Personal Information Management Practices and Behaviors of Social Sciences' Students

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This study reports the personal information management (PIM) behavior of university students under the backdrop of development of information and digital technology infrastructure in Pakistan. The PIM field has been explored through various perspectives in the developed world, but hardly any studies from the developing countries, specifically from the South Asian Region were found. The present, first study from Pakistan , adopted quantitative research design based on a pretested questionnaire to collect data from a sample of 221 students of master programs who were studying in their final semesters in five social sciences disciplines under Faculty of Economics and Management Sciences at the University of the Punjab (PU), Pakistan. The key findings revealed that most frequently used tools for relocating information once found are downloads on personal computers, self-created digital document (e.g. MSWord, Excel, Google Docs, etc.), URLs and hyperlinks. URLs are the most commonly used elements to save online information for future use. The revelation of their practices establishes that they need appropriate training regarding their personal information management.

Keywords: personal information management; information behavior; student information behaviors; information sharing.

Introduction

Information revolution has a direct impact on the information behavior of people. Its availability through a variety of modes such as desktop, laptop, palmtop (smartphone) and e-readers has changed the way individuals would seek and manage information. Wilson (2004) argued even a decade ago that scholarly information behavior today is governed to a significant extent by the existence of a wide variety of electronic information sources. Among with academia, the use of libraries as places to go for in search of information is being replaced.

Furtheremore, people use various techniques and tools to manage the information found for personal use in a variety of electronic devices. Stewart and Basic (2014) stated, "The increase in the quantity and accessibility of information creates the need for skills to assess the relevancy, reliability, and credibility of information as well as the ability to manage this information efficiently" (p. 75). Majid et al. (2014) also opined that many individuals may not be able to effectively manage their valuable information either due to inadequate awareness or lack of desired information handling skills" (p. 111). PIM is a phenomenon in the digital and mobile technology environment in which the learners live today. The idea of 'an individual' way of finding, storing, and working with information in more personal spaces (e.g. desktops, folders, emails and social media sites) is key to the study of personal information management. The first use of the term PIM is attributed to Lansdale (1988) as, "the methods and procedures by which we handle, categorize (sic) and retrieve information on a day-to-day basis". Jones (2007) also defined personal information as information people keep for their own personal use. He provided examples such as e-mail, appointments, web pages, books, articles, and documents. To these examples, Kaye et al. (2006) added letters, scientific specimens, and blackboards full of equations and discussed implications for development of digital tools that allow for personal archiving. Jones and Teevan (2007) defined comprehensively PIM as:

> Both the practice and the study of the activities people perform to acquire, organize, maintain, retrieve, use, and control the distribution of information items such as documents (paper-based and digital), Web pages, and email messages for everyday use to complete tasks (work-related or not) and to fulfill a person's various roles.

Jones, Bruce, and Dumais (2001) elaborated that Keeping Found Things Found (KFTF) has become increasingly more complicated as the sheer mass of information on the Internet has increased. Librarians and information scientists have conducted studies on Information behavior of various communities. In addition to studying users' interaction with information in environments like libraries, archives, museums and other organizations, researchers have lately started investigating personal information management practices of various types of users' groups. The authors have addressed PIM behavior of various groups of people. To mention a few, Pikas (2007) investigated in a qualitative way PIM of engineers. Hardof-Jaffe and Nachmias (2011) studied students' behavior. Otopah and Dadzie (2013) investigated PIM practices of students and its implications for library services using survey research, and Hwang, Kettinger and Yi (2014) of knowledge workers. Diekema and Olsen (2014) examined K-12 teachers' PIM practices. Barreau (1995) studied managers' PIM practices. Krtalić, Marčetić, and Mičunović (2016) studied personal digital archiving among social sciences and humanities students.

In Pakistan, the growth and use of information and communication technology (ICT) is on constant rise. The government has ICT friendly policies and the use of digital technology is encouraged in the education sector, particularly in the higher education. The aim is to connect students with information resources exist in the cyber world. The Higher Education Commission of Pakistan provides free access to a number of major databases and 150,000 electronic books to the universities (www.hec.gov.pk). The Government of the Punjab Province has distributed thousands of laptops for free to the university students to promote learning through digital sources. The largest number of these laptops has been distributed to the PU students. Moreover, students have access to computers and Internet/Wi-Fi in the computer labs, unit libraries, the central library and their departments. As a result, they make extensive use of digital resources for academic, fun and everyday needs. It has been observed as an instructor and research supervisor that the students have a high dependency on the information available online through Google. The information environment is changing in the country and so are the information managing behaviors. The literature demonstrates that PIM is comprised of various important skills and attributes. Research is being conducted worldwide on PIM behavior of various groups of people. It is a vital area to study as one of three domains of 'information management: individual, organizational and social in the context of emerging information environment.

While the area has been explored through various perspectives in the developed countries, there are hardly any studies from the developing countries, specifically from the South Asian Region. The present study aimed to address this gap in the literature. while comparing the findings with the PIM practices of the people from the developed countries shows the differences and similarities in PIM practices. Miller stated in 2005 that finding within one's personal space of information is particularly challenging since the tools are only in their infancy and tend not to take into account the particular characteristics of personal information finding (as cited by Jones and Teevan, 2007, p. 23). There is an increased ease of discovery tools now after a decade. Nevertheless, according to Jones (2008), we may spend significant amounts of time overcoming a pervasive problem of 'information fragmentation' made worse by the very tools that are designed to help us. Hence, the concept of 'keeping found things found' needs to be studied in context of the current developments occurred in the 'keeping' and 're-finding' tools. Ford (2015) argued that a study of how an individual group, organization or community organizes and manages its own information and knowledge does fall within the province of information behavior research (p. 26).

The study will be of value to other developing countries, specifically in Asia, due to various cultural similarities. It may also be used to compare the findings with the PIM behavior of the youth in the developed word similarities.

Literature Review

A review of literature demonstrates that Personal Information Management (PIM) has been studied in the context of user groups, tools, workplaces, manners and so forth using qualitative and quantitative methods. Following is a brief review of selected, available literature to the researcher.

A quite old study by Jahoda, Hutchens, and Galford's (1966) looked at how professors in science and engineering organize their documents into personal indexes. In this study personal index were, "organized collections of documents and/or homemade references to documents that the researcher keeps in his office". It focused on the information items science professors collect, specifically those items that other people have written, like journal articles. Kwasnik (1991) investigated how individuals organize and classify information in their own workspace. The findings suggested that context is important when organizing within a personal space of information.

Investigating PIM more generally, Jones and Thomas (1997) studied whether computer-based or computer-enhanced information management comprised a large part of people's PIM practice. The concept of Keeping Found Things Found (KFTF) was presented by Jones (2001) in the context of PIM. He asserted that keeping found information found is an essential challenge of PIM. Taking the concept of KFTF, Bruce, Jones, and Dumais (2004) conducted a two-phased study on a sample of 214 individuals to investigate both types of information behaviors: "keeping" and "the re-finding" using two staged observation method. The findings revealed that individuals use a range of methods to keep and organize information that they have found on the Web and want to re-access. The keeping method used by all respondents' groups on top was "Make a Bookmark or Favorite".

Kelly (2006) argued that "people should be observed in their natural environments at home, at work, and in between as they engage in PIM behavior in real time, recording both the process and the consequences of the behavior." Researchers have studied the role of certain information tools in PIM practices such as Whittaker and Sidner (1996) and Whittaker, Bellotti, and Gwizdka (2006). Later, Jones (2008) argued that: The creation of a community of people doing PIM-related research is in response to several observations: 1. Analogous to personal problem of information fragmentations, research relating to PIM is scattered across a number of different disciplines ranging from cognitive psychology to database management. PIM as a field of study provides a productive meeting ground for researchers from these disciplines. 2. PIM concerns such as the importance of understanding the life cycle of personal information easily fall in the spaces between other disciplines. 3. PIM is an area of intense interest both scholarly and popular.

Bruce, Jones and Dumais (2004) reported 'Keeping found things found in the context of Web'. They used observation method to record what people do in their offices when they are searching or browsing the Web and they find information they want to keep for re-use. Another work by Jones, Phuwanartnurak, Gill and Bruce (2005) explored how people organize their information in folders especially electronic documents and other files.

Khoo, et al. (2007) studied the ways people organize their computer files/folders on the hard disk of their office workstations and reported that they organized folders in a variety of structures, from broad and shallow to narrow and deep hierarchies. Henderson (2009) conducted a doctoral study on personal document management behaviors of knowledge workers to understand how they manage their documents and to develop guidelines for the development of tools to support personal document management. Capra (2009) studied the PIM of individuals on electronic devices. It reported that three main methods used to transfer files among computers were: email to self, USB drives, and network storage. It also found that almost all participants were using bookmarks to save information found on the web. Fourie (2011) established that to help sustain and improve the effectiveness of PIM practices, the need for librarians to ensure information literacy and the various time-saving techniques and tools users can utilize in seeing to their own personal information needs have also been greatly emphasized.

Swigon (2013) in a thought provoking article discussed PIM, Personal Knowledge Management (PKM) and Information Literacy (IL) while comparing their components and associated competencies.

He has presented a model of PIKM based on "the components of knowledge and information value chain and the spectrum of associated competencies".

Otopah and Dadzie (2013) investigated PIM practices of university students and implications of those practices on library use. Three basic activities related to PIM (keeping, finding-re-finding, meta-level activities) were considered. According to them these activities are efforts to establish, use and maintain a mapping between information and need. Capra, Khanova, and Ramdeen (2013) surveyed nearly 600 university employees' e-mail use with detailed comparison of use patterns between work and personal e-mail accounts. They reported that users engage in more "keeping" behaviors with work e-mail than with personal e-mail.

Hardof-Jaffe and Aladjem (2014) critically examined PIM tools to enhance learning of students by raising awareness to the personal information space; they designed a PIM workshop for educators and students with the goals of increasing awareness.

Kokabi and Nasiri (2014) researched to determine personal management application of the post graduate students of the faculty of educational science and psychology of Shahid Chamran university using the modified model of the domain of personal information management (i.e., finding and re-finding, preserving, and meta-level). Majid et.al (2014) reported that 75% of the students were using Internet services for managing and storing some kind of personal information such as pictures, text documents and e-mail.

Diekema and Olsenv (2014) investigated Primary and Secondary (K–12) students PIM practices employing a qualitative research design based on interviews. The key findings revealed that inheriting and sharing information play an important part in information acquisition for teachers and that information technology supporting education creates unintentional demands on information management.

Chaudhry, Rehman, and Al-Sughair (2015) reviewed information management practices of corporate sector professionals in Kuwait through a questionnaire survey. They focused on finding and re-finding of information, management of e-documents, communications and contacts; and use of tools and social media for managing information. Their results showed that knowledge workers in the private sector relied heavily on company sources, social media, and websites for information gathering.

In a recent study, Krtalić, Marčetić, and Mičunović (2016) reported that social sciences and humanities students manage and archive their personal digital information using common organization practices such as into folders according to the type and importance of the documents. They were rarely using specific tools to manage such digital information.

An overview of the literature demonstrates that authors have noted the woes and benefits of PIM to individuals and libraries, the tools, the methods and the systems of PIM at international level. Pakistan is on its way to become an information and knowledge society. Hence, it seemed important to address this area as no study was found in the local context. It will fill a gap in the literature on PIM behavior in the context of developing countries such as Pakistan.

Research Problem

Personal Information Management has been studied in a variety of contexts by the researchers. Workplace PIM practices have been of particular interest to the experts (Bellotti, Adler, Bly, & Candland, 1999; Luff, Hindmarsh, & Heath, 2000; O' Connail & Frohlich, 1995). University faculty has also been the subject of PIM studies (e.g., Kwasnik, 1991). Researchers have studied also the role of certain information tools in PIM practices. For example, Whittaker, Bellotti, and Gwizdka (2006) and Capra, Khanova, and Ramdeen (2013) examined PIM practices in the context of e-mail programs. Majid et al. (2014) investigated perception of the two public sector university students in Singapore regarding Internet for managing their personal information. To this point, PIM studies have investigated a variety of phenomena and user groups. Mostly such studies were found originated in the developed countries and a few from South Asian but none from Pakistan at the time of data collection. University students have to manage a bulk of information found from Internet, classrooms, teachers, class fellows and libraries. Moreover, their assignments, presentations and projects become a source of information for them, which may be important at a later stage.

They have to deal with storing, organizing and re-finding of information and need to keep it in a better-organized way to re-find later in lesser time. Also they should be able to link the information they have with the information they need anytime during their work. It requires some practical skills in the domain of information and digital literacy. In order to understand their behavior and to design better information services for them this study appeared important. It may also help in designing information and digital literacy programs to develop young learners as good personal information managers.

Aim of the Study

Overall aim of the study was to explore the PIM practices of the young students and how the digital developments have affected their behaviour.

Research Questions

1. What are the PIM practices of the students of social and management sciences?
2. What are the differences in PIM behavior on the basis of students' gender and discipline?

Research Design and Method

The use of quantitative design has been commonly used by information scientists in studying various aspects of information behaviors and perceptions. This study used the quantitative design based on a survey to address the research questions. A questionnaire developed by van Helvoort (2012) was used for collecting the data in late 2014 from the sample respondents on their PIM behavior (Appendix A).

Helvoort claimed that it was developed to "measure the behavior of groups of students (for instance department cohorts) in Personal Information Management (PIM). … The students' responses were checked on consistency, item non-response, desirability bias and information value of the results. All these criteria indicated that the questionnaire is an adequate tool for the assessment of PIM at an institutional level". Hence it was used, after getting author's permission, and slight modification to meet the local needs and adding latest variables. It was assumed that the students of the final semester would comparatively better understand the phenomenon due to their experience of dealing with information available in various digital forms.

The students enrolled in the final semester of the Master Programs in all the institutes and departments of the Faculty of Economics and Management Sciences were selected as sample to collect data. This Faculty includes Institute of Business Administration (IBA), Institute of Business & Information Technology (IBIT) Institute of Administrative Sciences (IAS), Department of Economics (ECO), and Department of Information Management (DoIM). A total of 250 questionnaires were distributed with the help and consent of the class teachers, and 221 duly filled were received back. The collected data was cleaned and then analyzed using SPSS. Due to the nature of data and research questions, descriptive statistics have been used to analyze data and present findings.

Results and Discussion

Personal Profile

The personal profile information enquired was only about the gender of the respondents and their discipline to determine the differences of behavior based on both variables (Figure 1) and discipline (Figure 2). Fig. 1 reveals that in total a majority of the respondents were male students. Nevertheless, the females were also in a significant number.

Discipline wise distribution is shown in Figure 2. It represents the participation from all the selected units for data collection. The highest number was from the Dept. of Information Management and the lowest from the Institute of Business Administration. The data was taken from the students of the final semester enrolled in the master programs of all the 5 programs.

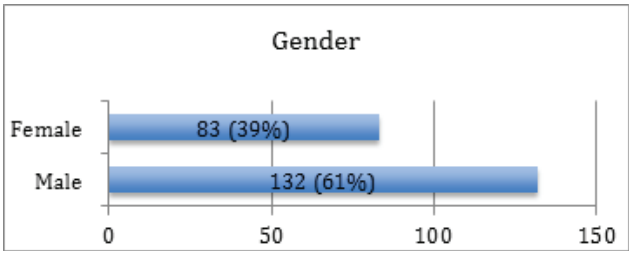

Figure 1

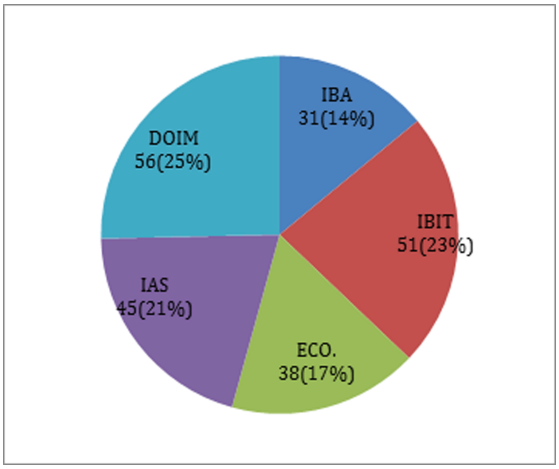

Figure 2. Respondents' distribution based on the intuitions/departments

Use of the 'tools' to relocate information (sources) once discovered

First of all, a question about 'Keeping' the found information for 'Re-finding' was asked. The respondents were enquired about using various devices or tools to keep the information once discovered, as it is very important behavior regarding PIM. Table 1 elaborates the results against various options in frequencies and percentages. The findings have been arranged according to the mean value of the respondents' usage pattern.

Table 1.
Tools frequently used for relocating information once discovered (N=221)

Tools	Daily (%)	Weekly (%)	Less than once a month (%)	Monthly (%)	Never used (%)	Mean	SD
I keep copies (downloads) of digital documents on my own computer	69 (31.2)	81 (36.7)	37 (16.7)	19 (8.6)	15 (6.8)	3.77	1.175
A self-created digital document (e.g. MSWord, Excel, Google Docs, etc.) with URLs and hyperlinks	63 (28.5)	56 (25.3)	44 (19.9)	32 (14.5)	26 (11.8)	3.46	1.347
Bookmarks and favourites on my own computer	48 (21.7)	63 (28.5)	58 (26.2)	29 (13.1)	23 (10.4)	3.39	1.249
Other (please specify)	12 (5.4)	9 (4.1)	183 (82.8)	4 (1.8)	13 (5.9)	3.07	.716
Online bookmarks (for instance delicious)	18 (8.1)	60 (27.1)	49 (22.2)	36 (16.3)	58 (26.2)	2.75	1.323
My own memo book (paper)	31 (14.0)	32 (14.5)	51 (23.1)	34 (15.4)	73 (33.0)	2.60	1.426
A digital notebook app (for instance Evernote)	22 (10.0)	45 (20.4)	51 (23.1)	29 (13.1)	74 (33.5)	2.58	1.383
Bibliographic Management Software (e.g. RefWorks, Endnote, Mendeley, etc.)	12 (5.4)	35 (15.8)	52 (23.5)	56 (25.3)	66 (29.9)	2.43	1.218

Note. 5= Daily; 4= Weekly; 3= Less than once a month; 2= Monthly; 1= Never used

Table 1 shows that copies (downloads) of digital documents on personal computers got the highest mean value. It was followed by self-created digital document and downloads on the personal computers with mean values a little higher than 3 on a 5-point Likert type scale. 'Bookmarks and favorites on my own computer' was third frequently used method. The least used tool by the subjects of the study was bibliographic management software. Notebook and online bookmarks were not commonly used for keeping information for re-use in future.

Information Retrieval Practice

They were further asked about 'Re-finding' of the information once found; the frequency of retrieving the saved information from any of the sources listed above. Table 2 reveals that a majority of the responses' frequency comes under weekly category.

Almost equal percentage of respondents would retrieve information on daily (17%) and monthly basis (20%). A significant number (39.4%) needed to retrieve weekly the stored information.

Table 2.
Retrieval of information from one of the systems mentioned

	Frequency	Percentage (%)
Less than once a month	40	18.1
Monthly	45	20.4
Weekly	87	39.4
Daily	38	17.2
Missing	11	5.0
Total	221	100

Elements of Information Saved

An information source has a number of elements one can choose from to save it for future retrieval. The respondents were enquired about the element of information they use while saving for future use. They were given multiple choices to check from. Figure 3 elaborates that URLs were most commonly used elements to keep digital information for future use (n= 155; 70%).

The study by Bruce and Jones (2004) also reported 'Creating a Bookmark or entering a URL as a Favourite' as the most frequently used method for retrieving information. Only 65 (29%) positive responses were about keeping summaries/abstracts got only. It may be because students seldom consult research papers for their studies at this level. They depend mostly on text or recommended books.

Sharing of Information

An important behavior regarding personal management of the digitally kept information is sharing it with others. It is a common practice in the cyber world, however, the information sharing practices differ in various cultural contexts. Ardichvili, et. al. (2006) argued that the impact of national culture factors on knowledge sharing has been largely neglected in the literature. Their qualitative study on knowledge sharing among workers in an organization established that cultural context of a country affects the knowledge sharing behaviors. This question was asked to explore the behavior of young Pakistani students (Table 3).

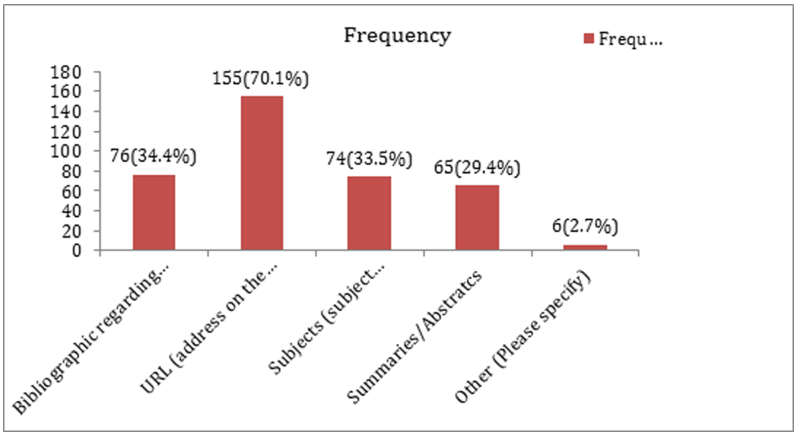

Figure 3. Elements of information kept about a source

It is apparent that students were hardly using online spaces for sharing knowledge. A majority of the respondents were sharing the information with their classmates or friends by sending them e-mail, while only 12% published on the public Internet for everyone to access.

The survey of van Helvoort (2012) also concluded that students were not much engaged in collaborative learning and sharing information. The author suggested that the "extra attention needs to be given to the curricula to collaborative learning and collaborative work" (p. 146). Yuen and Majid (2007) study of undergraduate students in Singapore found that students generally displayed a positive attitude towards knowledge sharing and were appreciative of its importance in peer learning. However, competition among students and lack of depth in peer relationship were the two main factors that inhibited knowledge sharing.

Table 3.
Sharing the saved information with others

Statements	Frequency	Percentage (%)
Yes, I publish them on the public internet; everyone can access them	27	12.2
Yes, I share them in a 'closed community', for instance in a shared folder; people have to log in to access the data	54	24.4
Yes, I share them with my classmates or my friends by sending them by e-mail	125	56.6
No, I keep them for myself and nobody else has access to my data	51	23.1

Gender and Discipline Wise Difference in PIM Behavior

One of the aims was to determine the differences in PIM based on gender and discipline. An independent t-test showed (Table 4) that there is no significant difference (Sig =.87) between male and female students' behavior regarding retrieving the saved information form the various systems mentioned. It may be concluded that the gender has no significant impact on PIM behavior of the students, it may be due to that both have access to similar kind of information environment and manage more or less the same way their personal information.

Differences in Information Retrieval Behavior based on the Selected Disciplines

The One-way Analysis of Variance (ANOVA) was applied to test the differences in mean value of students from the selected institutions/departments with regard to their information retrieval behavior. The results indicated no statistically significant differences in the mean scores of students for their information retrieval behavior ($F(4,216) = 0.343$, $P=0.849 > 0.05$). It determines that the information retrieval behavior of students belonging to different institutions/departments is more or less the same.

Table 4.
Independent sample t-test based on gender

Statement	Gender	Mean	Sig. (2-tailed)
How often do you retrieve an information item from one of the systems that you mentioned in question 1?	Male	2.58	.872
	Female	2.60	

Discussion and Conclusions

The study reveals everyday PIM practices of the university students enrolled in the final year/semester of master programs in the selected social sciences disciplines.

The findings show that most frequently used tools for relocating information once found are downloads on personal computers, self-created digital document (e.g. MSWord, Excel, Google Docs, etc.), URLs and hyperlinks. URLs are the most commonly used elements to save online information for future use. Online bookmarks (for instance delicious) are lesser used than bookmarks on personal computers. It is very interesting to note that only 17% students would need to retrieve on daily basis the information once saved in any of the digital mode (Table 1). Abstracts are least kept sources for future retrieval. It is because at master level students usually use secondary information sources and textbooks. The use of research articles or reports is not common in our academic environment. The least used tool by the subjects of the study was bibliographic management software.

The reason for this might be that the respondents were students of master's program, and they are not involved much in writing independent research projects in Pakistani public sector universities. It may also be due to their lack of knowledge on how to use a bibliographic management system, as there are hardly any training opportunities for them to learn.

Email is a commonly used medium for sharing information with friends and class-fellows. They are not very open to sharing information and a majority of students share it within closed community. Less sharing is again related to Asian culture where learned would hide their sources of knowledge in olden times. Information sharing culture needs to be promoted, through collaborative learning activities and projects in the context of information era, where access to tons of information sources is available for free. There was no significant difference between PIM behavior of male and female students. Also, there was no significant difference among the students of all the five disciplines.

Investigation of the PIM practices of young students revealed their patterns of interacting with finding, keeping and re-finding information in a digital information environment. However, further research, both in quantitative and qualitative manner, is desired at a much larger scale to understand various behavior dimensions of PIM practices. The present findings establish that they need proper training regarding their personal information management. Hence, appropriate PIM instruction strategies to facilitate young learners in dealing with the growing amount of information and managing it in an effective and efficient manner is required to enhance their productivity and to save time. This is a baseline study in this regard which reports useful data regarding social sciences students' information management behaviors and practices and the findings cannot be generalized.

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Appendix A

Dear Student,

This survey is about the use of Personal Information Management strategies for maintaining personal collections of information sources. The study aims to explore whether you knowingly use one or more 'systems' to keep track of the information that you have found and may want to use in future. Examples of such systems are: a collection of bookmarks for websites, a digital system with references to journal articles, study books and URLs or a simple paper memo to write down data.

A Questionnaire for the Institutional Assessment of Personal Information Management

1. How often do you use the 'tools' from the list below to relocate information (sources) that you once discovered?

Tools	*Daily*	*Weekly*	*Less than once a month*	*Monthly*	*Never used*
Bookmarks or Favorites on my own computer					
Online bookmarks (for instance Delicious)					
My own memo book (paper)					
A digital notebook app (for instance Evernote)					
A self-created digital document (e.g. MSWord, Excel, Google Docs, etc.) with URLs and hyperlinks					
Bibliographic Management Software (e.g. RefWorks, Endnote, Mendeley, etc.)					
I keep copies (downloads) of digital documents on my own computer					
Other (please specify) _____					

2. How often do you retrieve an information item from one of the systems that you mentioned in Question1?

☐ Daily ☐ Weekly ☐ Monthly ☐ Less than once a month

3. What information regarding the source do you keep? (Multiple answers possible)

Bibliographic data like author, title and publication year

URL (address on the WWW)

Subjects (subject headings, labels or tags)

Summaries/ Abstracts

Other (please specify)_____

4. Do you share the data from one of the systems that you mentioned in Question 1 with other people, for instance by publishing it on the internet? (Multiple answers possible.)

Yes, I publish them on the public internet; everyone can access them

Yes, I share them in a 'closed community', for instance in a shared folder; people have to log in to access the data.

Yes, I share them with my classmates or my friends by sending them by e mail

No, I keep them for myself and nobody else has access to my data.

5. Gender: Male ☐ Female ☐

6. Department: _____

Thank you for your time and response!