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Part 1

THE SYSTEMS LIBRARIAN

A LITERATURE REVIEW

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INDEX

Introduction

> *The ILS has been one of the great success stories of library technology and one of the main sources of job security for systems librarians* (Rhyno, 2003)

The aim of this literature review is to investigate the roles and activities of the library systems specialist or *systems librarian*, an entirely new breed of library professional developped during the library automation process all over the world.

A *systems librarian* is a person with primary responsibility for one or more computer-based library systems (Long, 1997). Even if a systems librarian may also be responsible for aspects of information technology in a broader meaning within the library environment, for the purposes of this work the searcher refers specifically to those professionals involved in the management of library automated systems.

Although the extent of this research would have covered the literature on the topic produced at international level perhaps in high ambitious way, it has been limited in fact by the term itself. The term "systems librarian" is strictly connected to the Anglo-American librarianship vocabulary (Muirhead, 1993; Lavagnino, 1997), that is not surprising if we consider *where*, *when* and overall *how* the first library automation projects took place. An attempt to identify the corresponding job title and related sphere of competencies in the literature of other languages has been made, in particular for Italian and French literatures, but the findings were not exciting and reveal a lack of debate on the topic. It is not only a question of vocabulary, it is a question of clear definition of roles, duties, knowledge, competencies involved in the process of technological changes that libraries have sustained for almost 30 years to support their evolving mission. In particular the word *librarian* in the phrase "systems librarian" reveals the reflective practice on considering how the libraries have mediated the explosion of computerised tools with the role played by the institutions themselves, but also the awareness of a professional category in a particular field of expertise[1].

The scope of this literature is reviewing such a type of professional, a necessary "evil" keeping the library technologically connected and serving as a conduit to the underworld of computer improvements and advancements (Cleyle, 2003). Over the years systems librarianship has been dissected and analysed from different authors and in different formats

[1] In particular Italian librarianship suffers from the lack of definitions of librarian roles. In the recent Diozzi, Ferruccio (2003) *Glossario di biblioteconomia e scienza dell'informazione*, Milano: Editrice Bibliografica the reader finds only the generic *librarian* (ita: bibliotecario) to designate all types of library professionals. On the contrary, all types of libraries are defined.

(books, journal articles, seminars and workshops, Web pages). Even if in this period institutions have kept pace with technological explosion in different time and approaches (automation process, services automation, OPACs, library integrated systems, communication standards, systems interoperability, Web/internet related services), in 15 years of covered literature we can identify through authors common issues dealing with the definition of systems librarian, they are: definitions of the responsibilities, specific skill sets, roles, personal qualities and attitudes, education, and definition of possible future developments. To go in depth in the topic, it could be considered that the most of the authors are systems librarians in university libraries, that they write on special journals concerning library automation or in specials columns of librarianship related journals, and finally they are aware that their role and power to act is strictly related to the type and size of the library where they work and to the technological developments in the future. As Westlake (1994) noted, it could be a strategy for surviving, a sort of self-protection of professionals rapidly grown, that have gained ground by specific competencies through self-education, and that want to maintain their position and/or develop it in relation to technological advancements. The debate is still lively and with the same intensity of the beginnings: it is enough to compare the writings collected in the issue no. 3 of Library Hi Tech 2003 completely devoted to systems librarians topic with the progenitor Chan (1987). These references constitute also the chronological terms in which the searcher has conducted her work. During all 1990s many authors have contributed to the debate, in particular with journal articles and also thesis (Lavagnino, 1997; Long, 1997; Dorrian 1998) referring of surveys, analysis of job advertisement posts, analysis of salary of systems librarians, etc. In this scenario, two are the books that give consistency to the debate, even if they represent different trends. The first is Muirhead (1994a), author of a reported survey on the status of systems librarian in the United Kingdom and editor in the same book of important contributions collected from professionals “of the field”; the second is Wilson (1998), whose work represents the attractive to give an objective foundation to systems librarianship through a variety of approaches to defining it (Jordan, 2003).

The searcher will propose for this work five sections: a brief history of the library automation, a description of the professional systems librarian, her/his education and training, and the future of her/his profession. The fifth section is an attempt to investigate the possibility of a systems librarianship in Italy.

The context: a brief history of library automation

A brief of overview in the library automation developments is the first step to understand the context where systems librarian finds his natural birth of place as one of the many consequences carry out by the introduction of automation in libraries (Gorman, 1987).
For reasons well exposed in Borgman (1997) and Peruginelli (1991), the searcher prefers to divide this brief overview in two different subsections. The first concerns with the development of the library automation history in those countries where it took place at least 40 years ago and with a rapid diffusion (the Anglo-American world, including also Canada and Australia). The second concerns with library automation development in Italy.

Library automation in Anglophone countries

Computerised systems for the basic housekeeping functions of cataloguing and circulation control can be traced back as far as the mid-1960s (Muirhead, 1994a). On Borgman's (1997) perspective, the automation goals of American and British libraries evolved through four phases (from 1960s to the current time)
The first concerns with efficiency of internal operations. In the 1960, in a time of expansion in higher education and increasing funds for library collections, the earliest library-automation projects computerised core library operations for local collections: circulation, acquisitions, serials and cataloguing. This stage was accomplished through both by improving internal work flow and by sharing data between libraries. It has to be noted that during 1960s there is a general and great involvement in developing standards related to the implementation and sharing of cataloguing data. In 1963 the Library of Congress started with the MARC project, in 1967 the first major online shared cataloguing system OCLC (then Ohio College Library Center, now Online Computer Library Center, Inc.) was established, the publication of bibliographic standards such as ISBD (International Standard Bibliographic Description) and AACR (Anglo-American Cataloguing Rules) is also of this period. In the same years conferences and workshops on library automation were held and journals on the topic of computer systems in libraries began their publications (Tedd, 1987). By the early 1970s important products and services built on computers first became commercially available to libraries, but a fair number of people had already reached the conclusion that library automation was important and that it represented a sound business opportunity: Rush (1988) notes that few of these people were librarians.

The second stage is represented by the access to local library resources. Online catalogues became a major theme in library automation in the late 1970s and early 1980s (Wilson, 1998). During this period online catalogs first came into existence for on-site use in libraries in the mid- to date 1970s, reached critical mass by the early 1980s, became available on local area networks and by dial-up modem by the mid- 1980s, and were accessible via the Internet starting in the late1980s. With online catalogues, all catalogues could be union catalogues, allowing simpler and more comprehensive access to the full array of library resources. Retrospective conversion is also an important key issue of this age: major research libraries are trying to convert all of their record to create comprehensive management reporting, and avoid the duplication of effort required by maintaining older records in manual form.

From a technical point of view, it has to be noted that while the early systems relied on proprietary hardware, software and even operating systems, the market moved now toward open systems that support library and computing standard. The trend began by the late 1970s to install in libraries minicomputers, instead of making use of an institutional mainframe, continued into the 1980s, and so the market rapidly grew for the turnkey systems which are now the choice of most large and medium-size libraries, in which hardware and software are sold together as a package, and various housekeeping functions are integrated into a single systems. Commercial vendors offered systems with a much extended range of functions (OPAC, interlibrary loan, serial controls, community information, thesaurus modules) in addition to the basic housekeeping functions (acquisitions, cataloguing, circulation control), and most of these can be parameterised to local requirements. Muirhead (1994a) argues that developments on such a type of library systems have meant that these sophisticated systems are now within the grasp of even the smallest of information services (see also Tedd, 1987).

Some consideration can be traced. First, and strictly to topic of this literature review, the heart of these activities has been some person or persons who guided the application or development of specific technologies that address library needs (Wilson, 1998). Second, these new automation efforts involved library departments that previously were able to ignore the projects that were under way. Finally, it registered a move from internal operations to services that directly affected library patrons and were visible to library constituencies.

The further stage deals with the access to resources outside the Library. In the 1990s, in an increasingly competitive market, a number of systems suppliers are developing and marketing “third generation” library management systems with more user-friendly interfaces based on

an open system approach[2]. New services such as online information retrieval and CD-ROM databases are now available to library users, while the delivery of traditional databases such as the library catalogue has been radically transformed (Muirhead, 1994a). Once basic operation were automated, libraries began employing communication technology to acquire access to the collections of other libraries. The shift in perspective from building exhaustive local collections to providing access to information as needed is a consequence of changing economics and of higher service expectations on the part of the user community (Borgman, 1997). The automation of local collections has created a massive set of resources for libraries available to libraries world wide and to the user communities thanks to the explosion of the World Wide Web.

The last stage concerns with the interoperability of information systems. It represents the current stage of library automation development, briefly summarised by the potentialities of the implementation of Z39.50 protocol and the progress in searching and data exchange in Extensive Mark-up language (XML), that allow libraries in the transition from local to global concerns for access to information. The shift is from bibliographic data exchange between local integrated systems and between local systems and sharing cataloguing utilities to interoperability between digital libraries. The interoperability challenge reflects the need for libraries to think globally (Lavagnino, 1997).

Library automation in Italy

Peruginelli (1990) provides an interesting introduction to this subsection[3]:

> Automation has come late to Italian libraries in comparison to some European countries and especially the United States […]. A further contribution to this delay has been Italian librarians' awareness that technical and strategic models such as the American one could

[2] See the interesting comparison that Rowley (1998) proposes about the contents list between the first and third edition of *The electronic library*, respectively published in 1980 and 1993.

[3] For the Italian situation it could be asked if it is reliable what Borgman (1997) writes for the 1990s for Central and Eastern Europe countries facing the library automation implementation in comparison with the Anglo-American experience: "while newcomers have the advantage of hindsight gained from other's experiences, they also are burdened in a legacy of available systems and techniques that may be predicated on traditions different from their own. Implementing these technologies in other environments requires that we identify those traditions and assumptions so that we can adapt the technology as needed to the local environments while maintaining the commonalities necessary to share information resources".

not simply be transplaned intact to the Italian environment and that foreign experiences would have to be carefully evaluated in order to find a new form adaptable to Italian reality.

Authors refer for the past decade a low rate of diffusion of automation systems in academic libraries (Di Girolamo, 1993; Bergamin *et al.*, 1997) and that library community continued to experienced a certain inertia from the in the face of automation, toward which its attitude is one of cautious resistance, for automation would require an opening to the business world, the need to deal with basic organisational problems, and a revaluation of library services (Peruginelli, 1990).

A survey conducted in 1989 (Cavagnis, Sotgiu *et al.*, 1992) on 600 libraries reveals that only 10 percent of them were automated. By the end of 1992, 24 percent of academic libraries managed automated systems comprehensive of those developed in house (Di Girolamo, 1993), even if from early 1990s the trend evolved towards the adoption of commercial packages and away from in-house systems (Peruginelli, 1990; Di Majo 1995) - according to what Rush (1988) registered for American libraries for the same period-. Personal computer systems for catalogue creation and management have proliferated in the early 1990s years in the smaller and mid-size libraries even products so-called SBN-compatible.

What is central for the history of library automation in Italy is the Servizio Bibliotecario Nazionale (SBN) project whose programming started in 1980 in charge of a commission of librarians and information scientists of diverse backgrounds, coordinated by the Istituto Centrale per il Catalogo Unico (ICCU) within the National Central Library of Rome, with the task of devising a model for achieving an efficient library service for the country. The main objectives of the project were the cooperation among libraries of different institutions (with the cooperation of Regions) linked to the SBN network (inclusive the State Libraries), the improvement of service and document circulation, containing service management costs. Leombroni (2003) argues that the final purpose of the SBN project was to use technology not in particular to automate manual procedures and the legacy as it happened in Anglo-American libraries, but in particular to change and give new order to the existing scenario of Italian libraries. The implementation of the project started in 1984 (Peruginelli, 1990) following the formal sanction by the Ministero per i Beni Culturali and under the direction of ICCU who provides direction and technical support to all the other libraries and software application began on four system prototypes on IBM hardware (BULL, SQL, ADABAS, Unisys). In 1992 the National Index started acting as a clearing house for bibliographic records and placement information and approves, through electronic mail message, the distribution and

delivery of loan requests. It has to be noted that its internal format is not a MARC-type format, even if in 1975 the project for the implementation of a national MARC, called ANNAMARC, was placed (Scolari, 2000). The Italian scene has been evolving rapidly since the implementation of the SBN project, not only in library automation, but above all in reconsidering the library's role and in generating interlibrary cooperation. By the end of 1980s and the early 1992 technical literature appears dealing with the first steps of libraries adherent to SBN project (De Robbio, 1989; Bucci 1992). The partial success (or failure) of automation process seems to due to lack of coordination within the library institutions, and in particular a lack of consideration of librarians's involvement in the process of library automation (Salvi, 1989): only in recent years it seems to attract the right attention (Tamburrini, 1999; Badalamenti, 2002; Bardi, 2002).

With the mid-1990s the Internet explosion, the access to world spread resources, the increase of electronic resources, the empowerment of operating systems, the new concepts of electronic and digital library strengthen the need of cooperation among libraries. Through the SBN 2 project, the original national project is being to develop the interoperability with other systems commercially available thanks to standardisation of protocols and procedure to remain competitive in library automation market (Bergamin *et al.*, 1997; Leombroni, 2003).

Systems librarian

Who is a systems librarian?

The systems librarians appeared in the mids-1970s, when the development of mainframe and minicomputers technologies and related development of function-specific automated library systems took place, for example with the automation of circulation of items and when on-line time-sharing systems were developed and used by many early library automation projects (Lavagnino, 1997). These first systems librarians dealt mostly with technical issues (setting terminal characteristics, running indexing jobs, backing up the systems) and had to interact with the programmers in developing the system and with technicians in keeping it running, and sometimes in operating the system and training library staff. By the end of 1980s technological advances enabled separate, function-specific automated library systems to evolve into integrated online library systems, adding the first public function in form of online public access catalogue (OPAC). Perhaps as a result of this, many libraries hired a systems librarian or reallocated an exiting librarian to coordinate a selection and implementation of a commercial integrated system. During this stage, those desirable project management skills were merged with the technical systems skills, and the systems librarians role began evolving into the more modern conception, truly merging "system" and "librarian" skills into one position (Lavagnino, 1997). The job title "systems librarian" seems to have been used in Australian libraries since the mid-1960s, initially with a quiet specific meaning, currently the interpretation of what it means and what duties it enrol varies widely: since the use of automated systems is an essential part of running a library today, all libraries will have someone on the staff (or at least access to someone within their parent organisation) who undertakes the functions of "systems librarianship", in its broadest sense, although often they have another job title. There appear to be a wide range of factors influencing each interpretation, which includes the type and size of library, its organisational structure, the experience and qualifications of the individual, and personal preference (Jilovsky, 2003).

It is evident from this first previous lines that systems librarianship is not a matter of definition of title, but a definition of responsibilities, roles, duties in a determinate workplace (size and type of the library), as Dorrian (1998) argues from a survey conducted throughout the American Research Libraries (ARL). As libraries become increasingly automated, the existence of some type of systems librarians has become more common. With librarians moving to second- and third-generation systems and integrating scores of electronic resources for patron access, the need for systems personnel has become commonplace (Wilson, 1998).

Chan (1987) is one of the first, if not the first, to introduce and debate this type of professional describing the complex and every changing context where a systems librarian operates. He provides this definition: "Systems librarians are the people responsible for managing computerised library systems", and adds according with his successors "uncertainty about their role is heightened by the fact that not all systems librarians are called systems librarians". Epstein (1991) seems to confirm this unclearness about the job title and probably she's referring to the systems librarian when describes the "systems administrator" who "must be someone who has the time to devote to the project, someone who can assume the heavy workload, especially during the initial implementation period". Muirhead (1993, 1994a, 1994b) in his studies conducted in UK through an extensive survey on this professional post states that "this generic term is used to include any post in which the principal responsibility is the management of automated systems in libraries", and he makes an important difference "it is to be distinguished from the terms 'system administrator' and 'system manager'" since they are terms used to refer to members of staff who carry out the function of administering the system, but whose main responsibilities lie elsewhere, and for whom this is a merely one of a number of duties". Ten years later Guinea (2003) makes the same differences between her role titled "systems librarian" and other ones within her library systems team at University at Leicester in UK, while for Budd (1990) the title is equal to that of "automation librarian", Dorrian (1998) from a closer examination of the job titles provided from the respondents of her survey finds out ten different categories emerging by grouping similar titles together.

In the meantime others authors have provided their definition of systems librarians (Dunsire, 1994; Martin 1988; Chu, 1990; Lynch 1994; Schuyler,1994) based on particular perspectives such as analysis of job advertisements, analysis of salaries, etc. and for this reason limited in scope but providing a good understanding of how the position has subsequently developed. Wilson (1998) remembers that a systems librarian is a specialist "similar to other specialist in libraries because he brings a given set of skills to the table and offer certain perspectives to an organisation". What is common from different authors is that the concept "systems librarian" is defined by itself through the job this professional performs, the duties, roles and responsibilities he supports[4].

[4] It is for this that the definition of role provided from Dumont (1989) for his "library technician" can be easily leaded to that of systems librarian: "the role of the library technician in technical services has changed radically, requiring a more knowledge-able, computer literate worker with greater skills and adaptability". See also the *Guidance notes* leading the *Systems librarian questionnaire*, at point no. for Muirhead 's (1994a) survey: For the purposes of questionnaire, systems librarians are specialist whose principal responsibility is the management of automated systems. The term is used to embrace a variety of job designations – Library Systems Manager, It librarian, Assistant Librarian (Systems), Systems Development Librarian, and Systems Administrator are a few

What a systems librarian does (or should do)? Responsabilities and roles of systems librarians

One of the most through explorations of systems librarianship is Wilson's (1998) book: the author takes a variety of approach to define this speciality. He articulates in details what systems librarians commonly do on the job. He identifies the following to be the typical responsibilities of systems librarians:

- integrated library system management
- network design and management
- server and host administration
- desktop computing
- training, documentation and support
- application development
- planning and budget
- specification and purchasing
- technology exploration and evaluation
- miscellaneous technology
- technical risk management
- communication and coordination

About specific skills that such a professional has to possess, Wilson (1998) lists: the ability to use data structures related to library materials, familiarity with knowledge and classification, information retrieval, desktop operating systems, server operating systems, programming, database design, troubleshooting, and network design and protocols. This list of responsibilities and skills illustrated how comprehensive the job description of a systems librarian can be. Once again the exact combination of these items will depend on the size and type of library or organisation, the skills and responsibilities of others working with the systems librarian, and other factors (Jordan, 2003).

Wilson's (1998) description can result an exploitation in a more theoretical approach and a less fragmented framework of what Chan (1987) describes about his fascinating role of systems librarian in a polytechnic library (with particular emphasis on personal relationship and qualities, and communication). However, during the 1990s other authors provided their definition of the role of systems librarians from a practical perspective, more related with the job functions and relations with the structure of organisations: they were trying to investigate this professional in a period of great development of library related technology, when not only

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examples – and it does not exclude those who have additional ine or other responsibilities. If you are in doubt about whether or not you qualify under this definition, please assume that you do, and complete the questionnaire as instructed above".

automated/integrated systems, but also networking, standards, interchange protocols were developing their possibilities to connect globally the world of information. Chu (1990), who defines himself an automation librarian, through a review of the jobs as described in advertisements finds out three stages in which the systems librarians are involved (planning, installation and implementation of an integrated system, maintenance), each one referring to particular skills that are so much that is not reasonable to expect the systems librarian to personally execute all functions, or be primarily responsible for all aspects, and for these reasons he asks a clear definition of the role of such a professional.

In reporting the results of his survey Muirhead (1994b) reveals that the systems librarian's post is not simply a matter of administering an automated library system and "the role is not only widening but also evolving from an essentially supporting role into a more high-profile providing a direct service to a range of customers". Among this customers, there are also the systems vendors, and all previous authors cited and many others (Epstein, 1991a; Glogoff, 1994; Karetzky, 1998, Bills, 2000) point out how it is important the relationship with this stakeholder. From the vendor's perspective (Brady – Ryan, 1994), the ideal systems librarian covers an important role before, during and after the installation of the system since she/he constitutes the "point of contact" between the library and the vendor; for this reason it is expected:

> "s/he takes responsibility for the system and the decisions required to progress the project, s/he is well organized and good organizing others; that s/he has good communication skills and is able to negotiate with staff at all levels, as well as the supplier; that s/he knows the library and its procedures well; that s/he is good at training; that s/he is interested in the new system and willing to learn; that s/he is able to cope under stress; and that s/he is adaptable, flexible, and happy to get involved at all levels"

The opinion that derives from different authors is that the debate is divided into two terms: what a systems librarian really do (Martin, 1988; Muirhead, 1994 and 1994a; Chu, 1990; Hatcher, 1995) and what a systems librarian could/should do (Brady-Ryan, 1994; Wilson, 1998). In this opposition there is a continuity, an homogeneity of perception that is "very hard to clearly define the role of systems librarians as long as the technology they deal with keeps changing at such a rapid rate" (Hatcher, 1995). But this unclear definition of roles is not a weakness, it is in the nature of this professional since:

> "what distinguishes the systems librarian is that the job itself was inconceivable until the widespread use of computers, and many of the duties involved do not fall within the traditional confines of library and information work" (Muirhead, 1994a).

With or without a systems librarian?

The pure "systems librarian" is generally found in large and medium-size library (Jilovsky, 2003). And what about in small libraries? There is a lack of literature on this field, Hatcher (1995) refers from data collected during an extensive survey that systems librarians in such a type of organisation have other duties, and for this reason Muirhead (1994a) notes that the incidence of "systems administrators" was found to be higher in these libraries. In Muirhead's (1994a) opinion, these institutions adopt smaller systems (low-cost, single application software packages running on PCs), but which also offer some housekeeping facilities usually requiring less attention, and looked after by a systems manager on a part-time basis. Muirhead (1994a) refers also that the position of systems librarian lacks in the majority of libraries where an in-house system has been developed, and for him one reason might be that where the high level of knowledge required to develop a system from scratch already exists in an organisation there is no need for the library to duplicate that skill by employing its own specialist.

On the other hand, there is the case of libraries large enough to have considered the position for a full-time systems specialist, but who decided that this not suite their best reasons (Warlow, 1994; Mitchell, 1994; Bovey-Friend, 1994). It is a question of approaches as consequence of organisational changes in spite of the introduction of technology, in particular Mitchell (1994) and Bovey-Friend (1994) refer of organisations that have adopted a team approach to systems management.

Finally it has to be considered those situations where the library automation arrived without a previous understanding of which competencies, services and professionalities it involves or how the lack of those can stop the development of new computer-based library applications: this is in particular described from Chavez-Villa and Perezrul (2003) for the Mexican universities (see also Mader, 1995). To fill in the gap, authors argues that a solution is not only hiring the position for a systems librarian or a systems department, but also in realising cooperative projects linking the parent institutions providing each other support and competencies.

About systems librarians: status, job satisfaction and rewards

Systems librarians coordinate the effective use of technology throughout the organisation regardless of the department or office concerned (Guinea, 2003). The sustained dependence on technology has created a systems librarian subspecies on whom every one depends, and that dependence make them the "professional's professional" (Seadle, 2003): the systems

librarian is responsible for the running of the library system and the maintenance and repair of equipment, large numbers of staff are dependent on him/her to be able to carry out their duties, as well as for minimising any stress associated with using IT (Muirhead, 1994a). Standing this importance, which is the status of this specialist, since the level of responsibilities is higher than other librarians? Answers come out again from different surveys conducted during the years with the purpose to analyse the status of systems librarians in relation to the position in the organisational structure (and salary), since the introduction of information technology and organisational change are strictly interconnected. Epstein (1991a) refers that only 25 percent of interviewed people had received an increase in salary with the new job responsibilities from previous positions and recommends that the systems administrator is someone "who can communicate with the director when the need arises". The same opinion is shared from Muirhead (1994b), he finds out that the majority of systems librarians reported directly to either their director/chief librarian or his/her deputy rather than a head of a section, and a good rate of respondent were responsible for professional library staff, but in particular for paraprofessional. Dorrian (1998) registers a comparable and similar results, even if the 35 percent of respondents of her survey indicated that they were part of the library's senior management team. Anyway, the results in Muirhead's (1994b) opinion are not enough encouraging, since the systems librarians' authority is complex and ambiguous, linked to an inheritance from pre-automation days and the possibility to cut across the formal organisation hierarchy of the institution. Seadle (2003) confirms the trend for systems librarians to belong to an independent unit with ties both technical and public services with an increasing independence towards library hierarchies, and that could confer "high status if it were not for the constant reminder of systems problems, such as printers not working, disk crashes, installation problems, unexplained systems errors". Current is also the trend, as prospected from Chu (1990) and verified from Muirhead (1994b, 1994d), to constitute a team held by the systems librarian as coordinator of automation specialists (Guinea, 2003).

Budd (1990) conducted an analysis throughout job advertisement of salaries for systems librarians, once again his conclusion is not so far from Muirhead (1994a; 1994b): systems librarians enjoy above average salaries by comparison with the broad spectrum of library and information service professionals, even if significant differences depend on the types of libraries, on the place of the position within the library hierarchy and on the needs of

individual libraries[5]. Wilson (1998) points out that technical positions within libraries have notoriously paid below the market value, and it is unlikely that libraries will ever on average compete with some other industries, but this factor should not become an excuse to avoid accomplishing whatever improvements can be made.[6]

Salary is only an indicator for the status and in general for the perception of the job satisfaction. Stress in another important factor, and "the range of duties and responsibilities undertaken by systems librarians would seems to suggest that might be especially prone to stress" (Muirhead, 1994b; see also Dunsire, 1994). If the general feeling of the systems librarians is that their salaries are not commensurate with responsibility, and their duties frequently place them under undue pressure, "this is balanced by the stimulus and fulfilment provided by the same factors" (Muirhead, 1994a)

[5] Muirhead (1994a; 1994b) finds out that gender is a significant factor in relation to earnings also for the position of systems librarians, but "only in the highest salary band" and "that the 'glass ceiling' that obstruct the progress of women to senior management in libraries generally is an equally effective barrier in the case of female systems librarians". Findings, based on interviews with employees in major public and academic library systems in the United States and Canada (Harris, 1999), reveal that library workers, particularly women, feel they have little control over decision making involving the introduction, integration and use of new technologies; futhermore not all the effects of technological change on female work are necessary positive in particular for career path devolopments. See also Hildenbrand (1999).

[6] Muirhead (1994d) argues that libraries, even if with a considerable differential in the salaries for computer professionals and librarians, will never be able to attract suitable staff with computing qualifications. Breeding (2003a) seems to deny this suspicion with his personal professional career.

Education and training of systems librarians

From reviewing U.S. and U.K authors, it emerges the notion of the systems librarian as a mediator or human interface between technology and its users. That is, system work is a specialisation within librarianship, in which the emphasis is placed on the provision of library services using information technology as a tool. But how have systems librarians reached this specialisation? Boyce and Heim (1988) pose with particular emphasis this question from an academic point of view and on the other hand, in the covered literature, there is no author who has not to try to provide her/his answer or at least touched the topic, first to define exactly the competencies and skills related to systems librarians' position, second to provide new library workers entering the profession with appropriate curricula for a clear career path development. Once again common traits are identifiable.

The systems librarian's education: a mix

Wilson (1998) has listed different skills related to the responsibilities and roles that a systems librarian has to perform in the workplace pointing out from his theoretical point of view "that of the useful skills, knowledge, and experience that create an effective systems librarian can be gained from a variety of backgrounds – and none of the possibilities is less valid".

An important issue to be considered is that libraries hire the position of systems librarian not only through job advertisements and specific recruitment actions, but deriving this specialist in the majority of the cases within their library staff (Muirhead, 1994a; Dorrian, 1998): it could confirm not only that when looking for a systems post it helps to be in a job, but also that employers prefer an inside knowledge of local systems and practices (Muirhead, 1994d). Chu (1990) recommends that the person in this position should be a professional librarian with several years of experience, and Muirhead (1994b) indicates that the results of his survey "show unequivocally that systems librarians are on the whole computer-trained librarians rather than library-trained computer expert" and the same trend is sustained from Dorrian (1998)[7]. Furthermore, there is no evidence to suggest that a technical service post is the most common route into a system post, or even that it is a necessary prerequisite (Muirhead, 1994d). And what about all managerial skills that many authors advocate to this specialist? Referring to their own experience, a discrete number affirms that they happened for

[7] In Northern American literature it seems a recent trend since Martin (1988) refers that the systems librarians are more likely to have a backgroungd in computers or be dual qualified. See also the recommendation of Chu

"accidental" (Allen, 1987; Schulman, 1999; Gordon, 2001; Goddard, 2003), meaning that their role arose with the impact of technology in their institutions and they found themselves in the right place at the right time to perform the new competencies of systems librarian: personal qualities, approaches and attitudes resulted "advantageous for a systems librarian to possess regardless of his or her professional background" Wilson (1998). Muirhead (1994b) finds out that only a very little number of his sample had a formal qualification in computer studies or previous work experience in the computer industry, while the majority had a postgraduate diploma in Library and Information Studies (LIS). From the ARL survey, Dorrian (1998) reports that 75 percent of respondents hold the Master degree in Library Science (M.L.S) - and in same cases a second master's degree - but none of them in computer science or engineering. On the other hand, in analysing job advertisements listed in *American Libraries* and *Library Hotline* from 1993 to 1997[8], Long (1998) refers that the majority (62 percent) of the positions required an M.L.S. degree and none of the advertisements were for entry level position (required at least 1 to 6 years of experience). Foote (1997), referring to her examination of position announcements from 1990 to 1994 through *College and Research Library News*, puts the focus on the fact than about one-third of the hired positions lacks of an MLS requirement, and she stresses the importance to understand the reasons of that.

Work experience is another issues of a certain relevance outlined in other authors who have conducted similar survey (Budd, 1990; Foote, 1997; Xu and Chen, 1999 and 2000), whose weight is comparable to that of an accredited education and in general it concerns with library housekeeping system, network or networking, and operating systems or environments.

Defining the systems librarians education is quiet complex since it seems composed by a mixture of elements, such as educational backgrounds, previous experiences, workplace (type and size of the organisation), commitments, technical but also personal skills

Providing an effective model of education for the systems librarian

Many authors from the late 1980s until nowdays have stressed the importance to keep the pace with technological advancements, providing the library workers of the next future with skills to enter the market place of systems librarianship in a suitable way (for example Boyce and Heim, 1988; Chu, 1990; McLain, Wallace and Heim, 1990; Fischer, 1994; Woodward and Meadows, 1994; Mader, 1995; Xu and Chen, 2001; Goddard, 2003; Chavez-Villa and

(1990) quoted above in the text that could be ridden also in the light of that basic computing expertise were not enough to define a technical or computer specialist as a systems librarian.

[8] A similar investigation has been conducted on 133 job advertisements for systems librarian in *American Libraries* in 1996-1997. The findings have been presented in Xu and Chen (1999, 2000 and 2001).

Perezrul, 2003). However, the first to provide an holistic approach to what could constitue an effective education and training for systems librarians is Muirhead (1994b), who verifies that the skills of a systems librarian are many and varied, not only systems related and probably these last ones considerably less important than those duties which cast the systems librarian in the role of mediator and which therefore required highly developed communication skills, and for this reason he suggests that the teaching of information technology (IT) should embrace not only a narrow technical expertise but also this wider range of related skills. Delivering such a type of education and training is not easy, in particular without excluding workers who want update their existing skills. So he argues that future trends will require input from various groups within the information community, often working in partnership in new and creative ways. These groups include: library schools, professional bodies and organisations, library systems vendor, systems librarians and their employers (see in particular Muirhead, 1994d and also Wilson, 1998[9]).

Pre-service education, continuing education are the key issues to developing up-to-date workers. On-the-job training has an important value in addition to finding a solution for formal pre-service ad continuing education opportunities (Pors and Schreiber, 1996; Wilson, 1998). Jordan (2003) explores in depth this key-issue, considering the on-the-job training for professional development the main source of formal training for systems librarians since most "LIS programs offer some sort of training aimed at systems librarianship", and deriving this assumption from Xu and Chen (2001). Through the on-the-job training, Jordan (2003) emphasises the value of the self-education of the systems librarians since "without skills and experience, librarians have difficulty getting jobs where they will receive effective workplace training", consequently he argues "doing all that one can outside of the workplace is very important" and provides a map of steps to enter the profession for self-educated future library workers. The author suggests certainly an extreme position within the panorama of more recent reviewed authors and tens year after Muirhead's survey. Stressing the unique importance of technical skills, he doesn't seem to take into consideration what Wilson (1998) points out, that is "the profession is larger than oneself or one's experience". In general,

[9] Through the following words Wilson (1998) define the broad area of delivery of systems librarianship education: "The appropriate education of a systems librarian will be necessarily eclectic. People in these position are called into function in a variety of technical and non technical roles. […] The time has come to make the changes necessary to meet the needs of this specialisation. To succeced in this endeavour, library schools, library administrators and managers, professional associations, library consortia and networks, vendors, and individual librarians must begin to seek and support multiple alternatives for achieving the goal".

Jordan's (2003) perspective could constitute a signal that in 2003, after 15 years of debate, a clear role for systems librarians has to be still defined.

Future of the systems librarians

What emerges from previous sections is that systems librarianship represents a blend of library science, computer operations, and management. Historically, this specialty arose out of exting library posistions in response to technological advancements within libraries. The contributions of people in these positions have defined the nature of the field, the roles to perform, the responsibilities to assume, the knowledge and skills to have or to gain in the next brief future also for new workers entering or approaching the field. All these issues suffers of an unique "evil": to be strictly related to advancemnts in technology, in particular library technology, in the short terms.

For this reasons probably these systems librarians authors put particular emphasis on the future developement of their profession, sometimes dramatically and perhaps sometimes forgetting that they serve the mission of the libraries like all other specialists within them. Will they able to cope with the technological pace? Will they survive? And if yes, How? What will they transform in? These are the questions to which authors try to answer and for which Wilson (1998) provides a detailed agenda. In particular it could be a theme of great interest for design or re-design educational programs for library schools and for all organizations delivering continuing education.

Some expectations

Chan (1987) refers his uncertainity "wheter systems librarians will always be needed" because "eventually as computer systems become increasingly user friendly and computing expertise becomes increasingly widespread, systems librarians may become extinct", but hopefully he adds "in any case, library automation is advancing so rapidly and systems are becoming so complex that systems librarians are likely to be needed more rather than less for at least the next decade". Technological devolopments are for the total Muirhead's survey respondents the main factor that would change the systems librarians's profession leading to yet more responsibility and a wider role for them (Muirhead, 1994c). That technology will not undermine the position of the systems librarians but enhance it is a shared opinion in the covered literature of more recent years, as consequence the attention is focused on defining technological developments: from these an attempt to design the new or addditional roles of systems librarians is made from the authors. How will change the content of the job?

Lavagnino (1997) tries to identify which causes will alter the role of the systems librarians during what she defines the *stage five* of library automation (the end-1990s), in the same way

that networks and networking has altered the systems librarians' competencies in the previous stage, the early 1990s[10]. They could be economical or political factors (the flat or decreasing of traditional funding sources), organisational (evolving organization structures towards a matrix structure), factors dues to advancements in learners' community (users' expectations for more sophisticated services requiring a greater access to data, technical and consulting support to sophisticated knowledge workers), or technological trends (new architecture designs for integrated library systems, database construction, office applications, development and wildspread of standards). Ross and Marmion (2000), in adopting the perspective of Lavagnino (1997), find reliable those issues and in particular for the stage five they verify the emergence of national and international standards (not only MARC), the proliferation of the architecture client/server embraced by the major systems vendors, the Web, the digitized full texts available on the Internet, the integration of the library catalogue with other resources.

Rhyno (2001) describes a very interesting process, at the end of which the ILS (*Integrated Library Systems*) could end and become known by a new acronym such as LAF (Library Application Framework) with the result of new library systems integrating "much more than traditional library modules, these systems may bring the web and mainstream technologies more fully into the core library activities". In a further article (Rhyno, 2003), the author stresses the importance for the systems librarians to manage the Web technology and in particular to reinforce the skills on XML (Etensive Markup Language) knowledge since "for systems librarians, XML represents a *lingua franca* for tying together systems, applications, and formats". The Web infiltration in no way will narrow the role of the systems librarian, and it will continue to be necessary for them to have a deep understanding of the library's activities in order to apply Web technologies effectively to the library's operations and services. The difference is in the range of software solutions that systems librarians have at their disposal, they will have no longer to deal with "niche technologies for niche tasks, [but] with a huge palette of largely mainstream technologies". What is occurring is a shift in approaches that makes for exciting possibilities and the result is expanding opportunities and challenges for systems librarians.

Rhyno (2003) shows new trends for systems librarianship and a new empowered roles for systems librarians. Will they be shared from all the systems librarians' community? The answer will be ambiguous against one's will. Once again it will depend on the type and size of the organisation, on the systems librarian position in library organisation that is expected to be rather high.

[10] About the importance for this period to posses expertise in network communications see Breeding (2003,b).

A glance to the Italian context: could be a systems librarianship?

In the previous sections the searcher has tried to define the roles and competencies of the systems librarians as they emerge from the professional literature. The attempt to be exhaustive is forcedly limited to the fact that the label to define this type of specialist is a term of Anglo-American librarianship or in general of those communities Anglophone and where experience of library automation started first and developed uniformly, or finally of those practitioners who are able to produce professional literature in English (see Mader, 1995; Nahotko, 1999, Chavez-Villa and Perezrul 2003). As consequence also the label *systems librarianship* is something that eludes the vocabulary of Italian professional literature, and Di Domenico (2001) argues that for the broader Anglo-Saxon term *librarianship* it is to mean a "system of research/learning/practices centred on professional competencies of the librarian" and as consequence it has to be differentiated from the label *library and information science* and related contents[11].

So, is it possible to speak of an Italian systems librarianship? Or simpler: who is the Italian systems librarian? Does he exist? The first immediate answer to the last question is: Yes, he does! if we assume from the previous examined literature that where is a library automation system running efficiently, there should be also a systems librarian/administrator or any librarian with a similar job title or finally a team with specific competencies to handle it. Thus, it seems to be only a matter of language and vocabulary. But the evidence is not so evident.

Looking for an Italian systems librarian: an attempt to define skills and roles

During an introduction and overview of recent developments in library automation systems, Scolari (reported in Casanova, 1998) argues that in the new scenario enhanced by new technologies the management role of the librarian is increasing and along with the *System Manager* a new professional is born: the *System Librarian*, who should assure an efficient management of the library system itself. It is important to note that "System Manager" and "System Librarian" are reported in English, and that they differ from the term used in the previous reviewed literature for the spelling since the Anglo-American authors write "systems

[11] See the entry 326. LIBRARIANSHIP; LIBRARY SCIENCE in *Multilingual Glossary for Art Librarians* (1996) "The profession concerned with the application of knowledge and those principles, theories, techniques, and technologies which contribute to the establishment, preservation, organisation and utilisation of libraries and library materials". URL: http://www.ifla.org/VII/s30/pub/mg1.htm(last visited 30/07/04), for which the proposed Italian translation is *Biblioteconomia*.

manager/librarian". Basili (1997) ends her article on the state-of-art of the Italian library automation wishing a new library professional similar to that so-called "system librarian" in the Anglophone countries. Neither of authors defines in their writings the mean of the job content of this specialist. In 1994 Muirhead (1994c) writes "the number of systems librarians as expanded rapidly over the past five years […]. However, there are good grounds for believing that the period of rapid growth is over […]. Despite this, there is still some way to go before saturation point is reached" and Wilson (1998) "there is no hiding the fact that systems librarianship is a demanding field". The comparison among the authors reveals something more than a simple matter of language and opens a further and much more general debate on the library professionnel in Italy that is cultivated in the last decade from many authors (see only for example: Carotti, 1998; Minardi, 1999; Foglieni, 1999; Di Domenico, 2001; Berger, 2001).

Since the lack of the systems librarian' s expertise, who in the Italian library organisations has played this role? The searcher refers in particular to the role of "mediator", the human interface between the systems and its user, the professional liasing with systems suppliers, providing support for system users, documenting the system and training the staff, etc., in brief to those competencies and responsibilities stressed in the Anglo-American literature examined above (in particular Wilson, 1998). It is quiet hard to think that this happened and happens occasionally, at least in large and medium-size libraries. A commitment from the directional level have had to be placed, but for whom? Probably these responsibilities are hidden in the technical/computing department of the organisation to which the same library refers (see Bucci, 1992) and/or share within higher or different levels of library management team (Tamburrini, 1999; Badalamenti, 2002), or finally there are people who are clearly in charge of them but they don't aware of it (De Robbio, 1989), the fact is that the Italian literature has not yet investigated this type of librarianship. On the other hand, from an historical perspective, it needs to remind that the general process of library automation has been leaded in Italy by SBN national project (Peruginelli, 1990; Basili, 1997; Bergamin *et al.* 1997; Leombroni, 2003) sponsored with public fundings and coordinated at central level, an issue that could have altered the framework of automation development as described from foreign authors for their own experiences and which does not allow to make a reliable comparison.

However, the need for a more significative involvement of librarians in technical decisions and their presence in the computing centres such as the presence of technical workers within

the libraries is stressed from Tammaro (1993). She describes also the duties and competencies of these *librarians* without any further job title specification (systems development, customisation and updating, dealing with the computing department and/or system supplier, communication and networking) that are not so far from those described for the systems librarians from the Anglo-American authors. An attempt to define technical skills to entry the librarian profession in the age of the "electronic library" is made up from Pettenati and Santarsiero (1995). They make a comparisons among the job advertisements appeared on the U.S. conference list Public-Access Computer Systems Forum (PACS-L) and those appeared on the Bulletin of the French Association des Professionels de l'Information et de la Documentation (ADBS) to find out the needs concerning the education and continuing education for European librarians of the new age. In PACS-L advertisements positions for systems librarians are present and a job description provided. From this survey the authors argue the need for an "electronic" librarian able to manage IT and devoted to a continuing professional education. If one of these "electronic librarians" could be the systems librarian is not explicited, but probably he should.

Waiting for an Italian systems librarianship

What in general is stressed by the major Italian authors covered is the need for more technical and computing skills and competencies for librarians, to enable them to face and cope with the technological advancements. The terms of the debate are broad, not focused on any library professional in details and rarely considering the context (type and size of the library) in which these new professional have to play they role. In this scenario the focus is on a growing need for continuing education and for continuing professional development in the profession.

Pors and Schreiber (1996) conducted a study funded by the European Commission Libraries programmes on continuing educational needs of librarians in relation to the IT applications in libraries. Even if the situation if fragmented through the different European countries, they argue that the extent of the efforts of continuing education seems low in relation to needs (see also Starre, 1993). Furthermore the study reveals that institutions delivering education are of different type (universities, vocational schools, professional organisation, etc), and that different are the degrees gained to enter the profession and then to develop specific competencies (Diploma, college degrees, Master). In particular for the Italian situation it is found "that the need for a specific training effort in the introduction and management of automation has been felt deeply".

But a new age for the profession seems coming out thanks to the two reforms in University degrees that took place in 1990s and that have enlarged the range of delivering academic education and continuing education through a method of credits. This also allows a possibility to join European standards in education. Course on computing has been introduced and specific curricula has been designed to prepare new specialists in the different librarianship fields (Petrucciani and Turbanti, 2001; Berger, 2001). Will this new asset able to provide the systems librarians' expertise? The question is not limited to this specific topic but on IT competencies in general since some authors remind that the recruitment of library workers has been conducted on a general basis, a fact that allowed to enter the work in an "accidental" way, posticipating any acquisition of skills, degrees of specialisation and career development during the working life (Taglè, 1992; Cibarelli, 1997; Carotti, 1998; Minardi, 1999). Tammaro (2003) puts the emphasis on the aknowledge of compentencies gained by the information professionnel through different backgrounds (educational and working experience) as a foundamental step both for the success of the University reform and for delivering appropriate continuing education (see also Longo, 2004b; Vannucci, 2000).

Conclusions

The introduction of information technology has meant for library a revolutionary approach in revising their mission, organisational structure and traditional services. Library staff has been involved in this changing environment as the human interface between technology developments and users' expectations.

Leading this process and keeping the pace of continuing technological advancements is not a simple task since it involves a wide range of skills and abilities. Among the library professionals, systems librarians have developed during the years a great number of competencies that allow them and the their organisation to joint the best results from the adoption of tools for library automation.

Because of this rapid rate, the roles of systems librarians need to be constantly redesigned, skills redefined. In particular appropriate education has to be provided before and during the working experience and delivered from the interested parties with a cooperative effort.

A formal and on-time education, intended also as continuing education, seems to be an important factor influencing the lack of systems librarian's expertise within Italian libraries, along with organisational structure and historical automation background. Furthermore it could be of general interest discovering if and how systems librarians' competencies are hidden within Italian libraries.

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