ABSTRACT
Some researchers have suggested that opportunities for serendipitous discovery of information may be limited in the online environment as a result of technological facilitation of information behavior. In response, they suggest building tools that enhance opportunities for serendipity. Based on our model of everyday serendipity, we offer design suggestions for tools that could enhance various conceptual facets of everyday serendipitous chance encounters.

Categories and Subject Descriptors
H.1.2 [Information Systems]: User/Machine Systems – human factors, human information processing, software psychology; H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval; H.5.2: [Information Systems]: Information Interfaces and Presentation – User Interfaces; K.4 [Computers and Society]

General Terms
Design, Human Factors.

Keywords
Serendipity, serendipitous discovery, opportunistic information encountering, chance encounters; psychology of system design, information behavior, information-seeking; conceptual model, system development suggestions.

1. INTRODUCTION
Chance encounters with information, objects, or people that lead to fortuitous outcomes are an integral part of everyday information behaviour. Erdelez stresses that “[r]esearch-driven and anecdotal evidence suggests that users often find interesting and useful information without purposeful application of information searching skills and strategies” [3, p. 1013]. She labels this type of discovery ‘information encountering’ [3]; other terms include “opportunistic discovery of information” and, perhaps most commonly, “serendipitous discovery”. Some researchers have expressed concern that opportunity for this type of encounter may be reduced as a result of technological facilitation of information behaviour [5]. In response to this concern, work in information systems has proposed the development of interfaces that support or enable serendipity [5,6]. In previous work [7], Rubin, Burkell, and Quan-Haase developed a model identifying the facets involved in everyday chance encounters. In the current paper, we explore the ways in which information systems could be designed to support the various facets of serendipity identified in the model.

2. FACETS OF SERENDIPITY
Based on a review of the literature [7], Rubin, Burkell, and Quan-Haase, identified two necessary conditions for serendipity: (1) a chance observation that is (2) instrumental in bringing about a fortuitous outcome. In that same paper we used a grounded theory approach to the analysis of naturally occurring accounts of serendipitous encounters (defined by the two necessary conditions mentioned above) in order to identify the facets of serendipity in everyday life and to explore their inter-connections. Based on our results, we developed a model of everyday serendipitous encounters (see Figure 1).

![Facets of Serendipity in Everyday Chance Encounters](image-url)

Figure 1. The Conceptual Model of Serendipity Facets in Everyday Chance Encounters [per 7].

In our model, we conceptualize ‘the find’ as the key to understanding serendipity because it is the focus of the serendipitous encounter. ‘The find’ is the information, object or person that, when encountered unexpectedly, triggers or facilitates the fortuitous outcome. Serendipity necessarily involves an element of chance (or at least the perception thereof: Facet C), since it occurs only when the encounter with the find is unanticipated, either because the find is encountered in an unexpected place or at an unexpected time, or because the very existence of the find is unknown to the individual. In order to
result in a fortuitous outcome, the find must be noticed (Facet B) or brought to consciousness. Finally, the meaning or significance of the find is defined in relation to a prior problem, possibly (or even necessarily) a problem that is, at the time of the encounter, not ‘top of mind’ or the focus of activity. Thus, a prepared mind (Facet A) is necessary for a serendipitous encounter, and in most cases the relevant problem must be activated or brought to the foreground before the significance of the find can become evident.

3. DESIGNING FOR SERENDIPITY

Based on this model, what are the recommendations for the design of tools to support serendipitous encounters? Our position is that serendipity-enhancing tools should support or promote one or more of the facets that are the preconditions for a serendipitous encounter: Chance, Noticing, and Activation of the Prepared Mind. We will present strategies to support these facets in the context of a common online activity: searching.

Adding an element of chance to online searching is perhaps the most obvious intervention to support serendipity. The combination of deterministic computational algorithms for search and relevance determination and utilization of social recommender approaches for item and resource identification can result in predictable search results [see 5]. One obvious approach to supporting serendipity in the online context is to reduce the predictability of these results by explicitly introducing a random element into search strings (one search engine, BananaSlug, does exactly this), perturbing the order in which search items are returned, or using algorithms to extend and enhance search strategies [see 2]. The goal of these strategies is to effectively broaden the search space, promoting encounters with items that might not, under existing algorithms, be identified.

Noticing is obviously critical to serendipitous encounters. Although noticing can be influenced in a top-down fashion by problem requirements [7], the primary influences on noticing are perceptual in nature. Thus, for example, we are apt to notice elements on the basis of perceptual characteristics: unique colour, animation, brightness, etc. [4]. Serendipity-enhancing tools can capitalize on this tendency of the visual system to orient toward salient items by giving potentially relevant items ‘interesting’ perceptual characteristics (e.g., putting them in a slightly larger font in a results display). This ‘low level’ approach to encouraging noticing is potentially better than the ‘push’ notifications used by some tools [2] because users are better able to ignore the suggested items, particularly if they are focally engaged in an alternative task.

Perhaps the most complex, yet potentially the most important, way to support serendipity is to support the activation of the prepared mind. Serendipitous encounters often involve a switch of focus from a problem that is ‘top of mind’ to one that is, at the time of the serendipitous encounter, still active but not the immediate focus of cognitive activity. Tools that support this facet of serendipity could assist searchers to maintain an active ‘problem list’, perhaps scanning encountered information and alerting the user (using the noticing strategies identified above) when something relevant to a background problem is encountered. Prompting a switch of ‘problem set’ could be as simple as allowing the user to associate each problem with a specific colour, and presenting potentially relevant search results in the appropriate coloured font. Tools that allow users to quickly and easily annotate and associate search results could support the activation of relevant problems by supporting the recording of even fleeting associations, allowing users to return later for a fuller exploration.

Everyday serendipitous encounters are experienced as ‘happy accidents’, sometimes drawing the encounterer away from a focal task, but never requiring that shift. In fact, interventions that demand attention (even if the end result is positive) are likely to be experienced as distractions [1], and tools that support serendipitous encounters should ideally blend seamlessly into the user’s online environment. This is perhaps the most critical aspect of tools to support serendipity, and the one that may be most difficult to achieve.

4. CONCLUSIONS

As we move toward larger integration of digital tools into everyday information seeking, it is necessary to better understand how these tools affect the chance encountering of information. The current paper presents an approach to designing tools to support various facets of serendipity.

5. REFERENCES


