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The role of agency in historians' experiences of serendipity in physical and digital information environments

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Abstract

Purpose – The purpose of this paper is to investigate the changing research practices of historians, and to contrast their experiences of serendipity in physical and digital information environments.

Design/methodology/approach – In total, 20 historians in Southwestern Ontario participated in semi-structured, in-depth interviews. The interviews were transcribed and analyzed employing grounded theory. The analytical approach included memoing, the constant comparative method, and three phases of coding.

Findings – Four main themes were identified: agency, the importance of the physical library experience, digital information environments, and novel heuristic forms of serendipity. The authors found that scholars frequently used active verbs to describe their experience with serendipity. This suggests that agency is more involved in the experience than previous conceptualizations of serendipity have suggested, and led us to coin the term "incidental serendipity." Other key findings include the need for digital tools to incorporate the context surrounding primary sources, and also to provide an organizational context much like what is encountered by patrons in library stacks.

Originality/value – The increased emphasis on digital materials should not come at the expense of the physical information environment, where historians often encounter serendipitous finds. A fine balance and a greater integration between digital and physical resources is needed in order to support scholars' continued ability to make connections between materials. By showing the active role that historians take in their serendipitous encounters, this paper suggests that historical training is critical for eliciting incidental serendipitous encounters. The authors propose a novel approach, one that examines verbs in serendipity accounts.

Keywords History, Academic libraries, Serendipity, Browsing, Historians, Historical research process, Information seeking

Paper type Research paper

Introduction

Historians, by training, are storytellers. They create narratives by integrating primary and secondary sources with their own research, to "give us insight not just into the particularities of historical experience, but also into the very meaning of the human" (Scott, 2011, p. 204). By the time historians have created a narrative on a particular topic, they have connected many ideas along their path of research: choices have been made, discoveries have been found, and a collection of smaller, though no less interesting, stories have been woven into the fabric of historians' work.

Serendipity is a form of storytelling (Rubin *et al.*, 2011). It is one which historians are intimately familiar with. Among the boxes of letters, photos, and old maps in the archive and along the carefully organized and browseable stacks of the library these micro-stories play themselves out, accompanied by words like "a-ha!" and thoughts such as "found it!" Time and again historians reflect on their research process with fond

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memories of the instance that they made that all-important connection: the one for which only serendipity can be held responsible (Hoeflich, 2007; McClellan, 2005). Retelling how they came upon a specific source or had an epiphany in the archives helps historians to link ideas not only for themselves, but also for their audience (whether it be friends, colleagues, or other readers) to be convinced that the connection they have made is a useful one.

Developments in information environments have altered the way that many historians seek information, and how and where they read, write, and browse (Solberg, 2012). There are many tools available to historians that change how they acquire and access their research materials. Google is the "key player" among search engines for humanities scholars (Kemman *et al.*, 2013), library discovery tools strive to retain their importance through innovation (Race, 2012), and digital historians even design their own toolkits (Graham *et al.*, 2014). Current studies of historical scholarship cannot ignore these changes.

Though shifting their research behavior to a digital environment might create new opportunities for historians (Ramsay, 2014; Rosenzweig, 2001), it remains unclear how this will affect their experiences with serendipity. Serendipity has continually been connected to the physical information environment (Kirsch and Rohan, 2008; Rimmer *et al.*, 2008) and a move to the digital could jeopardize historians' encounter with this phenomenon. To counter this, attempts have been made to design tools that recreate elements of serendipity in the digital environment (Iaquinta *et al.*, 2008; Rädle *et al.*, 2012; Thudt *et al.*, 2012), though none appear to have been implemented past the prototype stage. In addition, there is little evidence of these tools having been effectively used or evaluated (Quan-Haase and McCay-Peet, 2014).

This paper seeks to fill a void in our understanding of how historians experience serendipity in both physical and digital environments and examines the unique opportunities each presents. Digital environments create new challenges for the historical research process and might require historians to employ heuristic forms of serendipity to recreate what they have experienced traditionally in physical environments.

In total, 20 historians in Southwestern Ontario were interviewed about their research process, and their experiences of serendipity in both physical and digital environments. This paper addresses the following three research questions:

RQ1. How do historians describe serendipitous experiences?

RQ2. Does the physical environment of the library facilitate the serendipitous encounter?

RQ3. In what ways are historians experimenting with digital environments to encourage serendipity in their research?

Literature review

Several bodies of literature inform our study. The following literature review first highlights the connection between historical research methods and serendipity to set the stage for showing the importance of making connections for scholars in this discipline. Next, the literature that addresses the challenge of defining serendipity is reviewed to clarify our constraints in studying this phenomenon. Finally, the role that serendipity plays in both physical and digital environments is discussed to lay the groundwork for understanding the changing nature of serendipity as a result of a move in academia toward integrating digital resources.

Historical research methods: browsing and serendipity

The Sage Encyclopedia of Quantitative Research Methods outlines five steps in historical research (Lundy, 2008):

(1) identification of a research question;

(2) developing a hypothesis;

(3) data exploration and collection;

(4) fact-checking and analysis of evidence; and

(5) writing the narrative.

Though there are many variations on these stages, the move from the conception of a topic, to gathering information, to writing up the research is widely accepted as the "process" by which historians work. It must be remembered that this process is far from linear: the beginning stages are repeated time and again until historians feel they are ready to begin the writing process, and even then they may circle back to their sources for further scrutiny and fact-checking (Case, 1991).

The importance of the library to historians has been underscored repeatedly (Abbott, 2008; McClellan, 2005; Stone, 1982; Woolwine, 2014). An examination of historiographical textbooks shows that Lundy's (2008) third step, data exploration and collection, is the stage where the library and archive are most commonly visited (Brundage, 2008; Cantor and Schneider, 1967). Proper library use comes up repeatedly amongst the skills suggested for historians in these texts. Interestingly, several of these textbooks devote space to training historians how to browse. Browsing has been linked to serendipity by several scholars (Foster and Ford, 2003; McKay *et al.*, 2014), with Rice, McCreadie, and Chang (2001) giving the name "serendipity browsing" (p. 171) to information seeking which is undirected and not goal-oriented.

A textbook by Cantor and Schneider (1967) notes that browsing may seem an obvious aspect of working in a library, but nonetheless the authors continue to describe this experience to their reader:

> The student should make a point of spending some of his free time simply wandering around the stacks and looking at the books he finds […] By such general browsing, the student will find that he discovers many new sources, and in addition he will give a tremendous boost to his memory of these books if he opens and examines and glances through the contents of the volumes. Thus, book-browsing is not merely a form of idle curiosity, but is really a major aspect of the student's, and the scholar's, occupation (p. 195).

In addition to encouraging history students to browse, Cantor and Schneider (1967) state that this browsing will provide a "boost" to memory; a way for the historian to make connections between materials. Instead of a simple act that appears as a byproduct of searching, browsing is a strategy that these scholars undertake during their research process. Several other scholars note the importance of this skill (Case, 1991; Delgadillo and Lynch, 1999). Brundage (2008) states that shelf browsing "entails simply looking at the volumes adjacent to those books you have gone to the stacks to fetch; some of your target book's neighbors are almost certain to prove valuable" (p. 42), again reiterating the value of browsing to the research process.

Studies of historians' information behavior have confirmed the importance of browsing to the historical process. Delgadillo and Lynch (1999) conducted interviews with history graduate students, which revealed that students were often instructed to browse their local library collections as part of their assignments. The authors note the

importance of the chance encounter with material, showing that 10 of the 22 students described relying on "the element of serendipity when browsing" (p. 253). Duff and Johnson (2002) found that their participants browsed, rummaged, or fumbled through material in the archives at the beginning stages of their research as a way of building contextual knowledge. Not only were the historians they interviewed interested in information directly associated with their topic, but "also in any information that tangentially threw light on it" (p. 487). This contextual knowledge, built up during the entire research process, is needed for historians to identify relevant materials. Duff and Johnson (2002) argue that the "a-ha" moments that historians often assign to serendipity are less the results of a chance encounters than they are the product of "the deliberate tactics of the expert researcher" (p. 495).

Historians note that encountering a book, letter, or document in a physical environment is more useful than coming across it in a digital format. The historian Hoeflich (2007) notes the benefits of the "all inclusive" archive, integrating the physical and digital, and the negative consequences of digital reproduction of original documents. These consequences include a lack of experience with the tactile aspects of archival documents, and the loss of significant qualities of historical artifacts when they are reproduced in a different medium (Hoeflich, 2007).

The role of browsing and serendipity in historical research is underscored once more in a collection of essays titled *Beyond the Archives: Research as a Lived Process* (Kirsch and Rohan, 2008). The editors note that:

> These authors illustrate the mostly undocumented phenomenon that a commitment to a research subject might begin with a simple clue. Authors show how they moved from a hunch, a chance encounter, or a newly discovered family artifact to scholarly research (p. 4).

Each of these personal accounts shows a unique experience of serendipity in historical research, but one familiar enough to bring these scholars together to produce a book on the topic. Most of the scholars contributing to the collection recount their work in physical libraries and archives, and do not focus on digital collections. The shift to digital collections and internet research means a change for historians, and likely also a change in the way that they experience serendipity.

Challenges in defining serendipity

The *Oxford English Dictionary* defines serendipity as "[t]he faculty of making happy and unexpected discoveries by accident. Also, the fact or an instance of such a discovery" (OED, 2015). This definition is derived from the etymology of the word, which was coined by Horace Walpole (for details see: Merton and Barber, 2004; Rubin *et al.*, 2011). Since its introduction into the English language, investigations of serendipity have defined the term in multiple ways, focussing on different aspects of the serendipitous experience. Van Andel (1994) has drawn together the largest "collection of serendipities," containing over 1,000 instances of serendipity from the areas of science, art, technology, and daily life, and based on his comprehensive analysis, he proposed the following definition: "[t]he art of making an unsought finding" (p. 631). This definition, however simple it seems, proved difficult to understand, even for van Andel, who later in the same paper questioned what it was he meant by both the terms "unsought" and "finding."

More recent definitions of the term add to van Andel's the element of value, in that the found item is not just a surprise, but it is of benefit to the individual who discovers it. For example, in a study of 14 creative professionals' self-reported strategies for

increasing the chances of serendipity, Makri *et al.* (2014) state that serendipity "occurs when unexpected circumstances and an insightful 'a-ha' moment result in a valuable, unanticipated outcome" (p. 2179). This definition, derived from previous research by Makri and Blandford (2012), highlights, perhaps unintentionally, the subjective nature of serendipity. Both the "a-ha" moment and the value of the find can only be truly considered serendipity by the person who makes the connection that determines the experience. However, it is not until McCay-Peet and Toms' (2015) most recent definition of serendipity as "[a]n unexpected experience prompted by an individual's valuable interaction with ideas, information, objects, or phenomena," that the role of the individual is more clearly articulated. Agarwal (2015) has worked to place serendipity in the larger realm of information studies, and again shows that researchers have had difficulty deciding on what term to use when describing the phenomenon. The final definition offered by Agarwal (2015), "an incident-based, unexpected discovery of information leading to an a-ha! moment when a naturally alert actor is in a passive, non-purposive state or in an active, purposive state, followed by a period of incubation leading to insight and value" (n.p.), is useful to set the stage for historians' experiences with serendipity because it offers the insight that serendipity can occur during active research.

One goal of the present study is to understand how historians understand serendipity as it relates to their research. This specific focus leads to two important constraints. First, the study is limited in its scope because it investigates serendipity as it occurs during the research process. Second, it is discipline-specific in that it focuses on historians and their research practices. While we are aware of the existing models and definitions of serendipity, we wanted to keep an open mind about the way that this population understood their serendipitous experiences. For this reason, we chose not to adhere to a single definition of serendipity at the outset of our research.

Serendipity in physical and digital information environments

There are multiple environments in which historians work including libraries, archives, catalogs, desktops, museums, and the internet. In order to better understand the affordances of these various work environments, it is useful to break them down into categories. One way in which these are often discussed is in terms of physical and digital information environments (Quan-Haase and McCay-Peet, 2014). This division allows researchers to understand the means by which scholars find, access, and interact with research materials. Many studies have used the division of physical and digital before, whether looking at tool use (Toms and O'Brien, 2008), qualities of humanities researchers (Rimmer *et al.*, 2008), or their behavior in the library (Blandford *et al.*, 2006). For the present study, we compare and contrast how historians experience serendipity in both environments.

Physical information environments are conducive to the serendipitous encounter (Björneborn, 2008; Erdelez, 1999; McKay *et al.*, 2014). Humanities scholars themselves have written about their unique and research-altering finds in libraries and archives (Hoeflich, 2007; Kirsch and Rohan, 2008; McClellan, 2005). What is it about the physical information environment that encourages the chance encounter with information? The literature shows there are three main factors: the organizational structure imposed on material, the users' comfort with the physical space, and the users' ability to interact with physical texts.

Every time a researcher enters the library stacks, they are working with a collection of materials that have been organized by librarians using either the Library of Congress, or the Dewey Decimal system. One of the most important decisions in terms

of facilitating serendipity is to organize these documents not by author or title first, but by subject (Liestman, 1992). It is these subject headings that allow for the stacks of a library to be conducive to experiencing a chance encounter with text, as users can scan for relevant materials on the shelves in the areas surrounding the item they are seeking. This type of browsing, termed serendipity or undirected browsing (Carr, 2015), is one of the main ways that library users find information related to their subject that they did not know was there.

The importance of browsing to the serendipitous experience is shown in two studies on the selection and borrowing of physical books (Hinze *et al.*, 2012; McKay *et al.*, 2014). The first study examines the borrowing rates of neighboring books in a public library, using an OCLC data set to investigate if there was a "neighbor effect" (i.e. books loaned on the same date as other books that were located within their ten nearest neighbors). Though the study uses log analysis, and is therefore unable to confirm if the same individual was responsible for borrowing neighboring books, it does confirm, and quantify, self-reports by users of academic libraries, who report that "visiting the shelves is a valuable experience" (McKay *et al.*, 2014, p. 8). The second study by Hinze *et al.* (2012) investigates book selection behavior in a physical academic library to inform the design of ebook collections in digital libraries. Through observation and interviews the authors found that co-located books play an important role in the shelf-scanning techniques employed by many of their participants. The aim of the two studies by McKay *et al.* (2014) and Hinze *et al.* (2012) was not to look explicitly at serendipity in the stacks. Despite this, they both found that serendipity is a motivating factor for both public and academic library patrons who prefer to use the physical library shelves instead of their digital counterpart.

While the subject headings imposed by librarians make the browsing experience fruitful, there are other aspects of the physical library that facilitate serendipity. Björneborn (2008) found that there were a number of physical dimensions that public libraries should support, including unhampered access to material, explorability of space which invites users to browse, and stopability, which invites users to stop, touch, and assess library materials. Interestingly, Hinze *et al.* (2012) found that it was not the explorability or stopability of libraries that helped users to browse, but rather the constant nature of libraries. By being familiar with the physical library layout, which rarely changes, their participants were able to make a "mental map" of the sections of the library they commonly used, and which they relied on when browsing for information.

The third factor that helps to facilitate serendipity in the physical library is the user's ability to interact with texts. This works on two levels. First, book selection through browsing is often done through aesthetic attributes of the books that might, at first, seem arbitrary. For example, color, age, dust on the book, or images on the cover are all elements which factor into picking a book up off the shelf to find out more (Hinze *et al.*, 2012; Thudt *et al.*, 2012). In order for a serendipitous experience to take place, the user first has to notice the material that will enable her to make a connection (Rubin *et al.*, 2011). In short, serendipity cannot happen without something catching the user's eye.

The second level on which interactions with texts facilitate serendipity is through the tactile nature of browsing. Flicking through pages, touching, and holding materials is what Björneborn (2008) terms graspability and was described as a major affordance of the physical library by his participants. For historians, this tactile nature perhaps holds even more importance. Their work with primary documents is one factor that differentiates them from other humanities scholars (Case, 1986; Stone, 1982). Hoeflich

(2007) notes that "the physical touch of documents is often an essential part of the inspiration that moves a researcher to make a serendipitous discovery – it connects the researcher in a very real way to the period under study" (p. 826).

Despite the familiarity and comfort with the physical library, historians in the 2010s would be hard-pressed to work completely outside the digital information landscape. Studies that investigate the role of serendipity in the digital environment can be divided into two main areas: studies of humanities scholar's experiences with serendipity to inform digital tool design and investigations of how digital tools facilitate serendipity.

Rimmer *et al.* (2008) interviewed 14 humanities scholars about their use of physical and digital research spaces, and found that several participants mentioned serendipity as valuable. While this occurred most often in the physical environment, one participant noted a "different kind of serendipity" that they experienced on the web (p. 1384): where browsing through web pages caused one resource to lead to another, resulting in a find relevant to their research. For the other participants, however, the sheer quantity of information they encountered online was overwhelming. The authors concluded that "[n]ew means of browsing in digital libraries could improve scholars' perceptions of serendipity when working with digital documents" (p. 1389).

Looking specifically at historians, Martin and Quan-Haase (2013) found that this population was hesitant to adopt ebooks because they found that their serendipitous experiences with digital information environments lacked when compared to the physical. McCay-Peet and Toms (2010) examined historians' physical experiences of serendipity in order to inform the design of digital environments. They found that there were two main elements of serendipity in physical environments: active learning and social networks. They also saw it necessary to consider an "incubation period," as the historians' interviews showed that it often took time for some information to prove useful. This factor, they argue, is necessary to remember when designing digital environments with serendipity triggers.

Quan-Haase and McCay-Peet (2014) examine four different types of digital tools (social search tools, recommender systems, personal information management tools, and visualization tools) to determine how these support serendipity. They conclude that even tools designed for purposeful search (as opposed to browsing) can support serendipity, and they provide guidelines for tool design and evaluation frameworks for future studies. Digital humanities scholars have proposed tool designs that are aimed at supporting serendipity. For example, Ridge *et al.* (2014) built Serendip-o-matic, a "serendipity engine" that connects texts of the user's choice with those from digital libraries around the world. Martin *et al.* (2014) have studied users of physical libraries to inform the design of the Serendipitous Tool for Augmenting Knowledge, their mobile app prototype for supporting serendipity. This app, they argue, attempts to integrate the physical and digital library spaces, instead of highlighting one environment over the other.

From the literature review on physical and digital environments we learned that physical environments are catalysts for serendipity. Past research has linked this to their organization, the materiality of sources and the affordances to browse. Similarly, studies are now attempting to recreate these characteristics online, so as to stimulate serendipity in digital environments.

Methods

Participants for this study included professors and graduate students in history departments in Southwestern Ontario. This population was chosen because we were

investigating historians' use of research environments and we wanted a population that had historical training and research experience. From October 2010 to April 2013, the authors conducted in-depth, semi-structured interviews that ranged from 30 to 60 minutes in length. While diary studies and observations have been used successfully in past research (Björneborn, 2008; Sun *et al.*, 2011) the need for the interviews to take place in person to obtain detailed accounts containing rich data, made it difficult to recruit participants. E-mails to history departments, in addition to gaining several participants through snowball sampling, yielded a sample of 20 historians. We interviewed 11 faculty members and nine graduate students, with an even distribution of males and females. Ethics approval for this study was provided by the University of Western Ontario (REB #FIMS2010-014 R4).

The analysis followed a grounded theory approach and insights were developed based on the interview transcripts. Although we were aware of previous definitions and models of serendipity prior to starting the coding process, we decided to reject the use of a theoretical framework to "remain open" to the insights offered by the data (Corbin and Strauss 2008).

Interviews, semi-structured so the researchers could probe into unexpected avenues of discussion, took place in two main phases (Berg, 2007). In the first phase, ten interviews were conducted and analyzed. The constant comparative method of analyzing and continuously sampling from the population was employed here, with memos being made after each interview, and questions being added to reflect and expand on the previous findings (Glaser and Strauss, 1967). The preliminary analysis suggested that historians often experience serendipity and are concerned about its loss as a result of the increasing reliance on digital research environments (Martin and Quan-Haase, 2013). This prompted us to include several new questions to the interview guide to incorporate additional topics and to "shape the study as it proceeds" (Glesne and Peshkin, 1992, p. 127). A second phase of data collection, consisting of ten further interviews, was then conducted to further corroborate the findings and expand upon these topics.

Once all 20 interviews were transcribed, the complete series was then coded in three phases. The first, "an initial phase involving naming each word, line, or segment of data" (Charmaz, 2006, p. 46), often referred to as in vivo coding, resulted in three main codes: physical searching, accidental information acquisition, and heuristic serendipity (Figure 1). We then returned to the data to perform axial coding, an "intense analysis

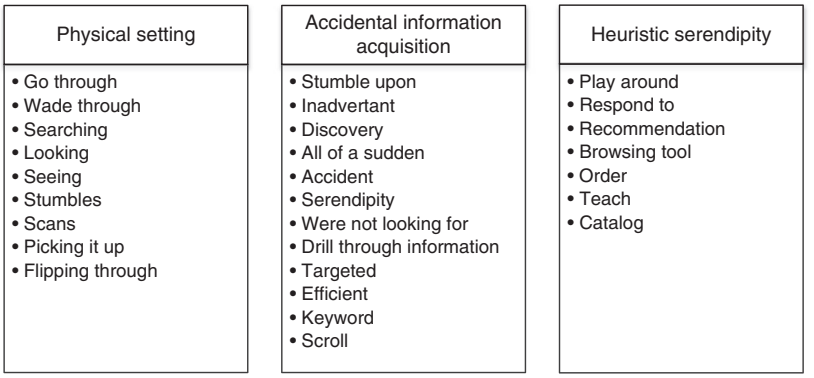

Figure 1.
In vivo coding of keywords related to serendipity in historical research

done around one category at a time" for each of the three codes (Strauss, 1987). We found that we had reached saturation for the themes physical searching and accidental information acquisition after coding 15 interviews. Saturation in qualitative research is reached when no additional insights are gained from further coding of the data (Corbin and Strauss 2008). Coding the remaining five interviews, and integrating memos written during the interview process provided saturation for the third code (heuristic serendipity). Here, it became clear that several elements of their digital environment caused these participants to think of digital serendipity differently than their experiences in the physical library stacks.

Throughout the first two phases of coding, we noticed that participants frequently used verbs to describe their research in the stacks, particularly in relation to their serendipitous experiences. This prompted the third phase of coding, which consisted of "a focussed, selective phase that uses the most significant or frequent initial codes to sort, synthesize, integrate and organize large amounts of data" (Charmaz, 2006, p. 46). We decided that several smaller themes we had made memos on (active voice, going through information, choice) were indicative of a larger theme. This phase of coding revealed a fourth central theme, which we labeled agency. This theme stood on its own, but also weaved through the other themes that had emerged in the previous round of coding. Figure 1 shows the types of verbs participants used when describing their experiences with serendipity, and also highlights that different verbs are relevant for each of the three themes.

Results

Four main themes associated with serendipity emerged from the coding of the interviews. The primary finding, relating to *RQ1*, introduces the concept of agency in historians' experiences of serendipity. The following section outlines themes that relate to *RQ2*. The final section, digital information environments, responds directly to *RQ3*.

RQ1: historians' experiences of serendipity and agency

As this study takes its understanding of serendipity from the perspective of historians who claim to have experienced this phenomenon during their research, we thought it necessary to reflect on the way that participants describe this experience. In the coding process, it became evident that many of the phrases used by historians to describe serendipity were in the active tense (see Figure 1). This led us to take the novel approach of locating the verbs connected to the serendipitous experience. Of the 20 participants in the study, 17 historians used active verbs to describe their engagement with research material in the library or archive. Participant 20, for example, used both the verbs "searching" and "use" to describe her actions during a serendipitous encounter:

> […] the pro of physical searching is the serendipity of it, where you go to the book shelf and use the other books that you might not have thought of as being useful (P20).

Participants also used words like "drilling," "looking," "wading," and "picking" in direct relation to a serendipitous occurrence. This realization prompted another analysis of the interviews through a new lens, looking at the role of agency in the experience of serendipity. In addition to the active voice used by participants in describing serendipity, we found several specific examples that show historians as active agents in their browsing process, anticipating a serendipitous experience

because they have created a situation where this is possible. Participant 14 displayed his knowledge of the library catalog and his method of working toward serendipity in the digital environment:

> With the online stuff you have to be a little more active in your desire to be open to chance. Because everything gets categorized very nicely and neatly, so when you want to move sideways through material you have to make a conscious effort to do it (P14).

Whether research was taking place in the digital or physical environment, it seems that the onus was on the historian to remain actively aware of where potential sources might be located and to make connections between materials. Indeed, Participant 11 linked serendipity to simply "looking in the right places" in order to be actively aware of materials in one's research area, and noted that although ebooks and digital libraries:

> […] will obviously affect the process of serendipity, and maybe serendipity will take different forms, but serendipity itself will continue […] when it comes to books, well I think the problem is that the authors are sometimes simply not aware of books that they ought to know about […] you've got to be looking, and you've got to be looking in the right places (P11).

As more information makes its way online, being able to continue looking in the right places becomes increasingly difficult. Historians will have to make conscious efforts to actively seek information in ways that lead to serendipitous discovery.

RQ2: importance of the physical library experience to serendipity

In the libraries and archives that our participants frequent, a number of different types of resources were part of their serendipitous experiences. While browsing the bookshelves most commonly led to this type of encounter, historians also mentioned the smell of primary materials in the archives being an important part of their search process. The context of the specific journal paper or newspaper story was also seen as necessary for serendipity to occur – without the surrounding and supporting material for these documents, it was more difficult for historians to make connections between these resources and their pre-existing knowledge of the topic.

When asked about serendipitous experiences, 15 of the 20 participants mentioned the stacks of the physical library or the shelves of an archive as the primary place where this experience occurred. Less an "a-ha!" moment and more an intended side-effect of browsing, their experiences with serendipity occurred amongst organized shelves, catalogued stacks, and piles of archival material. Participant 6 described how this experience was very contextual and based on interacting with the surroundings:

> There is a serendipity to browsing the stacks, to being in the library and sort of seeing the book that's next to it and picking it up and something catches your eye, and everybody's had that. Everybody that's worked in a library has had that experience (P6).

Six other participants described similar experiences when in the stacks. Whether the participants go to the library with the intent of searching for a specific book or simply to skim the shelves, they describe themselves as eagerly anticipating looking around in search of material that will help them with their research.

Not only do the participants anticipate finding material that benefits their research, they knowingly go to the stacks because of the order inherent in this environment. As Participant 10 pointed out:

> In the stacks you know there's an order to the books that are before and after, are usually somehow connected (P10).

The connections suggested by the catalog system do indeed provide links between materials that might be different than the way that the historians themselves would think to organize their research.

The physical catalog itself was another reason that historians visited the library. Though being phased out and replaced by digital catalogs, two historians mentioned using this tool in their searching. Participant 17 stated:

> I do still see the value in actually physically going to the library, and being familiar with the stacks and being familiar with the catalog (P17).

Whether searching, browsing, or a combination of both, our participants saw their use of the physical library as an important part of their research. This did not mean that they were unaware of the benefits afforded to them by its digital counterpart. They continued to express concern over the way that browsing is executed in the digital environment.

RQ3: digital information environments

When asked about their opinions regarding the digital library and searching for ebooks as opposed to their print counterparts, the primary concern of historians was the failure of the keyword search to span outward and show related material, as Participant 7 explained:

> You spot the article right next to it, or the article from a month before that your article is responding to, and you miss that with the e-searching, because it zeros in so tightly on what it is asked to find […] it does find it, but the serendipity, you see? It's missing (P7).

Despite the time saving and convenience of digital sources, half of the participants demonstrated anxiety over the limitations of this type of search, particularly in regard to the lack of opportunity for serendipity to occur. They were largely concerned that the tools they are using to conduct these searches focus too narrowly on their search terms and thus eliminate the extraneous items that they often find while browsing. Participant 16, when asked about serendipity in the digital environment, stated:

> […] in terms of actual chance encounters, you can get tunnel vision and sort of miss the surrounding material (P16).

It is this surrounding material that is the key to serendipity in the physical library, and without it historians have no, or very little access to, chance learning (P15).

The same keyword searches that were deemed sufficient by historians, then, are only useful when efficiency comes before discovery. These tools would likely be used at a later stage of the research process, when fact-checking and proof reading mean that citations need to be turned up quickly. When there is time to look around, the participants preferred the method that would turn up some information supplementary to their search.

The participants, concerns regarding digital tools were not only that they perform too targeted a search, but that they eliminate the context in which their sources exist. While it is convenient to know that a book or paper is available, library web interfaces do not always tell you where the item is located, or supply other information necessary for historical research. Participant 7's concerns over journal papers demonstrated this:

> And so when you search, you get what the search kicks up, and that just might be one or two articles from the same periodical, but you don't really have a sense of where they are in relation to other things (P7).

This context appears central to the participants' browsing habits: if books are near each other on a library shelf, they are likely to contain related material, and therefore more likely to add a positive outcome to their work. In a digital catalog, Participant 18 stated:

> [Y]ou lack the sort of serendipitous finding of books on the shelf, and sort of the tangibility of just scrolling down the next few call numbers (P18).

Largely due to this lack of context in the digital information environment, these historians found that browsing related material online did not produce serendipitous results similar to those experienced when browsing in a physical information environment.

In direct relation to *RQ3* several historians described their attempts to move their serendipitous experiences into the digital environment. Despite the aforementioned anxieties over digital documents, over half of the participants remained curious about ebooks, digital libraries, and how technology could aid their teaching and research. Although they were unconvinced that the same sort of browsing and serendipity were likely to take place in the digital environment, eight of the participants noted that they had experienced different types of chance encounters online. The structure of the web and the way in which the network makes connections were of interest to Participant 18, who stated:

> I think it offers a different serendipity, and so different abilities to sort of […] you know, you search a term or whatever and random books are going to show up, but they might be more related to what your original search was (P18).

Two tools that integrate elements of library serendipity are already popular with scholars, and were mentioned by five participants: Google Scholar and Google Books. Participant 8 spoke about the search engine in the same way that other participants described the physical stacks:

> That's why I prefer Google Scholar because it's less specific and you always stumble across things that you wouldn't have come across (P8).

This description of serendipity in the digital environment, particularly the phrase "stumbling across" is similar to the way that historians describe this experience in the physical stacks. Three other participants noted the importance of Google Book search, one of them employing this same term:

> Google Books, however, has just sort of come into my life. Because a Google search is, you know, you're looking for a subject and then books come up and you can stumble across them that way. I should add that I use Google Books much more than the official bought library books (P13).

Besides using Google, three historians were incorporating elements of serendipity into their online search strategies by investigating some of the options available to them at their own institutional libraries. Participant 1 passed the techniques she has taught herself for incorporating serendipity on to her classes:

> I always tell students that they can browse the catalog by the numbers, which is the equivalent of looking at the shelves, which comes as a real shock to them. The potential to do that is there (P1).

In addition to the various ways that participants were developing methods to recreate the serendipity they experience in the stacks, seven participants held out that elements of serendipity might be built back into these digital systems, whether via a

recommendation system or a digital browsing tool. When asked what this might look like, most were unsure, but the two following answers hint at the elements of serendipity that most appeal to them:

> One could imagine a really nice book interface which mirrors the stacks […] if you are looking at a book on the screen you want it lets you know what the two books beside it on the shelf are, but it has to be ambient, can't just keep throwing more information on the screen because then it reduces the usability (P6).

> I guess I like the potential for ebooks to be a sort of multi-dimensional resource and the idea that you could almost have a choose-your-own-adventure style link between ideas (P18).

It is evident from the interviews conducted that serendipity plays a vital role in historical research. But what is it about the historical research process that makes the serendipitous experience so prominent for these scholars? The following section will address this question.

Discussion

Agency and incidental serendipity

Looking "in the right places," as Participant 11 mentioned, does not happen only by chance, but because historians are taught how to search, browse, and discover. By means of their training, historians learn to use the library and archive to find the pieces of information that will help them build their story. The historians' own descriptions of serendipity using verbs, combined with their descriptions of browsing being almost verbatim the textbook instructions, shows that the experience of serendipity involves an element of intention. This finding extends Duff and Johnson's (2002) description of historians' experiences with serendipity being influenced by the "deliberate tactics of the expert researcher" (p. 495). The present study shows that individual agency is playing a role not only in the storytelling or reflection aspect of serendipity, but also that historians are actively seeking these experiences. This emphasis on locating agency through verbs in the historians' accounts provides an innovative methodology for the study of serendipity and information behaviors in general.

A recent definition by McCay-Peet (2013) shows that serendipity does not have to be an unintentional process. Instead it "makes room for serendipity as an experience in which the existence of intentionality does not rule out serendipity" (McCay-Peet, 2013, p. 11). The "unexpected" nature of serendipity described in previous studies (Makri *et al.*, 2011) occurs for historians, but it appears they have learned to expect the unexpected. Indeed, there appears to be intention, behind both the act of browsing and the choice of where this browsing takes place.

For historians, then, serendipity is not unexpected, but rather is incidental to the nature of historical research. The activities that historians engage with as part of their training (searching, browsing, looking) all help to place them in situations where serendipity is likely to occur. Reframing serendipity to reflect the agency of historians, and their involvement in the experience, then, would result in a definition that stresses the intentionality of the process:

> The incidental discovery of valuable information related to historical research; often takes place in an organized information environment.

The above definition does not necessarily contradict previous definitions of serendipity, rather links serendipity to historical training, and allows for serendipitous discovery by historians to occur in both physical and digital information environments. We know from the interviews, however, that these two environments create different experiences for historians.

Browsing and the physical library

The interviews conducted clearly show the importance of the physical library for historians. This supports much of what the past literature has found about their research habits (Abbott, 2008; McClellan, 2005; Stone, 1982). What is remarkable is that these scholars are intentionally going to the stacks to experience a serendipitous encounter with research material.

Contrary to the observations by Carr (2015) and Liestman (1992), several of the historians interviewed here clearly understood not only the organizational system of the library, but also the benefits that this system has for serendipity. Many of the participants described how they looked for research material; by going in search of a specific work but knowing that they would be browsing around the selected item for further research material. The importance of physical searching even extended past browsing the stacks, as several participants noted the need to physically browse through the documents they took off the shelves in order to find relevant, if not necessarily serendipitous, reading material. Each of these acts of browsing reflects a choice that the historians made. This suggests that training historians to browse, create context, and learn about the organization and layout of the library resources is critical. Academic libraries need to continue developing effective subject-specific skills that will support the research practices of diverse groups of scholars.

Searching and the digital environment

When searching online, historians had a difficult time placing their sources in context, which, for a researcher who is actively seeking serendipity in the physical environment, makes research much less fruitful. The narrow scope of the digital search results also limits the agency of these scholars, who are used to being able to make choices about what books they pick up when browsing and what chapters or articles they scan in those books. Instead of being able to browse at will, they have to choose from a list of results from a targeted search; this list does not allow them to browse, explore, or discover new material in context, the way a physical library would.

The key finding regarding the digital information environment is that it is not serendipity that is missing, but rather the lack of means to create context for the material that is located using digital tools. Historians using the online environment did not seem to suffer the common problem of over-exposure to information, or the "noise" of the web. Instead, they longed for the organization of the library to provide context for these digital materials. The digital search results only show what is directly linked to the search terms entered by the historian. Without knowing the other articles in an edition, stories surrounding a newspaper clipping, or the order in which a series of letters was written, these historical sources have no context. This results in two problems that limit the occurrences of serendipity: finding tangentially linked material does not occur as frequently as it does in the stacks, and historians are unable to make contextual connections to these sources that help them to integrate the sources into the story they are telling.

Conclusion

This study investigated historians' experiences with serendipity. To some extent the findings are unique to historians' research practices and training. The findings are applicable to other humanities scholars who employ the historical approach in their research, but cannot be generalized to all humanities scholars. This could provide a line of inquiry for future studies. Three main conclusions regarding historians can be drawn based on our findings.

First, the innovative approach we took to coding the verb usage in the interviews led us to demonstrate that agency plays a role in historians' serendipitous experiences. Agency, until now, has been largely ignored in the LIS literature surrounding serendipity. This finding has implications for studying historians' information behavior, as it shows that there is an agency to their browsing behavior that makes serendipity something that is incidental to their information behavior, and not unanticipated or unexpected, as is customarily assumed (Makri and Blandford, 2012; McCay-Peet and Toms, 2015).

Second, it was found that historians prefer the physical environment to browse for research material, and the chance at a serendipitous encounter is a large reason for this. The participants have become accustomed to creating connections between material that they encounter in the physical information environment, and do not find that its digital counterpart allows for the same experience.

Third, digital information environments could be improved by supplying context for historians' sources, both primary and secondary. Both Woolwine (2014) and Duff and Johnson (2002) highlight the importance of context to the historical research process. The present study demonstrates the need for digital tools that allow historians to place their research materials within the context of surrounding historical literature, and within an organizational system that highlights links and connections to other similar material.

Historians' work is piecing together segments of information about the past in order to tell a story. Much of these segments will be found by looking in the right places, in a library or archive, and many of the connections they make throughout their research process will happen as they browse for material, whether online or in the physical stacks. It is no surprise, then, that serendipity occurs throughout their research. This incidental serendipity is a product of their information behavior and learned research skills. Their ability to connect material and create a narrative out of their own experiences benefits not only those who read their historical work, but also those who want to hear about the historical research process.

Future work

Future work in this area could focus on exploring the connection between agency and serendipity. For example, it would be useful to know if agency accounts for serendipitous connections that are made in digital environments the same way it does in the physical information environment. Future studies could also look at different groups of library users to see if training in research skills increases their chances of serendipitous connections.

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Appendix. Interview Guide

Legend: normal font = original interview questions
bolded, italics = added serendipity questions

How familiar are you with ebooks?
Have you used them previously?
If yes, in teaching, or in research? Please provide some details about this.
Where do you access ebooks? Why did you choose this collection/website, etc?
Can you tell me features about (Enter specific platform here) that you like? Dislike?
If yes, how do you feel about ebooks?
If no, is there a reason you haven't used them?
Have you ever used Google Books? If so, can you tell me about that experience?
Are you aware of the ebooks that are offered at your university library?
Can you please tell me how you became aware of this?
Do you think that the digitization of your course syllabi would be beneficial to either yourself or to students?
What do you think the ebook, or the ereader, can do to benefit the student? The researcher?
Can you tell me some of the positive and negative aspects of using ebooks for research?
How do you think ebooks affect your ability to find information?
Do you think your research habits are going to change? And how do you think that will happen due to electronic devices?
Do you think ebooks either restrict or promote chance encounters with information?
Do you think that Ebooks will start to affect the way that people do their searching? The way that historians start their searches, and what information they go after?
Throughout:
If Digital Searching is mentioned:
How do you search in an ebook?
Can you tell me why a keyword search is beneficial? Are there downsides to this type of information seeking?
Have ebooks and other digital reading material changed your research behavior?
If Context is mentioned:
Why is the context of the material in a digital source important?
Can you tell me about the ways that sites you use incorporate the context of the sources online?
If skills are mentioned:
What skills do you think the next generation of historians will need to work with ebooks and other digital tools?

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