# A Network Analysis of the American Library Association: Defining a Profession

by

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*Dedicated to my parents, Richard and Marion,*
*whose love, wisdom and unwavering belief in my abilities*
*are both boundless and priceless.*
*Mom and Dad, you are my heroes.*

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ABSTRACT

The term "librarianship" is a generic one, suggesting one overarching discipline despite the numerous specializations and areas of research within the profession. While many disciplines use bibliometric analysis of their literature to define subfields of study within, such methods are not appropriate to librarianship due to the nature of both the field and the literature. This study follows Barnett & Danowski's (1992) observation that professional associations may be more meaningful in defining a discipline than analysis of the journal literature. As its largest professional body, the American Library Association (ALA) and its numerous divisions and round tables is evidence of the diverse specializations within librarianship. Using membership data provided by ALA, social network analysis is utilized to describe the structure of this organization and the ways in which these specialized divisions and round tables relate to one another from a network perspective. A single year's data for the 2004 membership year is analyzed in this thesis, allowing for the identification of the sub-disciplines and specializations of study and practice within librarianship as well as the relationships between and among them. Results suggest a core-periphery network structure with major partitions based on overall library type. Latent attributes include a library-type dimension and a research-practice dimension. Implications for the use of network analysis in defining potential channels for professional communication within librarianship are also discussed.

CHAPTER 1. Introduction.

The development of the World Wide Web has arguably had one of the most profound impacts on the manner in which the "traditional" library has come to communicate and deliver information to users in the twenty year period spanning the turn of the 21st Century. Indeed, information in electronic format and its delivery via internet and communication technologies (ICTs) has become so pervasive that the general sentiment[1] throughout the library and information science (LIS)[2] profession is that libraries and librarianship are undergoing a period of intense change.

What is "librarianship?" There is debate as to whether it can be defined as a field, discipline or profession[3] but the specific criticisms are beyond the scope of this paper. (See Becher, 1989; Bennett, 1988; and Houser & Schrader, 1978; for more discussion on this topic.) Suffice to say that while the term "librarianship" is somewhat generic, suggesting one overarching discipline, the profession has, in fact, numerous specializations, areas of research and theoretical philosophies. In addition, like similar disciplines with professional components, i.e., psychology, nursing and social work, a notable disconnection has been defined between library research and practice. While this "gap" will be discussed in later in this thesis, it is sufficient for now to say that it is a characteristic that adds to the complex nature of an already diverse field.

The American Library Association (ALA) is the largest professional organization for librarians in North America and while librarians do make up the majority of the membership, others involved in this group may include library trustees, publishers, information vendors and non-librarians with interests in the field. The numerous divisions and round tables within ALA as well as the existence of specialized affiliate library organizations[4] is further evidence of the diverse specializations within the profession.

As with most large professional organizations, the smaller, interest-specific divisions and roundtables within ALA may provide effective communication channels for information and technology diffusion as well as professional development among both practitioners and researchers in these areas. Defining the structure of the librarianship is the first step.

The purpose of this dissertation is to describe the structure of the ALA using proven social network analytic methods. Multidimensional scaling of the network data will provide for a spatial representation of the overall network. Standard centrality measures will identify the most prominent divisions/RTs and the use of partitioning and cluster analysis methods will identify those divisions and RTs with similarities strong enough to form sub-groups within the network. Finally, factor analysis will be used to identify the dimensions of the sub-group structure.

Through formal description of the structure of ALA's specialized divisions and round tables and the ways in which they relate to one another from a network perspective, one can gain a much more accurate "snapshot" of the LIS profession and the specializations within. To date, no such study of ALA or librarianship exists beyond anecdotal observations. Furthermore, there are topics ripe for additional research, including the examination of the impact of the World Wide Web and other information and communication technologies on the LIS profession as well as the feasibility of the ALA as a network for information exchange and communication of innovations. Whereas information acquisition, organization and dissemination are the "stuff of librarianship" there is little presently known of how our professional information is acquired, organized and disseminated *within* LIS.  Defining and describing the structure of the profession using SNA methods is a start and provides a blueprint for this important additional research.

## CHAPTER 2. Problem Statement.

This dissertation is motivated by two research questions.

*RQ1: Can network analytic methods be used to describe the structure of the ALA in a way that is meaningful in describing librarianship as a discipline?*

As with numerous interdisciplinary fields and professions, library and information science (LIS) is difficult to define. At present, there is no universally accepted overarching theory of librarianship. McGrath (2002) outlines a framework for a unified theory of librarianship suggesting quantitatively measurable interdependent relationships among the traditional areas of concern to librarianship: publishing; selection and deselection; acquisitions; storage and preservation; the structure of knowledge and classification; collections; and circulation. Unfortunately, there is little consensus as to what methods are needed to properly define, measure, and explain these relationships, and as such, McGrath's proposal remains undeveloped.

This lack of an overarching theory of LIS is understandable when one considers the abundance of philosophies purported to be the primary theoretical groundings for the field. Adding to the multiplicity of theories is the existence of both research and practical components to LIS, and a highly specialized body of literature ranging from scholarly research to professional journal to general interest and current events. Literature that is "all over the map" so to speak, in terms of its focus, perceived quality, prestige, and practical applicability is not subject to traditional citation analysis. Many journals considered important to practitioners are not peer reviewed, often containing articles that lack citations. Practitioners are often not required to publish, which skews the publications available to the academic sector. There is also debate within and beyond LIS as to the quality of publications.[5] As such, traditional bibliometric analysis techniques used to describe and define most academic disciplines is not applicable, at least not in a manner that would be meaningful or representative of the entirety of LIS. Another method is needed.

*RQ2: What are the implications of utilizing network analytic methods to examine professional communication within librarianship?*

Researchers point out that as with other professions such as nursing and social work, there is a gap between LIS research and practice (Haddow & Klobas, 2004; Powell, Baker, & Mika, 2002). In short, that research which is published is not being effectively communicated to practitioners. Could the study of ALA's structure from a network perspective provide insight on a possible conduit or multiple conduits through which research can be communicated more effectively to practitioners? Discussion will include features of the network that would need to be examined.

# CHAPTER 3. Theoretical Framework.

## 3.1. Defining Library and Information Science (LIS).

As stated in the introduction, LIS is difficult to define. There is an abundance of literature on various theoretical groundings but the lack of consensus is itself telling. Of LIS Biggs (1991) writes "[t]here is perhaps no profession or field of study less rooted in a coherent discipline" (p. 63). McGrath (1985) describes LIS as a "derivative profession … not yet a discipline in its own right … . [W]e derive from or are a branch of education which depends on sociology and psychology which in turn derive from biology, chemistry and physics" (p. 219). Dick (1995) extensively reviews the LIS literature only to find that researchers' perceptions of LIS defy any single disciplinary classification. He writes that when separated from information science, library science is

> "defined as a 'science' in the broad Germanic sense of *Wissenschaft* (Broadfield, 1949), a social science (Line, 1965; Shuman, 1992), an 'empirical science' (Machlup [& Mansfield], 1983, p. 16), 'a genuine albeit immature, natural science' (Harris, 1986, p. 158), an 'applied vocationally-directed social science which also contains elements that are related to the natural sciences and the humanities' (Bekker, 1987, p.17), an 'applied science' (Lor, 1991, p.158), and an 'art, even a fine art untouched by science' (Thompson, 1931)" (p. 219).

Dick separates library science from information science in his discussion of LIS theory in part because of the increasingly dichotomous nature of library and information science as a merged discipline. Yet, he also writes that while these two cultures are different, they need not be opposed. (See also, Butler, 1951; Kaplan, 1964; Richardson, 1992; and Stieg, 1990; as discussed in Dick's review, 1995). Certainly, the introduction of automation and computer science to the librarianship field during the latter half of the 20th Century has only complicated efforts to define McGrath's derivative profession. This further supports this author's rationale in limiting the scope of LIS in this paper to focus on library science. (Refer again to Note 2.)

*3.1A. Library "Science."*

"[T]raditional library functions" are humanistic traditions; they are not submissable to the scientific process and "no one pretends anything scientific about them" (McGrath, 1985, p. 221). But McGrath is careful to distinguish these traditional functions from the process of information transfer, which "would contain the potential for contributing to the store of scientific knowledge in our field" (p. 221).[6] Indeed, epistemological theorists recognize that information science (IS) has the makings of a science, albeit a "little science" (Koehler, 2001). While Brooks (1989) notes clearly that library science is not a science, information science at least has the potential to become a science.

In discussing Goldhor's 1972 challenge to apply scientific problem solving methods to LIS, Brooks (1989) outlines the problems in meeting such a challenge, describing the profession as "orbiting a theoretical black hole"(p. 239). "The field continues to expand in two areas: the institutional studies of library science and the institutional studies of information science. … Despite extensive theorizing and some empirical work, however, library science is still a craft and information science has only the promise of a science" (p. 240). Indeed, Brooks (1989) notes that neither discipline—library science nor information science—exhibits the definitions of a science according to Popper (1968) or Kuhn (1970).

While LIS may not have theoretical groundings based in the Popper/Kuhn definitions of science, this is not to say that there is no theoretical foundation at all. Wagner and Berger (1985) define two types of theoretical activity in social science: 1) orienting strategies that are statements of values and 2) unit theories that are proposals for scientific experiments. In considering Wagner and Berger, Brooks (1989) writes, "[a] large proportion of the literary corpus of librarianship serves to orient values or to interpret phenomena witnessed in the practice of librarianship. … The written corpus of librarianship becomes … a record of witness" (p. 245).

Wagner and Berger's (1985) definition of "unit theory," as applied to LIS, comes close to meeting the definitions of science, but Brooks clarifies that unit theories in LIS tend to not be generalizable in any manner that would allow for an explanatory function. "Unit theories permit some empirical test and a resolution based on measurement. … All are testable although not many are actually submitted to an empirical evaluation and then widely distributed as would happen in a scientific discipline" (1989, p. 245). Thus, even those studies applying traditional scientific methods tend to be situational, more akin to case studies that describe "what happened in our library" than to research that could lead to scientific theory building.

*3.1B. Alignment with the Social Sciences.*

LIS is most often, and perhaps appropriately, aligned with the social sciences in part because of the history of LIS education. When LIS education became the responsibility of universities during the 1920s and 1930s, there was debate as to whether the discipline should emphasize the profession as a social enterprise or as an educational enterprise to be categorized with literature and the humanities (Dick, 1995). As Cronin and Davenport (1988) note, it was this shift of the control of LIS education from the profession to the universities that allowed for LIS's gradual alignment with the social sciences. But Brooks' (1989) observation that LIS is a "value-oriented" discipline becomes problematic when discussing epistemology in the context of the social sciences. According to Dick (1995) LIS's status as a discipline requires it to "sacrifice certain professional characteristics" to assume the "value neutrality" of traditional social sciences (p. 217). Yet in his comprehensive review of LIS theory, Dick also notes that opposing camps consider such values to be worth retaining. "Reformers" like Donald Beagle (1988) seek to apply contextualism to LIS using "a new world view" to gain "deeper and more coherent insights into the nature and knowledge of libraries" while a normative-contextualist approach (Lyon, 1990; Woodward, 1993) emphasizes the "ideal of 'responsible technology' based on definitive notions of 'the public good' and 'a desirable society'" (Dick, 1995, p. 228). Other "reformers" include those emphasizing development librarianship, Afro-centric models, multicultural librarianship, feminist perspectives, and others. (See Hannigan & Crew, 1993; Harding, 1992; Harris, 1992; Leonard, 1993; Mchombu, 1991; and Rochester, 1992). According to Dick (1995) LIS "transformers" emphasize the principal proposition of emancipation following Foucault's (1970, 1972) analysis of power and knowledge. Relatively recent issues related to the digital divide, freedom of access, and privacy issues would fall within this camp which includes Farmer (1993), Frohman (1992), and Harris and Itoga (1991), among others.

*3.1C. Theoretical and Epistemological Grounding*.

The lack of theoretical, even epistemological grounding has not gone unnoticed within LIS. Radford and Budd (1997) observe that libraries and practitioners operate within "epistemological frameworks or normative systems that enable people to understand what a library is, what it does, and how it behaves within its systems" (p. 316). But often, as Dick (1999) notes, the "assumptions about valid knowledge and reality are hidden from view in a selection policy or a general classification scheme or a research methodology" (p. 308). One of the challenges to epistemologists is questioning such assumptions. "How much of what LIS claims to know on the basis of its modes of professional practice and research traditions can indeed be justified on the basis of evidence for its claims?" (Dick, 1999, p. 308).

Birger Hjørland (2005a), in his introduction to a special issue of one of the seminal journals in LIS, *Journal of Documentation*[7], points out that while in Sweden there is a strong influence on the relevance of philosophy and metatheory in LIS education, for the most part, the interest in the philosophy of science by the LIS community has been limited in the rest of the world. That there is a significant lack of researchers with the expertise to build a theoretical and philosophical knowledge for LIS is problematic since important work with broad implication cannot be done without considering epistemological problems. Most work is "too narrowly and unsatisfactorily based" and will "always be the case if research traditions in LIS are too narrow and uninformed by more broadly accepted theories" (p. 7). Hjørland (2005a) further advocates that the philosophy of science has "the potential to further the development of LIS as a field of inquiry as well as a professional field" (p. 5). This is an appropriate response to Dick's (1999) assertion that "an appreciation of alternative epistemological positions is not always directly useful to the librarian's practical duties," but it may "[enhance] a deeper awareness of the library's wider symbolic and sociocultural roles" (p. 308).

3.2. LIS and Citation Analysis.

Citation analysis (CA) and bibliometrics are common analytical methods for describing the disciplinary and research foci of various fields. A cursory topic search of the Institute for Scientific Information's *Web of Science (WoS)*—a portal to the *Science, Social Science,* and *Humanities Citation Indexes*—on the search query "(citation analysis) OR bibliometrics" returned 3,508 documents defined as peer-reviewed articles or abstracts. Those published 2009-June 2010 numbered 572. The same search query in Ebsco's *Academic Search Complete* database returned 1,434 results with 419 being scholarly articles published 2009-June 2010.[8] Indeed, the examples cited below are a mere handful of the studies available but a comprehensive review of citation analysis is beyond the scope of this study.

The foci of bibliometric/CA articles tend to fall into distinct categories. Studies may analyze a particular discipline or field (Bird, 2008; Budd & Magnuson, 2010; Oermann, Nordstrom, Wilmes et al., 2010; Yu, Wang & Yu, 2010), specific journals or databases (Fernandez-Alles & Ramos-Rodríguez, 2009; Mukherjee, 2010; Odell & Gabbard, 2008), user populations (Salisbury & Smith, 2010), the research of particular scientists (Ahlgren & Järvelin, 2010), as well as the methods utilized in citation and bibliometric analyses (Bergstrom & West, 2008; De Visscher, 2010; Glänzel, 2010; Schubert, 2010; and others). Bibliometric/CA studies are published in journals from multiple disciplines—*Web of Science* noted more than 100—though they tend to be most prevalent in *Scientometrics* and *Journal of the American Society* *for Information Science and Technology (JASIST.)* While both titles fall in the "Information Science and Library Science" category of *Journal Citation Reports,* these journals are first and foremost IS journals and relatively few of the CA/bibliometrics articles published in these journals would fall into LIS as it is defined in this thesis.

CA/bibliometric studies as published in LIS journals also fall into the categories listed above, focusing on analyses of particular disciplines (Al-Qallaf, 2009; Anwar, 2005; Baradar, Tajdaran, Musavi, & Abedi, 2009; Gabel, 2005; Gentil-Beccot, Mele & Brooks, 2010; Georgas & Cullars, 2005; Hadavas & Rutledge, 1990; Nolen, 2010; Okafor & Dike, 2010; Sagar, Kademani, Garg, & Kumar, 2010; Schaffer, 2004; Tsay & Lin, 2009; Weissinger, 2010; White, Boell, Yu et al., 2009), researchers (Koganuramath, Angadi, Kademani, Kalyane, & Jange, 2004; Tsay, 2009), and specific populations (Ahmed & Rahman, 2008; Goel & Garg, 1993; Knight-Davis & Sung, 2008; Magrill & St. Clair, 1990; Salisbury & Smith, 2010; Yin, 2009). LIS journals also publish studies that analyze journals, databases, and other research sources (Abdullah & Rahman, 2009; Ashman, 2006; Bakri & Willett, 2009; Biswas, Roy & Sen, 2007; Conkling, Harwell, McCallips, Nyana, & Osif, 2010; Herubel, 1990a; Herubel, 1990b; Howland, Wright, Boughan, & Roberts, 2009; Mukherjee, 2009; Sellen, 1984; Tiew, 2006; and Tsay, 2008). Unique to the LIS literature, however, is the application of bibliometric methods to traditional functions of libraries, especially collection management (Bracken & Tucker, 1989; Cox, 2008; Feyereisen & Spoiden, 2009; Keat & Kaur, 2008; Kim, Lee, & Park, 2009; Lascar & Mendelsohn, 2001; Pancheshnikov, 2007; Vallmitjana & Sabaté, 2008; Wilson & Tenopir, 2008). The LIS literature has little that involves the actual development of methods of CA. Discussions of new methods and bibliometric measures may eventually appear in LIS literature as brief communications, critiques, or as applications of a particular method, but they rarely originate there. New methods are more often developed in IS or in other disciplines and later *applied* in LIS and, even then, almost exclusively in the academic sector. Consider the literature on the Eigenfactor™ Metric which was finally discussed in a full length article published in *College & Research Libraries* (West, Bergstrom, & Bergstrom, 2010), two years *after* it appeared in the journal *Neurology* (Bergstrom & West, 2008).

Another topic rarely found in LIS literature is CA/bibliometric analysis that examines LIS as a discipline. Of those CA studies that do exist, some analyze interdisciplinarity and collaboration within journals falling in the *WoS* "Information Science and Library Science" (ISaLS) subject category (Levitt & Thelwall, 2009a; Levitt & Thelwall, 2009b) while others compare ISaLS to other disciplines in terms of cross-disciplinary citations or co-citations (Odell & Gabbard, 2008; Sugimoto, Pratt & Hauser, 2008). In these studies, however, information science journals and traditional LIS journals are not distinguished. While Janssens, Leta, Glänzel, and De Moor (2006) attempted to map library and information science they succeeded primarily in mapping information science since their bibliometric analysis included only one LIS journal.

An earlier study by White and McCain (1998) examined author co-citations to visualize information science and understandably included few of the traditional LIS titles. Only one CA study appears to support the notion that combining information science and library science in WoS's ISaLS category is problematic. Moya-Anegón, Herrero-Solana, and Jiménez-Contreras (2006) built upon White and McCain's work in a study in which they applied bibliographic and visualization methods, including self organizing maps (SOM), hierarchical clustering and multidimensional scaling (MDS) to library and information science research. The authors analyzed journals defined in White and McCain, but included additional journals from LIS, even some not indexed by *WoS,* as well as titles with "editorial scopes related to the application of IS to a specific technique or area of knowledge (medicine, geography, telecommunications), with [library and information science] as a secondary interest" (p. 65). Their analysis resulted in four subject clusters, *information science*, *library science*, *management* and what they term *science studies*. This suggests that traditional LIS and IS are separate fields which is further supported when we examine the nature of LIS literature and the field itself.

Much of the difficulty in using CA and bibliometric analysis to describe LIS has to do with the diverse nature of LIS journals in terms of content, rigor, and audience. There is a lack of agreement among researchers, practitioners and educators within the field as to what journals can be defined as the core sources for discipline-related information.

Melin (1976) examined LIS literature at a time when there was a rapid growth in the appearance of increasingly specialized publications. Consider that this specialization was a logical response to the rapid growth of libraries in the post-World War II period and the subsequent specialization among and within different kinds of libraries. Technological innovations were also increasing the need for specialization as library automation and systems became commonplace.[9] "For a librarian, journals serve as a critical source of the newest information. They supplement and are supplemented by specialized conferences organized to provide a forum for displaying the newest trends and an opportunity for sharing techniques and methods" (1979, p. 28). Melin identified four types of journal publications: those focused on specific types of libraries; those that are function or task-oriented, (i.e. technical services, cataloging, reference, systems, etc.); publications with a format-specific orientation (i.e. issues with microform, audio-video, electronic, etc.); and journals whose scope includes special interest and research. In examining the LIS publications still in print in 2010, it is clear that these categories have not noticeably changed in the thirty years since Melin defined them (refer to *Ulrichs Global Serials Directory*).

Such specialization is not without disadvantages, however. Many LIS journals are so specialized that they are of little use to anyone outside their respective areas of focus (Melin, 1979). There is also a clear distinction between research journals, most of which are peer reviewed and focused in the academic sector, and journals aimed toward practitioners. Haddow (1997) notes the concerns of Melin's contemporaries who point out that LIS journals, even those focused on research, tend to be less scholarly than journals in other disciplines (Danton, 1976; Wasserman, 1972; and others). Rayward (1990) describes librarianship as "complex" and "multifaceted" but lacking "the same notion of a research-front or cutting edge." Of course, LIS has a strong professional component that does not emphasize research so trade-style publications are to be expected. However, scholars and professionals within LIS are not necessarily in agreement as to what journals are most useful or prestigious within these multifaceted specializations, which only compounds the problem of using the analysis of the LIS's research and professional literature to define the discipline.

A number of studies provide evidence to support this lack of *internal* consensus regarding LIS literature. Kohl and Davis (1985) noted the lack of agreement by deans of LIS education programs and directors of libraries belonging to the Association of Research Libraries as to what journals were considered most prestigious when considering authors for tenure and promotion. Blake (1991) examined perceived journal prestige among faculty in LIS programs specializing in school library media centers (SLMC) and district level SLMC coordinators. Here again, there was little agreement. Furthermore, while Kohl and Davis (1985) and Blake (1991) noted differences in journal prestige ratings by LIS educators and LIS practitioners, Tjoumas and Blake (1992) focused on the perceptions of two groups of LIS faculty, specifically those specializing in either public librarianship or SLMCs. These two faculty groups not only held divergent views—they agreed on only five of the top ten journals ranked—but as the authors note, "neither group held a strong internal consensus in rating the titles…" (p. 183).

Buttlar (1991) and Fisher (1999) noted that the majority of authors publishing in LIS journals fall in the academic sector. Buttlar found that faculty in LIS education programs are most likely to publish followed by academic librarians specializing in public service. Fisher examined 147 articles published in an arbitrary year (1993) by 203 authors in six journals representing the primary branches of the profession, but found that the academic sector accounted for 68 percent of publications with academic librarians authoring the majority of them.

> "The remaining fields [were] represented as follows: special librarians – 18 (9%), public librarians – 8 (4%), school librarians – 5 (2%) and an 'Other' category – 34 (17%). ('Other' includes vendors and consultants, for example. Also in this category were 11 students [both MLIS and Ph.D.], which means more students published in these six journals than either public librarians or school librarians)" (1999, p. 68).

Furthermore, Buttlar (1991) notes that while publications are concentrated in the academic sector, academic librarians tend to publish only a few articles to achieve tenure and nothing more. The result is a lack of focus and continuity in the LIS research over time.

Certainly the characteristics of LIS literature as described above would warrant caution in using traditional CA and bibliometric methods in examining and defining the field. That there is a dual structure to LIS, one side emphasizing research and the other focused on practice, would be problematic in CA but not impossible to address. However, given the uneven focus and nature of publications and research occurring *across* the discipline, CA is not applicable. Adding to the difficulties is the gap between LIS research and practice (Haddow & Klobas, 2004; Powell, Baker, & Mika, 2002). In short, that research which is published is not being effectively communicated to practitioners. This gap and the potential to address it will be discussed later in this thesis as we discuss the applicability of network analytic techniques to LIS.

## 3.3. Social Network Analysis (SNA) and Defining a Discipline.

Work by Barnett and Danowski (1992), supported by others (Cappell & Guterbock, 1992; Chung, Barnett, Kim, & Lackaff, 2009; Doerfel & Barnett, 1999; Lee & Barnett, 2005), suggests that network analysis of professional organizations may provide for more meaningful definition of a discipline than examinations of the literature, especially in the case of fields which are inter- and multidisciplinary in nature. Discussion of social network analysis and its use in analyzing disciplines follows.

*3.3A. Social Network Analysis*

Social network analysis (SNA) is essentially a set of research methods that identify structures in social systems based on patterns of relations among the systems' components (Rogers & Kincaid, 1981). Such methods have been well established in the fields of sociology and communication by Stanley Wasserman, Stephen Borgatti, Katherine Faust, William Richards, George Barnett, James Danowski and Barry Wellman, among others. Rothenberg (2002) and Krebs (2002) were among the first to examine terrorist networks and with the advent of the World Wide Web and social software these methods are standard for research involving new ICTs (Chau & Xu, 2007; Hwang, Altmann, & Kim, 2009; Igarashi, Takai, & Yoshida, 2005; Kretschmer & Aguillo, 2004; Weare, Loges, & Oztas, 2007; and others).

While SNA methods are now common throughout the medical, behavioral, social, and information sciences fields, SNA has its origins in sociology, identifying social structures based on the relationships among a social system's components (Bavelas, 1950; Leavitt, 1951; Travers & Milgram, 1969). Social systems are composed of nodes connected by links that form to create an interdependent structure. Nodes may be people, work groups, divisions, or departments, depending on the level from which one is analyzing the system. Links are relationships which, when viewed in the context of organizations, are usually channels of communication such as phone conversations, email messages or face-to-face verbal exchanges. However, such channels may also be "implied" as with the physical proximity of work stations, or joint memberships on committees, in departments or in work groups. Such interrelated links and nodes form a structure which is defined as the system or network.

Barnett (1997) writes, "[u]niversally organizations are described as social structures" (p. 2) and as such can be subject to SNA methods. Applied to organizations, SNA "is usually carried out in order to determine the nature of interpersonal communication flows and how the formal and informal structures are related," (Rogers & Argawala-Rogers, 1995, p. 125). Such analyses have been employed to describe information flow and technology diffusion within and across national and international boundaries (Atouba & Shumate, 2010; Barnett, 2001; Choi, Barnett, & Chon, 2006; Kim & Barnett, 2000), as well as the structural relationships that exist within and between multiple organizations or groups (Chung, Lee, Barnett, & Kim, 2009).

Network analytic methods are applicable to bibliometrics and CA as found in a number of recent studies spanning multiple disciplines (Feeley, 2008; Hou, Kretschmer, & Liu, 2008; Pilkington & Meredith, 2009; Quatman & Chelladurai, 2008; Reid & Chen, 2007). Ironically, bibliometrics and CA are common in LIS and while some contributions have been made using SNA, application of network analytic methods to other areas of LIS inquiry is relatively recent (Haythornthwaite, 1996; Haythornthwaite, Bowker, Jenkins, & Rayward, 1999) and as of yet, undeveloped.

*3.3B. Barnett & Danowski's ICA Study.*

Barnett and Danowski (1992) analyzed the International Communication Association (ICA) as a means of identifying both the various subspecialties within communication and the relationships among them. Their study was, in part, a response to criticism of the field of communication elaborated upon in a special issue of *Journal of Communication* entitled "Ferment in the Field" (Gerbner, 1988), which debates the difficulties of defining communication as a discipline. The field lacks a unified or general theory of communication (Berger & Chaffee, 1987; Craig, 1988; Craig, 1993) in part, as Berger (1991) notes, because of the fragmentation in the field and the lack of "commerce" (p. 101) among the various specializations. Bibliometric and CA studies (Reeves & Borgman, 1983; Rice, Borgman & Reeves, 1988; and So, 1988) support Berger's description of communication as "Balkanized" (1991, p.101) and a 1993 special issue of the *Journal of Communication* titled "The Future of the Field: Between Fragmentation and Cohesion," revisits the disciplinary status of communication suggesting that the "ferment" of 10 years prior had changed little.

Barnett and Danowski's 1992 study was the first to examine the field of communication by describing the *relationships* among the discipline's many subgroups. They analyzed a professional organization, the International Communication Association (ICA), rather than simply analyzing the literature. Their work follows research by Ennis (1992) who examined patterns of shared areas of interest among members of the American Sociological Association and used multidimensional scaling (MDS) and cluster analysis of the matrix of proximities between specialties to describe the structure of the overall discipline[10]. Barnett and Danowski found that the structure of communication was "more complex than suggested by previous bibliometric research" (1992, p. 264). Whereas bibliometric analysis differentiated the specialties within communication on two dimensions, Barnett & Danowski found two, three, and four dimensions, depending on the method utilized. While their use of network analytic methods provided for a more robust description of the communication discipline, it was the analysis of ICA member interests rather than the literature that set this study apart. They wrote:

> "Journals … are the most formalized and controlled of academic media. Editors and editorial boards exert a strong gatekeeping function. The top leaders of professional associations typically appoint publications officers rather than the broad membership. Thus the view of a discipline as seen through its journals may reflect a more restricted picture than seen in other academic media such as professional association meetings, topical conferences, and electronic mail discussion lists. Moreover, judging from the rejection rates of journals, one might expect that there is greater variance in scholars' research interests than is observable through published articles.
>
> Another window to scholarly interests is available from the professional association affiliations of its members. Professional associations may be more reflective of actual member interests than the journals. Professional associations may provide broader participation in programming decisions and subgroup activities than occurs with journals" (1992, pp. 266-267).

LIS and communication share many characteristics as disciplines. Both lack a unified or overarching general theory and both are divided into very specialized subgroups. LIS differs in that its literature is not as easily subject to bibliometric research as is the literature of communication. Furthermore, LIS has a very strong professional component, one that is not always reflected in the literature of the field. The American Library Association is LIS's largest professional association. This thesis will describe LIS using SNA methods, focusing on the affiliations of ALA's members with the Association's specialized divisions and round tables. In a field where a discipline-wide analysis of the literature may be both problematic and misleading, the methods outlined in Barnett and Danowski (1992) are a logical approach.

## CHAPTER 4. Method.

The method described below is that used to analyze membership data to identify the structure of the ALA during a single membership year, 2004.

### 4.1. Design.

Membership data for the 2004 membership year were obtained by the author directly from the Membership Office[11] of the ALA. All personal identifying information was stripped from the dataset by ALA prior to receipt by the author. Each case in the dataset contained the membership information for a single ALA member and was composed of a unique identifier, a code representing the self-reported “type of library” affiliation and a list of each division and round table (RT) to which the member belonged. The resulting file listed 59,462 personal members with 36,956 (62.2%) belonging to one or more of ALA’s divisions and RTs. Those 22,506 individuals holding no division or RT memberships were dropped from the analysis. The divisions and RTs are the unit of analysis for this study. Since they number eleven (11) and seventeen (17) respectively, twenty-eight (28) nodes were identified in the network to be analyzed. (See Table 1 for a list of the individual names and acronyms for each division and RT identified in the 2004 data.)

The node is the basic unit of analysis with relations between and among nodes operationalized as the *joint* division/RT memberships held by individual ALA members. While the links are non-directional, they do vary in strength. The weight of the link between any two nodes is simply the number of persons who are members of both.

To obtain the number of joint memberships and thus the weight of each link, the data were converted to a 36,956 x 28 binary affiliation matrix of members (rows) and divisions/RTs (columns). An ALA member could hold from 0 to 28 division/RT memberships and for each member a “1” was placed in the column of a division/RT to which s/he was a member while a “0” was placed in columns where membership was not held. The resulting affiliation matrix $N$ resembled that shown in Table 2. Matrix $N$ was then pre-multiplied by its transpose $N'$ to form matrix $S$, a 28 x 28 co-membership matrix with each cell $s_{ij}$ displaying the number of joint memberships among any two nodes $i$ and $j$ (Table 3). This is a symmetric network, where $s_{ij}=s_{ji}$. No direction is implied and numbers on the diagonal represent the number of members in each division or RT. Matrix $S$ provides the data for further analysis using *UCINET*.

4.2. UCINET.

*UCINET* is a “comprehensive package for the analysis of social network data as well as other 1-mode and 2-mode data... . Social network analysis methods include centrality measures, subgroup identification, role analysis, elementary graph theory, and permutation-based statistical analysis. In addition, the package has strong matrix analysis routines, such as matrix algebra and multivariate statistics” (Borgatti, Everett, & Freeman, 2010, para.1). *UCINET Version 6.275* (Borgatti, Everett, & Freeman, 2002) which includes the freeware visualization component, *NETDRAW Version 2.084* (Borgatti, 2002), was used for the following analyses.

*4.2A. Centrality*

Centrality measures suggest the importance of an actor in a network and in the case of undirected or symmetric networks, centrality is the primary measure of prominence (Knoke & Burt, 1983, as noted by Wasserman & Faust, 1994). The following centrality measures were calculated in this study: degree, eigenvector, betweenness, and flow betweenness.

The degree centrality of a network is simply the mean number of links—in this case, joint-memberships—one node has with respect to all other nodes (Freeman, 1978/1979). The higher the degree centrality measure, the more prominent the division/RT. A network centralization measure is also calculated to reveal the overall variability in degree centrality of the individual divisions and RTs.

Eigenvector centrality examines the centrality of a node as a function of the centrality of the nodes to which it is linked (Borgatti et al., 2002). Eigenvector centrality describes the global structure among nodes since a node may be more or less central depending on the centrality of the nodes to which it is related (Bonacich, 1972). So, given a symmetric adjacency matrix $S$, the Eigenvector centrality of $x_i$ is shown by:

$$c_E(x_i) = \alpha \sum s_{ij}\, c(x_j)$$

The betweenness centrality measure (Freeman, 1978/1979) is used to suggest influence since it identifies those nodes that lie along the geodesic paths that link other nodes. Bavelas (1948, 1950) noted that the location of a node *between* others in a network suggests the potential for strategic importance. In the study of communication, betweenness centrality measures identify those actors who may be considered “gatekeepers” in controlling information that flows in the network (Wasserman & Faust, 1994) in that it is often only through these nodes that other pairs of nodes are linked. The betweenness centrality $c_B$ of a node $x_i$ is represented by the following:

$$c_B(x_i) = \sum_{i<j}^{n} (\sigma_{ij}(x_i)/\sigma_{ij})$$

where $\sigma_{ij}(x_i)$ is the number of shortest paths from $i$ to $j$ that pass through node $x$ and $\sigma_{ij}$ is the shortest path from $i$ to $j$.

An extension of betweenness centrality is flow betweenness centrality (Freeman, Borgatti, & White, 1991) where node $x_i$ will be seen as standing between other nodes to the degree that the maximum flow between those points depends on $x_i$. Consider that maximum flow may be defined as the amount of information flowing between points, the number of emails occurring between nodes, the number of telephones calls between two departments. In this study, maximum flow is the maximum number of memberships shared by two divisions/RTs. That said, let $m_{jk}(x_i)$ be the maximum flow from $x_j$ to $x_k$ that passes through $x_i$. The degree to which the maximum flow between all unordered pairs of nodes depends on $x_i$, where $j < k$ and $i \neq j \neq k$ is

$$c_F(x_i) = \sum_{j<k}^{n} \sum_{j<k}^{n} m_{jk}(x_i)$$

Flow betweenness differs from betweenness centrality in that the former allows for the use of valued links representing the strengths of connections among nodes whereas the latter is restricted to networks represented in binary terms. Also, flow betweenness is not limited to a measure focused only on the shortest paths linking pairs of nodes, rather it "determine[s] flows on the basis of all the independent paths in the network" (Freeman et al., 1991, p. 151).

*4.2B. Positional Analysis*

Multidimensional scaling (MDS) is a data analysis technique which, when used in network analysis, allows the researcher to map proximities among actors in a network. These proximities may be based on similarities or differences, the result being that actors or nodes more proximate in the input date are closer to one another in multi-dimensional space while those less proximate are farther apart (Wasserman & Faust, 1994). In discussing metric MDS (Torgerson, 1958), Barnett and Danowski (1992) write that "[m]athematically, this process is equivalent to converting a matrix of intercity distances to Cartesian coordinates, where latitude, longitude, and altitude are the dimensions and the cities' locations on each dimension is given. From these coordinates, … a map may be drawn" (p. 270). Woelfel and Fink (1980) state that MDS is simply a method of mapping relational data by applying concepts of space and distance. A matrix of distances is converted into scalar products and the coordinates are plotted in $N$-dimensional space. Similar actors appear closer together on the resulting map than those that are less similar.

UCINET applies MDS to matrices containing some known measure of proximity between all pairs of actors. In this study the proximities are the number of joint memberships held by each pair of divisions/RTs. These proximities are similarities between pairs of nodes, that is, the larger the number of co-memberships, the closer the nodes will appear in 2-dimensional Euclidean space. This method allows for a visual representation of the ALA's divisions and RTs, showing spatial relationships among the individual nodes as well as those among any subgroups within the network.

Different methods of cluster analysis may be used in SNA to identify groups within data matrices. There are numerous clustering algorithms which can result in the identification of different groups in the same data (Everett, 1986). In this study, however, Johnson's (1967) is the clustering method utilized. Given $S$, an $n$ x $n$ matrix of similarities, Johnson's hierarchical clustering identifies the pair of nodes with the greatest similarity, the parameters of which are defined by the researcher, and combines them to form a single cluster $C_1$. Since $C_1$ is now a single node, a new matrix of similarities of the size $n$-1 x $n$-1 is calculated. Again, the pairs of nodes with the greatest similarities are identified and combined to form $C_2$ and a new similarities matrix of the size $n$-2 x $n$-2 is calculated. This process is completed when cluster $C_m$ is created, which includes of all nodes. In this study links are the numbers of division/RT joint memberships, and since the average link method is specified, pairs of nodes with the greatest similarities are those with the highest average[12] number of joint members.

Structural equivalence (Lorrain & White, 1971) is defined most succinctly by Wasserman and Faust (1994) as follows: "[T]wo actors [or groups] are structurally equivalent if they have identical ties to and from all other actors in the network" (p. 356). Since perfect structural equivalence is difficult to achieve, most methods measure the degree to which pairs of actors or groups *approach* structural equivalence. Burt (1976) measured structural equivalence by examining Euclidean distances among actors and groups but in this study structural equivalence is measured using a matrix of correlation coefficients. Included in the UCINET software is the

CONCOR routine, which partitions the actors of a network using CONvergence of iterated CORrelations (Breiger, Boorman, & Arabie, 1975).

A matrix of similarities, in this case, the matrix of division/RT co-memberships is the input. CONCOR calculates correlations on, in this case, the rows of the matrix[13], and creates a new matrix of correlation coefficients. This matrix becomes the input for another calculation of correlations and the process continues through multiple iterations until the final correlation matrix contains only 1s and -1s. This matrix is partitioned into two subgroups, with those pairs of actors where $r$ = 1 placed in one group and those where $r$ = -1 in another. These resulting partitions may then be subject to the above process to be further partitioned with the final number of “splits” ultimately determined by the researcher.

*4.2C. Factor Analysis.*

Factor analysis (Guttman, 1955; Spearman, 1904; Thurstone, 1935, 1947) is essentially a method for identifying latent structure among a set of seemingly unrelated variables by examining the correlations between them. In this case the node-link network of ALA’s divisions and RTs is subjected to factor analysis in an attempt to identify dimensions of its structure that may or may not be revealed in the methods described above. UCINET performs a principal components factor analysis “in which the matrix is factored into a product of the most dominant eigenvectors” (Borgatti et al., 2010, p. 95). The input is the affiliation network while the outputs are tables of eigenvalues, factor loadings, and factor scores. A scree plot is used to verify those factors deemed most influential.

CHAPTER 5: Results.

Membership data for ALA members belonging to one or more divisions/RTs during the 2004 membership year are analyzed in this study ($n$=36,956). These individuals hold 65,448 memberships in the ALA's 28 divisions and RTs. As such, the mean number of division/RT memberships per individual in the study sample is 1.8 (range 1 to 28) while that of the entire association ($N$=59,462) is 1.1 (range 0 to 28). ACRL, an ALA division, is the largest node with 11,198 members while VRT, a round table, is the smallest with 243. The mean of number of members per division/RT is 2,337.4. It is not surprising that the largest nodes are divisions while the smallest are generally the round tables, which tend to be very specialized in nature. Still, node size is not the focus of this study, rather the relationships among the nodes and the structure created as a result of these relationships are what prove most telling.

ALA's divisions and RTs form a dense network. The density $d$ of a valued network is simply the sum of the strength of all ties present divided by the number of ties possible. Since $d$=173.2 ($SD$=300.9) the network map is too densely connected to reveal any meaningful structure among the 28 nodes. In a binary network, density is the actual number of ties divided by the number of possible ties. If we dichotomize the network such that the value of links between nodes are not considered, rather only that a link either exists or does not, $d$=1.0, meaning that the ALA is a connected network—where every node is connected to every other node. Note the visual map of the valued network resulting from the application of UCINET's Spring and MDS algorithms in Figure 1.

The researcher may address the problem of very dense networks by setting a threshold level for the link strength, a common method for dealing with large dense networks. If the valued network matrix is dichotomized using a threshold of, in this case, the network's average link strength of 173, the result is a binary matrix where a link only exists between two nodes whose link strength was greater than or equal to 173. However, the value or strength of the links is lost since in binary networks, links either exist or they do not. The connection between two divisions/RTs having 1000 joint members is certainly stronger than that between two divisions/RTs having only 100. Since connection strength is an important characteristic of the ALA network, it was decided that the valued network would be more appropriate in this study. Thus, links whose strength was less than the mean of 173 joint memberships were dropped from the analysis, allowing for the use of the valued network while removing the "clutter" created by the weaker peripheral links. The result is a more *useful* network map displayed in Figure 2.

ALA's network as presented in Figure 2 generally shows a core-periphery structure (Borgatti & Everett, 1999), with divisions centrally located and RT's in more peripheral areas of the network. Note that the heavier lines represent stronger links or, in this case, greater numbers of co-memberships. This is not surprising given that the divisions are larger and less specialized than the smaller, more peripheral RTs. However, the relative positions of the nodes within the core may describe some of the most important characteristics of ALA's structure. As discussed in section 4.2A above, centrality and betweenness measures identify those nodes with potential prominence and influence and these characteristics may or may not have any relationship to node size. Identifying those divisions/RTs with the highest centrality and betweenness measures not only allows us to describe the prominence and influence of these nodes, but it also provides a description of the relationship of each node's corresponding sub-discipline to all others represented within ALA.

5.1. Centrality.

The 2004 ALA division/RT co-membership network's normalized centrality measures of betweenness, degree, Eigenvector, and flow betweenness are displayed in Table 4. ACRL has the highest scores on all four centrality measures but is most prominent in its betweenness and flow betweenness measures relative to the other divisions/RTs. Note that ACRL's flow betweenness centrality score is more than 3.5 times that of the second most central, PLA. In betweenness centrality ACRL exceeds the second most central node, RUSA, by nearly 500 percent. That the second most central nodes in both of these measures are different is also notable and will be discussed later. Generally speaking, ALA's divisions have higher betweenness, flow betweenness, and degree centrality measures than RTs with a few notable exceptions. SRRT has higher betweenness ($c_B$=.342) and flow betweenness ($c_F$=1.325) centralities than all other RTs and two divisions, ALTA and ASCLA. It also scores higher than these divisions in degree centrality ($c_D$=3.928) but so do two additional RTs, IFRT ($c_D$=4.956) and LIRT ($c_D$=3.762). IFRT has a higher flow betweenness score ($c_F$=.803) than both ALTA ($c_F$=.194) and ASCLA ($c_F$=.349). Furthermore, LRRT is higher in flow betweenness ($c_F$=.329) than ALTA and very close to ASCLA's measure. Finally, GODORT ($c_D$=2.597) exceeds ALTA in degree centrality but not in betweenness or flow betweenness.

As discussed earlier, Eigenvector centrality examines the structure of a network in a more global manner since the centrality of a node is of function of the centrality of the node to which it is linked (Bonacich, 1972; Borgatti et al., 2002). In this study, ACRL is once again the most central of the nodes having a relatively higher score ($c_E$=66.266) compared to nodes with the second and third highest scores, LAMA ($c_E$=54.351) and RUSA ($c_E$=54.019). Again, divisions generally have higher Eigenvector centrality measures than RTs with the exception of ALTA and ASCLA. LIRT ($c_E$=17.016) and IFRT ($c_E$=16.915) score higher than both ALTA ($c_E$=9.007) and ASCLA ($c_E$=13.484) while SRRT ($c_E$=12.303) and GODORT ($c_E$=11.935) have higher Eigenvector centrality than ALTA.

In terms of the centrality measures discussed here, ALTA and ASCLA are relatively more similar to RTs than divisions suggesting that they are not as strongly connected to their division counterparts. Similarly, SRRT, IFRT, LIRT, LRRT, and GODORT appear more like divisions on many of these measures. While they may be specialized RTs, they obviously have stronger links to the larger and more central divisions in the ALA network.

5.2. CONCOR Analysis.

As a result of the CONCOR analysis, five partitions are identified in the ALA division/RT network (see Table 6). Since CONCOR partitions are defined using iterations of correlations, the initial matrix of correlation coefficients of ALA divisions/RTs is shown in Table 8 partitioned as in the CONCOR analysis. The first group or "block" may be identified as a "school library media center" (SLMC) partition in that the AASL, ALSC, and YALSA, all of which have very high within-group correlations, focus on school libraries as well as children and young adult services. Note also that this group has the highest within-group density (average tie strength) of 1115.0 (SD=234.6). The nodes in the second partition relate to "public libraries" (PL). PLA's focus is obvious and SRRT and IFRT involve social responsibilities as well as intellectual freedom and censorship, common issues in public libraries. Note the high correlation between SRRT and IFRT ($r$ =.90). The public library's role in promoting intellectual freedom and social betterment is a common philosophy throughout the LIS profession (Dick, 1995). The correlation between PLA, SRRT, and IFRT and the placement of the latter two divisions in the PL partition suggests that ALA members with interest in public librarianship share this philosophy. ALTA is not as highly correlated with SRRT or IFRT, but it is with PLA ($r$ = .90) and ASCLA ($r$ = .92). Since most public libraries have boards of trustees or some similar type of administrative directorship, the appearance of ALTA in this partition is not surprising. Furthermore, given that public libraries in the United States have historically been tax-funded and as such, sensitive to economic and political variables, there has been a growing need for public libraries and library systems to become involved with cooperative and consortial agencies and groups. As with ALTA, the appearance of ASCLA in the PL partition is not unexpected.

CONCOR's third partition may be called an "academic libraries" (AL) group. That ACRL is a member of this partition is understandable, however, one can argue that the respective reference, instruction, technical services and information technology foci of RUSA, LIRT, ALCTS and LITA are certainly not limited to academic libraries. Here again, we can examine the relationships among the nodes within the AL partition. Indeed the correlation coefficients of ACRL to RUSA ($r$ =.85), LIRT ($r$ =.87), ALCTS ($r$ =.91), and LITA ($r$ =.92) are quite large, suggesting strong links through large numbers of joint memberships, especially when compared to these same nodes' correlations to those divisions/RTs in the SLMC and PL blocks. It is not surprising that ALCTS and LITA ($r$ =.99) have the highest correlation among all pairs given the overlap in tasks and responsibilities among technical services and the information technologies so prevalent in contemporary libraries. GODORT has a very high correlation with ACRL ($r$ =.94), perhaps due to the fact that 70 percent of depository libraries in the United States Federal Depository Library system are academic libraries (Federal Depository Library Program, 2009).

Nodes with the lowest within-group correlations in the AL partition are LAMA and LRRT. LAMA's focus is management and administration, which is certainly not limited to academic libraries. The administrative structures of school systems provide for management in SLMCs and this may account for LAMA's relatively low correlation with AASL ($r$ =.35). Still, its correlation with ACRL ($r$ =.65) is only slightly larger than that with PLA ($r$ =.64). LAMA likely appears in the AL partition because of its strong relationships with other divisions/RTs, whereas LRRT focuses on LIS research, the practice of which tends to be focused in the academic sector.

The three partitions discussed above are made up of all eleven divisions and six round tables. The remaining RTs are divided into two additional partitions supporting the core-periphery structure (Borgatti & Everett, 1999) obvious in the MDS analysis. (Refer again to Figure 2). The larger divisions are concentrated centrally and the smaller more specialized RTs located outside the core. The between-group densities (Table 7) of the AL, PL and SLMC partitions are relatively high. Thus, there are large numbers of joint memberships extant among pairs of nodes belonging to different groups, which, in effect link these groups. Furthermore, CONCOR's first three partitions suggest that three dimensions, each defined by general library type, are attributes of ALA's division/RT structure. These dimensions are related to one another on a continuum, with an academic sector at one pole and an SLMC sector at the other. The PL partition falls between. Note the PL partition's between- and within-group densities. PL's between group densities with the AL and SLMC partitions are *higher* than its within-group density. The relatively high numbers of co-memberships connecting AL with PL and PL with SLMC suggest that it has a high level of betweenness when it comes to the relationships among these three partitions. This corresponds with PLA's flow betweenness measure in Table 4, which is second only to ACRL's.

The underlying attributes that may be described by the fourth and fifth partitions are not as clear as the first three. Partition four may be a research-oriented group as the round tables included—EMIERT, GLBTRT, LHRT, MAGERT, NMRT—discuss subjects that tend to be the focus of LIS research. Partition five is much more staff oriented, including RTs that deal with continuing education and staff organizations. Partitions four and five suggest that a research-practice dimension may be attributed to ALA's overall structure.

Figures 3 and 4 respectively show the CONCOR partitions on two-dimensional scatterplots and MDS maps of the ALA network. Once again, the CONCOR analysis supports the core-periphery structure and the groupings by library type observed in the MDS analysis. A comparison with yet another positional method, cluster analysis, follows.

5.3. Cluster Analysis.

Hierarchical cluster analysis supports the MDS and CONCOR analyses, and the dendrogram generated by Johnson's method (1967) can be seen in Figure 5. The solid vertical lines A, B, and C indicate the clusters outlined on the two-dimensional and MDS maps in Figures 6 and 7.

As with CONCOR there are three clusters based on library type—SLMC, public and academic—thus supporting the existence of three “library type” dimensions to ALA’s structure. However there are subtle differences *within* these clusters, namely, the conspicuous absence of the round tables presented in the CONCOR partitions until later in the clustering process. The public library cluster and the academic library cluster are combined relatively early in the process. As noted above in the discussion of the CONCOR results, the foci of RUSA, LIRT, ALCTS, LAMA, and LITA are not limited to academic libraries. The clustering that occurs at level 6 ($\eta$=.785), just beyond line A on Figure 5, suggests that these nodes provide for links between the public and academic spheres thus supporting the strong between-group links found in the CONCOR analysis.

Note that clusters formed at line A are made up of nodes representing divisions only. As the clusters are further aggregated a few RTs are added, namely LIRT, IFRT, SRRT, and GODORT, even before all divisions are. The relative prominence of these particular RTs also supports findings in the CONCOR analysis.

5.4. Factor Analysis.

The first factor identified by UCINET’s factor analysis routine accounts for slightly more than 20 percent of the variance in the 2004 ALA division/RT network (Table 9). This factor supports the CONCOR and MDS analyses in denoting the importance of the academic sector within ALA. Surprisingly, though, it is not ACRL with the highest factor score, rather it is GODORT (.728) followed by MAGERT (.704). ACRL is in fact, third (.697) while PLA and YALSA have scores at the opposite end of the range (-0.69, and -0.38 respectively), suggesting that LIS as it relates to public libraries, SLMCs or services for children is not influential on this most prominent dimension.

The second factor identified accounts for 9.3 percent of the variance and is quite clearly a "public libraries" dimension. PLA (.770) is grouped with many of the same nodes identified in the MDS and CONCOR analyses. Furthermore, ACRL (.086), AASL (-.103), and GODORT (.046) are at the lower end of this factor's range.

Factor three is not apparent in the CONCOR or cluster analyses described above although it can be seen in the 2-dimensional and MDS maps discussed throughout this section. This factor, which accounts for 6.5 percent of the variance, appears to be related to LIS research. LRRT has the highest factor score (.686) along with LHRT (.601), LIRT (.560) and ACRL (.518). The grouping of LHRT, with LRRT would suggest that interest in the history of this discipline is more applicable to research than to practice while the appearance of LIRT suggests that instruction and information literacy are prominent topics of contemporary LIS research. Given that PLA and AASL are at opposite ends of this dimension's range (-.026 and .058 respectively), it appears that LIS research is focused in the academic realm.

The fourth factor is the last to be considered in this analysis. (See the Scree plot in Figure 8). This factor describes a SLMC dimension and while it accounts for only 5.2 percent of the variance, it is supported by the library type dimensions identified in the CONCOR, cluster and MDS analyses. Here, YALSA, AASL and ALSC have the highest factor scores at .829, .778, and .676, respectively. PLA's score (.093) is near the bottom of this dimension's range, which further supports library type—in this case, the SLMC—as a factor defining ALA's structure. If one was to interpret this factor as being “services to children” rather than library type, PLA would likely have a much higher factor score.

All four of the factors discussed above, which in sum account for 41.2 percent of the variance in ALA’s structure, are supported by at least one other method utilized in this study, thus providing some support for interpretations that are always subject to bias. What the factor analysis does emphasize, however, is the relative influence of the academic sector in the overall structure of ALA. Three of the four factors discussed above relate directly to library type. Yet the prominence of the academic sector suggests that we can look at library type as a single dimension with the academic at one end of the continuum and SLMC at the opposite. This continuum along with a second showing the research—practice dimension of ALA’s structure is displayed relative to results of the other analyses in this study. (Refer again to Figures 3, 4, 6, and 7).

# CHAPTER 6. Discussion.

## 6.1. ALA's Division/RT Network and Defining LIS.

In the ALA's core-periphery structure (Borgatti & Everett, 1999), ACRL is the node with the highest in all measures of centrality including degree and betweenness. Recalling Freeman (1978/1979), this suggests that ACRL is the most prominent and influential of ALA's divisions and RTs. Furthermore, ACRL is the center of a cluster of nodes that define one of the most prominent dimensions of the ALA's structure, a core that is focused on the academic sector. Buttlar (1991) and Fisher (1999) observed the influence of the academic sector on LIS research and publishing. It appears, however, that this influence goes beyond scholarly article authorship to the very structure of the profession.

While this may not be a surprise to those familiar with the LIS profession, there are some aspects of ALA's structure that may be less obvious but still important in considering ways to define LIS. The methods described above identify four possible factors influencing ALA's structure and by extension, the LIS profession. Three of the four focus on library type and can be viewed on a continuum with the academic and SLMC sectors at the poles and a public libraries sector between them. The fourth factor is a research-practice dimension, which will be discussed in more detail later in this section.

The influence of library type in defining LIS is not a new observation. When Melin examined LIS journals in 1979, she noted that publications fell into four categories. Journals focusing on specific types of libraries were one of these categories and while Melin did not specify which category was most prominent in her examination, the present study suggests that it is, indeed, library type, specifically, the academic sector. Besides ACRL, CONCOR suggests that this sector is made up of the ALCTS, LAMA, LITA, and RUSA divisions, as well as GODORT, IRRT, LIRT, and LRRT. Of course, SNA also allows us to go further; to not simply identify the most influential groups, but to look at the relationships between this sector and the others in the entire network. Consider the CONCOR analysis, where AL, PL and SLMC sectors are identified. We know from the between-group densities (Table 7) that the strongest links exist between the SLMC and PL sectors. We also see that the PL sector has a relatively strong connection to the AL sector. Here again, PL falls "between" on the academic-SLMC continuum. While library type is obviously a significant dimension in LIS, so is the *position* of each sector relative to others. It is this structure that defines the field.

Consider again, "betweenness," a concept made tangible in network analytic methods, but lost in any analysis that may focus solely on division/RT size. For instance, if we only consider node size (Table 12), we see that ACRL is the largest with 11,198 members, followed by PLA (9,041), AASL (8,123), LAMA (4423) and RUSA, with its 4,400 members. If node size was a determining factor, PLA would be second to ACRL in centrality measures followed by AASL. Yet, RUSA has the second highest measures in all but Eigenvector centrality. Despite its smaller size, RUSA has positional advantages over much larger nodes like PLA and AASL. Furthermore, while RUSA may have its strongest links to the academic sector, as shown in the cluster and CONCOR analyses, it also has links to both the public libraries and SLMC sectors. RUSA is a *boundary spanner*, which simply stated, is an actor or node that connects a group to another group, or a group to its environment (Aldrich & Herker, 1977). LITA, LAMA, YALSA, and IFRT may also serve in this role.

When considering the betweenness of groups, the public libraries sector is the best positioned to connect the different sectors of LIS. As discussed in theories related to network diffusion (Granovetter, 1973; Rogers, 1995) and information dissemination, size is not nearly as important as “location.” That said, the analysis above suggests that when examining the primary sectors or “sub-disciplines” represented in ALA’s structure, the public libraries sector, though not the most prominent, may have more influence as a cohesive force in both the ALA network and the LIS discipline as a whole.

6.2. The Research-Practice Gap.

A fourth factor was identified in the methods described above—a research-practice dimension. Similar to disciplines like social work and the health professions, LIS has a strong professional component. The Master of Library Science (MLS) is the terminal degree for professional librarians and information specialists and few programs retain the thesis requirement common in research-oriented disciplines. Those individuals continuing on to the Ph.D. level tend to become LIS education program faculty or take positions in libraries or information agencies serving in some administrative capacity. Still, there is a research component within this practice-focused profession. LIS faculty conduct research and academic librarians, though practitioners, are often required to perform research and to publish in scholarly journals to meet tenure requirements.[14] As such, there is a large research component within ALA, one that is understandably focused in the academic sector and much less prevalent as one examines other types of libraries along the library-type continuum. For example, LRRT’s focus is research and has 776 members, 70.7 percent of whom identify themselves as affiliated with academic institutions (Table 13). Those LRRT members affiliated with public libraries (5.4%) and SLMCs (2.9%) number significantly fewer.

Haddow and Klobas (2004) and Powell et al. (2002) note a significant disconnection between LIS research and practice and discuss eleven gaps that contribute to this. (See Table 14). While it is difficult to address all of these gaps simply by examining ALA's structure, considering the nature of the LIS profession from a network perspective can provide insights lost in looking solely at the literature. For instance, the persistence of Haddow and Klobas' "knowledge gap" suggests that dissemination of LIS research, most often produced in ALA's academic core, is somehow being blocked or interrupted and thus not reaching practitioners in other sectors. This disconnection may also be enabling or at least contributing to Haddow and Klobas' "culture," "motivation," and "immediacy" gaps. Examining the structure of the whole network may allow for identifying points of disconnection, what Burt (1997, 2004) refers to as "structural holes" and enable researchers to identify possible "bridges" to enable the diffusion and dissemination of research to practitioners. For example, research focusing on information literacy and children may be published in a scholarly journal rarely examined by SLMC practitioners. If LITA is identified as a bridge or a "broker" that connects the AL sector to the SLMC sector this division may be utilized as a channel through which the SLMC-related research taking place in the academic core can be "pushed" to SLMC practitioners. At the same time researchers who share membership in LITA with SLMC practitioners may have the contact necessary to obtain feedback on practical implementation of their research. Of course, this is a hypothetical scenario, one whose accuracy would have to be examined using additional methods which analyze networks using a more micro-level approach.

The details as to *how* communication within LIS may be improved are beyond the scope of this study. The point is that ALA's network may provide an extant structure for the diffusion of practical and scholarly communication. If Barnett and Danowski (1992) are accurate in stating that professional organizations may be more indicative of the research interests in a discipline than the literature, then deeper examination of ALA's organizational structure is both warranted and necessary, for while ALA is the largest professional organization for librarians and information specialists, it also has the potential to be LIS's largest communication mechanism.

There is little doubt as to ALA's importance and influence in LIS. The U.S. Department of Labor's Bureau of Labor Statistics (2004) reports that 145,140 people were employed as librarians in the United States in 2004. As ALA reports in the data provided for this study, personal membership for that year was 59,462. It should be noted that not all members of ALA are employed – some may be retired, unemployed or students in LIS education programs. Others may be affiliated with the publishing and library supplier industries. Thus, stating that nearly 41 percent of *employed* librarians were members of ALA in 2004 would not be entirely accurate. Consider also that not all employed librarians may belong to ALA. While it is the largest professional organization for LIS professionals, it is not the only one. Many practitioners and LIS researchers choose not to belong to ALA because affiliate organizations may be more appropriate to their specializations. Examples of these affiliates include the Medical Library Association, Special Libraries Association, American Association of Law Librarians, Association of American Archivists, Music Library Association and others. Still, while these associations are autonomous, their affiliations with ALA are strong and despite the caveats outlined above, ALA remains largest professional body representing LIS.  Furthermore, it is the accrediting body for most of the MLS education programs located in North America that prepare individuals for professional positions.  Indeed, an ALA-accredited MLS is, in most cases, a minimum requirement for any professional LIS position, regardless of the specialized nature of the organization.

While ALA is certainly large and influential, could it be an effective vehicle for communication in a discipline so diverse and seemingly fragmented?  As a microcosm of LIS, can ALA provide for that information dissemination *within* the discipline that appears to be lacking with traditional means of scholarly and practice-oriented communication?  Consider that ALA is an effective body for communicating the concerns of LIS to entities *outside* the discipline.  Indeed, ALA is one of the largest lobbying organizations in the United States.  It is also effective in mobilizing its membership to address the external issues of funding and challenges to intellectual freedom so common in early 21st Century libraries.  However, it is not clear what part ALA plays in facilitating communication *about* the discipline *within* the discipline.  Its annual conferences attract tens of thousands of participants[15] where presentations and workshops run the gamut of disciplinary content.  There are weblogs, wikis and email distribution lists for nearly every division and RT.  Many of the larger divisions like ACRL, PLA and AASL are semi-autonomous, publishing their own journals and holding conferences independently of ALA's.  Beyond that, however, the actual methods and effectiveness of dissemination are unclear.

Haddow (2001) examined the communication of LIS research to practice and identified five channels—publishing, institutional, commercial, informal contacts, and system use.  She reported that the least effective communication occurred via publications whereas the most effective was through informal contact with friends and colleagues with shared interests. As Haddow and Klobas (2004) note, “this [informal] communication may be enabled by the more functional institutional and commercial channels, but is not dependent on their protocols and structures to occur” (p. 37). ALA is certainly a functional institution, one that permeates LIS. However, can it facilitate the effective communication that reportedly occurs among more informal networks? Can ALA’s network structure of divisions and RTs provide for the links, bridges and brokerage necessary to more effectively disseminate research and professional development among LIS professionals? In short, can ALA become the channel for traversing Haddow’s research-practice gap?

Defining the overall structure of ALA is the first step. This study has identified the most prominent and potentially influential divisions/RTs when measuring co-memberships as the linking force. Also identified are the organization’s primary subgroups as well as the strength of the relationships within and between them. ALA’s structure is a microcosm of LIS and provides a far more meaningful description of this discipline than anything discussed in LIS research to date. Additional research is now needed to examine the network at a more micro level; to identify those structural holes among individual nodes and both within and between the three primary partitions. More importantly, such analyses are necessary to identify those nodes best positioned to bridge the gaps and whose potential to provide for more effective discipline-wide communication throughout the discipline can be facilitated using the ICTs so pervasive in modern society.

6.3. Limitations.

The most obvious limitation of this study is the limited amount of information available with regard to each ALA member included in the analysis. This study is concerned primarily with one characteristic of each ALA member—whether or not he or she held membership in specific divisions and round tables. Institutional affiliation was examined in the analysis of division/RT memberships, but additional characteristics of each member, such as gender, age, educational background, and income were not analyzed because these data were not made available to the researcher.

Any of these variables may impact an individual's decision to become a member of a particular ALA division or RT. Consider for instance, that ALA may be cost-prohibitive for many individuals. The 2004 fee for regular membership[16] in the organization was $100 and additional dues are required for membership in each of ALA's divisions, which in 2004 ranged from $35 to $50. Membership in RTs is relatively less expensive with 2004 dues ranging from $2 for STORT to $20 for GODORT. With the mean salary for librarians in the United States in 2004 reported to be $48,700 (Bureau of Labor Statistics, 2004), individual income could certainly have played a role in the number of division/RT memberships held as would have institutional support, or lack thereof, for professional membership dues. Of course, income is only one confounding variable. Consider also that, as mentioned Chapter 3, ALA members affiliated with academic libraries or LIS education programs are often required to publish and participate in professional organizations to meet tenure requirements. This suggests that academic librarians may be more likely to join discipline-specific divisions/RTs than, say, public or school librarians.

Had additional membership information been available, the macro-level approach used in this study would still have been a limiting factor. In converting a 2-mode member-division/RT matrix to a 1-mode matrix of ALA division/RT co-memberships, a great deal of information about individual ALA members would have been lost. This is not to say that network analytic methods cannot be utilized to account for additional variables. Such studies may employ quantitative methods such as QAP regression (Krackhardt, 1988) or Galileo analyses (Woelfel & Fink, 1980), or any of a number of qualitative procedures. However, the macro-level approach used in this study, though somewhat limiting, is appropriate and sufficient given the research questions addressed and the types of membership data available.

Another limitation of this study is its purely descriptive nature. Given the methods utilized, we can describe the groupings of certain divisions. We can identify factors that *may* impact structure. We cannot, however, definitively explain this structure without, again, employing additional methods to analyze a data set containing more information types. While the network analytic methods implemented here may identify and define the overall structure and relationships among ALA's various nodes, they are insufficient in explaining or determining causality of the relationships. Such analyses require additional methods as well, such as QAP correlation and regression analysis, and *P** models (Frank, 1995; Skvoretz & Faust, 1999), which allow for predicting network structure from exogenous and endogenous variables. Even so, there is disagreement among researchers as to the efficacy of these methods.

Finally, consider that this analysis examines ALA's network structure at a single point in time. Arguably, technological innovations such as the advent of the World Wide Web and other information and communication technologies (ICTs) have had a profound impact on all areas of the LIS profession. Note the following anecdotal evidence acquired by the author during sixteen years as an LIS practitioner. Centralized bibliographic utilities like OCLC have changed the nature of technical services work such that much cataloging work formerly performed by professional librarians is now the responsibility of paraprofessionals. The ease and speed with which online vendors like Amazon™ and consortial ordering systems like Yankee GOBI™ can facilitate direct ordering by selectors and actual users, has changed many of the traditional responsibilities of acquisitions librarians. At the same time, the exponential growth of electronic journals, online databases, and the need to manage their accompanying license agreements has forced these same librarians to develop expertise in new areas. Whereas LIS professionals once had the monopoly on providing access to otherwise expensive or difficult to acquire information resources, ICTs have allowed the producers of information to provide their product directly to patrons, allowing them to bypass libraries, entirely. Although such resources are not free of charge, acquiring an individual article is still less expensive than subscribing to a journal. At a time when instant gratification and immediate delivery is a commonplace expectation, the monetary cost of purchasing information for immediate delivery to one's computer may be worth not having to travel to a library.

ICTs have contributed to an information environment in which the resources provided by libraries do not necessarily require users to physically travel to libraries to use them. The most obvious examples are electronic journals and electronic books which can be accessed through any computer, regardless of where the user may be. Changes such as these have understandably affected both the actual and perceived responsibilities of those in LIS discipline. Indeed, with the success of such resources as Google Scholar™ and Google Books™, academic institutions are increasingly minimizing the importance of traditional university and college libraries and even librarians as necessary resources. Such perceptions place libraries in a precarious position in times of economic stress and budgetary uncertainly. Indeed, libraries are often bear a relatively higher burden in funding cuts than other departments as academic institutions try to compensate for budget shortfalls. This is not as much the case in public and school libraries, since these institutions have a far more diverse user groups and with very different information needs. But one need only peruse the trade literature—examples include *American Libraries*, *Library Journal*, and *School Library Journal*—to find instances of library trustees or school boards questioning the need to fund library services and resources. After all, "isn't everything is online?"

This is not to say that ICTs have only negatively impacted LIS. Although technological innovation has always been an integral part of LIS, ICTs have revolutionized the ability of LIS professionals to acquire, organize and disseminate information. The ICTs described above have also brought an increased need for LIS professionals to specialize in relatively new areas like information literacy—teaching users to effectively retrieve and evaluate the massive amounts of information available to them. There is an increasing need for those in LIS to have technical expertise in emerging technologies as well as education in the intricacies of licensing and copyright. Furthermore, changing expectations among users—the desire for instant and constant connectivity to both resources and LIS experts—are forcing a continual evolution in LIS.

How are the changes outlined above affecting LIS in general and ALA in particular? The data analyzed for this study are from one point in time—2004. Would the same analysis of

ALA’s membership in 1992—the year preceding the introduction of Mosaic’s web browser—show a very different network? Similarly, how might ALA’s network look in 2014? Examining how ALA’s structure exists at present is important, but expanding such analyses to include an examination of how this structure has changed over time allows us to continue to build on the research elaborated upon in this study.

Chapter 7. Future Research.

There are numerous questions raised by this study. Besides the obvious "how and why are these nodes related?" we should ask such questions as, "has the structure of ALA and the relationships between and among the divisions/RTs changed over time?" If so, is there an obvious variable that may be examined more closely as a potential cause? A longitudinal analysis examining the pre-World Wide Web period through the present would be especially telling. Are the changes that have occurred in LIS since the release of Mosiac reflected in the structure of ALA?

There is also much still to learn about the network structure of ALA itself. This study focuses on divisions and RTs. However, there are also discipline-specific sections within each of these divisions and RTs. For example, ACRL has seventeen sections, including Community and Junior College Libraries, College Libraries, University Libraries, Instruction, Rare Books and Manuscripts, and numerous ethnic and culture-specific sections, among others. ALCTS has six sections and twenty-six interest groups. One may examine ALA's co-membership network at a more micro-level using these sections as units of analysis. Or, we could expand the scope to a more macro level. ALA, though the largest, is not the only professional organization for librarians and LIS professionals. SNA may be used to examine the relationships among ALA and any or all of its many affiliates.

One of the caveats of this study is its strict definition of LIS as traditional "library science." While library science and information science may have been merged into one disciplinary category during the period spanning the 1960s through the 1980s, the author notes that there may actually be a divergence occurring within this category (see Note 2). This has become especially noticeable with the growth of information systems research and various discipline-specific informatics research programs as well as the comparative ratings of journals within the "Information Science and Library Science" category of *Journal Citation Reports*. The method outlined in this study may be used to examine the relationship between LIS as defined here and library and information science as defined by the iSchools or by organizations that emphasize information science research. If, as Barnett and Danowski (1992) suggest, membership in professional organizations is more indicative than the literature in defining the specializations within a discipline, then a network analytic comparison of the membership of the American Society for Information Science and Technology (ASIST) with that of the ALA would be in order. Different levels of analysis would be appropriate depending on the focus of the research, which could address such questions as, "where is there overlap in terms of co-membership?" "Are certain subgroups within ASIST more likely than others to be linked to certain subgroups within ALA?" "Have these relationships changed over time?"

All of the above areas for additional research may be part of addressing what the author considers to be one of the most important questions emanating from this research: "how does ALA's network structure, as well as its relationship with affiliate organizations, affect communication both within and beyond the discipline? Does the network facilitate or inhibit communication flow among the membership?" Finally, "what role, if any, does the structure of the network play in the diffusion of information and technology among the LIS community?"

The last question listed above is especially important considering the gap between LIS research and LIS practice discussed in Chapter 7. How is information and research disseminated throughout the profession and what roles might diffusion theory (Rogers, 1995), and Granovetter's (1973) "strength of weak ties" play in reducing or eliminating Haddow and Klobas' "knowledge gap" (2004, p.31) between research and practice?  Haythornthwaite (1996) was the first to call for the use of SNA in studying information exchange in LIS.  Perhaps the first area of study should be LIS itself with a focus on this research-practitioner gap.

# CHAPTER 8. Conclusion.

Defining ALA is defining LIS and understanding its structure and the relationships among its sub-disciplines and specializations is crucial to the continued growth and evolution of the profession. This dissertation describes the structure of LIS using SNA methods for the purpose of developing a blueprint for additional research on LIS itself as well as the communication and dissemination of information throughout the discipline. Examining the literature of this field is limiting due in large part to the nature of the literature itself. A network analysis of ALA, on the other hand, is far more enlightening since ALA is the largest professional organization in LIS and includes members from both practice and research-oriented positions in all types of libraries and information specializations. Following Barnett and Danowski (1992), this study succeeds in identifying the major components of the field and the dimensions of its underlying structure.

The first dimension is library-type and is characterized by a continuum with academic libraries at one pole, school libraries at the other, and public libraries falling in between the two. The academic sector is at the core of the LIS discipline while smaller specializations are at the periphery. Furthermore, those divisions/RTs focusing on specific kinds of LIS services may play the roles of boundary spanners and bridges, serving as potential conduits of information between the academic, public and SLMC sectors. A second dimension, a research-practice continuum, is an additional characteristic of ALA's and by extension, LIS's structure. This dimension is of special interest to those seeking to close the gap between research and practice extant in the LIS profession.

While SNA, as utilized in this study, does not explain the structure of LIS, it does describe it in a manner far more meaningful than an examination of the literature. As a result, this same structure invokes questions that prompt us to look at the profession at a micro-level in an attempt to explain the "how's" and "why's" of LIS. Where the profession has been, where it stands at present and where it is heading are the kinds of questions LIS researchers and practitioners are asking. It is the opinion of this author that the utilization of SNA methods is the most effective manner in which to address these questions.

NOTES

[1] This is the author's conclusion based on a perusal of LIS conference themes, scholarly and trade literature as well as the themes of national professional development opportunities published and archived during the period 1996-2008.

[2] For the sake of simplification, LIS is used in this paper to refer research and practice related to traditional library science. LIS in this context may include user studies (i.e. information seeking-behavior, usability testing, etc.) but the author is not including information systems or the "computer science-focused" information science and informatics fields. When Library science and information science were merged during the period from 1960 through the 1980s there was a growing need for convergence of these disciplines due in part to the increasing influence of automation and ICTs on libraries. While this convergence has culminated in the advances of informatics and the development of iSchools, it is unclear as to whether a true convergence has occurred. The complete supplanting of journals that focus on the heretofore traditional LIS field by informatics, communication and systems journals (see *Journal Citation Reports for Information and Library Science*, 2006-2009) suggests that while information and communication sciences may be converging, there is question as to whether library science is included. More research on the convergence / divergence of these areas is needed.

[3] In this paper, the terms "field," "discipline" and to some extent "profession" will be used synonymously.

[4] Such organizations include the Medical Library Association, Music Library Association, Special Libraries Association, American Association of Law Librarians, and the Association of Research Libraries, among others. A listing of ALA affiliate organizations may be found on the ALA website at http://ala.org/ala/mgrps/affiliates/affiliates/index.cfm (accessed August 26, 2010).

[5] Discussion of the specialization of journal and the lack of consensus within LIS as to what journals are most prestigious in the academic and professional sectors will continue in Chapter III. While there is an abundance of literature examining the quality of LIS literature, this topic is beyond the scope of this dissertation.

[6] Interestingly, the study of information flow is common throughout communication science yet nearly non-existent in LIS. Haythornthwaite (1996) proposed the use of network analytic methods to study information exchange in LIS yet those studies that do exist fall outside of LIS.

[7] This special issue of *Journal of Documentation* includes discussions of critical realism (Wikgren, 2005), constructivism, collectivism and constructionism (Talja, Tuominen & Savolainen, 2005), pragmatism, neo-pragmatism and sociocultural theory (Sundin & Johannisson, 2005), grounded theory (Seldén, 2005), hermeneutics (Hansson, 2005), structuralism and post-structuralism (Radford & Radford, 2005) and phenomenology (Budd, 2005) as applied to LIS.

[8] Since these databases index different journals both should be searched to ensure a results list that is as comprehensive as possible. While there is a great deal of overlap in the sources indexed evidence of the need for searching both is seen when one considers that *College & Research Libraries*, an LIS journal in which many library related bibliometrics studies are published is not indexed by *Web of Science.* Similarly, *Scientometrics*, arguably the most influential journal in the development of bibliometric methods, is not indexed by *Academic Search Complete*.

[9] The changes occurring at the time Melin made this observation was akin to the period of the 1990s and early 2000s, when ICTs, the electronic database and e-journals changes the ways in which information is disseminated. Just as new journal titles emerged when Melin made her observations, so the trend continues in 2010.

[10] Ennis's method was used by McCain (1993) to describe the structure of the American Society for Information Science. To date, however, no such method has been used to describe LIS.

[11] The author gratefully acknowledges the assistance of John Chrastka, Cathleen Bourdon and the late Gerald Hodges in compiling these data.

[12] The average link method is utilized here and defines distance as the average similarity between nodes. The single link and complete link methods identify distance between nodes respectively as the largest and smallest similarities.

[13] Since this is a symmetric undirected matrix, the choice of rows or columns is not important. In the case of directed matrices, one would select rows or columns dependent upon whether the object of measure was in-degree or out-degree.

[14] Faculty status is one of the most contentious issues in LIS. Debates include the definition of "faculty librarians" as compared to teaching and research faculty as well as the nature and rigor of LIS publications and research. This discussion, however, is beyond the scope of this dissertation.

[15] 28,941 individuals attended the most recent ALA annual conference, held in July 2009 in Chicago (ALA, 2010). In 2004, the annual meeting held in Orlando, Florida, attracted 19,731 participants (ALA, 2005).

[16] The fees for ALA, division and round table memberships are cited on 2004 ALA membership form held in the personal papers of the author. Information on fee structures may also be obtained by access ALA's website as captured by The Internet Archive on May 23, 2004. URL: http://web.archive.org/web/20040610141613/www.ala.org/Template.cfm?Section=Membership

# TABLES

Table 1.
ALA Divisions and Round Tables (RT), 2004.

ALA Divisions, 2004

| | |
|---|---|
| AASL | American Association of School Librarians |
| ALCTS | Assoc. for Library Collections & Technical Services |
| ALSC | Assoc. for Library Service to Children |
| ALTA | Assoc. for Library Trustees and Advocates |
| ACRL | Assoc. of College and Research Libraries |
| ASCLA | Assoc. of Specialized and Cooperative Library Agencies |
| LAMA | Library Administration and Management Association |
| LITA | Library and Information Technology Association |
| PLA | Public Library Association |
| RUSA | Reference and User Services Association |
| YALSA | Young Adult Library Services Association |

ALA Roundtables, 2004

| | |
|---|---|
| CLENE | Continuing Library Education Network & Exchange |
| EMIERT | Ethnic and Multicultural Information Exchange |
| ERT | Exhibits |
| FAFLRT | Federal & Armed Forces Libraries |
| GLBTRT | Gay, Lesbian, Bisexual, Transgendered |
| GODORT | Government Documents |
| IFRT | Intellectual Freedom |
| IRRT | International Relations |
| LHRT | Library History |
| LIRT | Library Instruction |
| LRRT | Library Research |
| LSSIRT | Library Support Staff Interest |
| MAGERT | Map and Geography |
| NMRT | New Members |
| SRRT | Social Responsibilities |
| SORT | Staff Organizations |
| VRT | Video Resources |

Table 2.
Affiliation matrix *N,* ALA members x Divisions & RTs, 2004.

| Unique ID | AASL | ACRL | ALCTS | ALSC | ALTA | ASCLA | LAMA | LITA | PLA | RUSA | YALSA | CLENE | EMIERT | ERT | FAFLRT | GLBTRT | GODORT | IFRT | IRRT | LHRT | LIRT | LRRT | LSSIRT | MAGERT | MNRT | SORT | SRRT | VRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00001 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 00002 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 00003 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 00004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| … | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45875 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36954 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36955 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36956 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

$$n_{ij} = \begin{cases} 1 \text{ if ALA member } i \text{ is a member of the division/RT} \\ 0 \text{ otherwise.} \end{cases}$$

Table 3.
Co-membership matrix *S* – Joint ALA Division and RT Affiliations, 2004.
Numbers on the diagonal are the total number of members in each division or RT.

| | AASL | ACRL | ALCTS | ALSC | ALTA | ASCLA | LAMA | LITA | PLA | RUSA | YALSA | CLENE | EMI-ERT | ERT | FAF-LRT | GLB-TRT | GOD-ORT | IFRT | IRRT | LHRT | LIRT | LRRT | LSS-IRT | MAG-ERT | NMRT | STORT | SRRT | VRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AASL | 8123 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ACRL | 388 | 11198 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALCTS | 324 | 2071 | 4235 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALSC | 836 | 255 | 321 | 3307 | | | | | | | | | | | | | | | | | | | | | | | | |
| ALTA | 139 | 148 | 180 | 183 | 1070 | | | | | | | | | | | | | | | | | | | | | | | |
| ASCLA | 193 | 267 | 244 | 195 | 156 | 771 | | | | | | | | | | | | | | | | | | | | | | |
| LAMA | 328 | 1968 | 993 | 441 | 267 | 313 | 4423 | | | | | | | | | | | | | | | | | | | | | |
| LITA | 420 | 1883 | 1346 | 330 | 201 | 277 | 1190 | 3784 | | | | | | | | | | | | | | | | | | | | |
| PLA | 328 | 439 | 563 | 1087 | 506 | 376 | 1815 | 688 | 9041 | | | | | | | | | | | | | | | | | | | |
| RUSA | 339 | 2360 | 1003 | 409 | 207 | 277 | 1074 | 1079 | 1071 | 4400 | | | | | | | | | | | | | | | | | | |
| YALSA | 1410 | 263 | 297 | 1099 | 171 | 189 | 402 | 326 | 915 | 412 | 3630 | | | | | | | | | | | | | | | | | |
| CLENE | 68 | 134 | 97 | 76 | 53 | 103 | 139 | 114 | 171 | 111 | 67 | 378 | | | | | | | | | | | | | | | | |
| EMIERT | 106 | 176 | 103 | 129 | 42 | 56 | 107 | 89 | 188 | 132 | 111 | 48 | 545 | | | | | | | | | | | | | | | |
| ERT | 62 | 107 | 69 | 60 | 37 | 45 | 83 | 84 | 109 | 63 | 57 | 33 | 27 | 366 | | | | | | | | | | | | | | |
| FAFLRT | 50 | 105 | 89 | 46 | 38 | 48 | 84 | 84 | 72 | 92 | 38 | 34 | 35 | 36 | 330 | | | | | | | | | | | | | |
| GLBTRT | 41 | 191 | 93 | 35 | 7 | 13 | 54 | 73 | 105 | 74 | 61 | 9 | 35 | 7 | 6 | 550 | | | | | | | | | | | | |
| GODORT | 104 | 530 | 276 | 93 | 72 | 105 | 233 | 252 | 143 | 364 | 87 | 51 | 52 | 38 | 74 | 26 | 906 | | | | | | | | | | | |
| IFRT | 236 | 431 | 215 | 238 | 92 | 92 | 355 | 248 | 522 | 320 | 261 | 64 | 98 | 40 | 37 | 74 | 107 | 1487 | | | | | | | | | | |
| IRRT | 74 | 395 | 184 | 78 | 41 | 68 | 150 | 174 | 161 | 173 | 65 | 47 | 89 | 37 | 49 | 12 | 78 | 107 | 761 | | | | | | | | | |
| LHRT | 54 | 240 | 107 | 57 | 32 | 36 | 83 | 76 | 96 | 116 | 56 | 36 | 40 | 30 | 34 | 16 | 54 | 92 | 65 | 418 | | | | | | | | |
| LIRT | 201 | 974 | 190 | 92 | 48 | 70 | 259 | 276 | 126 | 497 | 118 | 88 | 76 | 33 | 45 | 26 | 127 | 117 | 75 | 66 | 1284 | | | | | | | |
| LRRT | 124 | 404 | 158 | 86 | 38 | 57 | 181 | 175 | 125 | 223 | 89 | 52 | 67 | 37 | 42 | 20 | 75 | 126 | 79 | 103 | 153 | 776 | | | | | | |
| LSSIRT | 12 | 54 | 112 | 17 | 11 | 10 | 55 | 34 | 51 | 102 | 20 | 27 | 7 | 3 | 2 | 4 | 17 | 21 | 4 | 3 | 24 | 12 | 341 | | | | | |
| MAGERT | 52 | 217 | 131 | 46 | 35 | 46 | 80 | 106 | 61 | 114 | 42 | 35 | 39 | 26 | 38 | 6 | 126 | 43 | 45 | 36 | 55 | 40 | 2 | 352 | | | | |
| NMRT | 137 | 434 | 155 | 109 | 36 | 50 | 111 | 133 | 239 | 218 | 148 | 48 | 61 | 38 | 41 | 44 | 65 | 118 | 59 | 60 | 123 | 97 | 18 | 38 | 1171 | | | |
| STORT | 63 | 103 | 82 | 62 | 48 | 48 | 102 | 81 | 113 | 97 | 56 | 41 | 39 | 32 | 40 | 6 | 58 | 58 | 45 | 41 | 58 | 53 | 27 | 32 | 33 | 265 | | |
| SRRT | 173 | 415 | 197 | 191 | 63 | 78 | 188 | 170 | 323 | 263 | 186 | 58 | 142 | 33 | 45 | 130 | 76 | 332 | 102 | 76 | 100 | 235 | 23 | 38 | 159 | 60 | 1293 | |
| VRT | 20 | 91 | 38 | 14 | 11 | 9 | 30 | 42 | 71 | 35 | 20 | 11 | 11 | 14 | 6 | 9 | 10 | 25 | 12 | 6 | 15 | 12 | 8 | 8 | 13 | 5 | 23 | 243 |

Table 4.
Normalized centrality measures – 2004 ALA Divisions/RTs.
(173 co-memberships are required for a link)

| | Between | Degree | Eigenvector | Flow Between |
|---|---|---|---|---|
| AASL | 0.390 | 8.123 | 23.263 | 1.751 |
| ACRL | **22.617** | **22.444** | **66.266** | **28.354** |
| ALCTS | 2.270 | 13.189 | 48.363 | 3.417 |
| ALSC | 0.533 | 8.765 | 25.467 | 1.985 |
| ALTA | 0.000 | 2.423 | 9.007 | 0.194 |
| ASCLA | 0.000 | 3.658 | 13.484 | 0.349 |
| LAMA | 2.090 | 15.705 | 54.351 | 3.666 |
| LITA | 2.672 | 13.912 | 49.679 | 3.991 |
| PLA | 3.382 | 14.218 | 42.241 | 7.352 |
| RUSA | 4.583 | 16.147 | 54.019 | 6.079 |
| YALSA | 0.096 | 9.040 | 25.680 | 1.748 |
| CLENE | 0.000 | 0.000 | 0.000 | 0.000 |
| EMIERT | 0.000 | 0.571 | 2.507 | 0.017 |
| ERT | 0.000 | 0.000 | 0.000 | 0.000 |
| FAFLRT | 0.000 | 0.000 | 0.000 | 0.000 |
| GLBTRT | 0.000 | 0.300 | 1.619 | 0.000 |
| GODORT | 0.000 | 2.597 | 11.935 | 0.103 |
| IFRT | 0.028 | 4.956 | 16.915 | 0.803 |
| IRRT | 0.000 | 1.453 | 6.787 | 0.058 |
| LHRT | 0.000 | 0.377 | 2.034 | 0.000 |
| LIRT | 0.000 | 3.762 | 17.016 | 0.185 |
| LRRT | 0.028 | 1.911 | 7.705 | 0.329 |
| LSSIRT | 0.000 | 0.000 | 0.000 | 0.000 |
| MAGERT | 0.000 | 0.341 | 1.839 | 0.000 |
| NMRT | 0.000 | 1.398 | 6.476 | 0.030 |
| STORT | 0.000 | 0.000 | 0.000 | 0.000 |
| SRRT | 0.342 | 3.928 | 12.303 | 1.325 |
| VRT | 0.000 | 0.000 | 0.000 | 0.000 |

Table 5.
Correlations among division/RT size and centrality measures.

| CENTRALITY MEASURE | Node Size | Division/RT | Between-ness | Degree | Eigen-vector |
|---|---|---|---|---|---|
| Division/RT | .725** | | | | |
| Betweenness | .729** | .400* | | | |
| Degree | .876** | .806** | .713** | | |
| Eigenvec | .825** | .792** | .666** | .991** | |
| FlowBetw | .798** | .470* | .992** | .771** | .719** |

***. Correlation is significant at the 0.01 level*

**. Correlation is significant at the 0.05 level*

Table 6.
CONCOR partitions.

| Block | Members: |
|---|---|
| 1 | AASL, ALSC, YALSA |
| 2 | ALTA, ASCLA, PLA, IFRT, SRRT |
| 3 | ACRL, ALCTS, LAMA, LITA, RUSA, GODORT, IRRT, LIRT LRRT |
| 4 | EMIERT, GLBTRT, LHRT, MAGERT, NMRT |
| 5 | CLENE, ERT, FAFLRT, LSSIRT, STORT, VRT |

Table 7.
CONCOR partition densities (beween- and within-group).

| Block | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 | 1115.000 | | | | |
| 2 | 312.333 | 254.000 | | | |
| 3 | 239.481 | 261.844 | 600.611 | | |
| 4 | 78.933 | 80.480 | 103.978 | 37.500 | |
| 5 | 44.889 | 51.167 | 63.444 | 23.000 | 21.267 |

Table 8.
CONCOR Partitions with 2004 ALA Divisions/RT correlation coefficients.

| | AASL | YALSA | ALSC | ASCLA | PLA | IFRT | SRRT | ALTA | ALCTS | LAMA | LITA | ACRL | RUSA | LIRT | IRRT | GOD-ORT | LRRT | GLB-TRT | NMRT | LHRT | MAG-ERT | EMI-ERT | CLENE | LSS-IRT | FAF-LRT | STO-RT | ERT | VRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AASL | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| YALSA | **0.88** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALSC | **0.81** | **0.93** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ASCLA | 0.52 | 0.62 | 0.73 | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLA | 0.62 | 0.48 | 0.61 | **0.82** | | | | | | | | | | | | | | | | | | | | | | | | |
| IFRT | 0.51 | 0.60 | 0.72 | **0.87** | **0.72** | | | | | | | | | | | | | | | | | | | | | | | |
| SRRT | 0.42 | 0.45 | 0.52 | **0.67** | **0.48** | **0.90** | | | | | | | | | | | | | | | | | | | | | | |
| ALTA | 0.47 | 0.64 | 0.79 | **0.92** | **0.90** | **0.84** | **0.60** | | | | | | | | | | | | | | | | | | | | | |
| ALCTS | 0.31 | 0.25 | 0.30 | 0.74 | 0.51 | 0.71 | 0.67 | 0.51 | | | | | | | | | | | | | | | | | | | | |
| LAMA | 0.35 | 0.41 | 0.53 | 0.90 | 0.56 | 0.86 | 0.77 | 0.80 | **0.88** | | | | | | | | | | | | | | | | | | | |
| LITA | 0.31 | 0.31 | 0.37 | 0.80 | 0.57 | 0.73 | 0.70 | 0.58 | **0.99** | **0.89** | | | | | | | | | | | | | | | | | | |
| ACRL | 0.20 | 0.17 | 0.23 | 0.67 | 0.64 | 0.52 | 0.45 | 0.46 | **0.91** | **0.65** | **0.92** | | | | | | | | | | | | | | | | | |
| RUSA | 0.33 | 0.29 | 0.38 | 0.78 | 0.46 | 0.78 | 0.75 | 0.60 | **0.96** | **0.94** | **0.96** | **0.85** | | | | | | | | | | | | | | | | |
| LIRT | 0.23 | 0.19 | 0.21 | 0.57 | 0.35 | 0.63 | 0.71 | 0.32 | **0.92** | **0.76** | **0.86** | **0.87** | **0.91** | | | | | | | | | | | | | | | |
| IRRT | 0.27 | 0.24 | 0.30 | 0.71 | 0.40 | 0.76 | 0.79 | 0.52 | **0.93** | **0.89** | **0.92** | **0.83** | **0.96** | **0.92** | | | | | | | | | | | | | | |
| GODORT | 0.27 | 0.21 | 0.26 | 0.71 | 0.48 | 0.67 | 0.69 | 0.47 | **0.95** | **0.84** | **0.95** | **0.94** | **0.96** | **0.93** | **0.94** | | | | | | | | | | | | | |
| LRRT | 0.27 | 0.25 | 0.28 | 0.61 | 0.41 | 0.77 | 0.80 | 0.40 | **0.84** | **0.74** | **0.82** | **0.75** | **0.86** | **0.92** | **0.92** | **0.87** | | | | | | | | | | | | |
| GLBTRT | 0.36 | 0.29 | 0.43 | 0.63 | 0.36 | 0.85 | 0.89 | 0.51 | 0.75 | 0.80 | 0.76 | 0.52 | 0.83 | 0.76 | 0.88 | 0.75 | 0.90 | | | | | | | | | | | |
| NMRT | 0.41 | 0.39 | 0.49 | 0.70 | 0.37 | 0.86 | 0.87 | 0.57 | 0.83 | 0.88 | 0.83 | 0.60 | 0.90 | 0.92 | 0.92 | 0.85 | 0.91 | **0.92** | | | | | | | | | | |
| LHRT | 0.27 | 0.21 | 0.27 | 0.60 | 0.33 | 0.73 | 0.86 | 0.42 | 0.82 | 0.79 | 0.84 | 0.69 | 0.88 | 0.95 | 0.95 | 0.88 | 0.93 | **0.85** | **0.93** | | | | | | | | | |
| MAGERT | 0.23 | 0.17 | 0.20 | 0.64 | 0.34 | 0.59 | 0.61 | 0.40 | 0.88 | 0.77 | 0.88 | 0.81 | 0.88 | 0.91 | 0.91 | 0.98 | 0.81 | **0.72** | **0.79** | **0.85** | | | | | | | | |
| EMIERT | 0.53 | 0.61 | 0.68 | 0.79 | 0.60 | 0.96 | 0.88 | 0.75 | 0.63 | 0.79 | 0.69 | 0.45 | 0.73 | 0.62 | 0.76 | 0.65 | 0.78 | **0.85** | **0.87** | **0.77** | **0.59** | | | | | | | |
| CLENE | 0.39 | 0.49 | 0.60 | 0.93 | 0.72 | 0.86 | 0.69 | 0.89 | 0.73 | 0.90 | 0.77 | 0.64 | 0.81 | 0.60 | 0.76 | 0.72 | 0.68 | 0.66 | 0.73 | 0.67 | 0.65 | 0.80 | | | | | | |
| LSSIRT | 0.24 | 0.22 | 0.33 | 0.71 | 0.54 | 0.60 | 0.54 | 0.56 | 0.69 | 0.69 | 0.81 | 0.84 | 0.69 | 0.65 | 0.65 | 0.74 | 0.60 | 0.58 | 0.59 | 0.60 | 0.66 | 0.56 | **0.66** | | | | | |
| FAFLRT | 0.28 | 0.32 | 0.37 | 0.81 | 0.54 | 0.72 | 0.62 | 0.63 | 0.83 | 0.81 | 0.87 | 0.82 | 0.84 | 0.74 | 0.85 | 0.89 | 0.77 | 0.67 | 0.73 | 0.79 | 0.90 | 0.70 | **0.82** | **0.76** | | | | |
| STORT | 0.40 | 0.50 | 0.59 | 0.92 | 0.71 | 0.89 | 0.74 | 0.82 | 0.76 | 0.88 | 0.81 | 0.71 | 0.82 | 0.81 | 0.81 | 0.78 | 0.76 | 0.73 | 0.79 | 0.76 | 0.74 | 0.85 | **0.94** | **0.73** | **0.90** | | | |
| ERT | 0.48 | 0.57 | 0.67 | 0.94 | 0.67 | 0.88 | 0.74 | 0.85 | 0.80 | 0.92 | 0.82 | 0.59 | 0.86 | 0.67 | 0.82 | 0.76 | 0.70 | 0.72 | 0.80 | 0.74 | 0.73 | 0.83 | **0.92** | **0.61** | **0.85** | **0.92** | | |
| VRT | 0.29 | 0.35 | 0.49 | 0.78 | 0.38 | 0.85 | 0.81 | 0.69 | 0.85 | 0.96 | 0.84 | 0.57 | 0.93 | 0.91 | 0.91 | 0.81 | 0.80 | 0.88 | 0.93 | 0.85 | 0.75 | 0.81 | **0.80** | **0.60** | **0.74** | **0.81** | **0.87** | |

Table 9.
Eigenvalues:
2004 ALA Divsions/RTs.

| Factor | Total | % of Variance | Cumulative % |
|---|---|---|---|
| 1 | 5.703 | 20.368 | 20.368 |
| 2 | 2.598 | 9.279 | 29.647 |
| 3 | 1.813 | 6.474 | 36.120 |
| 4 | 1.445 | 5.160 | 41.280 |
| 5 | 1.302 | 4.652 | 45.932 |
| 6 | 1.162 | 4.151 | 50.083 |
| 7 | 1.056 | 3.773 | 53.855 |
| 8 | .974 | 3.479 | 57.334 |
| 9 | .948 | 3.385 | 60.719 |
| 10 | .916 | 3.273 | 63.992 |
| 11 | .896 | 3.200 | 67.192 |
| 12 | .854 | 3.050 | 70.243 |
| 13 | .820 | 2.927 | 73.170 |
| 14 | .779 | 2.780 | 75.950 |
| 15 | .756 | 2.701 | 78.651 |
| 16 | .734 | 2.623 | 81.274 |
| 17 | .690 | 2.466 | 83.740 |
| 18 | .647 | 2.312 | 86.052 |
| 19 | .561 | 2.003 | 88.054 |
| 20 | .551 | 1.967 | 90.022 |
| 21 | .514 | 1.836 | 91.858 |
| 22 | .470 | 1.680 | 93.538 |
| 23 | .411 | 1.467 | 95.005 |
| 24 | .404 | 1.443 | 96.448 |
| 25 | .379 | 1.355 | 97.803 |
| 26 | .347 | 1.240 | 99.043 |
| 27 | .268 | .957 | 100.000 |
| 28 | .000 | .000 | 100.000 |

Table 10.
Rotated factor matrix for the first four factors:
2004 ALA Divsions/RTs.

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| AASL | .021 | -.103 | .058 | .778 |
| ACRL | .697 | .086 | .518 | -.036 |
| ALCTS | .684 | .228 | .146 | .021 |
| ALSC | -.042 | .312 | -.056 | .676 |
| ALTA | .049 | .605 | -.214 | .079 |
| ASCLA | .323 | .610 | -.054 | .212 |
| LAMA | .431 | .625 | .190 | .012 |
| LITA | .657 | .334 | .183 | .055 |
| PLA | -.069 | .770 | -.026 | .093 |
| RUSA | .590 | .334 | .347 | .054 |
| YALSA | -.038 | .162 | -.019 | .829 |
| CLENE | .102 | .548 | .181 | -.014 |
| EMIERT | .080 | .134 | .104 | .125 |
| ERT | .054 | .283 | .168 | .066 |
| FAFLRT | .429 | .098 | -.076 | -.098 |
| GLBTRT | .201 | -.182 | -.136 | -.027 |
| GODORT | .728 | .046 | .094 | -.026 |
| IFRT | .007 | .298 | .257 | .088 |
| IRRT | .361 | .094 | .280 | -.120 |
| LHRT | .180 | .029 | .601 | -.079 |
| LIRT | .452 | .008 | .560 | .041 |
| LRRT | .149 | .015 | .686 | -.032 |
| LSSIRT | .083 | .115 | -.015 | -.075 |
| MAGERT | .704 | -.062 | .053 | -.023 |
| NMRT | .055 | -.016 | .431 | .093 |
| STORT | .166 | .430 | .238 | .010 |
| SRRT | -.029 | .058 | .352 | .009 |
| VRT | .073 | .098 | .081 | -.065 |

Table 11.
Breakdown of 2004 ALA membership by organization type affiliation.

| Org. Type Affiliation | ALA members | | ALA Memb. with 1 or more Div/RT membership | |
|---|---|---|---|---|
| | Count | % of total memb. | Count | % of study size |
| Academic Library/LIS Program | 21126 | 35.53 | 13762 | 37.24 |
| Public Library | 15369 | 25.85 | 9990 | 27.03 |
| School/SLMC | 7796 | 13.11 | 5533 | 14.97 |
| Special Library | 4539 | 7.63 | 2595 | 7.02 |
| Other | 1799 | 3.03 | 566 | 1.53 |
| No Affiliation Given | 4512 | 7.59 | 3101 | 8.39 |
| Publisher-Suppl.-Service Prov. | 857 | 1.44 | 580 | 1.57 |
| Retired-Unemployed | 3464 | 5.83 | 829 | 2.24 |
| TOTAL | 59462 | | 36956 | |

Table 12.
2004 ALA Division & RT membership counts.

| Division | No. of members | Round Tables | No. of members |
|---|---|---|---|
| AASL | 8123 | CLENE | 378 |
| ACRL | 11198 | EMIERT | 545 |
| ALCTS | 4235 | ERT | 366 |
| ALSC | 3307 | FAFLRT | 330 |
| ALTA | 1070 | GLBTRT | 550 |
| ASCLA | 771 | GODORT | 906 |
| LAMA | 4423 | IFRT | 1487 |
| LITA | 3784 | IRRT | 761 |
| PLA | 9041 | LHRT | 418 |
| RUSA | 4400 | LIRT | 1284 |
| YALSA | 3630 | LRRT | 776 |
| | | LSSIRT | 341 |
| | | MAGERT | 352 |
| | | NMRT | 1171 |
| | | STORT | 265 |
| | | SRRT | 1293 |
| | | VTRT | 243 |

Table 13.
Breakdown of 2004 ALA division/RT membership by organization type affiliation.

| | Academic Library/LIS Program | Public Library | School/ SLMC | Special Library | No Affiliatior Given | Other | Publ. & Suppl. Services | Retired-Unemp. |
|---|---|---|---|---|---|---|---|---|
| AASL | 1358 | 225 | 5049 | 157 | 890 | 113 | 68 | 263 |
| ACRL | 8679 | 319 | 75 | 699 | 806 | 293 | 146 | 181 |
| ALCTS | 2575 | 568 | 45 | 427 | 244 | 152 | 159 | 65 |
| ALSC | 676 | 1573 | 380 | 109 | 281 | 81 | 76 | 131 |
| ALTA | 65 | 834 | 6 | 60 | 39 | 31 | 12 | 23 |
| ASCLA | 175 | 221 | 8 | 225 | 22 | 73 | 31 | 16 |
| LAMA | 1914 | 1663 | 56 | 330 | 198 | 172 | 53 | 37 |
| LITA | 2072 | 616 | 132 | 392 | 217 | 204 | 114 | 37 |
| PLA | 847 | 6810 | 44 | 303 | 533 | 264 | 107 | 133 |
| RUSA | 2434 | 1126 | 44 | 303 | 271 | 95 | 67 | 60 |
| YALSA | 828 | 1182 | 985 | 89 | 368 | 61 | 66 | 51 |
| CLENE | 127 | 114 | 7 | 55 | 31 | 23 | 13 | 8 |
| EMIERT | 217 | 170 | 36 | 31 | 40 | 20 | 5 | 26 |
| ERT | 50 | 23 | 1 | 34 | 31 | 92 | 132 | 3 |
| FAFLRT | 73 | 12 | 3 | 180 | 22 | 17 | 6 | 17 |
| GLBTRT | 266 | 140 | 27 | 32 | 48 | 15 | 13 | 9 |
| GODORT | 559 | 89 | 3 | 117 | 49 | 55 | 11 | 23 |
| IFRT | 555 | 501 | 112 | 76 | 120 | 47 | 19 | 57 |
| IRRT | 402 | 118 | 18 | 88 | 56 | 38 | 14 | 27 |
| LHRT | 251 | 53 | 6 | 35 | 40 | 18 | 3 | 12 |
| LIRT | 924 | 91 | 91 | 45 | 101 | 15 | 6 | 11 |
| LRRT | 549 | 42 | 23 | 38 | 86 | 22 | 7 | 9 |
| LSSIRT | 142 | 89 | 9 | 28 | 60 | 7 | 3 | 3 |
| MAGERT | 244 | 29 | 2 | 35 | 18 | 7 | 6 | 11 |
| NMRT | 724 | 126 | 48 | 47 | 182 | 26 | 11 | 7 |
| SRRT | 693 | 248 | 48 | 59 | 151 | 24 | 19 | 39 |
| STORT | 109 | 97 | 19 | 18 | 13 | 17 | 2 | 2 |
| VRT | 105 | 79 | 10 | 13 | 15 | 12 | 7 | 2 |

Table 14.
Eleven gaps between LIS practice and research as defined by Haddow & Klobas (2004, p.31).

| | |
|---|---|
| Knowledge gap: | Both researchers and practitioners would be more informed if there were more effective communication between them. |
| Culture gap: | Researchers and practitioners fail to understand each other, respect different types of work, gain new knowledge from different processes, and communicate only within their own peer group. |
| Motivation gap: | Practitioners are not interested in research. |
| Relevance gap: | Researchers and practitioners value investigation of different types of problem. |
| Immediacy gap: | Practitioners' problems need solutions more quickly than academic research problems. |
| Publication gap: | There is relatively little research publication in the field, and little of it is written by practitioners. |
| Reading gap: | Researchers and practitioners do not read each others' literature. |
| Terminology gap: | Each group uses terminology that is not understood by the other. This is particularly true of researchers. |
| Activity gap: | Few practitioners conduct research. |
| Education gap: | Practitioners do not have the knowledge and skill to conduct research. |
| Temporal gap: | Practitioners do not have time to read or do research. |

# FIGURES

Figure 1. NETDRAW's network structure of ALA Divisions and Round Tables, 2004.

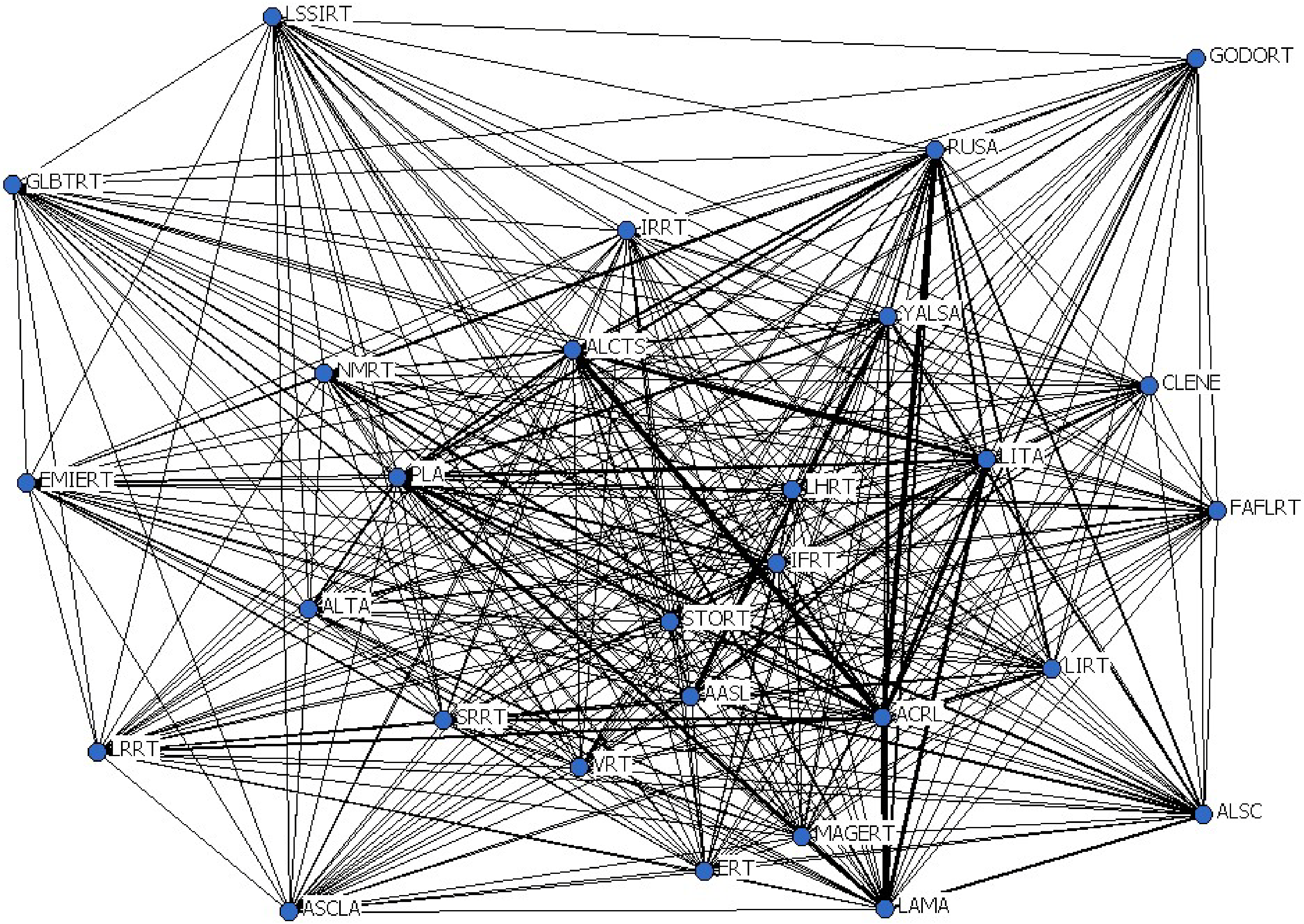


Figure 2. NETDRAW's network structure of 2004 ALA Division/RT affiliations. (173 joint memberships are required for a link.)

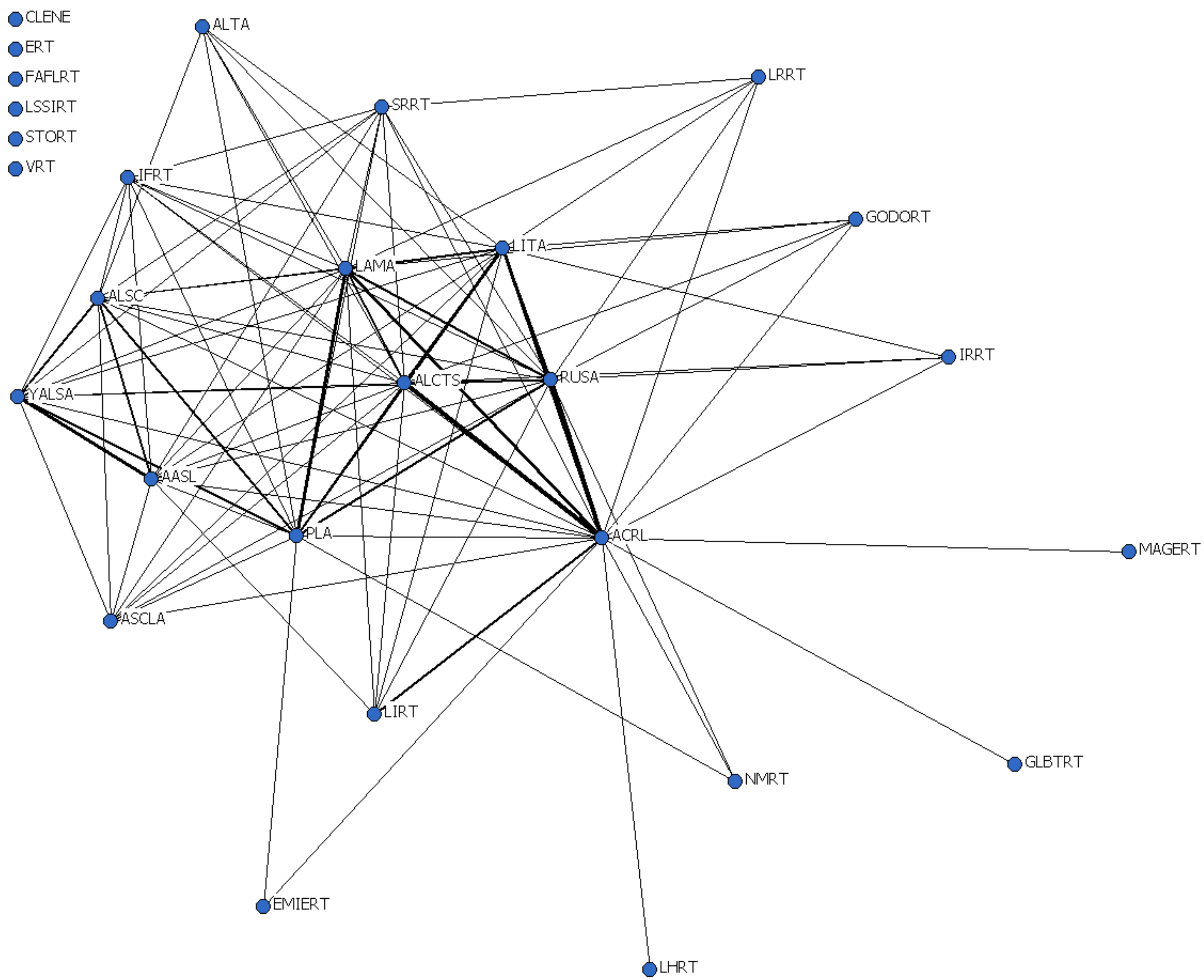


Figure 3. CONCOR partitions of 2004 ALA Divisions/RTs on a 2-dimensional scatterplot.
Dashed arrow shows *non-academic-academic* continuum of library types.
Solid arrow shows *research—practice* continuum.

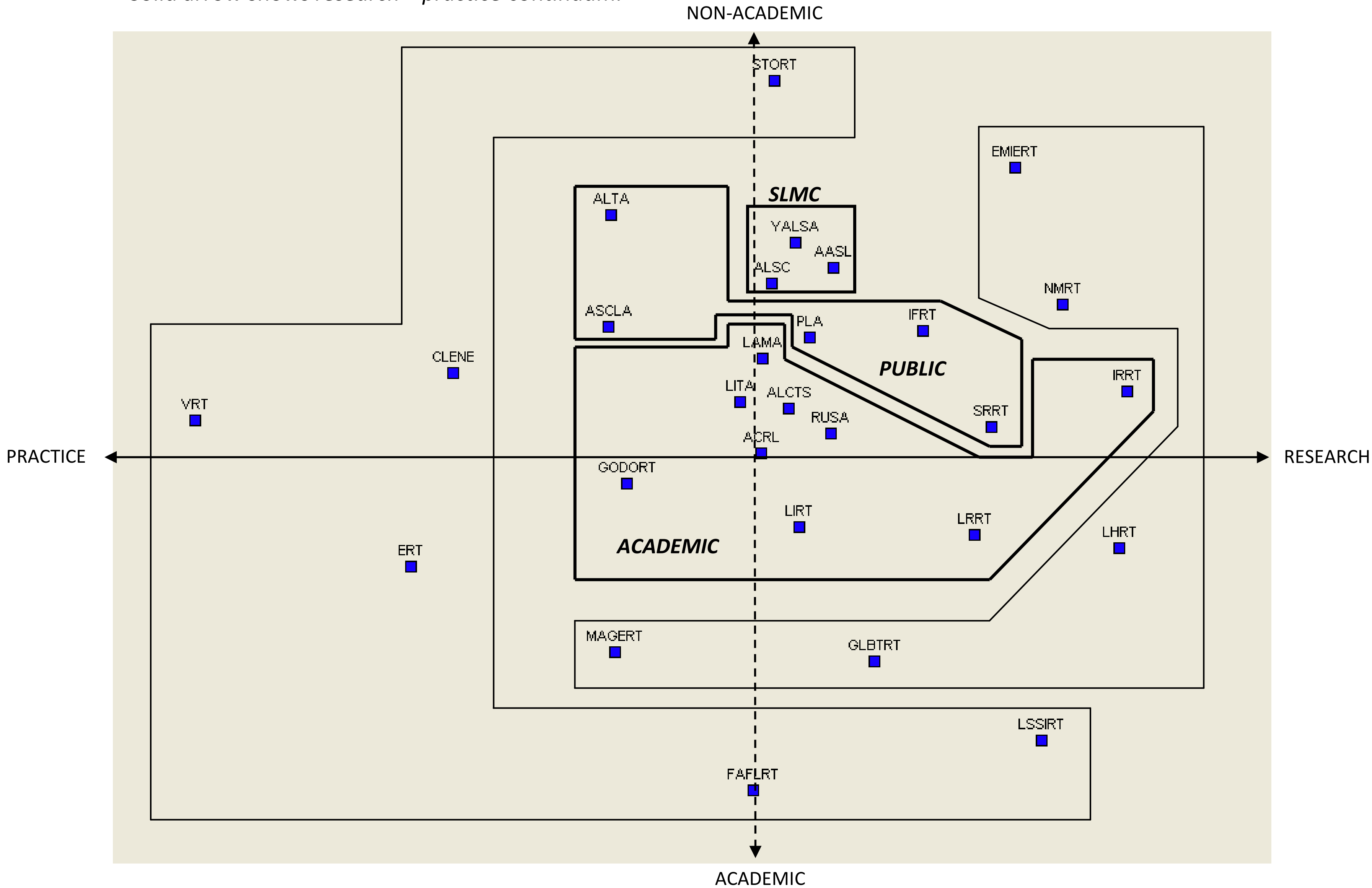


Figure 4. CONCOR partitions of 2004 ALA Divisions/RTs on the MDS NETDRAW map from Figure 2.
Dashed arrow shows *non-academic-academic* continuum of library types.
Solid arrow shows *research—practice* continuum.

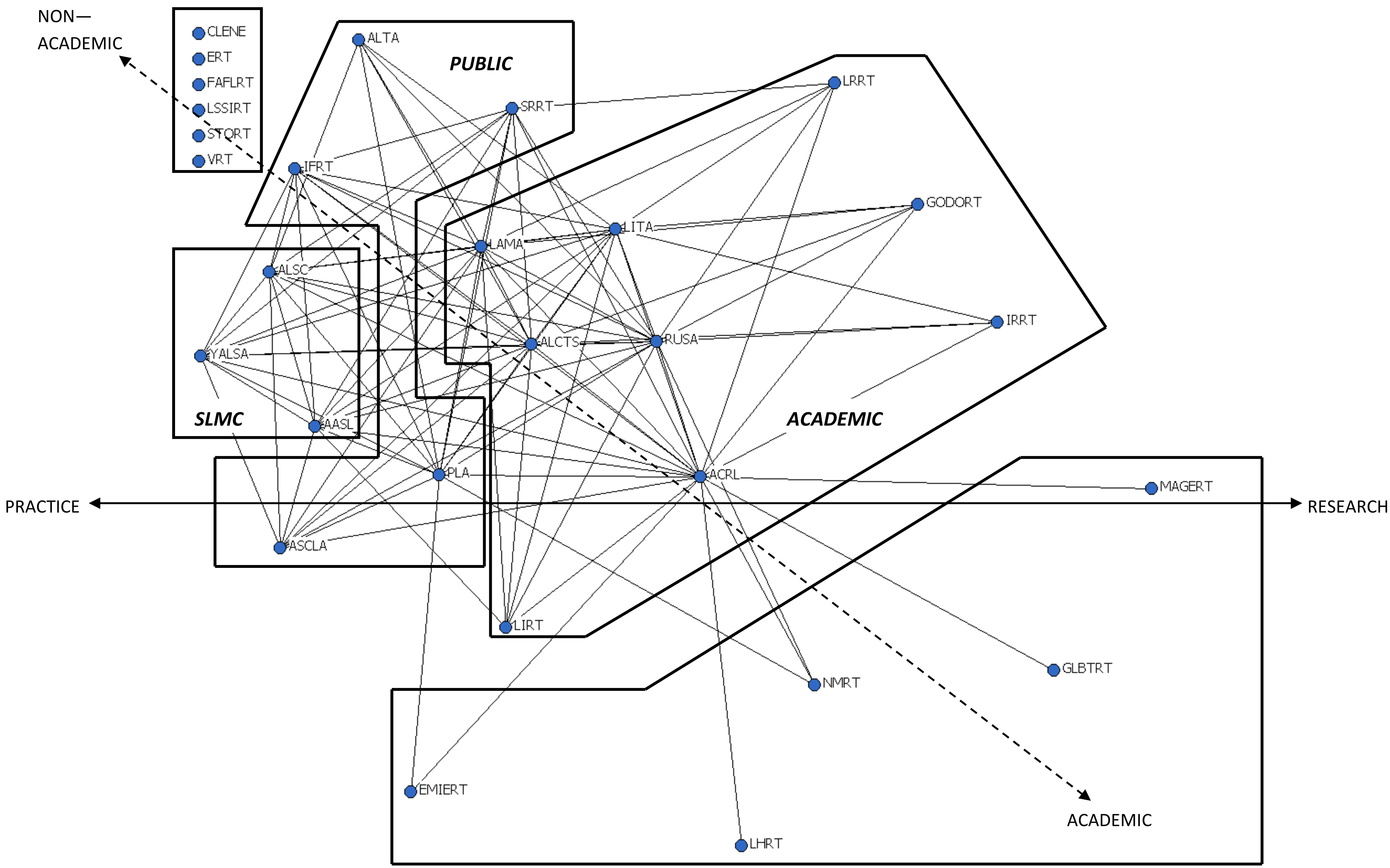


Figure 5. Dendrogram – Johnson's Hierarchical cluster analysis of 2004 ALA divisions/RTs network using weighted average method. (ALS = Average link strength)

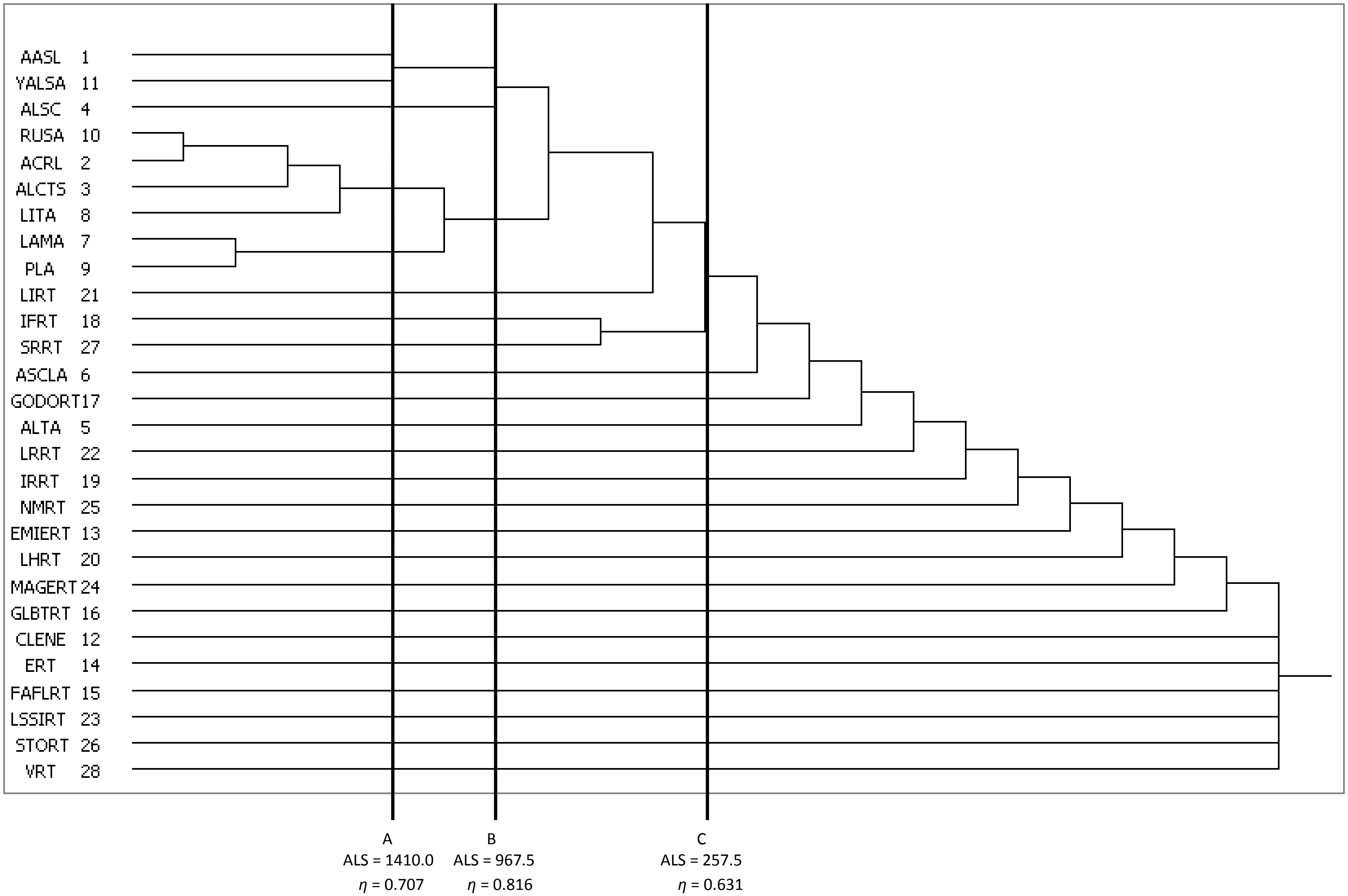


Figure 6. Johnson's hierarchical clusters of 2004 ALA Divisions/RTs on a 2-dimensional scatterplot.

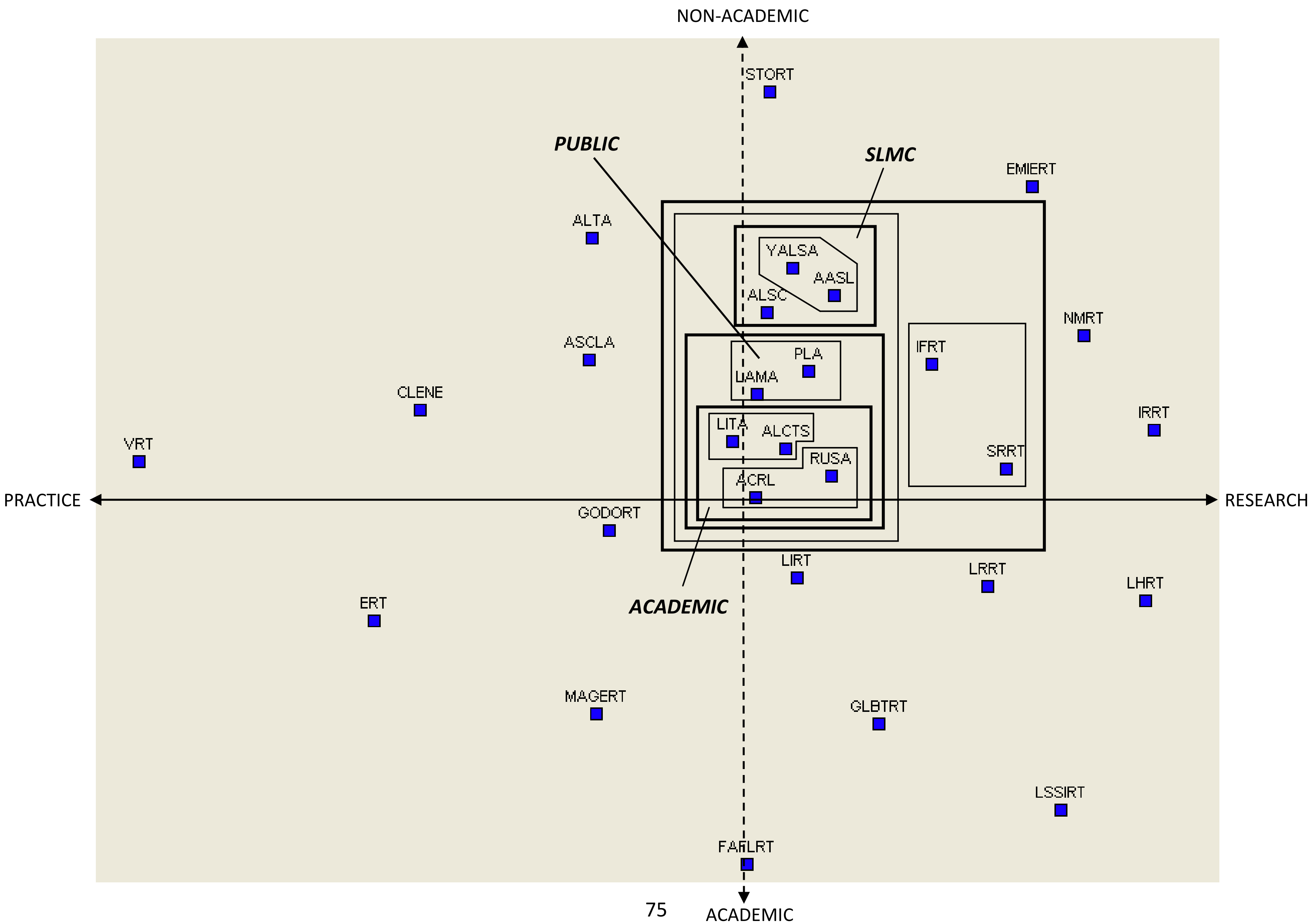


Figure 7. Johnson's hierarchical clusters of 2004 ALA Divisions/RTs on NETDRAW's MDS map.
Dashed arrow shows *non-academic-academic* continuum of library types. Solid arrow shows *research—practice* continuum.

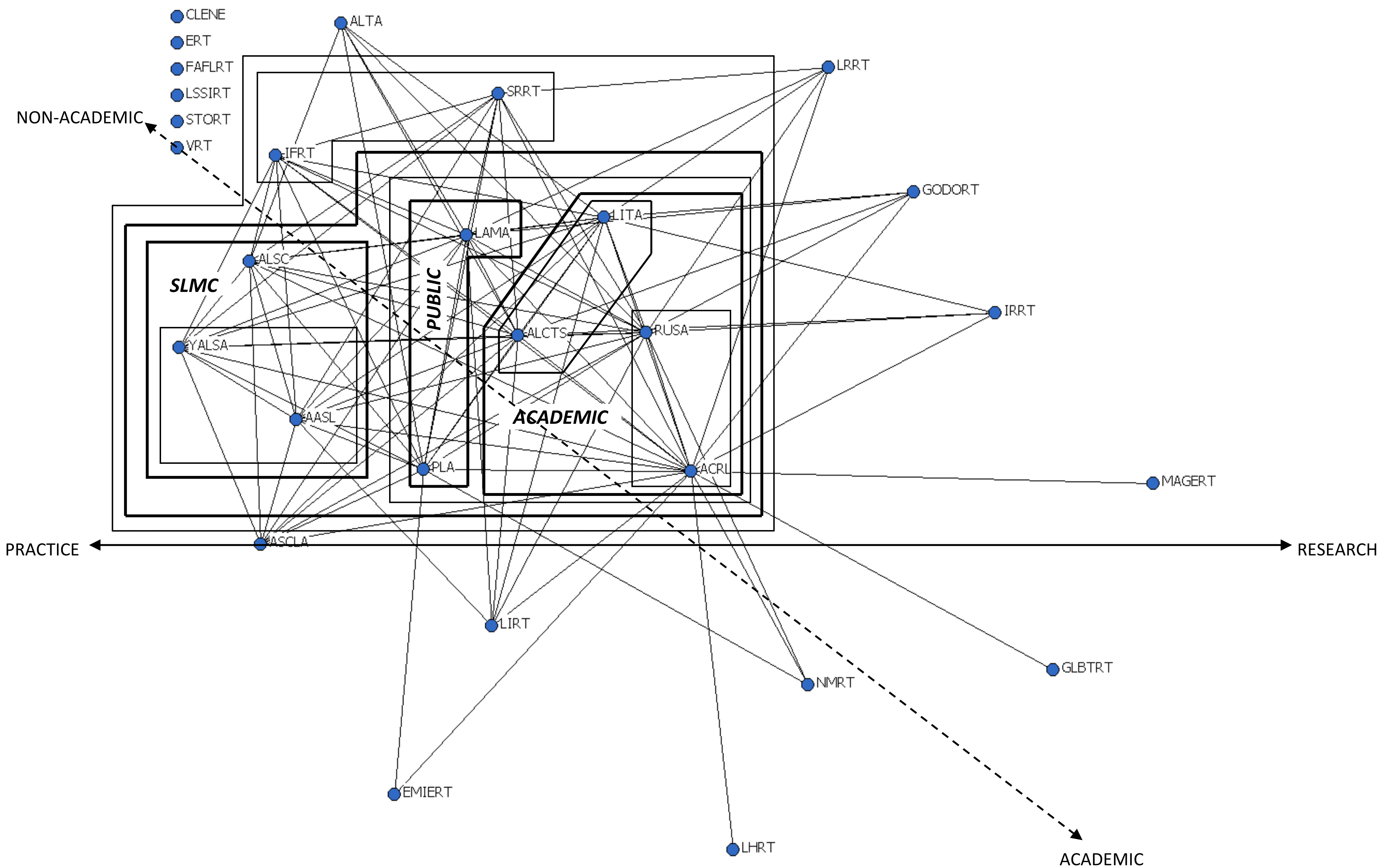
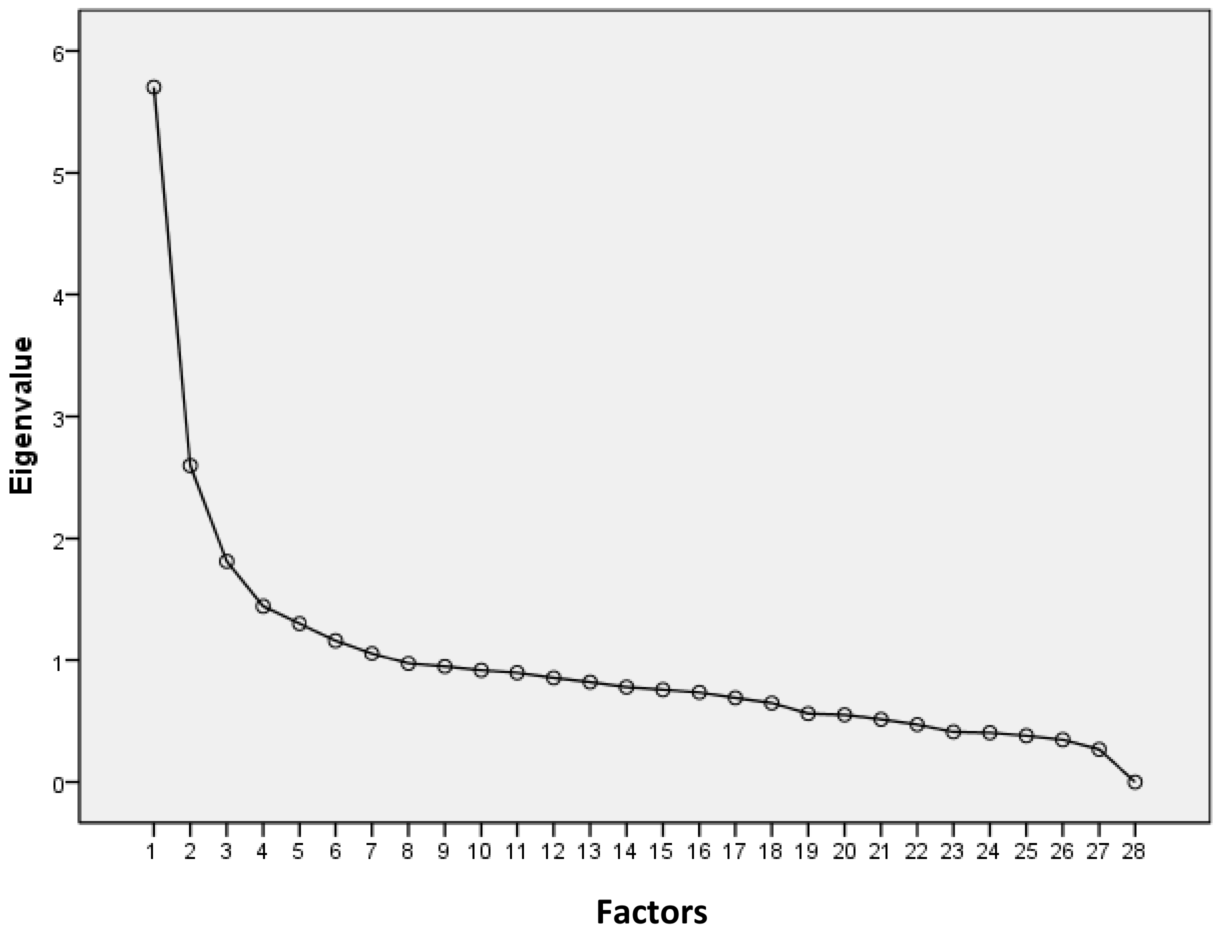


Figure 8. Scree Test – Factors & Eigenvalues of resulting from 2004 ALA Division/RT factor analysis.



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