Challenges of Conducting Research in a Digital Age

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Abstract

Human's lives have been changed in forms of different ways since a substantial development of the high technological appliances in the 21st century. This also includes the ways researchers conduct research by adopting the high technology tools in this era. Most people just witness the development and the substantial benefits brought to the research; however, some drawbacks could be neglected. Particularly, the plagiarism occurs when the widespread of adopting the Internet and lacking the anti- plagiarism software. This paper focuses on exploring the challenges and new directions for researchers when they conduct research in a digital age.

Keywords: digital age, plagiarism, advanced technology, multimedia, digital.

Introduction
Emails, the World Wide Web, and various digital technologies have emerged for the past two decades. Scholars are inclined to search for information and to conduct research online while reviewing literature and contacting publishers and editors. Several recent publications highlight the various methodologies the scholars use, including social, political and cultural exploration, which all employ researches regarding the Internet technology (Gauntlett, 2000; Howard & Jones, 2004; Jones, 1999; Mann & Stewad, 2000). Besides these publications, some textual analysis (e.g.Crowston & Williams, 2000; Mitra, 1999; Mitra & Cohen, 1999), surveys (e.g.M. Parks & K. Floyd, 1996; Schmidt, 1997; Smith, 1997) and experiments (e.g.Iyengar, 2002) have been adapted to use online system so as to investigate phenomena more precisely. Not surprisingly, the reasons why users would like to search for information online or research online are time saving, cheaper cost and effective response. Compared with traditional research methods, using these advanced high-technology devices certainly bring much convenience to scholars. However, some drawbacks exist together with benefits in this virtual environment. For example, a large amount of information on web makes users feel in the sea. In addition, searching for information effectively requires basic knowledge of information technology, such as knowing various functions of digital products and softwares. Furthermore, prosperity of electronic journals and publications easily mislead authors without severe censorship. Lastly, plagiarism exits in a growing number of submitting papers online. In this paper, it focuses on reviewing previous literature of four items mentioned above to show an explicit picture of challenges for users before they explore research in a digital age.

The comparison of information retrieval in the past and in digital age
In the past, those who wanted to review literature and collect information before doing research, they have to go to libraries. By means of borrowing books and periodicals, keeping notes on the notebooks and reading newspaper as well as personal communication, they could finish their review process. However, sorting out these pieces of information is like looking for a needle in a haystack, which wastes time and gains little achievement. Luckily, with the development of high technology, the pieces of information have seen a tremendous increase via Internet and computer-mediated communication (Fox et al., 2001; Horrigan, 2001) .
Compared with traditional methods, electronic media brings people substantial benefits, such as less time-consuming, unlimited borrowing authority, larger sampling population .(Wright, 2005). First, when conducting research via the Internet and through other multimedia, it is definitely more efficient than those in the past. More precisely, some searching engines, like Google, Baidu and Yahoo, give users feedbacks in one or two seconds. Moreover, with an increasing number of e-libraries in universities, searching for information becomes easily accessible by sorting out different codes of library categories to track information sources. This brings much convenience to both students and staff as well. Thirdly, downloading books and journals from the Internet provides much more flexibility and freedom for users. Those who read e-books and e-journals would not worry about paying fines if the journals are overdue. And most databases in e-libraries are regularly updated by IT support staff, which provides latest deliveries. The last and most important point is doing online research, by which the ways of sampling take priorities. In the past, researchers needed to have a face- to-face meeting to talk with participants, but due to embarrassment and insecurity, low reliability resulted in the failure of research.

However, the wide spread of communicative activity, which takes place through new media, increases in conducting primary research on virtue environment (Flaherty, Pearce, & Rubin, 1998; Matheson, 1991; Nonnecke, Preece, Andrews, & Voutour, 2004, August; J. Preece, 1999; J. J. Preece & Ghozati, 2001; Walther, 1996, 2002; Wood & Smith, 2001; Wright, 2000a, 2000b). As a decreasing cost of computer software and hardware and an increasing popularity of the Internet, more groups and organizations are using the Internet for communication and searching for information (Fox et al., 2001; Nie, Hillygus, & Erbring, 2002). These organizations not only offer information to consumers but also provide opportunities to researchers to access those people who browse web pages on these websites. Due to the nourishment of virtual communities online, a growing number of researchers survey in diverse areas, such as interpersonal (M. R. Parks & K. Floyd, 1996; Tidwell & Walther, 2002), group (Hobman, Bordia, Irmer, & Chang, 2002; Hollingshead, McGrath, & O'Connor, 1993), organizational (Ahuja & Carley, 1998) and mass communication (Flanagin & Metzger, 2001). Hence, researchers have access to larger population for sampling easily and samplers can use emails, online questionnaires and chatting tools text to response, which increase the freedom, flexibility and privacy for them. Consequently, satisfied reliability and validity can push research forward.

Although electronic media is beneficial in retrieving information, it also has some drawbacks. Compared with printing media, electronic media cannot be permanent for storage (Schneider & Foot, 2004). Specifically, the printed books and hard copies of periodicals could be reused and kept in libraries for a long time. According to the statistics from National Library report, each library of Australian universities averagely has more than two million bibliographies, including printing books, journals and periodicals. Take library of Sydney University for example, it has more than 5.1million bibliographies, the number which is far more than54, 000 electronic journals and 11,331 digital book chapters. Moreover, a face- to –face survey in research is more authentic than virtual environment because it can eliminate misunderstandings immediately, cement relationships, and encourage continued interaction (Community Banker, 2003). Last, cost of borrowing books from the library, reading newspapers and talking with people is lower, particularly, to those who are university students.

Overall, with the growing popularity on web-based research, electronic resource is more attractive for researchers, not only for its ease access but also for saving time as well. Sometimes printing media has priority but the trend of information era cannot be irreversible.

Knowledge acquired on technological products before conducting research

Though the web provides much ease for researchers to collect, share and distribute information, unskilful operation and lack of technology knowledge hinder them to explore further. Hence, as an advanced new technology, it requires a good understanding of the nature and characteristics of different digital products for researchers; otherwise, they will lose valuable time in searching for useful information.

According to Hui and Chau (2002), the digital products can be categorized into three items: tools and utilities, content-based digital products and online services. Each category of these products serves their different purposes. In general, most products in the category of "Tools and Utilities" are software programs, such as virus scanning softwares or Adobe Acrobat for creating and viewing PDF files, which perform its specific functions or achieving other purposes. Real player is the case in point. It allows users to listen to the online music and broadcast. The products in this category could be downloaded via Internet. There are some typical examples like e-journal, e-newspaper, Pro-Quest Direct, databases in the "content-based digital products", which are used

to assist in the information retrieval or data manipulation process. The function of these products is suitable and common used for researchers to acquire information. The product in the "online services" is to provide access to useful resources, such as server connection and online utilities. The characteristic is consumers can only locate target information instead of "purchasing" the product (Hui &Chau, 2002).

Apart from the classification of various products for research, researchers also need know how to use social software for research in a virtual research environment (VRE). Nowadays, the technology of Web 2.0 is widely used by both researchers and scientists as well, to enable them to work more efficiently and productively (Fraser, 2005). Its use is prevalent with academics, according to Fraser (2005):

> *It is very important in biological sciences, or bioinformatics. In the UK, JISC is running a programme which ends in 2011, and which is funding 24 VREs. In Europe, the European Strategy Forum on Research Infrastructure covers a number of key initiatives, including the Digital Research Infrastrure for Arts and Humanities.*

When researchers conduct research in VRE, Web 2.0 applications include blogs, wikis, Twitter, media-sharing sites such as YouTube, 3D environments and social networking sites such as Facebook and theseapplications are suitable for different research methods. Examples are shown below:

Identifying a research project	Federated search engines/commercial bibliographic indexes, RSS feeds
Identifying funding streams	E-mail alerts
Identifying project partners	Facebook , blog community and social sites
Collaborating on a research proposal	Google documents and Skype, QQ, MSN
Collaborating over research information	Google documents, wikis
Writing reports and other outputs	Searching engines, such as Google, Baidu, Yahoo
Disseminating results	Web-based seminar, e-conference, e-publications

Censorship for electronic media

With the popularity of online submitting and publishing format system, researchers, editors and readers prefer reading others' papers in the virtual environment. It has indeed revolutionised access to information and knowledge. Akdeniz (2002) explains its importance as follows:

> *In some societies, computer literacy is, arguably, already as important as the ability to read, write and count; in others, as yet too impoverished to make a substantial investment in the medium, it promises to be a vital tool in economic, social and educational development (p.1196).*

Many researchers have emphasized the importance and significance on electronic media in recent reviews (Bondarenko & Janssen, 2005; Clark & Kingsley, 2008; Eynon, Schroeder, & Fry, 2009; Peng & Nadarajan, 1995). While it is true that information provided via electronic media is "democratising information" (Sharp, 2001), ethical challenges are still needed to be noticed. Censorship can be taken by the government; academic institutions, like schools and university libraries; and some other institutions such as telecommunication companies; social media sites; military; wikileaks; individual websites; corporations aboard; trade secrets and

copyright. Although technology and censorship are often regarded as opposing forces in the information age, this tension is exemplified by the cases in Singapore, United America, China and Australia, which provide valuable experience on how to harness information via electronic media while having censorship controls in place (Holdom, 2005).

In Singapore, the censorship has been differentiated in home and business; children and adults; public and private consumption and it is heavier for public and home use than the business use. The example in U.S.A has been much more successful. Proponents of protecting intellectual property online in U.S.A to produce a system to remove infringing materials so that it could inhibit legally protected materials (Electronic Frontier Foundation, 2010). Due to the effort to expand surveillance of digital communications, the American government has carried out some federal laws to censor the Internet. For example, Digital Millennium Copyright Act (DMCA) is the case in point. Meanwhile, the government requires the libraries set up its internet connection for internal connection, like vpns. At present, filtering and blocking software in library is used widely to protect intellectual property. In China, various methods are used for censoring, such as IP blocking, DNS filtering and redirection, URL filtering, Packet filtering, Connection reset and Network enumeration (Wikipedia, 2012b). The censorship in Australia is divided between the states and the federal government and the censorship of the Internet sites hosted in Australia is considered to be the strictest in the western world (Wikipedia, 2012a). Particularly, on 1 January 2000, the federal legislation came into effect to enforce the regulation of the Internet sites. If the sites are found illegal by Australian Federal Police, the list of banned sites is then added to filtering software, which was offered by Internet Service Providers and the Australian Government (Wikipedia, 2012a). According to *ABC News* on 31 December 2007, the Telecommunications Minister of the newly elected Labor government, Stephen Conroy, announced that Australia would introduce mandatory internet filtering. It would provide greater protection to people from illegal and violent websites (Australian Broadcasting Corporation, 2007).

Research and plagiarism

There is an interesting explanation of the relationship between research and plagiarism from website *Writing-World.com*, in which the author quotes from a teacher's idea, "stealing from one source is plagiarism, but stealing from many sources is research"(Allen, 2001) . At what point do people use the previous published material cross the line from "research" to "copying"? The action of plagiarizing is defined as "To take ideas, writings, etc., from another and pass them off as one's own" (The Ameican Heritage Dictionary of the English Language, 2010). According to the UQ Researchers (2011),

> *Research is defined as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes.*

There is no simple answer to these two definitions otherwise they would have been codified into law long ago. In a research, the authors are permitted to quote rationally previous published bibliographies and form their ideas so as to find out new outcomes. Hence, using quotes and published sources in one's writing is ethical and acceptable ways by which conducting research. Consequently, plagiarism is made much easier by the recent availability of huge amounts of paper. Fortunately, there are some simple criteria to help one establish and to extinguish one from another (Allen, 2001).

When it is a Research…

♦   The author should identify the audience he/ she is writing for. For example, if it is written for a research or professional journal, quoting the work from others is not only acceptable but expected. However, if the writing is for a specific consumer publication (i.e., a magazine), the quotes from previously published sources would not be concerned since saleable articles are suitable in the consumer marketplace.

♦ Background information is expected when the author needs publish his or her work in an academic journal. This means that reviewing published sources of information that are accurate and acceptable. Suppose, if an article is on animal-assisted therapy for a magazine, the authors probably want to make definition of animal-assisted therapy for the audience. Therefore, current references would be drawn upon logically by which on one considers it as a plagiarism.

♦ The way how to reference the materials is important. In academic researches the author should quote directly or paraphrased. In either case, they are often supported with footnotes and complete references. Nowadays, Harvard Referencing System is adopted popularly by most academic institutions; APA writing style was first used by journals and publications of American Psychological Association and now it becomes a standard writing style among some disciplines. Another popular academic writing style is MLA, which is widely used in the humanities, especially in writing on language and literature. According to Achtert and Gibaldi(1985) , "MLA style has been widely adopted by schools, academic departments, and instructors for over half a century. The association's guidelines are also used by over 1,100 scholarly and literary journals, newsletters, and magazines and by many university and commercial presses."

♦ To what extent does the paper originate with the author is the key to decide if the material the authors uses for reference constitutes "justified research" or a form of copying. If the idea and style is original, then the author can use however much research he or she needs to stand the point. The question is to use something new and bring valuable materials when quoting
.

When it is plagiarism…

♦ Using simply another person's ideas as the author's is regarded as theft. When research is conducted, the inspiration and creativity of central ideas should come from the author. If it is only recycling others' work into the author's own words, it is a copy.

♦ If the author borrows a large proportion from others' original work, even it is referenced, it will be a problem. Thus, to the largest extent, the author's paper cannot be read like reading a condensed work of others'. If the paper has more quotes from the original work, it is not the "fair use" (Allen, 2001).

Challenges for editors

Though a large amount of electronic text has made plagiarism in the era of high technology, it is also easier to discover by means of plagiarism software (Lose, 2011). To help editors resolve the issue of plagiarism, some journals set an upper limit for the amount of text that can be reused, usually 30% (Giles, 2005). Some journals, such as *The Lancet*, have decided to check all manuscripts for plagiarism by using plagiarism detection software. In a recent case, the thesis of "The German Secretary" has been discovered plagiarism because nearly 20% of the all these contained copies. To be frank, few editors will knowingly republish a paper that contains a large amount of previously published work and no readers would like to read same materials in different journals several times (Giles, 2005). Hence, the Committee on Publications Ethics (COPE) is currently drawing up a discussion paper on text recycling when discovered by Cross Check (2011).

Conclusion

With the proliferation of Internet digital technologies in 21st century, it has challenged scholars conducting research in the virtual environment. Compared with traditional method, using those high technologies bring much convenience to researchers in terms of cost, time and efficiency together with some feedback. This chapter first explains the differences of retrieving information in the past and in a digital age. Then it moves to provide some basic knowledge of various digital products' function in order to improve the efficiency of the research. Furthermore, due to lack of severe censorship of electronic media resources, it exemplifies cases from some countries to provide experience and guide future research. Last, in terms of the boom of e-journals and e-paper, the emergence of the plagiarism has challenged scholars and editors. Thus, distinguishing the research and the plagiarism seems necessary and vital.

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