CHAPTER – III

REVIEW OF LITERATURE ON E-JOURNAL USAGE AND USER STUDIES
3.0 Introduction

The literature search is a key starting point for any research process assisting the researcher to identify previous and present research projects, and provides valuable knowledge for the understanding of the theoretical and methodological issues surrounding the research topic. Therefore, the investigator has conducted a detailed search for literature and browsed databases such as Library & Information Science Abstracts (LISA), Library, Information Science & Technology Abstracts (LISTA), Electronic Management Research Library Database (EMERALD), Academic Search Premier, Business Source Premier, ScienceDirect, Wiley InterScience, Vidyanidhi and Internet.

User and usage studies of e-journals appeared in the literature in the late 1990s, when a large number of e-journals had become widely available. Since there is vast published literature on e-journal usage studies, it is not the intention of this chapter to provide a very comprehensive review of all the articles dealing with various aspects of e-journals. However, an attempt is made here to highlight some of literature about e-journal usage and related issues.

Although, in this thesis, the term ‘use’ refers to browse, search, download, print, as well as read e-journals, in order to have a clear picture, the literature about reading of e-journals has been mentioned separately. Furthermore, the review is presented according to the place of publication, viz., Asia, Africa, Europe, Australia and America. Under each geographical division, articles are presented chronologically.

3.1 Studies on E-Journal Usage and User Studies: Asian Scene

Asia comprises many countries such as Iran, Pakistan, Iraq, India, Malaysia etc. Here, studies on e-journal usage and user studies in these countries are presented. The presentation is divided into two main parts, viz., Iranian situation and scene at other Asian countries.
3.1.1 Iranian Situation

As far as Iran is concerned, not a large number of studies in this area have been reported. These studies are presented into two parts, viz., studies on awareness, attitudes and use of e-journals; and studies on comparison of print and e-journal usage.

3.1.1.1 Awareness, Attitudes and Use of E-Journals

Hayati and Sotudeh (2002) found that the relationship between usage and some factors such as age, academic rank, familiarity with computer and training how to use the e-resources. Individual factors of not using e-resources included non-familiarity of non-users and a need to more training for users and also lack of time in both groups. Lack of easy access, cost, technical and facilities limitation were factors relevant to the information system.

Shahbazi (2004) investigated the level of using e-journals from the standpoint of scientific community. The author showed that 62.5% of users preferred e-journals to print journals. Moreover, 85.9% of users were familiar with e-journals (as cited in Asnafi, 2007)

Sotudeh (2004) studied the level of access to Elsevier e-journals at the University of Tehran. The results showed that there was a relationship between users' requests and successful downloads. Moreover, regarding the number of requests, the number of downloads was predictable. Generally, in any given hour of 24 hours, only half of requests were loaded successfully. Furthermore, the author said that as requests increased, access decreased and e-journal users did not have access to all of their requests.

Abdollahi (2005) studied attitudes of faculty members of Shahid Chamran University of Ahvaz toward the importance and use of existing scientific journals, and replacement of print journals with electronic forms. The results showed that 40% of faculty members perceived high role of scientific print and e-journals in promoting their scientific level but most of them evaluated compatibility of those resources with their information needs as low. Moreover, most of them agreed with increasing subscriptions
of e-journals and cancelation of print journals. In addition, 42.8% of respondents evaluated e-journals highly important and 2.1% low in this regard.

A survey conducted by Khasseh and Hatami (2006) showed that ScienceDirect and Proquest were mostly used, respectively by faculty members of Humanities at Shiraz University. The main reason for using online databases and e-journals was improving the quality of teaching and attendance in national or international conferences. In addition, the main reason for not using was meeting their needs through other information resources. Furthermore, the best method of training was setting up 'help link' on the university library website from the faculty members' perspective.

Asemi and Riyahiniya (2007) carried out a survey to investigate the relationships between awareness and use of electronic resources among students in Isfahan University of Medical Sciences. The results of that questionnaire-based survey showed that about 70% were aware of online databases and e-journals available, and about 53% of respondents have used them. In total, 87% of students felt that the available data resources met their information needs. Users were faced with problems like low speed connectivity and shortage of hardware facilities.

Salmani Nodushan, Hoseini Nasab and Shokraneh Nanehkaran (2008) found that ScienceDirect had the highest while Willey had the lowest rate of usage among faculty members of Tabriz University of Medical Sciences. The main reason for low rate of database usage was related to low quality of information provided by databases and lack of useful databases. The authors suggested holding workshops and instruction materials to improve the usage of e-journal databases.

Nikkar and Mooghali (2010) investigated attitudes of Payam-e-Noor University faculty members toward e-journals. E-journals' acceptance among faculty members was at average level on the basis of which it seemed both printed and e-journals had equal positions among such a group. Aged faculty with more experience had a lighter tendency to e-journal usage. Furthermore, there was no significant correlation among gender, subject, educational level and e-journals' acceptance.
Emrani, Moradi-Salari and Jamali (2010) reported on the analysis of Counting Online *Usages* of Networked Electronic Resources (COUNTER) - compliant usage data of Elsevier journals for the period of 2004 – 2009 by Consiran, an Iranian national consortium. The results showed that journal use followed the '80/20 rule' or Pareto principle. The conclusion was that, for a cost-benefit license model, institutions should be grouped into three or four categories based on their subject fields and amount of use. The authors highlighted the need for implementing a system to locally collect and analyse usage data rather than relying on the usage data provided by vendors and publishers.

### 3.1.1.2 Comparison of Print and E-Journal Usage

Mohammadi (2003) studied faculty members' use of central library's print and electronic sources at Iran University of Medical Science and Health Services. The results of that questionnaire-based survey showed that the rate of use of printed and electronic sources was 18.8%. Both printed journals and e-journals were mostly used.

Shayegan Nia, et al. (2004) carried out a study on the use and attitudes toward electronic and print journals at the University of Isfahan. They concluded that most of the users had used e-journals and a small percentage of them had used the print journals. Moreover, easy access to number of journals, speed and ease of information retrieval, volume of information retrieved, non-dependency on the time and place, and more motivation for reading were mentioned as the effective factors for using e-journals.

Jowkar and Dehghani (2006) studied use of e-journals in comparison with print journals among post graduate students of the departments of Education and Psychology of four Iranian universities. They found that most respondents used print journals, but the frequency of e-journal usage was more. Most students evaluated the importance of journals (electronic and print) as high. Even most of them preferred the electronic format; they evaluated their skill in use of e-journals as medium and believed they needed further instructions for use of e-journals. Most of them, explained that the main reason of their low usage of e-journals was insufficient instruction and low speed of retrieval.
3.1.2 Scene at Other Asian Countries

This section gives glimpses of some recent studies carried at other Asian countries, such as, Malaysia, Pakistan, Bangladesh, India, Japan etc., on e-journal usage and user studies, particularly, studies on awareness, attitudes and use of e-journals; comparison of print and e-journal usage; and access problems and related issues to e-journals.

3.1.2.1 Awareness, Attitudes and Use of E-Journals

Liew, Foo and Chennupati (2000) carried out a survey on graduate students of Nanyang Technological University (NTU) of Singapore to assess their use and perceptions of e-journals. Vast majority of respondents preferred e-journals over print journals. Commonly cited reasons were links to additional resources, searching capability, currency, availability and access ease.

Ibrahim (2004) reported findings from a survey conducted to measure the use and perception of the United Arab Emirates (UAE) University faculty members of e-resources. Frequency of use of e-resources was low. Reasons cited were lack of time because of the time needed to focus on teaching; lack of awareness to e-resources provided by the library; ineffective communication channels and language barrier.

Naushad (2005) examined use of electronic information services (EIS) among the users of the Indian Institute of Technology (IIT) Library in Delhi, India. Both questionnaire and observational methods were used for data collection. The most popular search method was keyword followed by author and subject. The author found that lack of printing facilities, terminals and trained staff were the major reasons that would discourage users from accessing the EIS.

Raza and Upadhyay (2006) measured usage of e-journals by researchers at Aligarh Muslim University (AMU), India. The researchers were aware of e-journals in AMU; many research scholars accessed e-journals from their departmental laboratories and computer centres, for both research and to update their own knowledge; most of the researchers used both printed journals and e-journals; and a large number of researchers were storing e-journal articles by downloading them onto discs. The authors highlighted
that lack of training and slow downloading were the problems faced by the researchers while using e-journals.

Kurata, Matsubayashi, Mine, Muranushi and Ueda (2007) carried out a study to show acceptance of e-journals based on Japanese researchers’ information behavior and estimation. The authors found that the Japanese researchers used e-journals as a matter of course and other electronic resources to some extent, for accessing information; but shift to electronic resources seemed to be not a transformation but a modification of traditional pattern of use.

Zainab, Huzaimah and Ang (2007) examined users preference and use of e-journals in general, especially those published in a hosting system, E-journals of the University of Malaya, Malaysia. The online questionnaire-based survey showed that e-journals were used for searching new information, reading full-text articles and abstracts, as well as browsing the table of contents (TOCs). Half of respondents rated the journals as 'good'. The author stated that respondents preferred keywords and title searches. Majority of respondents preferred articles in PDF and read the abstracts first to determine relevance before downloading the articles. The authors concluded that respondents believed that e-journals would either co-exist with print journals (46.2%) or replace the print journals (25.5%) or supplement (25.5%) them.

Fukazawa, Nakajima and Ishikawa (2008) reported results of the survey on usage of Elsevier e-journals at the Japan Atomic Energy Agency (JAEA). They found that number of users and articles read by users increased during the survey period. Moreover, JAEA users browsed a total of 1,028 titles for various fields such as chemistry, engineering, medicine, physics and social sciences.

Deshpande and Pathak (2008) investigated use of e-journals in Astronomy and Astrophysics (A & A) libraries and information centers in India. The purpose was to identify the basic minimum infrastructure necessary to provide users access to e-journals and to facilitate easy response in all major A & A organisations in India. The authors showed that increasing use of the electronic information-seeking environment had produced changes in the practice of science.
Galyani Moghaddam and Talawar (2008) studied use of e-journals at the Indian Institute of Science (IISc), Bangalore, India. The questionnaire survey showed that a growing interest in e-journals among the users at IISc. E-journals were mostly used for research needs and PDF was the most preferred format. The fact that users had free access to e-journals at all hours from their own computers seemed to be the most appealing feature.

Madhusudan (2008) studied use of University Grants Commission's UGC-Infonet e-journals by research scholars and students of University of Delhi, India. About 78% of the respondents felt that use of the UGC-Infonet e-journals had created high dependency value on their research work and they need current article alert services and electronic document supply services.

Sharma (2009) investigated use and impact of e-resources at Guru Gobind Singh Indraprastha University, India. Majority of teachers and research scholars preferred to use e-journals in comparison with other e-resources. The author found that the teachers and research scholars used ScienceDirect and Springer Link often, respectively.

Kaur and Verma (2009 a) described use of electronic resources and services provided at the central library of Indian Institute of Technology, Delhi, India. The authors found that awareness among users motivated them to use e-resources and services of the library. Maximum number of users preferred to use both the formats of the documents, i.e., print as well as electronic for seeking information. The e-journals were generally used 2/3 times a week. The users accessed the information more from their respective department, hostel and computer centre than the library.

Kaur and Verma (2009 b) investigated use of electronic information resources by the undergraduate and postgraduate students, research scholars and faculty members at Thapar University, Patiala, India. All of users used e-resources; awareness about e-resources encouraged users to use such resources to the maximum; and the users used computer centre and hostels more for accessing the information. The authors concluded that impact of e-resources was visible from the decrease in number of print journals in comparison to the increase in number of e-journals. Further, use of e-journals had
increased manifold and print material was quickly being replaced by the electronic resources.

Khan, Zaidi and Zaffar Bharati (2009) studied use of e-journals and databases by faculty members and research scholars of the Jawaharlal Nehru University (JNU) and Jamia Millia Islamia (JMI) University, Delhi, India. All of the respondents were aware of the availability of these resources and largely used them for reference purposes in their research work and studies. The degree of usefulness and utilization of online databases was high among the respondents.

Chirra and Madhusudhan (2009) studied use of UGC-Infonet e-journals by research scholars of Goa University, Goa, India. Department computer laboratories were the most preferred place for accessing e-journals. There was a need for user orientation for efficient searching of e-journals. Many of the respondents were not satisfied with the available Internet facilities.

Kurata, et al. (2009) described the current state of e-journal usage among Japanese medical researchers. 70% of the most recently read articles were e-journal articles; 80% of the e-journal articles were provided by academic libraries, while 60% of print journal articles were from private subscription journals; search engines were not used, but PubMed was used primarily to search either print or e-journal articles; no significant differences relating to article usage patterns were observed among age groups, however, large differences were found among fields of research.

Ansari and Adeeb Zuberi (2010) studied use of e-resources among faculty at the University of Karachi, Pakistan. The academics had computer skills that facilitated use of electronic resources, although a majority had little knowledge of e-resources and e-resources were used for research and for preparation of lectures. Lack of knowledge and lack of facilities were the main reasons for not using e-resources. Nearly all respondents were satisfied or quite satisfied with available resources.

Santhi, Radhakrishnan and Swaroop Rani (2010) studied use of electronic information sources by academic staff at affiliated engineering colleges under Anna
University, Coimbatore, **India**. Statistically, significant relationships were found between use of electronic information sources and age or computer literacy.

Natarajan, Suresh, Sivaraman and Sevukan (2010) carried out a survey of faculty members and research scholars on *use* and user *perception* of e-resources in Annamalai University, Chidambaran, **India**. Despite availability of wide range of e-resources, the frequency of their use was low. The reasons identified for this were lack of time, lack of awareness, lack of subject coverage and slow downloading.

Ali and Nisha (2011) determined the extent to which research scholars at Central Science Library, University of Delhi, **India** were aware and made use of e-journals. The results showed that more than 60% of users were using e-journals weekly for the purpose of research. Print journals were consulted by the majority of users compared with e-journals. Using keyword was the most popular search method for searching e-journals among research scholars, whereas the date of publication was the least desired option. However, it was found that slow downloading of PDF files was the major problem that would discourage users while using e-journals.

### 3.1.2.2 Comparison of Print and E-Journal Usage

Afaq and Mahmood (2005) analysed *use* of library and information science (LIS) journals (electronic and paper) in two sets of graduate students from Departments of LIS in **Malaysia** and **Pakistan**. Findings of the survey showed that LIS journals, had as their objective, provision of guidance in the education and learning process of LIS students and provision of leadership in the practice of librarianship. The profession needed to have a heightened awareness of LIS journals and required fast and easy access to that body of literature.

### 3.1.2.3 Pattern of Reading of E-Journals

Wang (2010) investigated journal use and reading behavior of social scientists at National Cheng-chi University in Taiwan and made comparisons between scholarly journals use and reading pattern of social scientists and other scientists in **Taiwan** and the USA. The author found that social science faculty used scholarly journals in multiple languages, mainly English, Chinese, German and Japanese, which is different from
scientists in the United States. In addition, they used e-journals more than print journals. The number of article readings by social science faculty members was approximately 195 readings per year and nearly 440 hours were spent reading per year. In contrast to scientists in the United States, the social scientists in Taiwan read fewer readings, spent more time reading, and read older articles.

3.1.2.4 Access Problems and Related Issues to E-Journals

Islam and Chowdhury (2006) provided information about e-journals, their subscribers, management issues and necessities from the Bangladesh perspective. The authors showed that due to the infrastructural problem in the field of library and information sector in Bangladesh, use and access to e-journals were very limited. However, it was expected that e-journals would become more popular when each and every part of the country was connected with the world’s information super highway. So, libraries that were already subscribing and those that had not yet subscribed to e-journals but were planning to do so, should organise and manage e-journals properly so that their users could get the maximum benefit from those resources.

Rajanikanta and Ramasesh (2009) investigated needs for the library infrastructure facilities to access on-line journals through the consortium and databases in medical college libraries in Bangalore, India. Also, they provided information about accessing the on-line journals by the faculty members working at medical colleges.

Yokoi (2010) carried out a survey on problems with accessing e-journals in the context of academic libraries. She states that academic libraries are increasingly collecting many e-journals and their collections are shifting from printed versions to electronic versions. Unfortunately, it is difficult for academic libraries to properly keep their own e-journal collections, because the collections can generally be accessed only from the delivery platforms provided by each publisher. In order to enable academic libraries to improve access to e-journals for end users, she surveyed the ease of accessing information across the platforms.
3.2 Studies on E-Journal Usage and User Studies: African Scene

An attempt is made in this part to present some studies on awareness, attitudes and use of e-journals in African countries, such as, Nigeria and South Africa. The presentation comes as follows.

3.2.1 Awareness, Attitudes and Use of E-Journals

Mgobozi and Ocholla (2002) investigated use of e-journals by academic staff, library staff and postgraduate students in the universities of Natal and Zululand, South Africa. The level of e-journal use by the two universities was low. It was recommended that the academic library should provide facilities where users can access e-journals on their own. The librarians should also market their services and products to library clientele. There was a need for user education, especially in the use of e-journals.

Ehikhamenor (2003) conducted a survey on using e-journals and databases by academic staff of selected disciplines in 10 universities in Nigeria. Out of the respondents having Internet access, nearly 60% used electronic bibliographic databases and 58% used e-journals at least once a month.

Ajegbomogun (2007) presented use of e-journals at the University of Agriculture, Abeokuta, Nigeria. The study determined availability and usefulness of e-journals and research output on the Internet. The author described the problems faced by users in information seeking on the Internet. He also offered suggestions on how to harness e-journals on the Internet.

Ozoemelem (2009) carried out a study on e-resources usage by Library and Information Science postgraduate students of the Delta State University, Abraka, Nigeria. The need for deeper understanding regarding the reasons why some college students made use of e-resources while others did not was mentioned. The obstacles to students' usage of electronic library resources were also discussed.

Damen (2009) provided information about e-journals from and about Africa. The popularity and advantages of e-journals, the efforts of national and international organizations to offer the public access to more information, the strategy of commercial
and non-commercial organizations to make information available to low-income populations, and introduction of legislation to protect copyrighted material were discussed.

Omotayo (2010) studied access, use and attitudes of academics toward e-journals at Obafemi Awolowo University, Nigeria. The author found that all of the respondents were aware of e-journals. A majority of them used e-journals monthly and literature search was the main purpose for using e-journals. Accessibility to current journals, better international connections to up-to-date information, and speed in accepting and publishing articles were perceived to be the major advantages of e-journals over print journals. The author said that power failure, systems breakdown and slowness of server due to bandwidth problems were major constraints.

Agboola (2010) surveyed use of print and electronic resources by agricultural science students in Nigerian universities. The results of that questionnaire survey revealed that agricultural science students most preferred to use The Essential Electronic Agricultural Library (TEEAL) among electronic resources available in their libraries (52.2%). Major problems faced by the agricultural science students include inadequate access to full Internet connectivity and lack of skills to use electronic resources.

Oduwole and Oyewumi (2010) examined accessibility and use of web-based electronic databases on the Health Inter Network Access to Research Initiative’s (HINARI) portal by physicians in the Neuropsychiatric Hospital, Aro, Nigeria. The study further revealed that majority of the physicians accessed the portal once every two weeks from the internet cafes in and around the institution. Information retrieved was used mostly for clinical decision making. The author said that respondents were faced with inadequate time for research because of their busy schedule, poor internet access and inadequate information retrieval skills.

3.3 Studies on E-Journal Usage and User Studies: European Countries Scene

Studies on e-journal usage and related issues have been done in many of European countries, such as, United Kingdom (UK), Germany, and Croatia etc. This section gives an overview of some studies in this regard, particularly, studies on
awareness, attitudes and use of e-journals; comparison of print and e-journal usage; and pattern of reading of e-journals.

3.3.1 Awareness, Attitudes and Use of E-journals

Some earlier studies in European countries on use and attitudes toward e-journals such as a survey of staff in the basic sciences at British universities by Gomes and Meadows (1998); a survey on academics at the University of the West of England (UWE) by Nelson (2001); and a survey on faculty members at the University of Strathclyde, Scotland by Tomney and Burton (1998) showed low use of e-journals. Moreover, Tomney and Burton (1998) found that members of the History and Education departments had not used e-journals at all, while the heaviest users came from Business, Science and Engineering. The main reason for not using e-journals was unawareness of the existence of e-journals and the main advantage of e-journals was accessibility.

Rusch-Feja and Siebeky (1999) at Max-Plank Institute, Germany conducted a wide-scale online survey on use and acceptance of e-journals. The findings indicated a major shift in research information use from printed to electronic. Most respondents used e-journals between every two weeks and once a month. The author found that the major advantages of e-journals were perceived to be accessibility, currency, ease of downloading and improved search ability, while the major disadvantages were concerns about archiving, incomplete issues and lack of back issues.

Eason, Richardson and Liangzhi (2000) studied pattern of use of e-journals among undergraduates, postgraduates, researchers and academic staff at thirteen universities of United Kingdom (UK). Data were collected through log files of SuperJournal. The log file recorded in a structured manner the interaction between the user and the service, showing where, when, how, what and by whom the service was used. The contents (both coverage and relevance) and ease of use of a system as they were perceived by the user were the most significant factors affecting pattern of use. Users’ perception of both factors were affected by a range of intervening factors such as discipline, status, habitual approach towards information management, availability of alternative e-journal services, purpose of use, etc.
Eason and Harker (2000) studied use of e-journals from the Super Journal project, UK. The indispensable functions of digital libraries were basic browsing, printing and search facilities; directed searching was used less intensively than browsing features; researchers were not very good at searching; and features such as alerting, saving and customizing were peripheral (i.e., dispensable) for most users.

Wolf (2001) conducted a web-based survey to determine the academic staff and researchers’ attitudes toward e-journals at Cardiff University, UK. The academics preferred to use e-journals to print because of ease of access, but did not feel that e-journals were qualitatively better than print journals. The authors said that friends and colleagues were a major source of information about e-journals titles.

"Clajus and Maier (2001) carried out a survey on use and attitudes toward e-journals among academic staff at the University and State Library in Köln, Germany. They found that 16% of respondents did not want to renounce the print version of the journal under any circumstances. The biggest advantages of the new service were full-text access from their own desktop (49%) and the better currency of the e-journal over print" (as cited in Galyani Moghaddam and Talawar, 2008, p. 16).

Pazur (2002) studied acceptance and use of e-journals by scientists at the Rudjer Boskovic Institute (RBI) in Zagreb, Croatia. The respondents stressed availability before the print version as the most important advantage of e-journals, and the most important disadvantage to be slow downloads. Very few respondents thought that e-journals had no disadvantages at all. Most of the respondents preferred the print version in the situation where both were available, but many used both versions equally.

An online survey on e-journal usage by academics of University of Patras, Greece found that e-journals were used daily and weekly mostly for writing up publications and for teaching. They accessed e-journals almost from their offices. The main reasons that would discourage users from accessing e-journals were not enough relevant material and lack of back issues (Monopoli, Nicholas, Georgiou and Korfitai, 2002).
Talja and Maula (2003) gathered data on scholars’ use of e-resources through semi-structured interviews at University of Tampere, Finland. The findings suggested that e-journals and databases were likely to be used most heavily in fields in which directed searching was the dominant search method and topical relevance the primary relevance type, and less in fields in which browsing and chaining were the dominant search methods and paradigmatic relevance the primary relevance type.

Bontrhon, et al. (2003) studied e-journal use by faculty and students at Edinburgh University, Scotland. The authors found that faculty made very little use of the library's e-journals web page and its subject trees, preferring to go directly to bookmarked tools, such as, the Web of Science or PubMed to find relevant articles. Staff, generally seemed to make very little use of the value-added features of e-journals, such as, tables of contents or mailing features. The library web page was used as a last resort.

Torma and Vakkari (2004) elaborated relations between digital library use by university faculty, users’ discipline and the availability of key resources in the Finnish National Electronic Library (FinELib), Finland by using nationwide representative survey data. Results showed that the perceived availability was a stronger predictor of the frequency of use of its services than users' discipline. Regardless of discipline, a good perceived provision of central resources led to a more frequent use of FinELib. The satisfaction with the services did not vary with the discipline, but perceived relevance was the key predictor.

Jamali, Nicholas and Huntington (2005), UK reviewed the conclusions of several papers that used log analysis to study use and users of e-journals. These papers gave contradictory conclusions on the volume of use of subscriptions through Big Deals, but showed a high degree of concentration in use of the titles and a clear preference for PDF rather than HTML format. They also provided interesting information on the behavior patterns of users and growing preference for searching to the detriment of browsing as the main means of accessing information.

Vakkari and Talja (2006) analysed how academic status and discipline influenced the major search methods used by university academic staff for obtaining electronic
articles for teaching, research and keeping up to date in their field. The data consisted of a nationwide web-survey of the end-users of the Finnish National Electronic Library (FinELib), Finland. The authors found that keyword searching in journal and reference databases were clearly the most important access methods in all disciplines compared to browsing, chaining or obtaining material from colleagues. Academic status and discipline influenced the patterning of search methods used. Keyword searching in databases was more common in natural sciences, engineering and medicine than in other disciplines. Semi-directed searching comprised of browsing, chaining and colleagues as sources of access. It was significantly more common in humanities than in other disciplines. They concluded that patterns of searching for journal articles were changing because of the provision of digital information resources. In particular, the role of colleagues was diminishing.

Rogani (2007) studied user perception at the University of Calabria, Italy with the digital collection service of Emeroteca Virtuale (EV) provided by Comitato interuniversitario base dati ed editoria in rete (CIBER), a national consortium of university libraries. The results of that questionnaire survey showed that there was necessity of supporting new cooperative initiatives to disseminate scholarly information. The main reason of using EV was its availability and saving the time. Furthermore, lack of awareness of its existence was the primarily issue that limited use of that digital tool. Moreover, most users were satisfied with EV. Many respondents would like to have more information about the digital services provided by the library system.

Borrego and Urbano (2007) carried out a research to analyse behavior of the users of a package of 31 e-journals of the American Chemical Society (ACS) using the data of consumption per IP address of the University of Barcelona, Spain. Data of sessions, articles downloaded and abstracts viewed were analysed. Most of the consumption was concentrated at a few IP addresses, and most of the users made little use of the information available. A greater dispersion of the consumption of electronic information than that existing in the paper world was also observed. Furthermore, the authors determined that the number of abstracts viewed was a good predictor of the number of regular users of a journal.
Borrego, Anglada, Barrios and Comellas (2007) presented the results of a survey on use of e-journals by the academic staff of the universities belonging to the Consorci de Biblioteques Universitaries de Catalunya (CBUC), the consortium of Catalanian university libraries in Spain. A high proportion of staff was aware of collection of e-journals and that there was an increasing preference for the electronic to the detriment of the print format. Collection of e-journals was highly valued. Importance of discipline and age as explanatory factors of the use of e-journals were confirmed. Preference for the electronic format was higher among academic staff in Biomedicine, Engineering and Exact and Natural Sciences.

Bravo, Diez, Almuzara and Suarez (2008) studied the pattern of use of e-journals in Spanish university libraries. No stagnation was observed in the number of articles downloaded during the period studied. However, the overall figures for downloads were not particularly encouraging. ScienceDirect had the highest rate of use. The larger universities did not always have greater number of downloads than institutions of smaller size. Although, there was no clear pattern of usage, there were observable preferences on the part of different universities for given packages and a considerable spread of use was noted.

Termens (2008) studied use of e-journals by the members of a library Spanish Consortium, the Consorci de Biblioteques Universitaries de Catalunya (CBUC). The author showed that some universities made more use of e-journals than others. The methodological model used had proved to be viable for studying pattern of use at more detailed levels than the general institutional level normally covered by COUNTER compliant reports.

Atakan, Atulgan, Bayram and Arslantekin (2008) studied electronic databases usage at Ankara University, Turkey to encompass assessment of the effectiveness of the digital library and value of multidisciplinary databases in terms of user preferences and usage rate by academic ranking. They compared the results of two surveys carried out in 2002 and 2005. Increased number of the faculty members had awareness of the digital library. The authors highlighted that the most preferred databases had been Web of Science, ScienceDirect and EBSCO.
Dilek-Kayaoglu (2008) examined the use of e-journals by the faculty of the Istanbul University, Turkey to determine whether the users would be pleased by the cancellation of the printed or parallel published journal subscriptions in favor of the e-journals only. Majority of respondents supported transition from print to e-journals only. The faculty in the fields of natural sciences and health sciences gave the strongest support for the transition from print to electronic only, while the humanities and social scientists gave the least support, respectively. Three-fifths of the respondents, regardless of discipline, reported that the major barrier to use of e-journals was the lack of sufficient subscriptions in their discipline.

Karasözen (2008) explained the increase in usage of electronically licensed databases by Anatolian University Libraries Consortium (ANKOS), Turkey with reference to COUNTER compliant e-journal collections. The diversity of usage among the universities and the cost-effectiveness of electronically available databases with the consortium were explained.

Tonta (2008) analysed the seven-year worth of consortial use of e-journals comprising more than 25 million full-text articles downloaded from ScienceDirect's e-journals between 2001-2007 in Turkey. Some 100 core journals, constituting only 5% of all SD journal titles, satisfied over 8.4 million download requests. The lists of core journals were quite stable, consistently satisfying one third of all demand. A large number of journal titles were rarely used while some were never used at all.

Nicholas, Rowlands and Williams (2011) provided the results of a two-year investigation into the use of e-journals by the UK research community. Log analysis, questionnaire, interview and observation were used to collect the information. The main findings were that journals had become central to most disciplines and that the electronic form had become the prime means of access. In addition, all researchers seemed addicted to journal content.

3.3.2 Comparison of Use of Print and E-Journals

Obst (2003) compared print and electronic use of 270 matched journals of North Rhine–Westfalia (NRW) Consortium using re-shelving statistics and online user metrics
at Medical Branch Library, Muenster, Germany. Obst found that print usage declined dramatically between 1999 – 2001; e-journal usage accelerated rapidly, nearly tripling over the same period; and journals published in both formats lost 30.4% of their print use within approximately two years. Total loss for print-only titles was 45.8%. A correlation between frequency of use of a journal title in both formats was detected.

3.3.3 Pattern of Reading of E-Journals

Academics of University of Patras, Greece preferred articles electronic format for reading but for the age group 55-64, the percentage decreased. The main reasons for preferring the electronic format were ease of use, access and searchability, and the capability to save and print the information (Monopoli, Nicholas, Georgiou and Korfitai, 2002).

Ollé and Borrego (2010) presented a qualitative study of impact of e-journals on the information behavior of academic researchers at Catalan universities, Spain. The results showed that academic researchers read more, and more widely. However, their reading was becoming more superficial; they were compelled to improve their discrimination skills in order to decide what to read in more depth. Electronic accessibility of journals meant that researchers made fewer library visits. i.e., web browsing and table of contents e-mail alerts were replacing physical browsing.

3.4 Studies on E-Journal Usage and User Studies: Australian Scenario

This part provides an account of the studies carried out by the professionals in the field of e-journal usage and related issues in Australian scene. This review is presented in two sections, viz., awareness, attitudes and use of e-journals; and pattern of reading of e-journals.

3.4.1 Awareness, Attitudes and Use of E-Journals

Deng (2010) investigated the extent to which electronic resources were utilised in higher education in Australia through an online survey. The study revealed that usage of electronic resources was common in a university environment with the rapid advance of information and communication technologies. The author found that use of electronic
resources was very much dependent on the user and the purposes of using electronic resources. Awareness and quality of the available electronic resources were the two important factors for effective and efficient use of electronic resources.

3.4.2 Pattern of Reading of E-Journals

Tenopir, Wilson, Vakkari, Talja and King (2008) carried out a comparative study on e-reading patterns of faculty members in the United States, Finland and Australia from 2004 to 2007. The surveys used a variation of the critical incident technique to focus on the last e-article read. The authors found that academic staff members who published more also read more. Most differences in reading pattern resulted instead from differences in subject discipline. In all countries, number of electronic article readings varied by academic status; age did not explain adoption of e-resources, but older readers used both print and electronic resources in a more balanced manner; both e-article and article reading pattern varied by discipline: Scholars in medicine and engineering read more articles than scholars in other disciplines, humanities and social sciences scholars read both books and journal articles, which explains in part their lower use of e-journal articles. Furthermore, the authors stated that publication productivity was associated with the number of electronic article readings in Finland and the U.S.A.

Tenopir, King, Spencer and Wu (2009) showed variations in article seeking and reading pattern of academic staff at two universities in Australia and five in the United States. Subject discipline of the reader influenced many pattern, including amount of reading, format of reading, and average time spent per reading. Medical/health faculty read more than others and mainly for current awareness purposes, while engineering faculty spent more time on average per article reading, and they also read more for research. The authors also showed other factors that influenced some reading pattern included work responsibilities, age and productivity of the reader and purpose of the reading.

3.5 Studies on E-Journal Usage and User Studies: American Scene

Most studies on e-journal usage retrieved were on a variety of different aspects of e-journals and conducted by researchers from the United State of America (USA). An
attempt is made here to present the studies regarding e-journal usage carried at American
countries on a subject-wise basis, viz., awareness, attitudes and use of e-journals;
comparison of print and e-journal usage; pattern of reading of e-journals; and access
problems and related issues to e-journals

3.5.1 Awareness, Attitudes and Use of E-Journals

Abels, Liebscher and Denman (1996), USA found that for the acceptance of
e-journals, determinants included technology infrastructure facilities, users' computer
skills, number of web access points provided by the library, and the accuracy and
completeness of the content once the user arrived at the publisher's Internet site.

In a questionnaire-based study, attitudes of faculties toward e-journals at eight
universities across the Columbia, USA were surveyed by Budd and Connaway (1997).
Only 8.4% of faculty considered e-journals equal to print journals and 77.1% did not
think that they had sufficient experience with e-journals to evaluate them. In general, the
faculty tended to be conservative in their use and attitudes, since their institutions tend to
be conservative. There were some apparent variances in responses by such demographic
variables as gender, rank and departmental affiliation.

Curtis, Weller and Hurd (1997) studied use of e-resources by health sciences
(medicine, nursing, and pharmacy) at the University of Illinois, Chicago, USA. They
found that use of the print Index Medicus among faculty was in transition: While 30.5%
continued to use the print resources, 68.0% of faculty accessed Medical Literature
Analysis and Retrieval System Online (MEDLINE) through electronic means. Faculty
preferred accessing electronic databases from their offices for doing so from the library.
Health sciences faculty used a wide variety of e-journals and databases. Most faculty did
not take advantage of either in-house or electronic training sessions offered by librarians.

Bancroft, Croft, Speth and Phillips (1998) examined use of library services by
faculty members and graduate students at the Washington State University Libraries,
USA in 1996. A great majority of the respondents chose the 'never used/no opinion'
option for online full text journals; however, nearly 50% gave high appreciation to the
ability to download full text articles in the future. It indicated that already in 1996, academics realised the value of e-journals even without actually using them.

"Holmquist (1998) conducted a survey at Princeton University, USA on 1,800 students, faculty, professional librarians, technical researchers, clerical staff and administrative staff. Majority of respondents said they had not used electronic versions of print journals because: The respondents preferred reading articles printed on paper; they had not had time to learn about them; they preferred paper for browsing; their 'important' journals were not available electronically, and they were more inclined to use electronic 'preprints' than e-journals" (as cited in Serotkin, Fitzgerald and Baloughthe, 2005).

Lenares (1999) conducted a survey of faculty at institutions whose libraries were members of the Association of Research Libraries, USA. She found that 46% used e-journals in 1998, and 61% used e-journals in 1999. She also noted that in the 1999 survey, 49% of respondents reported 'fairly frequent' or 'frequent' e-journal use, and that the increased acceptance might be attributed to increase in the number of parallel-published journals.

Tenner and Yang (1999) found that awareness of e-journals differed highly among academic members affiliated to different faculties of Texas University, USA. The highest results were from the Sciences, followed by Medicine, but only about 37% of the respondents actually made use of e-journals, with respondents from the Liberal Arts reporting the lowest use level. 61% of the respondents preferred print journals over e-journals, and even 40% of the e-journal users preferred the print format. However, large majority of the respondents were positive about the place of e-journals in scientific research. Advantages of e-journals identified by the respondents were availability and home access, while concerns included permanence and graphics.

Brown (1999) surveyed faculty in astronomy, chemistry, mathematics and physics at the University of Oklahoma, USA. The author found that less than 50% of the respondents used some form of e-journals to obtain journal articles. Brown also found that 62% to 65% preferred print journals, and a small fraction preferred both print and electronic formats.
Weingart and Anderson (2000) examined awareness of the faculty and administrators toward electronic resources at the University of Utah, USA. Findings showed greater need for publicity and training.

Stanford University Libraries, USA (2000) carried out three e-journal user studies through interviews and surveys. The findings of first survey showed that over 75% of the respondents preferred e-journals to their printed counterparts. Limited content (lack of back issues) was seen as a factor for disliking use of e-journals. The second survey showed that lack of back issues was a major problem for e-journals, and slow downloading was perceived only as a minor problem. The most popular online-specific features were hypertext links to cited articles. More than 50% of the respondents read full-text articles from the screen. The third one, examined changes in perception and attitudes of scientists towards e-journal usage over one year and the impact of e-journals on their research. Almost all of the respondents used e-journals regularly and frequently—not so surprising.

Tenopir and Read (2000 a) reported online database and e-journal use pattern in ninety-eight public libraries in the United States and Canada. The results showed that library users at all sizes of public libraries tended to use research databases most frequently early in the week, at midday, and at times that correspond to the academic calendar. Peak usage varied with size of library, but a capacity of between one and ten simultaneous users would satisfy 99% of demand in every size of the library. A questionnaire sent to those libraries revealed many other factors that might influence database use, including posting signs or preparing handouts, availability of remote login, and placement of a database on the library's homepage. Only the number of workstations, adjusted for population, was found to be statistically correlated with amount of use. In a related study by the same authors in academic libraries in the United States and Canada, similar results were obtained but no statistically significant correlation was detected between factors that might influence database use and amount of use (Tenopir and Read, 2000 b).

Hurd (2001) interviewed faculty in the basic and health sciences at University of Illinois at Chicago, USA regarding their use of e-journals, databases and other digital
resources. The author found that faculty who used e-journals were enthusiastic about their benefits, but critical when a particular resource failed to offer features that they considered basic to the genre. The most-valued e-journals appeared to be those that have long been high-impact and peer-reviewed print titles. When faculty searched databases, they appreciated links to full text; increasingly they expected such features. When users printed articles of interest, PDF files appeared to be preferred.

Tobia, Lynch, O’Connor and Raymond Jr (2001) surveyed faculty members at the University of Texas Health Science Centre at San Antonio (UTHSCSA), USA in 1996 and again in 2000 regarding their e-journal use pattern. When asked in the 1996 survey to rate the importance of e-journals to their professional productivity, 44% of the respondents said that e-journals were 'essential' or 'very important', and 20% said that they were 'essential'. By 2000, those percentages had increased to 47% and 28%, respectively. A decision could not be made on the question of whether to cancel print titles in favor of electronic titles, however, primarily because e-journal aggregators could not guarantee a stable back file.

Sanville (2001) carried out a study on use of e-journals in the Ohio Library and Information Network (OhioLINK1)'s Electronic Journal Centre, USA. The results strongly indicated that libraries and their consortia were in a rapidly evolving arena in which they knew that levels of information use would rise through desktop electronic access, but it was not yet possible to predict how high that rise might be.

Dilevko and Gottlieb (2002) conducted a study on e-journal usage of undergraduate students at the University of Toronto, Canada. About 40% of respondents used online sources (including e-journals), and 23.4% used print journal sources most of the time. Interestingly, 74.5% would prefer an 'exact' print journal to a 'good enough' online journal. They cited problems with e-journals such as eyestrain from computer screens, the higher costs of printing articles as opposed to photocopying them, and that many e-journals were missing critical information such as tables, graphs and diagrams.

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1 OhioLINK, the Ohio Library and Information Network, is a consortium of the libraries of 88 Ohio colleges and universities, and the State Library of Ohio.
Dillon and Hahn (2002) administered a large-scale online survey at the University of Maryland, USA. About half of the faculty members reported using electronic formats of printed journals at least once a month, while 31% reported never using electronic formats of printed journals, mainly because of personal subscriptions and unfamiliarity with accessing the resources. Only 29% used e-journals, which had no print counterparts, at least once a month. Preference between printed and electronic formats was given both for core journals and non-core journals. Large majority wanted core journals to be available in both formats, while for non-core journals, preferred electronic access only. Advantages of the electronic format were identified as ease of access, search capabilities and hyperlinks to outside content. The main concerns about moving to electronic only were image quality and access to the full content of the journal.

A study by the Digital Library Federation (DLF) and Council on Library and Information Resources (CLIR) that collected data from public (state-funded) universities, private doctoral research institutions and liberal arts colleges at Washington, USA found that, despite popularity of e-journals, print formats continued to be important for serious researchers. A total of 3,234 undergraduate students, graduate students and faculty were interviewed. Undergraduate students were more willing to accept an entirely online information environment, whereas graduate students and faculty expected a combination of print and electronic resources to satisfy their research needs. Reported barriers to using electronic resources included: lack of time and insufficient training in how to search for information, determine its credibility and analyse it (Friedlander, 2002, as cited in Serotkin, Fitzgerald and Baloughthe, 2005).

According to Brennan, Hurd, Blecic and Weller (2002), University of Illinois at Chicago, USA access to e-journals was changing research habits. They employed a diffusion theory approach in their qualitative study of science faculty members' use of and attitudes towards electronic resources. Following characteristics of e-journals determined how easily they were adopted: the content characteristics included critical mass of issues and volumes for a given title, critical mass of titles in a subject collection, full equivalence to print issues and timeliness of appearance. Functionality characteristics contained searching facilities that supported browsing, locating known articles and
subject/author retrieval, ease of navigation, links to other articles, high-quality printing and seamless movement among related resources.

Davis (2002) compared usage statistics of articles downloaded from a collection of more than 200 titles in the sciences and social sciences at all the institutions in the North East Research Libraries Consortium (NERL), USA. Patterns indicated a high degree of skew in use of the journal collection: A small number of journals formed majority of total use. No institution used every title, and some titles were used very infrequently by the consortium as a whole. Student enrollment was a good predictor of total usage, with medical institutions being an exception. It was recommended that institutions considered their consortial membership and organised themselves into groups of homogenous institutions with similar missions.

Pattern of e-journals and databases use by students, faculty and residents of University of Illinois at Chicago, USA were assessed by De Groote and Dorsch (2003). While, 53% of the users indicated that they searched MEDLINE at least once a week, other databases showed much lower usage. Overall, 71% of respondents indicated a preference for online over print journals when possible. Convenience and full-text availability appeared to play roles in selecting online resources. The findings suggested that databases without links to full text and e-journal collections without links from bibliographic databases would have lower use.

Cochenour and Moothar (2003) surveyed faculty, graduate students and administrative professionals of Colorado State University, USA to determine their usage and acceptance of e-journals. A majority of respondents used e-journals at least monthly basis. Almost all respondents supported adding electronic access to print journal subscriptions, but fewer respondents supported canceling print subscriptions and relying on the electronic subscriptions. Respondents strongly supported having access to journal back runs, older than four years and believed that the libraries had a good balance of print and electronic resources.

Tenopir (2003) analysed the results of over 200 studies of use of electronic resources in libraries published between 1995 and 2003. The main conclusion of that
review was that electronic resources had been rapidly adopted in academic spheres, though the behavior varies according to the discipline. Subject discipline, status, sex and age were typical factors related to use of electronic libraries by university faculty.

Abouserie (2003) conducted a questionnaire-web survey on information seeking behavior of social science faculty at the University of Pittsburgh, USA with special reference to use of e-journals. The author found that there were difference in the sources used to perform the basic tasks or activities, teaching, research and service, according to the school, faculty rank, years spent in the university, and gender; the degree to which faculty depend on electronic sources differed across tasks/activities, as follows. They depended more on electronic sources for research tasks than for teaching tasks or service tasks; e-journals would be accessed from offices more than any other location such as departmental libraries, central libraries and home. In a related study by the same author and in the same environment, (Abouserie, 2006), use of e-journals by Library and Information Science faculty members was surveyed. The study showed a difference in using various information sources, where the study found variability in the sources used according to rank and gender. The study also showed a variance satisfaction with electronic sources, where faculty members were most satisfied with index, abstracts, full text databases and e-journals. Faculty members considered e-journals as high creditable, most accurate, high reasonable, most supportive and convenient to meet their needs.

Jacoby and Laskowski (2004) identified problems and issues in assessment of electronic reserves and investigated usage measures, particularly web server logs, for after-hours and off-campus usage at the University of Illinois, Urbana-Champaign, USA. Findings indicated that electronic reserves were heavily used during non-traditional service hours and from outside the library's physical walls.

Franklin and Pulm (2004) presented results from web-based surveys of more than 15,000 networked electronic services users in the United States, between four academic health sciences libraries and two large main campus libraries serving a variety of disciplines. At the four academic health sciences libraries, there were approximately four remote networked electronic services users against each in-house user. Sponsored researchers at the health sciences libraries appeared to use networked electronic services
most intensively from on-campus, but not from in the library. The purpose of use for networked electronic resources by patrons within the library was different from the purpose of use of those resources by patrons using the resources remotely.

Renwick (2005) administered a survey to faculty at The University of the West Indies, USA. The results showed that 73% used computers daily and 82% felt that their computer literacy level was average or beyond. Overall, it was found that faculty had high awareness of the electronic resources. Many respondents felt that e-resources were important, and, though many felt that they were competent users, 83% were self-taught and many expressed a need for training.

Serotkin, Fitzgerald and Balough (2005) introduced a set of e-journals without print counterparts to students enrolled in graduate allied health science programs at Saint Francis University, USA to measure usage of those journals as well as the students' reactions to them. Findings indicated that students would use and prefer electronic full-text journals to those in print or microform, even though they reported problems in learning and understanding how to use a variety of vendor-specific search engines.

Burrows (2006) described e-journal usage in health sciences libraries, USA during the past decade. The author found that health sciences libraries, their patrons and the public at large pioneered embracing the new versions and continued to accept the significant changes in scholarly communication they enabled. Although, the pattern of e-journal usage among health sciences libraries and other special and academic libraries had similarities, they also had differences.

Kozak (2007) examined questionnaire responses from academic atmospheric scientists at University of North Carolina, USA on why and how they use e-journals and article databases. It was found that many atmospheric scientists used article databases and e-journals to find current and older literature. The results did not offer any startling discoveries but did help verify previous beliefs that atmospheric scientists used article databases and e-journals regularly.

Botero, Carrico and Tennant (2008) analysed the comparative findings of two e-journal usage studies undertaken at the University of Florida (UF) Libraries, USA
comparing online journal usage statistics derived from COUNTER - compliant
publishers. The authors showed that full-text downloads increased in all disciplines from
2004 to 2005 and the general disciplines exposed distinct differences in usage pattern.
Not only there was a demonstrated cost benefit for the UF Libraries through those Big
Deals, there was a significant use of the titles not previously offered to library patrons
and now being received through the bundled packages. The two studies showed that,
despite a growing percentage of the materials budget being spent on online bundled
packages, the Big Deal at the UF Libraries was a Good Deal if measured by overall use
and by price per full-text downloads.

Kraft (2009) used journals’ online usage statistics at South Pointe Hospital, USA
to justify and increase the library budget, which enabled the library to purchase more
titles as journal infrastructure software. Even though, the collection had been created, it
must be maintained and promoted; the article briefly discussed need for education and
promotion of the resources.

Shearer (2009) carried out a study on usage data of a core medical e-journal
collection at Florida State University College of Medicine (FSU COM), USA. Usage data
were extracted for four e-journal packages (Blackwell-Synergy, Cell Press, Lippincott
Williams and Wilkins and ScienceDirect). The results indicated that development of the
core list was a valid method for creating a new twenty-first century, community-based
medical school library.

Fleming-May and Grogg (2010) believe that one of the enduring quests in LIS is
to develop models and tools that will assist with the task of determining which materials
will be popular and which will (literally) collect dust. Their report presents a review of
the state-of-the-art of electronic resources usage measurement, highlighting the
importance of presenting clear and meaningful measurement of electronic resources use
in LIS research, assessment and standards creation. The authors explore the nature of
current standards, tools and initiatives for measuring and reporting electronic resources
usage.
3.5.2 Comparison of Use of Print and E-Journals

Morse and Clintworth (2000) compared patterns of print and e-journal use in the Norris Medical Library at the University of Southern California, USA. The results showed that for journal volumes in the study subset, users accessed the electronic versions more than ten times as often as the print versions during the study period. The results further revealed a remarkably similar usage curve in the print and electronic data, with just 20% of titles accounting for nearly 60% of usage in both study sets.

De Groote and Dorsch (2001) examined the impact of e-journals on use of the print collection in university of Chicago Health Sciences, USA. They found that print journal usage decreased significantly with the introduction of e-journals, even for journals available only in print. They pointed out that library patrons might assume that all journals were available in both formats; librarians might have an important awareness-raising role to carry out.

Rogers (2001) conducted a longitudinal survey of the usage of e-journals, print journals and electronic databases at Ohio State University (OSU), USA. The findings showed that since 1998, there had been a significant progress in the acceptance and usage of e-journals at OSU-in 1998, only 200 e-journals were available, while in 2000, the number of available e-journals increased to more than 3,000. Number of faculty respondents reporting daily, weekly or monthly use of e-journals increased from 36.2% in 1998 to 53.9% in 2000. At the same time, at least weekly usage of printed journals decreased (from 74.3% to 65.6%). She found little or no correlation between age and frequency of use. Availability and ease of information location were seen as advantages, and lack of connectivity and lack of hard copy were seen as disadvantages.

Sathe, Grady and Giuse (2002) studied the impact of print versus e-journals on research processes at the Vanderbilt University Medical Centre, USA. They discovered that some of the differences in the ways that print and e-journals were used at different points in the research cycle were significant. Researchers favored print over electronic sources for browsing and reading tables of contents, and researchers preferred electronic sources over print for printing or photocopying and checking references.
Wulff and Nixon (2004) examined pattern of use of electronic versions of journals supplied by the Kornhauser Health Sciences Library, USA. Usage data supplied by three major vendors of e-journals were compared to reshelving data for corresponding print titles. Electronic use correlated with print use across journal pairs. Titles that had not been selected for the library's print collections, but which were bundled into publishers' packages, received little use compared to electronic titles also selected in print.

Siebenberg, Galbraith and Brady (2005) concluded that most print journals at Washington State University's Owen Science and Engineering Library, USA in 2003 were actually used more than they were prior to introduction of e-journals. They argued that availability of electronic formats had in fact greatly enhanced total use of all titles.

Borrelli, Galbraith and Brady (2009) examined use of geology journals at Washington State University (WSU), USA before and after electronic access was provided, to determine if use of the print collection increased as in the previous studies at WSU of three other science disciplines. The study showed that changes in the use of individual titles were research driven. By 2001, geology users were using print and e-formats equally. Geology print use in 2002 was virtually the same as that of 1998, but electronic usage had increased dramatically. Use data for 2003 showed that print use declined. As geology users became more familiar and comfortable with e-access, there was an increase in total citations in the papers they authored.

3.5.3 Pattern of Reading of E-Journals

King and Montgomery (2002) studied reading pattern of faculty at Drexel University, USA. They found that amount of reading remained high; outcomes from reading continued to be favorable, particularly from library-provided articles; while 42% of faculty reading was from library-provided articles, faculty still relied heavily on readings from personal subscriptions; most of the library-provided reading was from electronic articles; and readers spent much less time locating and obtaining library-provided articles when they were available electronically.

Belefant-Miller and King (2003) profiled reading behavior of faculty at a medium-sized university, USA. Their work re-examined a 1993 study, presenting the
situation from 1993 to the electronic era. They concluded that, on an average, faculty read 384 documents per annum, of which 161 were journal articles; had 4.2 journal subscriptions per person; and published three articles per annum.

Smith (2003) explored the role e-journals played in faculty's weekly scholarly reading habits at University of Georgia, USA. Survey results indicated that electronic access to journals, particularly library-funded access was integral to research activities, with vast majority of respondents reporting that they read at least one article from an electronic source every week.

Tenopir, et al. (2003) provided a rich synthesis of earlier surveys and literature on reading behavior. The findings showed that number of personal subscriptions per scientist had decreased, signaling a shift from a journal economy to an article economy; author websites had not caught on; they accounted for less than 1% of readings in both early and advanced phases; there had been a massive increase in electronic formats for reading; average readings per scientist had increased, large majority of which were supplied from library collections in print or digital form; usefulness of the articles read and indicators of their value suggested that information content had not changed much, but its overall value to the scientific community had increased as more articles were read and could be accessed more conveniently.

Tenopir and King (2003) presented results of readership surveys at three universities in the USA with different levels of e-journal implementation. It was found that faculty read a great deal and scientists tended to read more than non-scientists. Amount of reading by university scientists had increased over the past 25 years. Most of that increase in reading had come from library collections. Reading by faculty also came from a broader range of journals. Faculty used the electronic collections much more than print, partly because of convenience and time savings. Reduced amount of use of the print collections had implications for their continued viability due to sharp increase in cost per use. There was no observable difference in the age distribution of articles read with introduction of e-journals.
Tenopir, King and Bush (2004) determined reading pattern of medical faculty of the University of Tennessee Health Science Center (UTHSC), USA. Medical faculty read a great deal, especially compared to scientists. The most frequently reported principal purpose of reading was to support their primary research. Majority of reading came from recently published articles, mostly from personal subscriptions. Medical faculty continued to rely on print journals versus e-journals. Age of faculty did not appear to influence the choice of print or electronic format. Medical faculty read more articles than others on an average and need information digested and verified in a way to save their time. Convenience and currency were highly valued attributes.

Boyce, King, Montgomery and Tenopir (2004), USA found little change in reading pattern before and after introduction of electronic access. They estimated the range of journals consulted by the typical academic researcher had grown from at least 1 article per year from 13 titles in the late 1970s, to 18 in the mid 1990s, to approximately 23 titles by 2001. Their analysis revealed the extent to which electronic formats had displaced print. However, using colleagues as information gatekeepers and “following up the literature” remained important despite technological advances.

Tenopir, King, Boyce, Grayson and Paulson (2005), USA identified reading pattern and attitudes of American astronomers toward e-journals. Astronomers, like other scientists, continued to invest a large amount of their time in reading articles and placed a high level of importance on journal articles. They used a wide variety of formats and means to get access to materials that were essential to their work in teaching, service and research. They selected access means that were convenient—whether those means be print, electronic or both. The availability of a mature e-journals system from their primary professional society had surely influenced their early adoption of e-journals.

Liu (2005) studied reading behavior of engineers, scientists, accountants, teachers and managers in various organisations, as well as graduate students at San Jose State University, USA. The results showed that a screen-based reading behavior was emerging for reading electronic documents. That behavior was characterised by more time spent browsing and scanning, keyword spotting, one-time reading, non-linear reading and
reading more selectively. While, less time was spent on in-depth reading and concentrated reading.

Tenopir, King, Clarke, Na and Zhou (2007) studied journal reading pattern of pediatrician members of the American Academy of Pediatrics (AAP), USA. The authors found that pediatricians read journal articles primarily for current awareness and most often rely on quick reading from print journals for current awareness. Reading for research, writing and presentation were more likely from library-provided e-journals. Convenience and purpose of reading were key factors that explain reading pattern of pediatricians. Print personal subscriptions were convenient for current awareness reading, while e-journals systems were convenient for reading for research because they provided access to a broader range of journals.

Tenopir, King, Edwards and Wu (2009) examined how faculty members locate, obtain, read and use scholarly articles. Data were gathered using questionnaire periodically since 1977, USA. They found that average number of readings per year per science faculty member continued to increase, while the average time spent per reading was decreasing. Electronic articles accounted for majority of readings, though most readings were still printed on paper for final reading. Scientists reported reading a higher proportion of older articles from a wider range of journal titles and more articles from library e-collections. Articles were read for many purposes and readings were valuable to those purposes.

3.5.4 Access Problems and Related Issues to E-Journals

Harter and Kim (1996 a), USA investigated access problems and issues related to networked e-journals. The results revealed relatively poor accessibility and usability for the journals studied. The findings showed that practical problems that arose when users attempted to retrieve the texts of electronic publications. The issues raised by the problems identified in the study were discussed.

Mercer (2000), USA studied the complexity and challenges in measuring use of digital resources. She focused on journal usage statistics, whether provided by vendors or generated institutionally from transaction logs, describing how use statistics for Highwire
Press and Ovid journals provided not only a sense of the volume of use, but also the breadth across disciplines and user groups. Moreover, she recommended that librarians explored measurement issues both locally and at higher levels to establish a set of minimal standards for basic use statistics.

Davis and Solla (2003) reported an analysis of American Chemical Society's e-journal downloads at Cornell University, USA by individual IP addresses. While majority of users (IPs) limited themselves to a small number of both journals and article downloads, a small minority of heavy users had a large effect on total journal downloads. There was a very strong relationship between number of article downloads and number of users.

3.6 Summary

A review of literature reveals that there exist many studies on e-journal usage and issues relating to it. High number of studies in this area shows importance of e-journals especially in academic environment. This review with chronological order shows that as time passes, e-journals have been accepted more among the users and have established themselves as viable publication media in many fields. However, use of e-journals was low in the early years (e.g., Tenner and Yang, 1999; Weingart and Anderson, 2000) but has gradually increased over time.

Moreover, variables determining users’ behavior in the use of e-journals can be different according to variables such as discipline, age and academic position. Another point is that, the most studies on e-journal usage retrieved on a variety of different aspects of e-journals were conducted by researchers from USA. Also, most studies concentrated on usage of e-journals by faculty members than other types of users.

In addition, this review demonstrates that there are different research methodologies which are used for profiling e-journals usage and users such as questionnaire, interview and transaction log analysis. Further, few research has been done on use of e-journals in Iran. Nevertheless, there is a lack of comprehensive study in this field. Also, the study coverage of the previous studies in Iran was very limited and none of them studied all the variables together like the present study. To this extent, it is
justified that the present study is the first of its kind that investigated research scholars' e-journal usage belonged to four disciplines at ten universities in Iran.

Thus, this chapter gives glimpses of studies of e-journal usage and user studies and related areas both in Iran and other countries.