginning of the study and it is positioned in the introductory section in a separate chapter, because it serves the scope of *framing* the object of the research (Creswell, 2003, p. 30). Conclusions and future directions, drawn from the literature, about a scarcely studied, hardly manageable topic accomplish the task of directing the successive choices about methodology and methods of data collection.

The progression into the matter has been characterised by fits and starts, because the initial search for indices of mere measures and indicators for DLS impact assessment in an academic setting was a drawback. Then, it led to the discovery of evaluation theories and procedures, learning ad teaching practices, and also to the discovery DL design, implementation and management studies, which nevertheless represent the significant backdrop to any evaluation model of this kind.

Literature reviewing has proved the difficulty to fix definitions of terms, because of the intangible trait of impact and the reasonable newness of DL. It has been hard to find a sense of direction along the way, too, because of the number of heterogeneous, practical cases, hardly reconcilable with a well-defined impact assessment framework.

Case studies, implementations, evaluation programmes entirely originate within the Anglo-Saxon environment and confirm the freshness of the research object within the Italian Library and Information Science setting.

As for source tracing and the source types taken into account during literature reviewing, the following can be listed:

1. source tracing tools: online scholarly databases, like LISA (Library and Information Science Abstracts), Social Sciences Citation Index, ERIC, web search engines, like Google Scholar, web bibliographies, national and international online catalogues.

2. source type: journal articles retrieved from e-journal aggregators, such as Emerald, Ingenta, ScienceDirect, glossaries, international standards, reports, websites, guidelines, presentations and online toolkits.

3.2.2 Research proposal

The process, which has brought to the definition of the research problem and the research strategies, has been very long and time-consuming. Firstly, it was immediately apparent that in Italy the matter had not been properly taken into account yet. Secondly, at the beginning the idea of facing DLS impact assessment was discarded as impracticable, because it appeared to be the least investigated aspect within the wider area of performance measurement. As a result, the study was focused on the more approachable, larger field of performance measurement and the development of an evaluation model, based on performance measures and indicators, to be applied successfully to a DL environment within a traditional library context.

In order to conduct the research, it was estimated proper the application of the Delphi method, whose aim is to create a "collective human intelligence capability […] via structured communications" (Linstone & Turoff, 1975), that is why, apart from its application as a forecasting procedure, it can be especially successful in a variety of areas, like "putting together the structure of a model" (*ibid.*), where both the creative exploration of ideas, and the production of effectual information for decision-making are involved, but the method seemed too limited to encompass also a user-centred qualitative modulation, which soon emerged as an imperative.

The more the review of the literature expanded, the more it was clear that the focus on DLS performance measurement risked to be too broad and too obvious. It missed the fundamental point of users' perspective and involvement. Preliminary results from the interviews with expert observers revealed an exquisite consideration for users and the importance of their contribution to the design, implementation, improvement and evaluation of DLS.

The research problem was then refocused back to the original idea and narrowed down to the search for a model of impact assessment, thus recognising and revaluating

the centrality of users in evaluation with a view to developing an understanding of the dynamics and effects that come into being when users interact with DLS.

3.3 Qualitative research techniques for data collection

As said, a naturalistic inquiry cut and the qualitative method approach have been found suitable for the purposes of this research. The aim is to concentrate on a meta-evaluation discourse, where results spring directly from users and a dynamic orientation to the research is judged the right approach to collect valuable meaningful data. As Patton (1990, p. 42) explains,

> A dynamic evaluation is not tied to a single treatment and predetermined goals or outcomes but focused on the actual operations and impacts of a process, program, or intervention over a period of time. The evaluator sets to understand and document the day-to day reality of the setting or settings under study […]. The data of the evaluation include whatever emerges as important to understanding the setting.

In this context the researcher assumes a pragmatic stance in order to let data enlighten the research problem without constraints, manipulations or controls. Accordingly, the selection of data collection techniques has followed the path designed by the methodological framework (Marshall & Rossman, 1999; Creswell, 2003). The choice of appropriate techniques is very important, because they represent the formal structure of the content that is to be collected (Gorman & Clayton, 2005), or the information that is to be obtained.

Mindful attention is to be paid to the validity and reliability of data; careful consideration must be given to how one technique sustains the others and the contribution that one data collection procedure gives to another.

The strategy to be applied is that of triangulation of data sources, where the consistency of information within qualitative methods is compared and cross-checked (Patton, 1990, p. 467). The triangulation design that emerges,

> can also capture a more complete, *holistic*, and contextual portrayal of the unit(s) under study […]. Elements of the context are illuminated. In this sense, triangulation may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge (Jick, 1979, pp. 603-604).

so that greater confidence in the solidity of data may result.

Table 2 below shows the recursive and sequential trait of the research. The exploration of meaning and the search for content-rich data to meet the aims and objectives of the research problem are conducted through various tools and procedures.

Table 2: Synopsis of research aims, objectives, data sources and collection tools

Aim	To improve value and benefits of DLS for users
Objectives	? To gather and analyse previous and current research on DLS impact assessment ? To establish the importance of the study and frame the research
Data source	Books, journals, websites, databases
Tool	Literature review

Aim	To outline the object of research
Objectives	? To gather highly expert information to back and expand the literature review results ? To provide a frame to contextualise the study ? To investigate what DLS impact in an academic environment means ? To understand the dynamics that come to being in any impact assessment programme concerning users, disciplines, library mission etc. prior to a methodology of evaluation ? To enucleate tentative DLS impact indicators
Data source	Professors of librarianship and information studies Professional librarians and library practitioners Italian digital academic publishing houses' representatives Members of digital library consortia
Tool	Open-ended questionnaire with experts via e-mail

Aims	To improve value and benefits of DLS for users To lay the foundations of a culture of assessment in the organisation as regards DLS

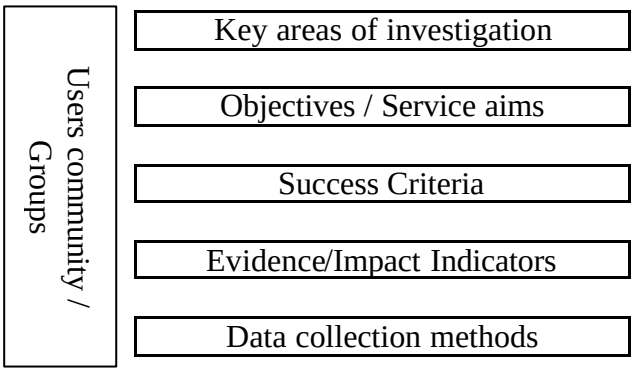
Objectives	? To ease discussion on the building of a DLS impact assessment model, or a methodology of evaluation ? To solicit context-based DLS impact measures and indicators ? To explore the consistency and applicability within the local context of already gathered DLS impact measures and indicators ? To mirror the contribution of the organisation to institutional goals ? To improve DLS
Data source	ULS library staff
Tool	A focus group with library professionals from the law library and the scientific libraries

Aim	To improve value and benefits of DLS for users
Objectives	? To identify uses of DLS ? To investigate users' needs, priorities, expectations and ideal services ? To explore indirectly evidence of DLS impact on users ? To search for changes produced on users by DLS
Data source	Students, researchers, teachers, the ULS coordinator
Tool	Face-to-face, in-depth, unstructured interviews with key-informants

3.3.1 The search for impact

Any measurement or assessment activity is a process. The following scheme arises from the review of the literature, assumed as one of the starting points of the research methodology. As far as impact assessment is concerned, already workable and tested frameworks suggest taking into account the following successive steps (ACRL, 1998; Streatfield & Information management associates, 2000; Poll, 2003; SCONUL/LIRG, 2003; eVALUEd, 2004; Payne & Conyers, 2005).

Table 3: Draft of a tentative impact evaluation model



The intent of the process (as showed in Table 3) is to find out evidence of the effects or changes that DLS have on UNICAM users, starting from the definition of:

1. the people and their activities, consistently with the academic environment;
2. the objectives that the provider of DLS may be pursuing, derived from the DLS mission statement;
3. the impact indicators by which to assess if those objectives have been met and if other, not searched-for or not previewed effects, have been produced;
4. the manifestations of evidence to be collected;
5. the appropriate methods to collect that evidence.

The following three key areas of investigation have been identified:

1. students' learning
2. teaching and training
3. researchers and research

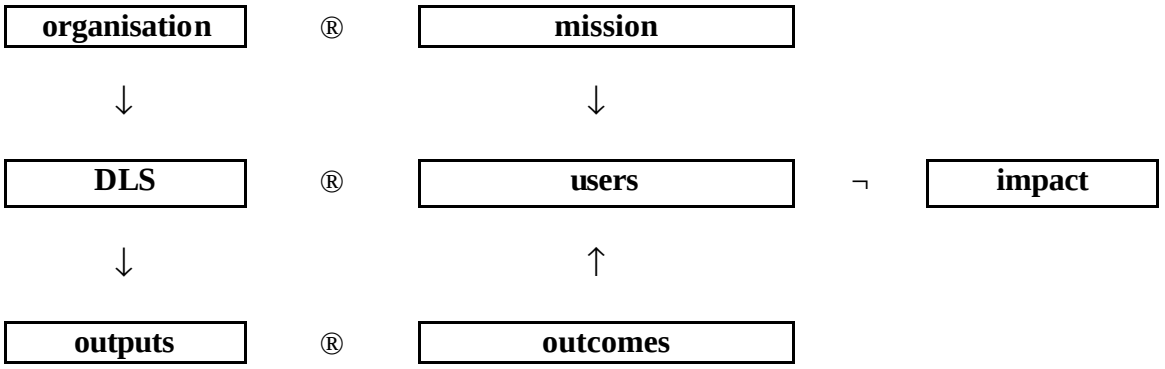
For every key area, objectives, inspiring changes brought about by the users' contact with DLS, are to be devised, if applicable. They state what the organisation is seeking to attain. As the object of assessment is impact, it doesn't follow that what the institution is pursuing is then what is obtained, because unexpected results or effects can show up. Examples of criteria, drawn from literature, reflecting achievement and success as regard the identified objectives (Rubin, 2003; Payne & Conyers, 2005; Markless & Streatfield, 2006) against which to measure possible impact are:

1. changes in awareness and knowledge;
2. changes in skills and competences;

3. changes in attitudes and behaviour;
4. higher social inclusion;
5. higher success in research, study and job (Burroughs, 2000; Poll, 2003, 2005b).

The searched-for intent is to make impact measures and indicators flow consequently and so evidence be collected. Of course, data gathering in UNICAM community may reveal different results from those that have been listed here as mere exemplifications. Anyway, all the points showed are cardinal and born in mind together with aims, objectives and research questions and the relations showed in Table 4 below.

Table 4: Conceptual map of the relations working in DLS impact assessment



3.3.2 Open-ended questionnaire with experts

3.3.2.2 Purpose

The exploratory approach makes it imperative to put into action appropriate strategies and tools to back and contextualise the study, to get primary data to forward the investigation.

The interview with "privileged observers" (Corbetta, 2003, pp. 89-91) or experts is typically used in a preliminary phase of a research, when the boundaries of the object under study are yet to be clearly defined. This technique is contemplated among qualitative data collection tools in social research to elicit information and meaning from people who are not part of the particular phenomenon being studied, who for their professional, academic and scholarly achievements are widely recognised experts of the

phenomenon, thus having a privileged point of observation, because of their direct and deep vision of it.

The use of this technique serves the scope of gathering lacking information, enriching the information drawn from the literature review, confronting the two sources in order to collect opinions to draft a preliminary conceptual model.

3.3.2.3 Advantages and limitations

Interviews with experts are generally regarded as typical tools of the qualitative method research, even if the way they are conducted sometimes makes them a hybrid technique. Because of the people involved, who need to be reached in different places, often they are not face-to-face, but distantly administered structured interviews, or open-ended questionnaires. The control over the line of questioning, that an open-ended questionnaire allows, is useful when the researcher boks for data to be indexed and classified to produce meaning. On the one hand, the level of standardisation of the information is assured, on the other, the door is open to the discovery of what is not known. The bivalence of this structure is particularly useful when the objective of standardisation of results is to be reached, but at the same time, the phenomenon is quite unknown and the complexity of responses cannot be previewed, so that a closed-ended questionnaire is not convenient (Corbetta, 2003, p. 79).

Either questions are sent by mail or e-mail, the researcher has no means to interact with the respondent, which presents both advantages and limitations as far as the quality, quantity and content of results are concerned.

Opting for this technique has the practical advantage to reach contemporarily a group of participants from different places. The use of technology (questions are sent via e-mail) hinders immediacy, that's why the researcher must be very careful in formulating intelligible questions, in avoiding bias, because they cannot be corrected or better explained like in a semi- or unstructured interview.

Another limitation for the researcher is that it has been very difficult to get in contact with respondents, to convince them to participate to the study and get back their responses, because the initial assent was usually followed by interesting feedback

revealing how the questionnaire per se was not too demanding as far as the number of questions was concerned, but the conceptual complexity of the topic requested a time-consuming attention.

3.3.2.4 Sampling procedures

The sampling procedure, developed for this open-ended questionnaire, is indebted more to a qualitative approach than a quantitative one. The hybrid nature of the technique lets the researcher free to choose the most suitable procedure for the needs of her study (Marshall & Rossman, 1999). The objective being to understand a phenomenon, the appropriate criterion is not a statistical representation of the population of interest, but a substantial representation of it. The intent is to contemplate all the situations of interest, not to reproduce the characteristics of a population (Corbetta, 2003, p. 75). As Slater (1990, p. 41) points out, "The trade-off between the two approaches lies in breadth against depth", where depth is here preferred, because the aim is to understand and build meaning, not to prove an hypothesis.

Indeed, a small number of participants can generate valuable information by the adoption of a purposive sampling procedure, or what Patton calls "intensity sampling", that is, selecting "information-rich cases that manifest the phenomenon of interest intensely" (Patton, 1990, 169-171).

In this case stakeholders are identified among Italian DL experts at various level, i.e., professors of librarianship and information studies, who are particularly engaged in DL research, professional librarians and library practitioners working at DLS implementation and management, Italian digital academic publishing houses' representatives and members of DL consortia. Eight people are selected according to the number and quality of their scholarly publications, the projects they are involved in, and past achievements. The rate of responses is settled at 50%, because only four people completed and sent back the questionnaire and two of them returned also a feedback message via e-mail, even if not requested, which proved very useful in the ensuing construction of the focus group with ULS staff and interviews with local stakeholders.

Once identified as potential respondents to the questionnaire, people are contacted on the phone to make the invitation, ask for consent to participate, explain briefly the project content, the extent of the engagement, establish a deadline to collect their answers.

3.3.2.5 Open-ended questionnaire design

The open-ended questions are built around a set of subjects or areas of investigation, covering the critical issues raised by the literature review and the gap spotted in past and present research both at international and at national level. They concentrate on the following points:

1. Definition of DLS impact in an academic environment;
2. Relation between users, activities and disciplinary differences with respect to impact assessment;
3. Categories of use and reasons for use of DLS;
4. A way to impact assessment;
5. Potential indicators;
6. Methods and techniques to gather data.

The questionnaire has a discursive flow and is built in a sequential mode in order to facilitate respondents to progress towards the end. The questions have been piloted with the tutor and a colleague outside the researcher's organisation. The process to the final construction of the questionnaire has been very time-consuming. The researcher has found the congenial approach only after experimenting the application of already tested models to her context, i.e. The Impact Implementation Programme (Payne & Conyers, 2005) and the eVALUEd toolkit (2004) without complete satisfaction and realising that content-rich results could only come from primary users (Patton, 1997).

After rethinking questions according to suggestions and critical points, they are sent via e-mail to participants accompanied by a presentation/reminder letter where factual information is given and an endorsement letter, where the research project, its aims and intents are repeated more particularly.

3.3.3 Focus group interviews with ULS practitioners

3.3.3.1 Purpose

With the focus group interviews administered to the ULS library practitioners, the research starts the factual exploration of the ULS context. Data collected through the literature review and the answers from expert observers of the Italian DL environment are employed as background to this questioning. Focus group interviewing is inserted in the middle of this qualitative study. It takes the form of open-ended questions proposed for reflection to a group of colleagues.

At this stage of the research, the necessity to develop an assessment scheme of fit-to-the-context DLS impact indicators, makes the collection of richer, deeper data the proper way to accomplish the task. Insisting on the "context of discovery", as Reichenbach (cited by Corbetta, 2003, p. 74) defines the qualitative field of approach, helps get data inspiring the conception of new ideas and "contributes something unique to the researcher's understanding of the phenomenon under study" (Morgan, 1997, p. 3, 6). Patton (1990, p. 336) provides the best justification about the use of this technique in an evaluation programme, adding: "focus group interviews can […] be used with staff to identify key elements in a program's implementation and treatment."

3.3.3.2 Advantages and limitations

Focus group interviewing is "a highly efficient qualitative data collection technique" (*ibid.*, 1990, p. 335), because in rather little time the researcher can "produce concentrated amounts of data on precisely the topic of interest" (*ibid.*, 1997, p. 13). Additionally, the interaction between participants helps balance views and opinions, thus preventing extremeness. Group dynamics tend to bring naturally people to focus on the important topics and issues (*ibid.*, p. 336). Focus group interviews present also weaknesses in that they are overtly directed by the researcher, whose role of moderator cannot be effaced. At the same time considerable skills to manage a group are requested from the researcher, to make the experience a success.

3.3.3.3 Sampling procedures and design

The selection of a sample of the population to study is a crucial step in any research design (Crotty, 1998; Tashakkori & Teddlie, 1998; Corbetta, 1999, 2003; Creswell, 2003; Powell & Connaway, 2004).

The selection of the population for the focus group has been strongly influenced by the context under study, because it involves a very small community of colleague librarians. Sampling has been an easy task; the number of people under investigation is very small, which has made the sampling frame and the sample nearly coincide. Namely, it consists of two librarians working in the ULS technical services division, ten librarians working in branch libraries, two of whom in campuses distant from the biggest and central one. As the ULS is small, all professional librarians are involved in DL design, implementation and management and for this reason it is not correct to speak of a purposive sample of the population chosen for the focus group, because all respondents are absolutely relevant to the purposes of the project. The management, non-skilled staff and short term contract staff have not been invited to participate for opposite reasons. The management, represented by the ULS coordinator, is later interviewed, because regarded as central among local stakeholders, while non-skilled staff is not involved in the DL implementation and management dynamics.

The context of interest is local and limited to UNICAM and the library system, so that the location is decided as a direct and natural consequence. The focus group is gathered in the meeting room next to the ULS coordinator's office, normally used for meetings. The place is very familiar to everybody and a very relaxed atmosphere is established from the start.

The collection of data is cross-sectional, because made only at one point in time and is functional to the purposes of this study.

The areas of investigation are concentrated on DLS impact on academic learning, teaching and research and evidence of impact in accordance with the activities performed by students, teachers and researchers.

To keep the collection of data in line with the study aims and objectives, the researcher also believes important to reserve a part of the interviewing to investigate

respondents' perceptions and suggestions about the implementation of a DLS impact assessment programme in UNICAM, consistent with the institutional goals.

After a first drafting, the questioning route is proposed for review and comments to a colleague librarian working in another University library and a non-librarian colleague within the institution. The intent is to get feedback from expert and non-expert people, to test whether the questions are clear and practical, words accurate in order to avoid as far as possible response bias (Slater, 1990).

Colleagues have been invited to participate following a phone call, eight of them accepted. An endorsement letter, sent via e-mail, serves also as a reminder for purposes, consent and the meeting time and date. Anyway, the researcher repeats in a brief introductory note, before starting the actual interviewing the purpose of the meeting and what it involves.

3.3.4 In-depth interviews with key-informants

3.3.4.1 Purpose

The researcher considers that the most significant, suitable and effective way to find information and explore the local context is the direct involvement of primary users of DLS in the construction of the evaluation model (Patton, 1997) and the best-fitted tool to reach the scope is judged the face-to-face, in-depth, semi-structured interview.

When presenting the method that best can help the construction of a context-based evaluation framework, Patton (1997, p. 22) states,

> "Utilization-focused evaluation […] is a process for helping primary intended users select the most appropriate content, model, methods, theory, and uses for their particular situation".

If users are the focus, not because they are the privileged object in an impact assessment undertaking, but because they are the actors of this process, the strategy of the interview helps bring out the densest and richest meaning and concerns the "context of discovery".

3.3.4.2 Advantages and limitations

The advantages that a research may obtain from the practice of interviewing are numerous. Firstly, the immediacy of response to a question or a problem, because data

can be collected quickly and easily. Secondly, the direct interaction between interviewer and interviewee allows discussion over meanings, avoids ambiguities and yields unexpected insight (Gorman & Clayton, 2005, p. 125). The face-to-face contact, a friendly approach help establish a confident atmosphere, which usually results in intense talks.

For the purposes of this research, the interview is used to probe into the opinions and suggestions of local key-informants, identified in students, researchers and teachers, about a model of DLS impact assessment, to be evidenced indirectly from their points of view.

Interviews present also limits, because the collection and analysis of data may be very time-consuming. Analysis must be very careful, and interpretation as well, because it lends itself to errors of judgement.

The interviews conducted for this study have been at times difficult to take on, because the researcher encountered misconceptions on the part of users about the nature and functions of UNICAM DL. Nevertheless, the researcher's attitude was of encouragement to facilitate talks.

3.3.4.3 Sampling procedures

Among the criteria guiding the procedure of sampling, is that of gaining a variety of perspectives on the research problem (Gorman & Clayton, 2005). This principle particularly applies to qualitative inquiries, where the objective of sampling is not that of representation for obvious practical reasons, but to provide intense descriptions and thick data. Semi-structured and unstructured interviews are data collection tools which discard the sampling criterion of representing in a small scale an entire population in favour of an approach centred on subjects. The researcher's interest is focused on the understanding of phenomena through people's experiences, opinions, attitudes and behaviours (Corbetta, 2003).

The above-mentioned sampling procedure is applied to the interviews with key-informants. The sampling selection identifies some categories of primary, information-

rich users, acquainted with the DL environment, who can be the first beneficiaries of this impact assessment model.

People are chosen among students, teachers and researchers of the Faculty of Law. Among students considerable interest is represented by graduating students working at their dissertation and PhD students, because they certainly have made the experience of using digital information resources and services. The ULS coordinator is also interviewed as the person, whose ample views on the dynamics and implications of a DL and its services in the academic context, will help close the circle of the research. The questioning route used for the ULS coordinator is similar to that of the focus group.

3.3.4.4 Interviews design

The process of designing the interviews has been long and full of obstacles. At the beginning the idea was to build in broad terms a background frame to develop in more structured questions to be used to approach participants. As the interviewer is a novice in the field, it was considered that the employment of questions established ahead could help her task. At the moment of verbalising the broad areas of investigation into brief, clear, simple questions, it unmistakably appeared that it was not easy to funnel the utterly new topic in such structures. Every question needed an accompanying explanation, which could make the interviewer play the dangerous role of a guide influencing heavily the interviewee, thus invalidating the genuineness of data. As Corbetta (2003, p. 87) states the choice of data collection tools depends on the objectives of the research and the characteristics of the phenomenon under study. It was, then, decided to rely on the frame as a trace for an experiment of unstructured interview, even if true questions have been formulated (see Appendix). Thus, respondents are allowed to express what is salient to them, answers are not suggested, and respondents' orientation to the topic is best clarified (Foddy, 1994, p. 128-138).

The following topics are located through the interviews:

1. Users' general approach to DL
2. Use of UNICAM DLS
3. Purposes of use

4. Needs, satisfaction, expectations and priorities of DLS
5. Evidence of change produced by DLS.

They are proposed to respondents according to a line of questioning that is not fixed, but may take other directions. Care of the researcher is that all the points are discussed and that wished-for emerging issues are recorded.

After the identification of interviewees, they are contacted in person, or on the phone to gain consent to participate and make an arrangement as for the location, time and date. A brief explanation about the topic is also given in an endorsement letter, sent also via e-mail and serving as a reminder. Four people are interviewed in representation of different user groups.

All interviews are audio taped and transcribed verbatim.

3.5 Data analysis and interpretation of all collected data

"Data analysis is the process of bringing order, structure, meaning to the mass of collected data" (Gorman & Clayton, 2005, p. 206). It entails a description and interpretation of data, their reduction to manageable units to be manipulated in order to discover meaning not readily apparent.

The answers to an open-ended questionnaire, an in-depth interview or focus group consist primarily of text, in this particular context of transcribed words. The researcher chooses to search for evidence of meaning using a coding procedure (Gorman & Clayton, 2005, p. 211-213), in order to draw from the written text small units of meaning marked by codes, which help the researcher to let emerge themes and patterns to be more easily reused in the construction of the other investigation tools.

The cross-case analysis is the strategy adopted in the interpretation of data, because the building of an evaluation model, according to the areas investigated, gets meaning from the concurrence of the different opinions of respondents brought together (Patton, 1990, p. 376).

Analysis and interpretation of data go through a process of coding in order to make sense of the amount of information provided, but the researcher doesn't want to abandon the presentation of results in a narrative way too, in order not to betray or to

alter data given originally by respondents. The purpose of the researcher is to understand and discover meaning.

3.6 Validation of findings

The question of data validity and reliability attainment is fundamental in either a quantitative or qualitative-oriented research, because it is impossible to study a phenomenon through the totality of the population involved (Tashakkori & Teddlie, 1998) and, the qualitative approach, in particular, may be replete with ambiguities. Pure qualitative research must concentrate on rigorous methods and techniques for data gathering, on the credibility of the researcher and the paradigm orientation underpinning the study (Patton, 1990, p. 461).

Sampling procedures must be carefully conducted and methods of research carefully chosen. As Patton remarks (*ibid.*, p. 185),

> The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher rather than with sample size.

Even so, the researcher is conscious that apparently the research may result poor as for the sample size, and notwithstanding the information-richness of the chosen cases, the limited number of people involved may entail poorness of results and of emerging meanings. The validity of findings, the reliability of gathered data, the credibility of the study in its wholeness is pursued, as it has been previously indicated, through the triangulation of data sources (Patton, 1990, p. 467), expecting from this approach, within a qualitative methods framework, that it will rarely lead to a single consistent picture (*ibid.*, p. 467-468); different sources almost certainly liberate different kinds of data. It is to the researcher to understand those differences and draw consistent meanings from them, so that credibility is attained.

The researcher keeps to the context under study, trying to provide the richest possible picture through the careful choice of the sample, the continuous interaction with participants, the careful keeping of records, field notes, transcripts and a research diary.

3.7 The researcher

The researcher has been working at UNICAM for ten years, and has experienced the making of the digital revolution in libraries from the beginning. Like her colleagues, she has lived the efforts, the difficulties to accept continuous change in her job, but conscious of the potentialities and the benefits for users. The attention to discovery, implementation and management of a local DL, typical of the first years, has been little by little supplemented with the need to understand uses, purposes of use, behaviours, impact of digital resources and services to provide always better services, to target and justify expenditures.

The researcher has started her research on DL impact evaluation for personal interests to discover that the chosen subject is particularly felt by the library management and the library staff.

Gaining access and trust has been easy (Gorman & Clayton, 2005), because the researcher is part of the library staff, the study is not imposed by any authority and its usefulness for the organisation has been widely recognised, because hopefully results could be used to better understand users' needs. All this helped a lot to obtain permissions from the management and collaboration and respect from colleagues and local stakeholders. A mechanism of mutual exchange started out according to the *reciprocity model* devised by Patton (1990, p. 253).

The stance of neutrality, required to give credibility, reliability, validity and accurateness to the study (Patton, 1990, p. 55), which could be corrupted by the deep involvement of the researcher in the fieldwork, is preserved because the researcher has no particular theory or hypothesis to prove and no results to back with manipulated data.

3.8 Limitations of the research

This research states from the very beginning its focus:

1. the impact of digital resources and services on a small academic community of an Italian university;
2. the tentative construction of an impact evaluation model for that community.

The research moves within the complex and large fields of DL and evaluation, too large to be dealt with the limited resources and time allowed to the researcher.

Once the subject of the study has been restricted to the development of an impact evaluation model, other limitations have shaped the research:

1. the small sample of participants in the study;
2. participants among key-informants have been chosen only in the Faculty of Law, nearer to the researcher, while hard sciences disciplinary areas have been ignored;
3. users have been chosen only in the organisation. Potential remote users have not been taken into account (Tammaro, 2006);
4. the involvement of non users of UNICAM DL could have been useful to get an external perspective (Tammaro, 2006).

3.9 Ethical issues

The deep involvement of stakeholders in the construction of this evaluation model for the assessment of DLS impact may raise various ethical issues (Patton, 1997, p. 362). The making and use of an evaluation tool can be affected by many factors, which can in turn bias results, that's why it is crucial to make ethical decisions in evaluation, which entail autonomy of decision, fairness, trade-offs calculation, follow a plan, limit stakeholders' involvement to primary intended users and evaluators' integrity and neutrality (Patton, 1997, p. 362-363).

Political issues and influences by decision-makers can be particularly evident in a small context and in these circumstances any evaluation activity is at risk. The selection of stakeholders in an evaluation programme focused on users is decisive, not only for the validity of the study, but also for the ethical issues at stake.

As for the purposes of this research, the coincidence between workplace and study location has made it simpler to ask for access and gain permission, being the research usefulness recognised and trust placed in the researcher. The management was also asked preliminary permission to address colleagues and use part of their working time for the focus group interviews. As the study is not commissioned by the institution,

but arises from the personal interests of the researcher, freedom has been left to select stakeholders and to develop a strategy of research.

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4. Analysis

4.1	Open-ended questionnaire with experts	76
4.1.1	Aims	76
4.1.2	Foreword	76
4.1.3	Analysis	77
4.2	Focus group with ULS practitioners	85
4.2.1	Aims	85
4.2.2	Foreword	86
4.2.3	Analysis	86
4.3	In-depth interviews with key-informants	98
4.3.1	Aims	98
4.3.2	Foreword	99
4.3.3	Analysis	99

References 108

4.1 Open-ended questionnaire with experts

4.1.1 Aims

The open-ended questionnaire with experts was intended to *outline the object of research* through the attainment of the following objectives:

1. to gather highly expert information to back and expand the literature review results;
2. to provide a frame to contextualise the study;
3. to investigate what DLS impact in an academic environment means;
4. to understand the dynamics that come to being in any impact assessment programme concerning users, disciplines, library mission etc. prior to the building of a methodology of evaluation;
5. to enucleate tentative DLS impact indicators.

4.1.2 Foreword

Being already in a written form, data gathered through the open-ended questionnaire, administered via e-mail to participants, were first read to get the gist out of them, reread to highlight emerging concepts and keywords, then written down in order to group the contributions given by respondents in common points of analysis. Six key factors have been identified by the researcher as the backbone of the successive investigations with local library professionals and academic users.

Answers are not discursive, but fairly straight to the point. One respondent felt more at ease giving a general global answer to the proposed topic, instead of giving an answer to every question, which made it more difficult to assign statements to this or that problem arising from the single questions.

At the same time, even if not solicited, feedback came from respondents in the e-mails accompanying the answers to the questionnaire, which proved in line with the researcher's conclusions, drawn from the literature, that

"The interesting newness of the topic is inevitably related to the difficulty of definition and lack of standardization".

All responses by experts, librarians and users are reported in inverted commas and italics.

4.1.3 Analysis

A. Impact of DLS on students, teachers and researchers' activities (towards a definition in context)

Given a definition of impact as a foreword to the questions, the settling in context of the concept is taken as a reference point for the subsequent inquired topics. DLS impact comes out and is readily recognised as an "intangible" asset. All the reflections bear in mind or evidence, even if not apparently, the thinness of the concept pertaining to the sphere of personal and professional changes, which may not be readily ascribed, or not only, to the use of DLS.

Two main points are made about the DLS effects and changes relevant to the activities of academic users and suggested as worth analysing:

1. methodology of research;
2. methodology of learning.

"If we want to speak about effects and changes, we have to mention that the most evident ones are related to the methodology of research and the methodology of learning."

All academic activities are comprised, as learning is specular to teaching, even if not all respondents agree to this picture,

"… as for now the digital library is having an impact mainly on research, while the impact on teaching and learning frankly seems to me too limited …"

> *"… future efforts should concentrate on integrating the digital library into a seamless environment, where the different workplaces […] research, teaching and learning […] coincide. As for now they are juxtaposed and not homogeneous … "*

> *"… while many great progresses have been made in the making of digital libraries, the same efforts have not been made to develop students' learning through digital libraries …"*

Changes produced by the use of DLS in all academic activities will eventually have an impact in the personal and professional life of users, thus generating a cascade effect in society at large by the attainment of:

1. success;
2. a better quality of life.

An important issue is thus suggested by respondents, moving the point of interest outside the library, its digital homologue and the academic community walls to the contribution that these organisations and institutions bring to society and its growth.

Libraries can play an important and fundamental role, helping and promoting the impact of DL in society by supporting the digital information environment itself.

> *" … libraries can help the closing of a circle: from the digital library to e-research (digital resources and research activity in the same setting) and e-learning (which is not only learning or teaching by distance, but to be able to make the whole process of learning in a digital environment …"*

B. The definition of users and their activities to target DL resources and services and impact assessment

All respondents agree that a DL accomplishes its tasks and is successful, if target users are well-defined, so that the development of the digital collection of resources and services is in line with their needs, uses, expectations and priorities. The interconnection

between DLS providers, users and DLS is fundamental to make the system and its dynamics work well,

> *"If the users are successful, also the digital library will be successful. To do this, the digital library first of all must define its users. "*

The issue of remote users, who are not institutional and not known to DLS providers, is taken into account by respondents indirectly, or not considered at all, probably because the notion of the local "academic community", usually well-known and well-delineated is born in mind, even if it is time for DLS providers to think that the scientific community is boundless and international by definition. However, one respondent makes clear

> *"… fortunately enough, it is not hard to sketch out a users' profile of DLS designed for and targeted on an academic community, because easily counted among enrolled students, researchers and professors distributed among well-known disciplinary areas. "*

Still, it may be concluded that it is acceptable that the conception and development of a DL is strongly related to a well-defined picture of its end-users and that any impact assessment initiative, that is taken, must first look at this community of users or at least to those groups who are defined by their disciplinary areas of interest.

C. The importance of disciplinary differences in DLS impact assessment

All experts agree to recognise the importance of disciplinary differences in the take up and use of DLS in both further and higher education. Disciplines in academia clearly define groups and how the academic work is conceived and organised, both at research, learning and teaching level. The library may play an important role in facilitating an evenly approach and use of DLS by a close collaboration with the

academic and teaching staff and with the provision of courses targeted on specific users, their acquisition and use of information skills.

Opinions from experts about disciplinary differences seem to arise more from their personal and professional experiences made in the field as users and providers of DLS, instead of being the result of formal reflections drawn from a literature on the subject, which is very important for the purposes of this study as term of comparison with data obtained from UNICAM library staff on this issue, not fully investigated with local users and key-informants for reasons of time and resources.

In the provisional sketch-out of a DLS impact evaluation model, it remains at the back as an issue to be taken into account, but not emerging.

> *"I believe it is important to differentiate users for their activities … [where] … the uses of electronic resources and DL services [are involved]."*

> *"The use that students make of DLS may not depend on motivations or the acquisition or possession of ICT skills, but on the nature of the discipline itself and the provision of DL resources and services for that discipline."*

> *"According to their discipline, different users or academic groups have different approaches […] to the digital means that support their activity. In hard sciences, the use of digital resources is massive and very up-to-date. In the humanities, users still rely very much on paper-based resources and the use of DLS is sometimes seen with suspicion."*

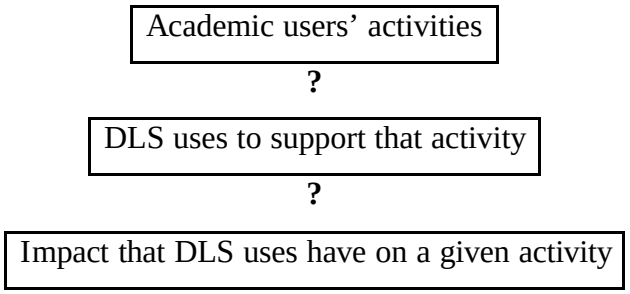
D. DLS uses and purposes of use as prerequisites to impact assessment

The investigation on DLS uses and purposes of use appeared focal to the researcher, because the analysis of uses and reasons for use represents a starting point for the definition of an impact assessment methodology and potential indicators. This

approach is confirmed by respondents, who willingly propose to consideration some lists of possible DLS uses and reasons for use in an academic environment.

It turns out that the nature of use is a prerequisite to the understanding of the effects that DLS produce on users and how they are changed by this use. It is also a precondition to the detection and analysis of those areas of service presenting critical flaws and demanding intervention, where an evaluation of their actual status of impact may serve as input to an improvement or demonstration of value.

The thread in the mind of the researcher, when asking for examples of use and reasons for use, develops this way:



and responses from experts substantiate this line in giving suggestions about uses, categories of use and reasons for use related to academic activities.

> *"I suggest: information seeking, information uses, information re-use, information creation, information sharing."*

All academic activities (learning, teaching and research) find their support in the mentioned categories of use of information at different levels of engagement:

Table 5: Uses, categories of use, reasons for use of DLS

Research and scholarly dissemination	- information seeking - information uses - information creation - information sharing	- bibliographies - data analysis - results compilation - articles writing - peer reviewing

		and communication
Teaching	- information uses	- class preparation
	- information re-use	- keeping up with a field
	- information sharing	- dissemination
Learning	- information seeking	- references
	- information uses	- bibliographies
	- information re-use	- assignments writing
	- information sharing	- exams preparation
		- dissertation writing
		- study groups

The compilation of this table is derived from experts' responses. It does not pretend to be exhaustive, but provides an introductory and systematised approach to the issue.

Of course, the outline is valid both for digital and traditional library tools conveying information, even if methods and components are diverse.

E. A provisional definition of a DLS impact assessment methodology

Two starting points have been suggested by respondents, when asked to pinpoint some steps to be followed in a DLS impact assessment activity, so that a model or a methodology could come out at the end of the investigation.

> *"I think that impact assessment should start from the design of the DL and should be in collaboration with users."*

A methodology of assessment is justifiable, and probably successful, if inserted in a system. It must be conceived together with the DL, designed and targeted to a well-known group or community of users, because related to the achievement of defined service aims. The relation between the service as it is and users as they are known makes any evaluation activity, so impact assessment, flow consequently. Users are central to the design of a DL, because it does not exist per se, but for service purposes.

" … We have to focus on different targets of users, their activities and daily tasks and comparing these with the mission of the digital library."

If DL service providers know their users' needs, priorities and expectations, they will target the satisfaction of those needs, priorities and expectations, thus helping make successful, fully-aware users. DL service purposes, which are reflected in DL design, content, implementation and management, should also be the reflection of the DL mission statement, that's why,

"I also suggest that the wanted impact should be mirrored (or transparent) in the mission statement of the DL."

The model that is suggested here is not just attentive to the process of evaluation, but regards it as the last in a circle of activities, feeding all the others, not least the control over the DL mission statement (at the start of the circle) and its congruency and fulfilment within the system. In this model the respondent suggests that impact is not an "intangible", hard to assess, because escaping any definition, but an achievable result in the mind of operators from the DL conception, because tangibly inscribed in its mission.

Another suggested starting point is to give a clear definition of the digital collection, together with target users.

"First of all, one should define what the library has access to (or intends to have access to) and what it provides through its digital collection, thanks to a benchmarking with an optimal model. All this is to be related to sustained costs, which eventually will be compared to received benefits."

The first requested step seems here to be that of the DL provider, who is taken in acquisition processes and cost/benefit analyses. But, here too users are at the centre of an ideal model of impact assessment,

"… impact assessment is made possible through specific indicators related to the social context where users of DL services live and operate. […] So that another step is to identify target users to define their profile …"

The configured system is again circular. It starts from users, it goes on to the definition of the DL collections and services based on users and their profile, it passes then to the production of measurable outputs and the detection of impact through indicators that can be conceived only for the particular DL under study and its context.

F. An idea of DLS impact indicators

Respondents have expressed their uneasiness in their e-mail messages, which the researcher took also as feedbacks, when confronted with the request for the definition of potential DL impact indicators, because

" … at the moment, no standard, national or international, exists to be used as reference for classes of DL impact indicators that could be adapted to one's organisation. As far as I know, there are case studies, whose achievements can be useful, even if particular."

Anyway, as the question was about suggestions of prospective impact indicators, their responses, even if not related to a precise context, were very precious, because those very same suggestions have been proposed to UNICAM library professionals to get their opinions about a contextualised application.

"Indicators referring to performance are among the most used. They prepare the way to the more elusive impact measurement."

One respondent suggests performance indicators, which do not properly measure impact, but could be useful as indirect measures of impact.

"I suggest that indicators could be to do quicker, to do better, and to do with DL what could not be possible before. It is good then to specialise them for types of users and uses."

Impact evidence is then to be searched in how things are done and activities are performed by DL users. Compared to the past, when digital information tools didn't exist, the time saved thanks to the use of DL can have many positive consequences and effects in the lives of people, detectable in a more successful quality of the academic life, but also in a generic better quality of life. Improvements are made possible both in the quantity of things done and in their quality. Their detection serves the scope of a better provision of DL services that make better users.

DL impact assessment is a virtuous process, which is worth exploring, even in its slightest aspects, if it is not possible or affordable to do it comprehensively yet.

4.2 Focus group with ULS practitioners

4.2.1 Aims

The focus group with the local ULS practitioners was meant to *improve value and benefits of DLS for users* and to *lay the foundations of a culture of assessment in the organisation as regards DLS* through the achievement of the following objectives:

1. to ease discussion on the building of a DLS impact assessment model, or a methodology of evaluation;
2. to solicit context-based DLS impact measures and indicators;
3. to explore the consistency and applicability within the local context of already gathered DLS impact measures and indicators;
4. to mirror the contribution of the organisation to institutional goals;
5. to improve DLS.

4.2.2 Foreword

The writing of the focus group questioning route is very much indebted to the results obtained from the open-ended questionnaire, because those answers helped refocus partially already-settled objectives and inserted in the reflection new points of view and suggestions, proper of the Italian environment, to be usefully solicited from UNICAM library practitioners in order to investigate common views, difficulties, critical points in the design, implementation and management of a DL, which inevitably affect the use and fruition of this service and any evaluation undertaking. Basically, the plan behind the questioning route is the exploration of the feasibility and applicability of a DLS impact assessment activity in UNICAM ULS.

The focus group interview turned out to be very much unstructured, more than foreseen. It soon appeared clear that to interview colleagues, who the researcher shares everyday problems with and has a close contact to, could not be but a guided talk. The conversation flow was very lively, as the topic was judged very "hot", even if not all participants gave their contribution evenly. Colleagues from the law library were less talkative than the colleagues from the scientific libraries, which the researcher expected, because the use of DLS is less spread in the disciplinary area of law.

The focus group lasted one hour and a half.

The ULS coordinator was not invited to this focus group, as the researcher found that her presence could hinder colleagues from expressing freely their opinions, as their vision of things could be more limited, thus judged not worth showing. She was later interviewed according to the same questioning route. The analysis of data is conducted in the same way as the open-ended questionnaire, by encoding the written forms of both the focus group and the ULS coordinator's transcripts.

4.2.3 Analysis

A. Responsive e-collections and services

The discussion in the group started with a topic the researcher believed could break the ice, because current in the everyday working life of her colleagues.

Fundamentally, it was also the first question, because it was important to understand the state of the art of UNICAM DL and its responsiveness, to investigate the existence of critical points, the need for improvements, which could justify a thorough evaluation activity and last but not least, if it was the case, to propose the building of an impact assessment model to the organisation.

The picture coming out can be summed up as follows:

- **benchmarking helps define the responsiveness of the e-collection, because other internal parameters have never been used**

  "For the design and development of our e-collection and e-services, we have followed the model of other universities similar to ours and what consortia proposed. […] In some disciplinary areas it is easier. [...] There are resources you cannot do without or you have information flaws… "

  "One should analyse costs and benefits, but benefits are always greater, because it is also a matter of prestige. […]This is against budget shrinking and costs, but if one also pursues quality, some resources are a must."

- **few librarians have to manage many databases and e-journals**

  "There are too many databases and e-journals to manage and to be up-to-date for each and any of them."

  "UNICAM is a small university with many disciplinary areas. We must cover a lot of disciplinary sectors with insufficient human resources sometimes."

- **costs are always rising. The librarian is attentive to users' needs, but they cannot be always satisfied, because of budget cuts**

"Our e-collection is not exhaustive. It doesn't respond to users' needs. For instance our most important database has limited accesses, because costs are huge. […] Novelties are important, but most of times we cannot buy them."

"In my disciplinary area the most important citation database is free, but it is frustrating for researchers not to have the full-text document delivered immediately on his desktop, when he wants it and this happens quite often."

- **corollary e-services are used to supplement the lack of or cuts in accesses**

"Researchers used to work by themselves. Now that resources have diminished, they ask for our help with corollary services."

"A lot of resources, provided by the consortium last year, are no longer accessible. I have got to use other digital services to supplement. The equilibrium is kept, and users are still satisfied, but I don't know for how long."

"E-service standards are lower, and next year we don't know what will happen."

B. Evaluation as tool to be in line with the DL mission statement

All respondents found it very important to look constantly at the DL mission statement as parameter of good choices and practices, even if the connection between evaluation activities and the fulfilment of aims and objectives stated in the DL mission appeared to be out of their consideration. When induced to reflection on this topic, they all agreed that if you want to get solid evidence that what you are doing is well-done and in accordance with your mission aims and objectives, a regular evaluation activity is the response. Someone is sceptical in this respect and proposes a rethinking about the

DL mission statement. They generally think of input and output measures and quantitative methods of measurement, when questioned about evaluation.

> *"The mission statement is a fundamental document, giving the coordinates of the DL as a virtual and real place where the needs of users, contents and information management meet."*

> *"Yes, I think you are right that evaluation starts from the mission statement. It is a way to control."*

> *"At the moment our mission statement is not such a refined instrument to be used, both to have control over the development of our e-collections and evaluation activities."*

> *"Usage statistics is a powerful and reliable tool of measurement."*

C. Evaluation tools and collaboration with the parent institution

This issue was treated very lively by respondents. On the one hand they feel the great importance of a factual collaboration with the parent institution, because in their opinion that is the key to an authentic success for UNICAM libraries. On the other hand they generally experiment frustrations, lack of understanding and little communication. This time, without hints from the researcher, they state the importance of being in line with the mission statement and strategic plans of the parent institution. DL design, implementation and mission should reflect those greater objectives. Unfortunately, often librarians are not given the tools to accomplish this task, both for economic and cultural reasons. At the end all respondents agree that this difficulty is not only local, but generally shared by all Italian universities, where the digital information revolution is still to be understood and accepted, especially by the older generations of academics.

In this respect, evaluation activities on a regular basis could play the essential role of showing DL worth and value, how the library and its digital counterpart contribute to the well-being of the parent institution and the community it serves. Only the ULS

coordinator foresees the weight of the whole range of evaluation activities from input to impact measurement.

" … DL resources and services should be at the centre of the management policies. A strategy only written on paper and barely realised."

"The management doesn't understand or pretends not to understand how important is for us to be part of the consortium providing many of our digital resources."

"Yes, they put the DL among the fundamental services, and then they cut our budgets."

"There are so many inputs every day. Needs tend to grow, but at the end of the day we get cuts and less resources."

"Usage statistics can help show our worth and the usefulness of DL resources. They are unquestionable data."

"UNICAM strategic plan declares among its objectives a better quality of research and of its students. […] DL can contribute greatly to quality attainment. Quality is attained if you work on more national and international research projects, […] if students are taught how to learn, how to do research, how to use information resources. […] These objectives are reached if one is helped by qualitative evaluation tools, measuring impact and effectiveness."

"Generally speaking, Italian academia is not very much aware of this complex phenomenon. They get confused when dealing with digital information tools, resources etc."

D. Collaboration with the academic staff

This point was seen as critical by all respondents. Everybody was aware that a well-working collaboration with the academic staff would be in favour of a thorough use of DL resources and services. Positive cascading effects could be then detected in the various activities of the academic community.

When solicited about useful forms of collaboration, which would increase and favour DL impact on users, respondents let emerge the following:

- **choose together new e-resources**
- **the library as the centre of information and proposals about DL services**
- **information literacy skills training**

> *"There is reciprocity. If a need arises, or a proposal is made, it is discussed with the professors of the department. Financial, quality pros and cons are evaluated."*

> *"Professors are usually receptive in my department. The library is the place where needs and proposals about information resources and services converge."*

> *"Some professors are easily approachable. […] they understand the importance of a professional opinion, when dealing with a database or a new e-journal."*

> *"Some professors are open, when I propose information literacy training for his students. They willingly lend their class for the purpose, as this kind of initiative is not structured by the faculty."*

> *"The relationship between professors and librarians should be fluid and easy, which is not. Of course, professors must trust librarians and librarians have to be highly professional."*

but a reflection on their experience also gave vent to the following:

- **professors tend to consider DL resources and services as their own property**
- **professors manage DL funds and use them at their own discretion**
- **professors have a vague idea of DL uses and usage**
- **professors think that DL has freed them from the library**

> *"Professors have their own points of view. […] They tend to compare the digital library as the traditional small department library they used to manage personally."*

> *"Sometimes professors don't even conceive that they are not the sole users of e-resources. There are professors who don't do research. The people in their research group usually search, browse, download, read and study for them."*

> *"Unfortunately, professors manage funds for the acquisition of e-resources. […] Money is in the hands of few people, who sometimes don't realise the importance of digital bibliographic tools."*

> *"Even against good usage statistics, sometimes they oppose that digital tools are inappropriately used."*

E. The DL for research

When coming at the tangible uses of DL resources and services, apart from a recognised extensive use of digital tools for research, it soon appeared a different approach according to different disciplines and research groups. Researchers from hard sciences departments are usually autonomous, tend to do by themselves and get to the librarian only for corollary e-services, i.e. digital document delivery, when they cannot get personally the documents they need.

Researchers from the law departments are almost dependent on reference librarians for the digital research. This is particularly true for the older generations of researchers. Their cultural background hinders them from approaching technology positively. Besides, their research circuits are still much indebted to paper-based documents.

> *"My researchers work by themselves. They usually contact me for technical setbacks or information […] Passwords, access etc."*

> *"I have to give advice, guide users to the most appropriate resources. Sometimes, they don't have a clue. Professors are not interested in learning and doing digital research. Students are much more receptive, they are curious and willing to learn."*

F. The DL for teaching and learning

Asked for uses, and indirectly effects and changes, brought by the DL to teaching and learning, respondents confirm a trend that the researcher had also learned from literature as far as the Italian academic world is concerned. These two academic activities are less touched by the use and support of digital tools. They tend to stay behind and anchored to tradition. It much depends on how classes are conceived, usually as lectures with students as passive learners. Rarely they are asked for practical tasks, requiring bibliographic research, knowledge of research tools, let alone digital tools.

Teachers as well tend not to use in their classes digital devices or to induce students to make use of digital resources, if they themselves don't have a good command. In this field much is left to the personal interests and curiosity of teachers and students. The disadvantage is that they happen to discover things by chance, because they have met the right people to satisfy an information need.

"There are professors who use digital devices and materials in their classes. It depends on the subject. Maybe they have seen a difference, easiness in learning and in making things real, touchable."

"There are many technical difficulties, so if someone wants to use certain resources is discouraged."

"It much depends on the teacher. If he is personally willing to use the resources and services of the DL, then he tends to transmit his knowledge to his students, so that they become curious and turn to the librarian to learn more, otherwise…"

G. Information literacy as key

Information literacy is considered by all respondents as the "Gordian knot" of any impact that the DL can have on users. Through the acquisition of information skills users get knowledge, awareness and confidence. They become independent, curious seekers, who will continue to search and learn for the rest of their lives. All this will have positive effects both on their personal and professional life and on society as well.

Respondents are well conscious of the significance of information literacy; nevertheless they confirm the difficulty of letting this message pass to the academic staff and management. Sometimes bureaucracy discourages the standardisation of this activity, which should go side by side with the development and promotion of DLS.

An interesting point is made when one respondent refers information literacy to lifelong learning for librarians.

"User education, but also librarians' education. Librarians must be ready to learn, if they want respect from their counterpart and want to transmit their knowledge."

"Information literacy training is usually left to the good will of the librarian and the teacher who understands its importance."

"Information literacy should be part of the educational strategic plans of faculties and be promoted at academic level."

"Information literacy is fundamental. […] If you give students the right tools to support their learning, you must be ready to teach how to use them. They will be better students, then."

"At the moment I cannot do more. It is a matter of political will and self-reflection by the faculty, which presumes that what is being done, is good this way. There are a few people aware that things must change, but individuals by themselves cannot change the policy of a whole faculty."

"Some professors think it is important to be able to search that particular database for their subject. […] They pass their knowledge to students."

H. A DL impact assessment model for UNICAM

All the key-factors evidenced till now only indirectly contribute to understand the feasibility of a DL impact assessment model in UNICAM ULS by letting emerge critical areas in the service worth evaluating.

The inquiry also goes straight to investigate how to assess impact, how to get evidence that our DL is producing effects and changes in the academic activities of our users. It has been very difficult to gather data in this respect. Respondents found themselves confronted with a matter they have never thought before; at best they found the topic interesting, but elusive and indefinable for a variety of reasons:

- **too many factors contribute to the definition of some examples of impact**
- **data gathering evidencing impact is time-consuming**
- **data gathering involves too many actors (not only DL providers)**
- **data gathering cannot be reduced only to numbers and figures**
- **very in-depth investigation involving people as individuals**

- **long-term changes are hard to follow.**

"Let's make an example, I measure a 5% increase in scholarly publications after a semester when training is given to researchers on DLS. How can I tell that it is because of the courses? Too many factors can influence this datum, maybe more funds given to the research project."

"If I see an increase in OPAC accesses after training courses on the OPAC search strategies, I can probably assume they have had an impact on users' search skills.[…] It is all very misty."

"How can you relate the number of students who use DLS with their better grades? You can assume that, but not be sure. They may be successful, because they attend classes regularly."

"It is very interesting, but very difficult […] It involves people."

"Too many variables. Learning depends on teaching and teaching on research."

"I understand that the question is, where are the advantages of using DLS? They can be only indirectly conceived. If I do research more quickly, I can assume that I write more articles, I work better, I am less stressed, but it is impossible to gather this evidence if I don't ask users directly."

"I can think of the student's confidence with DLS, who gets curious about research and after graduation keeps on doing research."

Remarks from respondents are very interesting and straight to the core of the problem, in spite of their ignorance of the issue. Even if they are not able to find solutions and ready-made answers, the researcher is positively surprised and not frustrated, because much of what is said is expected.

Information-rich data for the purposes of the study come from the investigation of advantages or differences detectable, in respondents' opinion, between the past when DLS didn't exist and the present. Differences are seen as quite obvious:

- **immediate results**
- **thoroughness of research**
- **quick access to resources**
- **easy access to resources**
- **time saved**
- **quantity and quality gains.**

Interestingly enough for the researcher, another datum emerges from the discussion, even if not solicited, comparable to the suggestions made by experts, that is, to relate impact assessment to definite, simple and clear objectives to be reached in a reasonable amount of time, so that data can be easily gathered and analysed, according to a small number of indicators.

> *"I think that for this kind of measurement it is important to have an objective to be pursued and reached. […] It may be embedded in the mission statement, or be conceived in line with those of the university, but at least, it is tangible and hopefully measurable."*

I. How other experiences help

At the end of the focus group, in order not to influence participants, the researcher introduced a provisional synopsis (Table 6), not at all exhaustive, collected from the literature review. The researcher is for the most part indebted to the eVALUEd Project (2004) and the LIRG/SCONUL Impact Implementation Initiative (2005) for its compilation. She was in doubt about showing or not the synopsis during the meeting

and at last she decided to do it to get colleagues' opinion about other organisations' experiences and their viability in our organisation.

The chosen measures and indicators mostly result in quantifiable data, identifiable as "indirectly qualitative", whose analysis would eventually evidence impact. Other parameters come out from the interviews with experts and from the discussion, were retained by the moderator as detectable by purely qualitative methods of inquiry, such as interviews and focus groups with end-users to be used in combination with the quantitative ones and will be exposed in the conclusions.

Comments were predominantly positive as for correctness and insight. Some of them were reckoned easily transferable to our reality, others were frankly discarded as unpractical. These last will be reported in detail:

- **number of citations of DL resources in students' assignments**
- **number of DL resources cited in scholarly publications**
- **number of peer reviewed articles x e-journal**
- **percentage of high graduation rates**
- **percentage of high grades in examinations**

These indicators are chosen, because librarians are certain that researchers are not used to state if the citation or the document have been digitally retrieved in their bibliographies or references and they don't pretend it from their students. The last two indicators are pointed out as not convincing, even if collectable, because many variables can enter the determination of these data.

4.3 In-depth interviews with key-informants

4.3.1 Aims

The interviews with local key-informants were meant to investigate ways to *improve value and benefits of DLS for users*. The following objectives are set as determinants for the achievement of the aim:

1. to identify uses of DLS;
2. to investigate users' needs, priorities, expectations and ideal services;

3. to explore indirectly evidence of DLS impact on users;
4. to search for changes produced on users by DLS.

4.3.2 Foreword

Face-to-face interviews happened to be not only key moments for the research because of the meaningful data collected, but also valuable occasions for learning and professional growth.

Even though the interviewer was careful that all the main points made in the questioning route were answered, interviews were very much unstructured. This looseness did not develop by chance, but it was precisely the researcher's intention to let the conversation flow freely, convinced that crucial issues would come out from DLS end-users' opinions and experiences, that they would help identify real and not supposed uses, needs, priorities, expectations, effects and the advantages gained and the differences made by these services. Indirectly, the researcher searched for areas of investigation about impact measures and indicators to be confronted with results gathered from experts and ULS library professionals to let emerge those aspects in need of assessment, or, those areas of DLS where assessment is approachable.

The researcher was impressed by the converging of their observations, even if coming from different points of view.

Interviews lasted from half to one hour.

4.3.3 Analysis

A. Users' profile in context

Few people were selected for interviewing. They were chosen as representatives of particular groups of the academic community, certain that they would put forth the instances of their group. A graduating student, a PhD student, a researcher and a professor of the Faculty of Law, who extensively use digital services, are information-rich respondents. This was confirmed when they were asked to introduce and explain their academic activity and if it was important for them to have access to DLS.

All interviewees confirmed that they daily use digital resources usually for their research activity, less for teaching and never for learning. They are also accustomed to use the Internet on a regular basis for their personal needs, to access the Web, both from home, in the library with their laptop and from their offices. They know the law library website and are used to check it for news and changes.

"I am working on my dissertation and for the first time in my career I do research properly. At the beginning I was scared, I didn't have a clue. […] Then, apart from the library, I discovered very useful materials in databases and e-journals."

"The object of my research is very new and digital resources don't exist at the moment. […] I make do with free online institutional websites, official documents and general subscribed e-journals."

"For my PhD research on biotechnologies, I am very much indebted to databases and e-journals the library provides."

"I can say I am Internet dependent. I work at home and in the library with my notebook. Easy and free."

"Especially with my Masters course students in economy and information technologies, I communicate via the Internet, we use the e-mail and have a blog."

B. Different levels of approach to DLS to work on

This side of the inquiry was meant to investigate how interviewees had got to know UNICAM DL and the digital services offered. In a scale from non-user to expert user, the people approached can be defined experts, and the way they approached the digital information world is important to understand what strategies can be put into action to attract more and more users, to change non-expert users into independent

digital information seekers. If there is no approach, there is no use, there are no needs and the goal of a more successful academic community is missed.

The researcher found out some critical points, because approach seems to be left to personal interests and curiosity in less strong and qualified users.

> *"I got to know these very useful tools, asking people here and there. […] I mean my fellow students, who have already written their dissertation. […] I didn't get any help from my tutor, who only told me 'Go and work' and nothing about the existence of databases and e-journals."*

> *"When I started my PhD course, I approached the digital world of research. I didn't know anything before. To work as tutor in the library helped me very much. I only received hints about a couple of Italian bibliographic databases from my professors."*

> *"The approach was easy. Information circulates in my research group."*

> *"I work side by side with the library. They give me advice. I make proposals […] No problem."*

C. Use of DLS for research, less for teaching and never for learning

The inquiry about use was not intended to investigate if technical devices or functionalities are used by interviewees, even if sometimes they also came out during the conversation as advantages helping to save time, to make checks etc.

Use of DLS was meant as finalised to the main activities of respondents, i.e. research, teaching and learning.

Digital tools are never used for learning. Students are not accustomed to use the DL. Classes are theoretical, students are not stimulated by their teachers to study

practical cases and there is no need to do research, to use the library, let alone DL resources, unless when the student gets to the dissertation.

> *"Students don't learn to do research. They have exams to pass, they study on textbooks and that's it."*

> *"Very rarely teachers suggest a website or an e-journal to study a topic more in detail."*

When asking teachers about the use of DL resources and services to support their activity, they confirmed the trend, but they also explained objective difficulties.

> *"Classes are very traditional. It would be very useful, straight to the point to have access to online resources in class, to search together […] 99% teachers don't see the usefulness, otherwise investments would be done."*

> *"I use DL resources in class. The lesson is livelier, students learn more and better. It also helps me make concepts real. Often, we don't have the technical devices […] a fight with the administration."*

> *"Very useful, not only for the single course, but also for students' lifelong learning. But it is not easy to get the right classroom, where to find a PC and a projector, at least."*

DLS are used for research by the academic staff and both at undergraduate and postgraduate level as regards students. They support scholarly publications, theses and dissertations writing. This is the most important use.

D. Needs and priorities in use

This part of the interviews was always very lively. For different reasons the topic was very close to respondents' heart, because they all expressed satisfaction about the help DLS give to their work and they know exactly what they need or would prefer.

Needs are about:

- **extensive contents to cover new disciplinary areas**
- **up-to-date resources**
- **free access**
- **personalisation**

"I am generally satisfied of e-collections. […] I need more resources on European law in English, because the debate is lively in the Anglo-saxon world. We'll see to that."

" … to have all Italian law journals online and updated."

"I am in favour of free access to everything, not only legislation or jurisprudence, but also full-text articles. This would be the true access to thinking […] It would help reflection and the circulation of ideas."

"I'd love to learn how to get access to personal services. I know some are provided through the catalogue. I am sure they can make a difference."

Priorities are about:

- **content steadiness**
- **full-text access**
- **remote access**

"It is frustrating when I cannot get to full-text articles and the publisher asks me to pay for them."

"I always hope to get the right, content-rich results and that they are accessible. It is vital that all e-journals are full-text."

"Content is very important for a law researcher, for instance there are sites and databases which give complete data about legislation, others don't."

"To me it is a priority to be able to connect to the University DL from home."

E. Expectations and ideal services

Sometimes expectations get confused with priorities, but generally speaking when respondents are asked to reflect on what they would like to have and don't have yet, they usually think about content enhancement, which is typical for the discipline, because especially in Italy law digital resources are not so much widespread and if they think about more sophisticated tools, they always relate them to content.

"Law research needs more digital and digitised resources. This is the future and I expect to be more technically equipped to face these changes."

"I expect to have all resources in a digital format, so that they can be easily accessed from my desktop. […] Not only journals, but also monographs and encyclopaedias. If you don't have a resource in your library, let say a foreign book, it is vital to have access at least to its indices. I hope all online catalogues will report this information."

"Some databases are not very friendly, search strategies are limited. Easiness of use is an important value. I hope this will change."

F. Support of the library to foster the use DLS

This issue was in absolute among the most important for interviewees and they all summed up the support that the library can provide in two concepts:

- **information literacy**

They were not able to name properly information literacy, but they certainly explained it very well. The approach to DL is proved to occur mainly by chance, users are luckier if they already possess ICT skills, which helps them to get familiar with digital resources, but they lament and advance requests about the acquisition of proper skills to use DLS, or else if there is no use, there is no impact. The expectation to be technically equipped is not only about appliances, but also about competences and skills both for the academic staff and students. In this respect, valuable suggestions are given, which should be very attentively weighed.

> *"Fast changes in digital publishing demand a continuous updating of technical skills and competences. Digital resources are crucial for teachers and researchers and they have to be well-equipped to use them. […] Meetings with librarians to acquire digital information skills seem to me the best solution."*

> *"Training to use DLS is very interesting, but I am sure courses are not successful among students, because if they are not stimulated by their teachers […] they don't see the point. Now I can say I would have had that training."*

> *"I learned by myself, but I wasted a lot of time. Training would have been very helpful."*

- **promotion**

Promotion is equated to information literacy as for the benefits that users can get from the awareness and existence of certain services. Its success is related to a close collaboration with the academic staff.

"Needs don't come up, if nobody tells me about the existence of a service."

"Ignorance about the DL is widespread. I give advice to my fellow students. Researchers and teachers are ignorant as well."

"I think promotion should be done going personally to the researcher or the professor and offering help and advice, otherwise it doesn't work."

"Teachers can contribute to the promotion of these services by saying it to their students and by making them use DLS."

G. Advantages and gains

The focal moment in interviews was the question about the changes that users had seen in their academic activity and, why not, personal life thanks to DLS, which usually was further explained as before and after differences and advantages gained.

Here as well, answers converged towards well-defined concepts, even if when the question was conceived, the researcher supposed that different users usually have different experiences and views. It is true that perspectives are varied, because the student looks mainly at his future and the usefulness of digital resources and services for his profession. He has become an independent learner, he may not know about this or that resource, but he knows how to search for it. The PhD student's awareness is such that as future full-time researcher and teacher he will be a competent user, but also a promoter of DLS. The present teacher and researcher are aware of the usefulness of DLS, because they have experimented their impact in their activity and couldn't do without.

As for the advantages and changes, they are thus summed up:

- **time saved**
- **completeness of research**
- **easier life**

- **immediacy of concepts retention**
- **class vivacity**
- **isolation defeated**
- **communication**
- **up-to-date information**
- **more publications**
- **more funds**

> *"I save much time. I can collect my data immediately. To do research is much easier and my life is easier."*

> *"Time, time, that is the advantage of digital resources. If I had known them before, I would have saved much more time for my dissertation."*

> *"I could not live in my town, if I hadn't the support of DLS. As a researcher I don't feel isolated. Communication with my community is immediate and access as well."*

> *"Research is very detailed, complete. If you use these tools, you can be almost certain that you have covered all the literature about a topic and have current information."*

> *"You can check and crosscheck your information and references. You feel there are no boundaries."*

> *"I work faster and the number of my publications has increased. The hope is to get more funds for that."*

One respondent remarks that one must be careful about disadvantages as well. Digital tools are immediate and quick. Digital publishers tend to push authors to produce their works in little time. She evidences two kinds of risks, one can qualify as

negative impact. One is superficiality opposite to accurate reflection, while research and learning need rigour and time. The other one is plagiarism, considered as a rising phenomenon among students.

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5. Findings

5.1	Assessing DLS impact at UNICAM	110
5.2	The model	111
5.2.1	The methodological perspective of the model	112
5.2.2	Contents	114
5.2.3	Recommendations for the ULS	120
	References	122

5.1 Assessing DLS impact at UNICAM

The data supporting this research originate from the *literature review* and the *in-context investigation* engaging experts, librarians and end-users.

The literature review shows DL impact assessment as an understudied matter for objective reasons of newness and indefiniteness. Nevertheless, interest is confirmed by a growing number of case studies, which contribute to carry on research. Their final goals are to define standards and to reach comprehensive results.

Experts' opinions and thoughts confirm the conclusions of the literature review, but let the way open for exploration, providing positive suggestions for the building up of a DLS impact assessment model and giving directions about a suitable methodology, involving users' profile description, objectives to be pursued, content and methods.

UNICAM librarians' opinions, gathered during a focus group interview, sometimes instinctively, contribute to the research validating data offered by experts, adding valuable data about the context of research, showing deep understanding of their reality, providing insight into the proposal of DLS impact assessment in UNICAM as possible and auspicious, but hard to realise, and giving hints about critical areas of investigation and measures and indicators of impact.

End-users close the circle of data collection. The researcher's convincement is that an evaluation design and undertaking is made by and for users (Patton, 1997). They are the most important source of data, particularly in impact assessment, where users are the only focus of investigation. By giving name to DLS uses, needs, priorities of use, expectations and changes occurred after use, interviewees help the research grow in meaning. Indirectly, users provide suggestions about measures and indicators to assess impact, by "talking" about their experiences.

All these data are merged by the researcher to verify connections, to build meaning on common grounds, which implies the ability to devise a methodology and content for a model of DLS impact assessment, purposely tailored to the organisation and its needs.

Conclusions are not meant to be definitive and authoritative. They represent an attempt and a proposal to be presented to the researcher's organisation for scrutiny.

5.2 The model

> Models are developed to help evaluators know what steps to follow and issues to consider in designing and implementing a study. […] Models help evaluators identify and distinguish among alternative approaches. (Patton, 1990, p. 115)

The approach taken and declared at methodological level (chap. 3) to study an evaluation model for DLS impact assessment is what Patton (1997) defines utilization-focused evaluation. The researcher is keen on recommending this approach to evaluation. It is not even a formal model, but a strategy. It lets freedom of search, because it

> […] describes an evaluative process for making decisions about the content, focus, and methods of an evaluation – but the content, focus, and methods are not specified or implied in advance. (Patton, 1990, p. 121)

The application of this strategy served the purposes of this study, but the conclusions evincible from the analysis of collected data do not allow such a recommendation.

Respondents' approach to the methodology of the model is mainly ascribed to what Patton (1990, pp. 115-123) would define "goal-based evaluation".

The researcher also found that her colleague librarians had a vague idea about how to approach evaluation, as a well-settled culture of assessment and evaluation of services does not exist in the organisation.

> *"I think we should look at other organisations and see how they have conducted surveys, prepared questionnaires. We will, then, be sure about how to approach the matter of measurement."*

However solicited about the role and centrality of evaluation, they showed responsiveness and a perfect notion of the effects that evaluation procedures can produce in terms of improvement of services, increased value for the library and proof of the contribution to parent institution objectives.

> *"Last year we saved our e-journals subscriptions thanks to usage statistics. We proved that they were used and use was growing!"*

"Evaluation can help us show that what we do is not ineffectual, that our services are important."

"Our DL can be better promoted. Measurement of its use may be a way."

The researcher is, thus, further sustained in her intent to propose a DLS evaluation model for UNICAM.

5.2.1 The methodological perspective of the model

Methodology, meaning action undertaking in ordered progression, respect of planned phases and correct application of procedures, represents the backbone of any evaluation model.

The methodological perspective the researcher reports, is grounded on collected data and is validated by consecutive iteration. A theoretical base is discovered in the literature review among other potential methodologies and is identified in goal-based evaluation. A practical substantiation is found in experts' opinions. The appropriateness of application is confirmed by the ULS library practitioners.

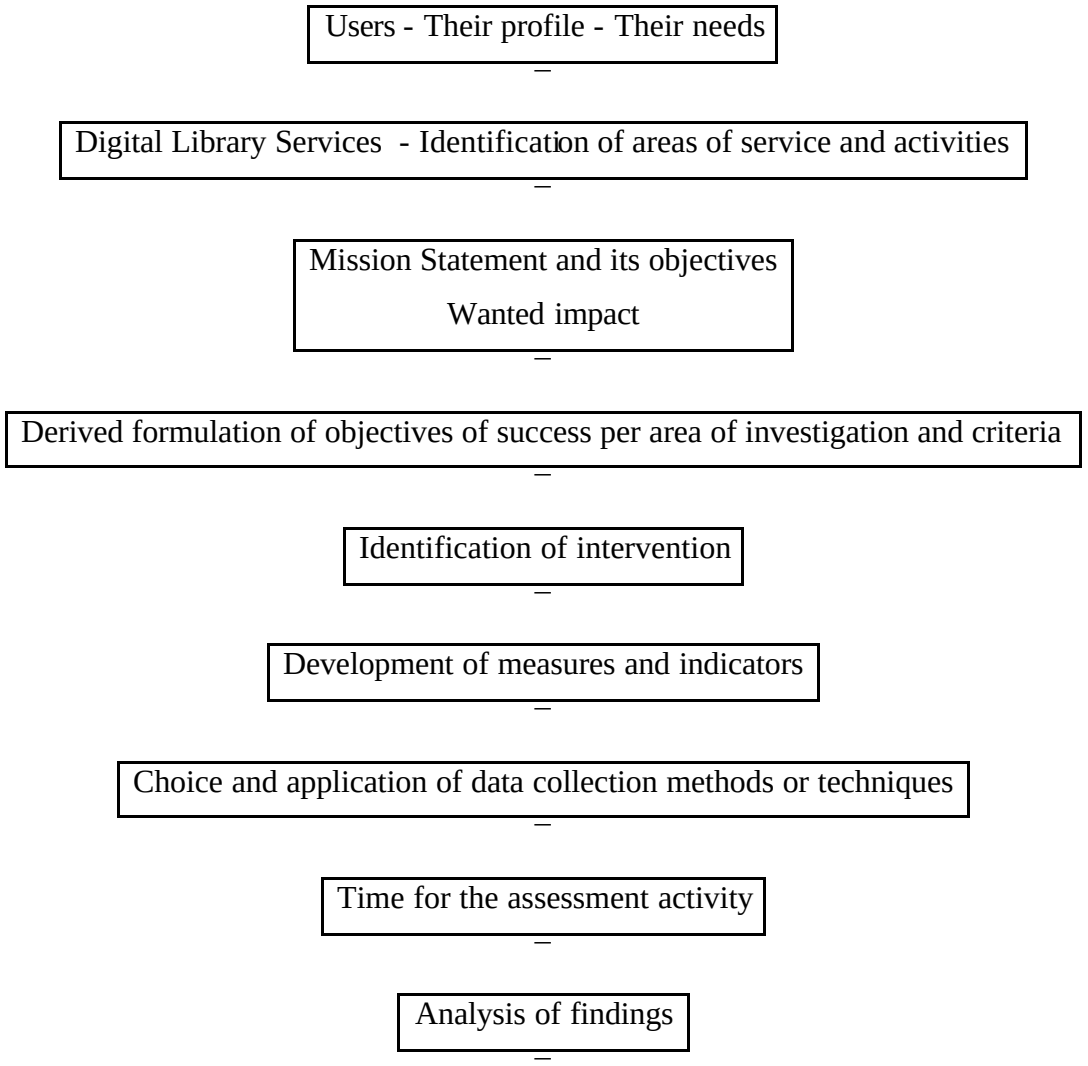
Evaluation is part of a whole system, where every component is sustained and justified by the other ones. This is the assumption behind experts' opinion that impact assessment, as the last facet of DL design, implementation, management and use is, or must be, inscribed in the goals and objectives of DL designers and its verification can be done according to those goals and objectives.

The design of a new service, as response to an ascertained need, has its objective in the satisfaction of that need. It is successful if it produces positive effects in users. Thus, effects can be assessed against those objectives, usually stated in the mission of the service. The focus is clear and specific. From the start the evaluator knows what to assess. The control over the service, the extent to which objectives are attained, appear firm and well-established.

The goal-based evaluation solution seems to be very sensible and to work properly for an organisation that is not well-ahead or expert about evaluation activities, which is the case of UNICAM ULS, engaged sparingly till now in input/output measurement, gathering only some usage statistics of its DLS via server logs analysis and relying heavily on publishers' and aggregators' usage statistics for the digital contents it gives access to.

The different phases of the methodology that has been devised, may be thus represented:

Table 7: Impact assessment methodology



Presentation of results

Verification of wanted impact
Verification of not expected impacts

The last phase of verification turns back to the mission where the wanted impact is, directly or indirectly, stated. The researcher also gives account of an issue, emerged during the focus group, which she also knew of from the literature review, that is, not expected effects can come forward throughout an impact assessment activity, because of the very nature of impact and its not assured and easy attribution.

5.2.2 Contents

While methodological procedures represent the outer framework of an evaluation model, the central and probably most significant component is made of its contents. By content the researcher means the exact definition of what is going to be assessed and used for assessment in terms of

- **users' profile and their activities**
- **the mission and its objectives**
- **areas of investigation**
- **uses and purposes of use (criteria)**
- **clear specific measures and indicators**
- **appropriate methods and techniques of assessment.**

The research has been particularly attentive to make information about contents emerge from the inquired context, because peculiar to UNICAM ULS. Meaning produced by respondents is extremely valuable. It is elaborated according to the classification of users and their activities, in order to be proposed then to the attention of the ULS colleague librarians and management.

- **Users' profiles and their activities**

The identification of this datum has been quite simple and straightforward, because it is declared from the very beginning that the study is focused on an academic community

and its internal groups of DLS users, to be classified according to the different disciplines offered by UNICAM University, distinguished here, only as exemplification to work upon and better adapt, in three macro-areas: Social Sciences (e.g. Law, Political Science), Pure Sciences (e.g. Physics, Mathematics) and Applied Sciences (e.g. Informatics).

The academic community is made of: students, teachers and researchers and their activities are respectively: learning, teaching and research. The boundary between teachers and researchers is not clear-cut in Italian Universities, in UNICAM as well, as teachers are also researchers and vice-versa.

- **the mission and its objectives**

Among other statements, UNICAM DL mission reads,

  - to select, gather, organise and facilitate access to quality digital information according to the educational aims of faculties and scientific needs of the academic community
  - to promote the best possible use of DL resources and services through provision, access and user education

A. Impact on students and learning

As for the DLS impact on students' learning, the study identifies three main areas of intervention, where impact can be assessed, that is students' competences and skills to be successful learners, DL information literacy skills to become independent seekers and students' work quality to make a successful curriculum.

Key questions to consider when assessing DLS impact on students' learning

- How well do DLS meet students' needs?
- How well do DLS support students' learning?
- How good is the collaboration between the library and academic staff to help DLS access for students?

Table 8 below is partly the one proposed for scrutiny and comments to ULS librarians, purged from those measures and indicators, judged not appropriate for UNICAM DLS.

It accounts for methods of impact investigation proper to quantitative measures and indicators. Data are statistics: figures, percentages and relations between figures, easily comparable over time in appropriate longitudinal studies.

Table 8: Students' learning: criteria and quantitative measures and indicators

Areas of investigation	**Criteria**	**Measures and indicators**
Students' competences	1. Responsive e-collections 2. Easy access (on and off campus) to DL resources and services 3. Ease of use of DL resources and services	1. Number of uses x number of resources 2. Number of uses x annual budget spent 3. Usage statistics OPAC (Number of accesses, downloads, printings) 4. Usage statistics ULS portal 5. Usage statistics Emeroteca Virtuale (e-journals) 6. Usage statistics single databases
DL information literacy skills (to become independent seekers)	1. Awareness of DL resources and services 2. Easy access (on and off campus) to DL resources and services 3. DL information literacy skills in modules/courses 4. DL information literacy skills in curricula 5. DLS training provided by the library	1. Usage statistics OPAC (Number of accesses, downloads, printings) 2. Usage statistics ULS portal 3. Usage statistics Emeroteca Virtuale (e-journals) 4. Usage statistics single databases 5. Usage statistics Digital Document Delivery (NILDE) 6. Number of modules/courses with information literacy as learning outcome 7. Before and after DLS training tests to assess retention (difference in scores)
Students' work quality	1. Students' assignments 2. Reading lists 3. References 4. Bibliographies 5. Exams preparation 6. Dissertation writing 7. Study groups	1. Number of e-resources in module/course reading lists 2. Number of DL resources and services in VLE (online tutorials, VRD)

Both users and librarians also evidenced some parameters, named effects DLS use produce, which cannot be reduced to figures and statistics. The researcher takes them as qualitative indicators of impact, or in NeLH FOLIO's (2006) definition "descriptive observations".

The most appropriate to students' learning are:

- **time saved**
- **easier life**
- **immediate results**
- **quick access to resources**
- **easy access to resources**
- **quantity and quality gains**

Proper methods for investigation and data collection are qualitative and the inline techniques are:

- questionnaires
- interviews with students, academic and library staff
- focus groups with students, academic and library staff
- before and after DLS training tests to assess retention
- observation
- examination of coursework

B. Impact on teachers and teaching

As for DLs impact on teaching, the research identifies three areas of investigation: quality of teaching about transmitted knowledge and competences through DLS, the library collaboration with academic staff and DLS entering curricula content.

Key questions to consider when assessing DLS impact on teaching

- How well do DLS meet teachers' needs?
- How well do DLS support class preparation and knowledge dissemination?

- How good is the collaboration between the library and academic staff as for DLS in course/curricula planning? Do DLS information literacy skills enter course/curricula planning?

Quantitative measures and indicators are showed in Table 9 below:

Table 9: Teaching: criteria and quantitative measures and indicators

Areas of investigation	**Criteria**	**Measures and indicators**
Quality of teaching	1. Class preparation 2. Dissemination	1. Number of e-resources in module/course reading lists 2. Number of DL resources and services in VLE (online tutorials, VRD) 3.
Library collaboration with academic staff	1. Choice and implementation of e-resources, e-services 2. DL information literacy skills in modules/courses 3. DL information literacy skills in curricula	1. Number of departments working with the library as for e-resources in VLE and portal 2. Number of modules/courses with information literacy as learning outcome
Curricula content	1. DL information literacy skills in modules/courses 2. DL information literacy skills in curricula	1. Number of modules/courses with information literacy as learning outcome

The most appropriate qualitative indicators evidenced for teaching are:

- **immediacy of concepts retention**
- **class vivacity**

The most suitable methods for data collection are qualitative and techniques are:

- questionnaires
- interviews with students, academic and library staff
- focus groups with students, academic and library staff
- observation

C. Impact on researchers and research

As for DLS impact on research, the study identifies one area of investigation in academic success or quality of research, meaning the production of scholarly and creative works and how it has been changed by DLS.

Key questions to consider when assessing DLS impact on students' learning

- How well do DLS meet researchers' needs?
- How well do DLS support and assist research?
- How are the research process, production and dissemination of research affected by the use of DLS?

Quantitative measures and indicators are showed in Table 10 below:

Table 10: Research: criteria and quantitative measures and indicators

Areas of investigation	**Criteria**	**Measures and indicators**
Academic success (quality of research)	1. Scholarly publications 2. Bibliographies 3. Data analysis 4. Results compilation 5. Articles writing 6. Peer reviewing 7. Responsive e-collections 8. Easy access (on and off campus) to DL resources and services 9. Ease of use of DL resources and services	1. Number of uses x number of resources 2. Number of uses x annual budget spent 3. Number of peer reviewed articles x e-journal 4. Usage statistics OPAC (Number of accesses, downloads, printings) 5. Usage statistics ULS portal 6. Usage statistics Emeroteca Virtuale (e-journals) 7. Usage statistics single databases 8. Usage statistics open access services

The greatest number of qualitative indicators pertaining the area of research have been found in:

- **isolation defeated**

- **communication**
- **up-to-date information**
- **more publications**
- **more funds**
- **time saved**
- **completeness of research**
- **easier life**
- **immediate results**
- **quick access to resources**
- **easy access to resources**
- **quantity and quality gains**

The most suitable qualitative methods identified for data collection and the appropriate techniques are:

- questionnaires
- interviews with researchers and library staff
- focus groups with researchers and library staff
- observation
- document analysis

While elaborating information about the three defined categories of users and their activities, the researcher found that both quantitative and qualitative methods of assessment are to be used to conduct an as more as possible complete investigation about DLS impact, since the study indicates factors of impact which cannot be reduced to figures and statistics in any way.

Recommendations for the ULS

It clearly appears that a programme of DLS impact assessment cannot be as wide-ranging as the one exposed, which represents the results of the research in its completeness as regards the attempt to build an evaluation model. A great amount of

data has not been directly used for this purpose, but they illuminate other aspects of impact assessment procedures and can be suitably used for recommendations.

The quality of an evaluation activity does not depend on the number of measurements or assessments, but on an accurate selection of services that demand evaluation according to particular circumstances and contexts.

This research has revealed that there are certain DL areas of service in UNICAM, which show their impact weakness, while believed fundamental, and assessment should start there with a longitudinal perspective, both to get the service state of the art and to identify spheres of improvement and success to work on, the objective being to assess changes in a given period of time.

Impact of DLS on students' learning is very much underestimated. At the same time great emphasis is given to the usefulness of DL information literacy skills to make students independent seekers. It is worthwhile assessing this feeble area of service, applying the suggested methods for various reasons:

- students are now weak DLS users
- one of the parent institution strategic objectives is to make successful and quality students and graduates
- running DL information literacy training will accrue librarians value
- students' competences, skills and work quality will increase and their education will be more complete
- students will prepare to become lifelong learners.

Another area of service suffering from the same limitations, judged strategic by all respondents, and not by chance strongly connected to the other one, as for the provision and promotion of DLS among students and teachers, is the relationship of the ULS with the academic staff.

The reasons why DLS impact assessment is recommended here are:

- awareness of DLS to support new teaching methods, less theory-oriented and more case-oriented
- class vivacity and curiosity stimulation
- students' and teachers' accrued DLS competences and skills

- increasing use of e-resources in students' assignments and in course/module reading lists for better completeness.

The researcher suggests the use of the assessment tools emerged during the study, not as prescriptive, but as a proposition, because they cannot have the pretence to be complete or definite. The construction of an impact evaluation model is an ongoing process. The more the participating actors, the better the achievements. Besides, the goodness of an evaluation model must be tested against real uses and a real context.

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6. Conclusions

6.1 Summing up 124

6.2 Recommendations for further research 126

6.1 Summing up

Summing up results from the investigation exploring the feasibility of a DLS impact assessment model for UNICAM ULS, the researcher confirms that the constructivist approach chosen has born interesting insight to this matter. The researcher is also comforted in her research choice to transpose qualitative strategies of conducting evaluation to a meta-discourse on evaluation, which, in her intent, would have brought to the building of an impact assessment model. In this respect, the exploration shows a way that could be successfully followed by further studies.

The research also proves that information-rich data can be usefully drawn from respondents at different levels. The researcher has tried to explore new ways about the selection of informants. The choice to involve a panel of experts in the investigation was a dangerous and risky attempt to bring the impetus of larger views to the study and to evidence briefly the state of the art of Library and Information Science national research on DLS impact assessment. The difficulties encountered in contacting and convincing them to participate were certainly overcome by the thickness of collected data.

Data are the centre of this study. They illuminate a context, explain uses, needs, bring to surface the dynamics of an organisation culture and substantiate service effects. Data findings respond to aims and objectives and answer the questions set at the beginning of the research. Questions start with a "how" to underline the exploratory nature of the research.

1. How are users changed as a result of their contact with DLS?

This is the focal question the study tries to answer. It is the question at the back of the attempt to build a DLS impact assessment model for UNICAM ULS. By the literature library service impact is equated to change and it exquisitely pertains to the individual, his personal and professional life in terms of attitudes, behaviours, knowledge, competences, skills and awareness. It is not easy to detect impact, because not quantitatively measurable.

The study replies to this question by proposing a fit-to-the-purpose model, whose validity for the context is searched for in the context itself, among DLS providers and end-users.

The researcher's expectations are not turned down. Changes in the activities of UNICAM community user groups can be assessed about their skills, competences, work and life quality, cooperation with the library and education policies. All these assets are intangibles, like the ones rendered by users who speak about immediacy of results, time saved, better communication, up-to-date information, new teaching methods, but also superficiality and plagiarism.

2. How to assess DLS impact on academic users and their activities?

Many variables contribute to changes in academic users' activities, which does not hinder the evaluator from trying to find the most suitable ways to assess them.

The research concludes that both quantitative and qualitative methods of evaluation are to be used cooperatively to assess impact, if effective valuable results are looked for. Behind methods, a rigorous methodology must support the whole process of evaluation. The methodology, emerged from the research, finds in the DL mission the objectives to be pursued in the evaluation and concludes that the impact to search for must be already inscribed in the mission statement and DL design.

Impact assessment is also proposed as a longitudinal activity to be performed regularly to be successful.

3. How can academic digital librarians tell if they are making a difference?

Any evaluation undertaking has behind it this question. The digital revolution has brought to question the existence itself of the library, as the organisation that select, collect, mediate and preserve information. In a time of budget shrinking as well, it is vital for libraries to prove their value. This issue has been brought forth imperatively by UNICAM library practitioners. They have expressed concern for the difficulties of starting a whole evaluation programme, where impact assessment may represent the last but most important activity. At the same time, they have recognised the centrality of evaluation in a library organisation life, especially when a great part of its services have

become digital to prove value, attract funds and be visible. That's why they strongly have stated the importance of gaining a culture of evaluation and assessment in their organisation.

4. How do DLS contribute to library and parent institution goals and objectives?

UNICAM users and library practitioners have widely answered about the usefulness of DLS and how they contribute to fulfil the ULS and parent institution mission. When they think of the current strategic plan of the institution about students' quality, quality of research, internationalisation, new Masters and PhD courses, they cannot but think how efficiently and effectively DSL support the academic activities.

They lament that DLS contribution to parent institution goals is not fully recognised by the leadership that keeps cutting funds for DL resources and services year after year, while this is a sector that should be improved. The employment of measurement and assessment activities can be a response to this unresponsiveness.

6.2 Recommendations for further research

The researcher humbly recognises that she is a novice to research, that her study suffers from many limitations and that this almost new topic to Italian Library and Information Studies research could have produced more meaning to contribute to enhance studies in this area.

Usually, DL impact assessment is relegated to case studies presentations, all valuably, but partially contributing to further this kind of research. The researcher's hope is to make her very little contribution as well, but there is still a long way to go, because this study is not even about impact assessment, but stops at the construction of an assessment model pre-phase.

It would be interesting to further the research to the application of the model to the real context it has been conceived for results, mostly for testing and amends.

7. Reflective review

A critical reflection on the research work, when it is done, it is no easy task. The researcher is conscious that time has come to release her work to the judgement of expert scholars. Nevertheless, an objective review of the different steps taken to carry out the research may both serve to sum up the way the work has been conducted and to give hints for further research.

To a novice, the approach to qualitative research is very hard, because the researcher is to become acquainted with a methodology, the philosophical background that justifies it and is asked to apply it and to prove it against a real context. Rigour and creativeness are both involved and balanced to a good outcome.

The many hurdles populating the way from the dissertation proposal to the conclusions drawn from data, have shaped the research and given it its identity.

The *research proposal* was functional to clarify and narrow down the topic from a generic intent to deal with DL evaluation to performance measurement of academic DLS, stopping at input and output measures. The appropriate methodological approach for this kind of study seemed at the time to be the involvement of a panel of experts to put down a taxonomical structure of DLS measures through the Delphi technique. Perfect on paper, the project soon revealed to be too ambitious and too banal at the same time.

Negotiations with the tutor and the conclusions drawn from the literature review revealed a new field of research in DL evaluation tending to the discovery and standardisation of measures of impact and outcome. At the same time, the researcher realised that her own organisation was in search of new ways to understand the information needs and behaviours of its users, in order to serve them better, to be effective and in line with its own mission and that of its parent organisation. It was a natural turn to start searching literature about impact assessment of academic DLS.

Once proved the effectiveness of the *research problem*, its aims and objectives, the researcher found the first difficulties while *reviewing* the *literature*, which is little, sparse, disagreeing about terminology and objectives, conducive to locally produced

results, too meagre to be used for benchmarking and standardisation, particularly in Italy, where the topic has been barely taken into account. The first reaction to these results was of frustration, then little by little the researcher realised that any encountered dead-end confirmed the validity and the usefulness of the study that was going to be started out, which, even if conceived in and for a small academic community, in the researcher's intentions could give its own contribution to research in the field.

Narrowing down the topic, framing the study within the boundaries of the researcher's own workplace, given the limited resources available, meant also to think out an efficacious strategy for the *sampling procedures*, which privileged depth instead of breadth. The choice of the samples (always very small) has been very cautious, attentive to particularly information-rich cases.

Data collection tools were chosen in line with the approach and the population targeted and proved successful, so that it was no longer appropriate to pursue the way of the Delphi technique application, which meant an ampler view to the research and far greater time and financial resources allotted. Sometimes during data collection, the researcher experienced the frustrating impression that what she was talking about or what she was asking was far too difficult to discuss or reflect on, as if nobody among participants had ever thought about the topic, but the novelty, revealed as a surprise, also started a reflection among colleagues about an exiting new way to approach DLS provision in the organisation and in users a new consciousness about the role of the library in the academic community.

The process of data collection was hard a the beginning. It was difficult to funnel aims, objectives and the research questions into a grid of concepts and a line of questioning, simple and immediate, for every group of informants. Fortunately, gaining access to the information environment has not been difficult and the response, apart in some expected cases among experts, has been enthusiastic and sympathetic.

The researcher was conscious that more cases to study among users and experts and the use of other data collection tools could have added more revealing information. The field observation technique is born in mind, which could have helped shape better uses, behaviours, needs of DL users. Luckily enough, the researcher's working milieu coincided with the research environment, so observation was a kind of ongoing process,

because day by day there were plenty of opportunities to monitor potential informants unobtrusively, even if in an unstructured way. In the end, both work and research have benefited from this overlapping, new insights have been produced.

The use of a reflexive journal and the practice of note taking has been very helpful. Keeping track of how the work has been evolving, jotting down ideas, intuitions and remarks proved particularly useful when feeling discouraged or stuck and going back to reflections was sometimes illuminating. Unfortunately, this job has not been done accurately and systematically. It would have helped forward the study to its end more quickly and maybe with better results.

Doing research is a demanding task, asking for total dedication and full-time commitment, which was not the case of the researcher. Nevertheless, this experience revealed a rigorous methodology and a detached practice of researching, which has become an imperative in any professional undertaking of the researcher, thus transferring it to her working context.

Time and inexperience have unquestionably been major constraints, but taken as a whole the study has been successful in evidencing, at the end, a methodology to approach evaluation in a library context, targeted on users and emerging, even if indirectly, from them.

Still, some last remarks are necessary, because revealing of mistakes that could have been avoided or things that could have been done differently:

1. the anxious search for already-made answers to the quest for DLS impact assessment tools or techniques in literature;
2. the also spasmodic search for a clear-cut definition of impact as applicable to libraries and DLS, which proved too time-consuming and at the end frustrating. For some time the research lost its point and focus, while the obvious answer was to accept that no agreement has been reached yet and research has to work towards it;
3. a more convincing involvement of Italian DL experts in the study by providing more information about the project and its intended outcomes, which might have produced richer information;

4. interviews to key-informants chosen only among members of the Faculty of Law. This option was a great limitation, due time constraint, however giving a flare of partiality to the study, because there are obvious intuitive difference between disciplines and the way digital information is transmitted and used. The investigation of these differences is important to target DLS impact according to different user groups within the same community;
5. selecting a greater sample of population both among experts and among local users. The researcher is conscious there are many information-rich cases, which have not been taken into account;
6. capturing and involving in the research remote users of DLS, choosing them among those who have used or use the services, or putting into action online devices, like pop-up questionnaires on the ULS website, to investigate how effectively they have changed or influenced their academic life and career;
7. the involvement of UNICAM DL non-users could have given precious insight to the research, because observations and impressions from non-experts and non-users may be as valuable as those from experts. An unprofessional eye may detect uses, needs and behaviours better than an experienced eye, because too experienced;
8. following the advice of the tutor and expert scholars during the research process as for taking certain steps, indulging in certain activities and doing things according to a rigorous tested method would have avoided waste of time and less frustrations.

On the whole, the researcher expresses her satisfaction as regards the results obtained in accordance with the prefixed aims and objectives. How and if the findings of this study may be useful to the researcher's community of DLS users and to the wider DL research community is by far a question that only time can answer.

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9. Appendix

1. Experts open ended questionnaire

1a. Endorsement letter

Dear (Name of participant),

This is an invitation to participate to a study as part of the requirements for my Master's Course in International Information Studies, held jointly by the University of Northumbria in England and the University of Parma in Italy.

For my dissertation I have chosen to investigate the assessment of digital library services impact on academic library users. The aim is to build an evaluation model, tailored for the University of Camerino Library System, workplace of the researcher, to produce recommendations for the organisation and hints for further research. The prototype-like model will be put to the attention of the local library management as measurement tool to become an eventual future reinforcement to the measurement activity already in place.

As the matter is new to the Italian digital library setting, it is judged proper to rely on the opinions of experts to break new ground about observable impact evidence, being their highly-professional insight most valued.

The survey takes the form of an open-ended questionnaire. Issues find their source in the aims of the study and are also grounded on the findings of international projects and research.

The collected data represent a fundamental part of the study for the researcher's final dissertation. They won't be divulged, handed over to a third party or used in any other form outside the context of this study, as they strictly respond to its scope and purposes.

Anonymity is assured throughout the process, unless participants express their willingness to reveal their identity to the others.

On completion of content analysis of collected data, the researcher will release results to participants and be willing to give any further information or explanation upon request.

This is an academic work, whose eventual outcome rests on the improvement of services and evidence-based practice.

With best regards
Clementina Fraticelli

1b. Questionnaire

Starting from the definition of impact in library services as “any effect of a service, product or other event on an individual or group”, would you please consider the following questions:

1. What are, in your opinion, the effects, which may result in changes produced in users by digital library services in an academic environment? What impact may these services have on the activity of academic staff and students?

2. In a programme of impact assessment of digital library services in an academic setting, do you think relevant to differentiate users (students, academic staff and researchers), their activities (learning, teaching and research), and the disciplinary areas they are involved in? Do you think functional to relate subject and disciplinary differences to impact assessment?

3. Would you categorise uses and reasons for use of digital library services in an academic setting?

4. How can the impact of digital library services be assessed? Would you suggest or pinpoint a few steps to be followed in an impact assessment activity of this kind?

5. What, do you think, may be taken as potential indicators showing evidence of impact? Would you categorise them according to users and disciplines?

6. What methods and techniques do you reckon more appropriate to collect data evidencing impact of digital library services?

7. Would you add any comments or give further suggestions on how to best approach the development of an impact assessment model of digital library services?

2. ULS practitioners focus group interviews

2a. Endorsement letter

Dear colleague,

Thank you for accepting to participate to this focus group interview. I hope not only to collect valuable data for my Master's dissertation from the discussion that will follow, but also that we have a chance to think about our organisation and the digital services we provide.

The objective of this meeting is to know your opinions about the state of the art of our DLS, the impact that they eventually have on users and how to get evidence of that impact, i.e., if and how it can be assessed, so that a methodology of impact assessment to be proposed and used in the organisation will result.

Anonymity will be guaranteed both while collecting the data and in the narration of the research.

I ask your consent to tape our conversation to be able to analyse contents resulting from the discussion.

The coordinator consented that the time you devote to this meeting will be considered as "paid working time".

Thank you again for your cooperation. Would you please give your consent to the anonymous use of the data and to the taping the focus group interview?

2b. Focus group questioning route

Opening question:

1. How would you reckon DLS provided by UNICAM ULS at present?

Introductory questions:

2. As for DLS provision in relation to the mission of the organisation, do you think it accomplished?
3. Do you think it in line with the parent organisation mission?

Transition questions:

4. Do you think that any evaluation practice can serve the scope of better managing and improving DLS?
5. What kind of evaluation activity do you have in mind where DLS and users are central?

The notion of impact of DLS on users is here introduced according to the definition: "any effects of a service or a product or other event on an individual or a group"

Key questions:

6. How do DLS support users' activities and is useful to them? What library practitioners can do in this respect?
7. What effects or changes, if any, do DLS produce on them?
8. How can those effects be assessed by library practitioners?
9. What methods and techniques may be applied?

Final question:

10. Would anyone of you add anything to what we have been saying till now? Would you please take the sheet of paper in front of you, read the list and comment the DLS impact measures and indicators proposed there to conclude the meeting.

Table 6: Provisional synopsis of impact measures and indicators

STUDENTS' LEARNING		
Areas of investigation	**Criteria**	**Measures and indicators**
Students' competences	1. Responsive e-collections 2. Easy access (on and off campus) to DL resources and services 3. Ease of use of DL resources and services	1. Number of uses x number of resources 2. Number of uses x annual budget spent 3. Usage statistics OPAC (Number of accesses, downloads, printings) 4. Usage statistics ULS portal

		5. Usage statistics Emeroteca Virtuale (e-journals) 6. Usage statistics single databases
DL information literacy skills (to become independent seekers)	1. Awareness of DL resources and services 2. Easy access (on and off campus) to DL resources and services 3. DL information literacy skills in modules/courses 4. DL information literacy skills in curricula 5. DLS training provided by the library	1. Usage statistics OPAC (Number of accesses, downloads, printings) 2. Usage statistics ULS portal 3. Usage statistics Emeroteca Virtuale (e-journals) 4. Usage statistics single databases 5. Usage statistics Digital Document Delivery (NILDE) 6. Number of modules/courses with information literacy as learning outcome 7. Before and after DLS training tests to assess retention (difference in scores)
Students' work quality	1. Students' assignments 2. Reading lists 3. References 4. Bibliographies 5. Exams preparation 6. Dissertation writing 7. Study groups	1. Number of citations of DL resources in students' assignments 2. Number of e-resources in module/course reading lists 3. Number of DL resources and services in VLE (online tutorials, VRD) 4. Percentage of high graduation rates 5. Percentage of high grades in examinations

* A measure is meant as a simple, not elaborated datum

** An indicator is meant as the relationship between different elements

*** The relationship is intended against potential users (in the academic community differentiated among groups of students, teachers and researchers) counted according to different disciplinary areas. To measure responsive e-collections, number of uses x number of resources and number of uses x annual budget spent, can be conceived.

TEACHING		
Areas of investigation	**Criteria**	**Measures and indicators**
Quality of teaching	1. Class preparation 2. Dissemination	1. Number of e-resources in module/course reading lists 2. Number of DL resources and services in VLE (online tutorials,

		VRD) 3. Percentage of high graduation rates 4. Percentage of high grades in examinations
Library collaboration with academic staff	1. Choice and implementation of e-resources, e-services 2. DL information literacy skills in modules/courses 3. DL information literacy skills in curricula	1. Number of departments working with the library as for e-resources in VLE and portal 2. Number of modules/courses with information literacy as learning outcome
Curricula content	1. DL information literacy skills in modules/courses 2. DL information literacy skills in curricula	1. Number of modules/courses with information literacy as learning outcome

RESEARCH		
Areas of investigation	**Criteria**	**Measures and indicators**
Academic success (quality of research)	1. Scholarly publications 2. Bibliographies 3. Data analysis 4. Results compilation 5. Articles writing 6. Peer reviewing 7. Responsive e-collections 8. Easy access (on and off campus) to DL resources and services 9. Ease of use of DL resources and services	1. Number of DL resources cited in scholarly publications 2. Number of uses x number of resources 3. Number of uses x annual budget spent 4. Number of peer reviewed articles x e-journal 5. Usage statistics OPAC (Number of accesses, downloads, printings) 6. Usage statistics ULS portal 7. Usage statistics Emeroteca Virtuale (e-journals) 8. Usage statistics single databases 9. Usage statistics open access services

3. Key-informants in-depth interviews

3a. Endorsement letter

Dear user,

Thank you for accepting to participate to this interview. I hope not only to collect valuable data for my Master's dissertation from the discussion that will follow, but to have a chance to reflect on the digital services our ULS provides.

The objective of this interview is to get your views about our digital library services, which will eventually help understand the changes that the use of this services have brought in your academic professional life, so that a methodology of impact assessment may be proposed and used by the ULS to give always better services.

Anonymity will be guaranteed both while collecting the data and in the narration of the research.

I ask your consent to tape our conversation to be able to analyse contents resulting from the discussion.

Thank you again for your cooperation. Would you please give your consent to the anonymous use of the data and to the taping the focus group interview?

3b. Interviews questioning route

Opening question:

1. Would you introduce yourself by telling what your current academic activity is and what is your professional background?

Introductory questions:

2. Do you use DL resources and services in your academic activity?
3. Can you explain how and in what kind of activities DL resources and services are useful to you? Would you make some examples?

Transition question:

4. What are the DL resources and services that you need and are provided and what are those that you need and are not provided? What resources are essential to you and what are desirable?

Key questions:

5. What are your priorities when using DL resources and services?
6. What are your expectations about the provision of DL resources and services by the ULS?
7. How would you describe your ideal DL resources and services?
8. Does the use of DL resources and services have made a difference, or produced a change, to your academic activity? Would you describe it?

Final question:

9. Would you add anything to what we have already said, or, is there anything that you would ask in turn to the interviewer?