Opportunistic Discovery of Information and Millennials: An Exploratory Survey

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ABSTRACT
Now that digital information can be accessed anywhere, there has been a resurgence of interest in information encountering (IE) and the opportunistic discovery of information (ODI). However, no studies have attempted to distinguish between the task-oriented contexts associated with IE and the more diffuse and varied situations in which ODI occurs. The authors conducted a survey (n=48) of undergraduate students between the ages of 18 and 25 in order to identify which mechanisms, formats, sources, and contexts provide them with opportunities for serendipitous information acquisition. Further, the survey was adopted to cover a variety of task-specific (IE) and non-task specific scenarios (ODI). The results of this exploratory study confirm that both IE and ODI seem to be common among this cohort, but the mechanism of delivery and the format in which the information is presented impact the frequency of occurrences.

Keywords
Education, human information behavior, information encountering, millennials, opportunistic discovery of information

INTRODUCTION
If most of us are suffering a form of information overload, millennials or “digital natives” – those born after 1980 (as defined by Howe and Strauss, 2000) – may be expected to be at the forefront of the battle to control, assess, and store information. The born-digital generation became a focus of scholarly and public attention by the early 2000s. The first wave of publications attempted to define the unique characteristics of millennials. Howe and Strauss (2003) identified seven core traits: millennials are (1) self-perceived as special; (2) sheltered; (3) confident; (4) team-oriented; (5) conventional; (6) pressured; and (7) high-achieving. An assortment of studies (see DiLullo, McGee and Kriebel, 2011) expanded upon the Howe and Strauss characterization, identifying a number of additional traits: millennials prefer to learn via the use of technology; they are active learners who prefer customized assignments; they value immediacy and convenience; and they prefer small group work. One of the expected characteristics of millennials has been affirmed in numerous instances: millennials are multitaskers. Their frequent engagement in “off task” and “off topic” searches has been identified but insufficiently explored.

In addition, the preference for information delivered via technology has both positive and negative aspects. The accessibility of digital information across multiple devices increases the potential for information fatigue, but it also creates opportunities for serendipitous discovery. The purpose of this study, then, is to explore the contexts in which millennials experience information encountering (IE) and opportunistic discovery of information (ODI); the types of tools and formats that facilitate these experiences from discovery to personal information management; and the extent to which the domains of need and task play a role in regard to finding information.

BACKGROUND
In 1997, Erdelez introduced the concept of information encountering (IE), or serendipitous information discovery. She noted that encountered information includes problem-related (previously sought) and interest-related (entirely new) information. A broader concept, opportunistic discovery of information (ODI), has frequently subsumed IE and an almost unlimited array of other browsing behaviors. As one study put it, “the defining characteristics of OB [opportunistic browsing], setting it apart from other forms of browsing, are ubiquity, being unintentional, and requiring no cognitive effort” (DeBrujn and Spence, 2001). Several studies have affirmed the role of opportunistic information discovery in human information behavior, noting that it serves multiple beneficial purposes in refining, expanding, and redirecting
searches (e.g., Andre, Teevan and Dumais, 2009; Miwa, Egusa et al., 2011).

The effects of information overload, multitasking, and social media on task performance and learning have been the subject of intense research interest, resulting in the identification of a varied array of tools and preferences relevant to the group. However, in spite of the interest in ODI, and the use of college students as participants in many studies, its role in the lives of millennials has been addressed only peripherally.

The research to date suggests that multitasking, permeable boundaries between task and non-task information behavior, and ODI may signal a departure from traditional information-seeking models (which assume that information is limited and extracted in cumulative stages). The implications for information literacy instruction are evident. It is important noting that the association of ODI and affective needs has been examined in terms of creativity and learning (McCay-Feet and Toms, 2010, 2011b) and in relation to Elsweiler’s studies of serious leisure (Elsweiler, Baillie and Ruthven, 2011; Elsweiler, Wilson and Lunn, 2011). A study by Lindley, Meek et al. (2012) found that subjects consciously or unconsciously tried to facilitate ODI in their web searching, using separate windows when at work for personal use, compiling “to do” lists of interesting content, and minimizing information they could return to later. This behavior was opportunistic or casual, and most significantly, ongoing, “there is no sense that they would ever be ‘finished’.” This finding is consistent with the “curated lifestyle of constant interrelated activities” posited by Rheingold (2012), in which distinctions between home and office or work and play will blur.

RESEARCH METHODOLOGY
Given this applied and theoretical background, there are obviously a number of considerations that serve to inform this paper and its underlying methodology. Consequentially, the project team developed a set of broadly defined research questions to examine these issues:

- How often does ODI occur among millennials?
- How do mechanisms of delivery and the format in which information is presented relate to the frequency of ODI occurrences?
- Is there a correlation between social media usage and the frequency of ODI?
- In regard to the distinction between task (IE) and non-task (ODI), and given that each may create opportunities for multitasking, what are the implications?

In order to explore how often IE and ODI occur in the lives of millennials, the authors created a matrix that organized the domains related to information context. Courtright (2008) discussed “context” in information behavior research, noting that the term has multiple uses. Contextual factors that shape information practice may include rules, resources, and cultural influences. These have usually been examined in terms of particular workplace or everyday-life settings such as researcher-defined bounded environments in organizational (e.g., studies of professional and managerial employees) or everyday-life settings (e.g., Chatman’s small worlds, Fisher’s information grounds). Lievrouw (2001), among others, has emphasized the role of the information actor in constructing context. Thus a human actor “could conceivably inhabit several discrete or overlapping information environments depending upon activities and imperatives” (Courtright, p. 281, citing Lievrouw and Farb, 2003).

Context, then, has been viewed alternatively as a container or background (and one that is usually poorly defined), or as the constructed meaning of the user in interaction with community, institutional, and technological factors. As Courtright concluded, the most fruitful research approach is to treat context as relational and dynamic, and to focus on the actual activities and practices of users, rather than treating their information needs in isolation.

To identify the frequency of occurrence of IE and ODI in various contexts, the authors carefully designed survey questions to address many behaviors and information types. After these domains and elements were crafted, we developed a 39-question survey. Of these questions, 12 were contextual (or demographic), while 27 focused on the topic at hand. All of these were written using natural language and posed using a five-point Likert scale with: (1) never/almost never (2) = seldom (3) = sometimes (4) = often (5) = always/almost always. Our decision to ask questions in the vernacular meant that not every prompt was discernible as IE or ODI, and task or non-task. Rather, several questions were simply directed at instances of serendipity and information acquisition.

The survey was made available online to students at the University of Missouri (MU) for a one-week period in December 2012. It was distributed via Qualtrics, an online survey, statistical data collection, and analysis program. Participants were recruited by posting a notice on the MU Libraries homepage, stapling flyers at various locations on campus, leaving handbills at computer lab work stations, and by word of mouth. Five $50 gift cards were awarded to participants at random to create an incentive for participation.

Data Analysis
Following our recruitment, data was analyzed using a multi-step process that emphasized the reporting of descriptive statistics. We collected 48 valid survey responses. The results were deliberately limited to undergraduate students under the age of 30. While the consensus is that millennials were born after 1980,
following Howe and Strauss’ definition, we chose to adopt an alternate 11-year window for the sake of simplicity.

In addition to our tabulation of statistics, Pearson chi-square ($\chi^2$) tests were conducted using the SPSS software package to address the research questions. Correlational scores were also tabulated using questions about social media usage and information literacy training.

**RESULTS**

The majority of students were between the ages of 18 and 21 (n=38) with the remainder falling between 22 and 25 (n=8). More females (n=33) than males (n=13) responded to the survey. Racial categories were reported as mostly “white” (n=39) and “African American” (n=5), while all but two students reported that their country of origin was the United States. Social media usage was found to be high with a clear majority (n=38) reporting that they use Facebook “always/almost always” or “often.” Regular use of other social media was much lower (Twitter n=15; LinkedIn and MySpace n=18). On average, the respondents reported spending a total of 2.4 hours per day using these social media tools.

Only 4 students reported having taken a for-credit class of this type, 7 had finished an online tutorial teaching these skills, and a clear minority (n=17) had received another form of training. While reported instances of “being in Ellis Library ‘always/almost always’ or ‘often’” were high (n=19) and coupled with a self-reported average of 5.4 hours spent there per week, these results were likely skewed by the participation of student workers.

**How Often Does ODI Occur?**

Although IE and ODI both relate to serendipity and information acquisition, the two have been conceptualized in our survey as distinct phenomena. IE occurs exclusively during active searching tasks, while ODI is conceptually broader and occurs during any type of behavior.

Our survey asked 5 specific IE questions and 7 general ODI questions to help ascertain the frequency of these experiences in various contexts. The average number of students reporting that they “always/almost always” or “often” experienced these occurrences was 12.2 for IE and 8.9 for ODI. An average of 11.4 students reported that instances of IE’s happen “sometimes,” which was slightly less than the result for ODI (n=17). Variation was also apparent in the average number of students who reported that they “seldom” or “never/almost never” experienced these events (24.2 for IE, 19.3 for ODI).

These results indicate that self-reports for both IE and ODI experiences in our study sample show a variety in frequency distributions, which is an important finding for future differentiation among these information behaviors.

**How do Delivery and the Format in Which Information is Presented Relate to ODI Occurrences?**

The intention of this research question was to identify if certain tools and formats for presentation of information may facilitate regularity of IE/ODI experiences. The argument that underpins the rationale for this question is that a reliance on technology is one of the self-described attributes of millennials; it follows that the characteristics of preferred mechanisms and formats (notably digital tools and new media) may play a role in their experiences of IE/ODI.

Our survey results revealed that the highest levels of ODI were reported by millennials via images in text messages; articles found on the web while searching out of boredom; discussions in class; and links in emails. Given that our coding process only provided a limited degree of coverage to IE, more data is needed to confirm a definitive link between these items. But, for high and low frequency questions, it was possible to selectively determine which results were significant and at what level (see Table 1).

Regarding images and text messages, one question asked students how often they “receive pictures via text message from my friends that are interesting […]”. A large number noted that this was “always/almost always” or “often” the case (n=18). Moreover, by conducting a Pearson chi-square ($\chi^2$) test, we found that these results were statistically significant at the 0.05 level.

<table>
<thead>
<tr>
<th>Question</th>
<th>Sig. Level</th>
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<tbody>
<tr>
<td>Q.2 5 I receive pictures via text message from my friends that are surprisingly interesting to me.</td>
<td>0.059</td>
</tr>
<tr>
<td>Q.2 8 When I am getting a book off the shelf for a class in Ellis Library, I find other books nearby that are useful.</td>
<td>0.023</td>
</tr>
</tbody>
</table>

Table 1. Relevant Scores of Significance (≥ 1%)
Is There a Correlation between Social Media Usage and ODI?
Given that we have established at least some degree of variation occurs in relation to IE/ODI, mechanisms of delivery, and information formats, we were interested in how social media use and information literacy training may correlate to these experiences. To respond to these questions, we calculated the Spearman’s ρ (rho) value of aggregate serendipity using the reported frequency of Facebook, Twitter, and other social media tools (as well as previous information literacy instruction). The resulting values turned out to be marginal. The calculated correlation coefficient between serendipity and Facebook in our study was found to be small, but positive (+0.235). Regarding Twitter (-0.18) and other social media tools (+0.043), the relationship was even smaller and apparently more irregular. Indeed, given that in all cases these values did not exceed ±0.29, the relationship of each with serendipity was negligible or weak.

In Regard to the Distinction between Task (IE) and Non-task (ODI)
Generally, it may be claimed that millennials (sometimes) find information unexpectedly and that this is (to an extent) without regard to their associated search or activity. But, perhaps our most important finding relates not to if something is unexpectedly found but what is found in relation to which task. Answering this question will require substantially more research, but given that the multitasking opportunities created by technology are substantial, trends in this area are worthy of study. After all, the experience of finding information only matters to the extent that it is about and used for something.

Survey responses suggested that millennials unexpectedly find information relevant to personal activities in some – but not all – academic contexts. As a case in point, students were asked if they “click on different types of side ads while browsing the Internet and doing homework.” Nearly all (n=44) indicated this was not the case. While working on homework and using a search tool on the MU Library webpage, a clear majority (n=30) also said that they do not tend to “notice topics of personal interest.” But, complicating matters, “while in class and without asking,” a large number of students (n=20) “hear important things from others that have nothing to do with school.” Even more (n=21) reported that, “while working on an assignment due the next day,” they “always/almost always’ or ‘often,’ “check Facebook and end up looking at a friend’s photo galleries.”

CONCLUSION
Although this was an exploratory study, we were able to quantify the presence of serendipity in information behavior, consistent with Andre et al. (2009) and Miwa et al. (2011). We observe that ODI and IE are likely to occur while students engage in a multitude of tasks, but, perhaps most importantly, our study documents that it involves both information search-related and non-search related activities. The frequency of ODI experiences among millennials in our study sample were high in several contexts (text message images, web articles, class discussions, e-mail links) and low in others (displays, public TVs, and videos from mobile devices), suggesting that these experiences do not occur uniformly.

Informed by this preliminary study, the authors have identified three objectives for future research. First, we need to ascertain if the type of activity (on- or off-task) influences the extent to which millennials encounter information. Next, a sample of sufficient size must be collected in order to allow interested parties (i.e., educators) to make relevant inferences using generalizable data. Finally, the survey items should be refined so that all questions relate to either IE or ODI. In addition a broader range of questions should be included to identify additional contextual factors that facilitate or impede serendipity.

Our study has shed light on millennials and their information behavior in relation to IE and ODI. Millennials were found to have serendipitous encounters regularly, either while attempting to meet an information need or while going about their daily lives. We now have a better understanding of both the types of information and the contexts of discovery that are conducive to serendipitous information acquisition.

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REFERENCES


