DOES SERENDIPITY PLAY A ROLE IN THE INFORMATION LITERACY PROCESS?

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Abstract

Background
There is not currently a vast amount of literature that explores how people view the value of serendipity and where it plays role. Serendipity and information literacy are both elements of information behaviour, however it is not made explicit within the literature whether the two concepts are linked.

Aims
This study aimed to address the gap in the literature and explore whether there is, or is not, a relationship between serendipity and information literacy.

Methods
A ‘search exercise’ and questionnaire followed by semi-structured interviews were carried out with 5 MA librarianship students and 4 information professionals. The ‘search exercise’ and questionnaire were then analysed in relation to Erdelez’s (2004) theory of an ‘information encountering episode’. The interviews were analysed taking a phenomenographic approach.

Results
Erdelez’s (2004) theory of an ‘information encountering’ episode was questioned to some extent, with the results of the search exercise and questionnaire pointing towards a much more circular and iterative process of serendipity or information encountering. In relation to the interviews, three dimensions of serendipity and information literacy emerged, with both librarianship students and information professionals placing themselves at various points along the continuums. If serendipity is valuable, a result of conscious thought and control, or teachable, it may be related to information literacy. If serendipity is not valuable, as a result of pure luck, or is considered not teachable, then it can not be related to information literacy.

Conclusions
It was concluded that a variety of conceptions exist along each continuum of serendipity and information literacy, ranging from those that link serendipity to information literacy, to those who see them as two entirely unrelated phenomena. Recommendations were made for future study in order to test the model that arose, including using participants from a wider cross-section of the community in greater numbers.
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## Contents

**Abstract** ........................................................................................................................................... 3

**Acknowledgements** ......................................................................................................................... 4

**Contents** ........................................................................................................................................... 5

1. Introduction........................................................................................................................................ 6
   1.1. Chapters ....................................................................................................................................... 6
   1.2. Aims and Objectives ..................................................................................................................... 7
       1.2.1. Aims ....................................................................................................................................... 7
       1.2.2. Objectives ............................................................................................................................. 7
   1.3. Context ......................................................................................................................................... 7

2. Literature Review ............................................................................................................................... 11
   2.1. Information Behaviour ................................................................................................................ 11
       2.1.1. From Linear to Non-Linear Models ....................................................................................... 12
   2.2. Serendipity ................................................................................................................................... 13
       2.2.1. Definition .............................................................................................................................. 13
       2.2.2. The Goal Problem ............................................................................................................... 14
       2.2.3. Control of Serendipity ......................................................................................................... 15
           2.2.3.1. Psychology and Serendipity ......................................................................................... 16
           2.2.3.2. The Process of Serendipity ......................................................................................... 18
   2.3. Information Literacy .................................................................................................................... 22
       2.3.1. Information Literacy Models and Frameworks ....................................................................... 22
       2.3.2. Conceptions of Information Literacy ..................................................................................... 25

3. Methodology .................................................................................................................................... 27
   3.1. The Phenomenographic Approach .............................................................................................. 27
   3.2. Data Collection ........................................................................................................................... 27
       3.2.1. Participants and Sampling .................................................................................................... 27
       3.2.2. The Information Seeking Exercise ....................................................................................... 28
       3.2.3. The Interviews .................................................................................................................... 28
   3.3. Data Analysis ............................................................................................................................... 29
       3.3.1. The Outcome Space ............................................................................................................. 29
   3.4. Strengths and Weaknesses .......................................................................................................... 30
   3.5. Ethical Aspects ............................................................................................................................ 30
   3.6. Pilot Study and Feedback ............................................................................................................ 31
4. Result and Analysis

4.1. The Outcome Space

4.1.1. Continuum 1: Luck-Conscious

4.1.2. Continuum 2: Valuable – Not Valuable

4.1.3. Continuum 3: Teachable – Not Teachable

4.2. Librarianship Students

4.2.1. Conceptions of Information Literacy

4.2.2. Continuum 1

4.2.3. Continuum 2

4.2.4. Continuum 3

4.3. The Information Professionals

4.3.1. Conceptions of Information Literacy

4.3.2. Continuum 1

4.3.3. Continuum 2

4.3.4. Continuum 3

4.4. The Search Exercise

5. Conclusions

6. Recommendations

Bibliography

Appendices

Appendix 1

Appendix 2

Appendix 3

Appendix 4

Appendix 5
1  Introduction

1.1 Chapters

1.  Introduction
   This chapter will introduce the aims and objectives for this study and present the context
   behind the justification for the carrying out of this research.

2.  Literature Review
   This will provide an overview of the issues that have arisen within the literature with
   regards to information behaviour, and more specifically serendipity and information
   literacy.

3.  Methodology
   This chapter will provide justifications for, and an outline of, the phenomenographic
   approach taken with regards to the analysis of the data collected.

4.  Results and Analysis
   The results of the data collected will be predominantly presented in the form of a
   phenomenographic outcome space; it was therefore decided to combine both this, and the
   analysis within one chapter.

5.  Conclusions
   This will pull together and conclude upon the findings from both the literature review and
   an analysis of the data.

6.  Recommendations
   This will provide recommendations for both the improvement of, and expansion upon this
   study.
1.2 Aims and objectives

1.2.1 Aims

- Investigate conceptions of serendipity and information literacy.
- Establish if any link is made between the two concepts.

1.2.2 Objectives

- To carry out a literature review looking first at that which subsumes serendipity and information literacy: information behaviour. Second, to examine the definition of ‘serendipity’ and related terms such as ‘information encountering’, and the issues relating to these concepts. Finally, it will examine the various information literacy competency frameworks and skills models, in order to assess whether serendipity is mentioned at all, whether implicitly or explicitly, before considering the conceptions of information literacy that arise from the literature.
- To design and test an ‘information seeking’ exercise that will assess Erdelez’s theory of an “information encountering episode” (2004) and facilitate discussion in the interviews.
- To carry out phenomenographic interviews with students and librarians with regards to their conceptions of serendipity and information literacy.
- To analyse the results obtained with a phenomenographic approach in mind in order to facilitate the creation of an ‘outcome space’.
- To compare the results obtained with previous studies, particularly that of Erdelez (2004) and to make suggestions for future research.

1.3 Context

There is not currently a vast amount of literature that explores how people view the value of serendipity and where it plays a role; a viewpoint that arose during the completion of an assignment looking at recent research into information encountering and serendipity as part of
the INF6350 Information Resources and Information Literacy module at the University of Sheffield. There are however numerous articles that discuss what serendipity or information encountering are, and indeed the psychology behind these encounters, such as Heinstrom (2006). The fact that serendipity has been explored in such depth by various well known and respected scholars suggests that there is a certain level of importance placed upon it. A further assumption may also be made that, as serendipity is often mentioned in the context of information literacy studies, for example Foster & Ford (2003) and Erdelez (1999 & 2004), it could in fact be an important part of the information literacy process. In studying people from various backgrounds, it is hoped that this research will ascertain their feelings towards serendipity, and its relationship if any to information literacy.

While SCONUL’s ‘7 Pillars of Information Literacy’ (SCONUL, 2004) do not, at least on the face of it, make a reference to serendipity, it appears to be present within others. For example, the ‘Australia and New Zealand Information Literacy [ANZIL] Framework: Principles, Standards and Practice’ (2004), which are adapted from the US ‘Information Literacy Competency Standards for Higher Education’ (ACRL, 2000), state that:

“the information literate person applies prior and new information to construct new concepts or create new understandings [...] [and] determines whether information satisfies the research or other information need [...]” (Bundy, 2004: 20-21).

While it may be going a bit far to suggest, as McBirnie (2008: 602) does, that this statement ‘explicitly' places serendipity within the information literacy process, it certainly appears to implicitly make the suggestion. As Australia and the US are so dominant within the field of information literacy, it seems justified to further explore this notion.

One study that has attempted to address the question as to what serendipity is, and what the process of a serendipitous discovery involves was that done by Erdelez (2004); this study

“A typical IE episode starts with information searching for a foreground problem, which leads one to notice an IE trigger and eventually encounter information related to some background problem” (Erdelez, 2004: 1017).

Erdelez (2004) “reverse engineered” this process in order to carry out her study by identifying graduate students from a library and information science course in Business Information Resources as a group with a “common, known task that served as a background problem” (2004: 1017). In order to induce an information encountering episode, Erdelez (2004) introduced an information encountering trigger into a database that she had created for the purpose of the study, an item that she knew the students should take interest in. Finally, she created a “cover task” which would serve as the “foreground problem” (Erdelez, 2004: 1017). Ten students took part in what they believed to be an online shopping study; it was only at the end of the study that they completed an exit survey about their potential information encountering episode related to the red-herring article. From this survey, Erdelez found that none of the students had had a full information encountering episode, that is: noticing, stopping, examining, capturing and returning (Erdelez, 2004: 1015). While nine out of ten students had noticed the article and its relation to their studies, none of these students stopped to investigate. Erdelez gave two main reasons for the negative outcome of this study; firstly, that:

“the research-context of the cover story may have increased the motivation of the participants to stay focussed on the foreground task and therefore suppressed their natural information encountering behaviour” (Erdelez, 2004: 1021)

Secondly, she believed that the “artificial nature of the foreground problem” may have been a barrier (Erdelez, 2004: 1021). This study will hopefully go some way to solve the above
mentioned problems, as it will, as Erdelez suggests use a ‘self-generated’ foreground problem (Gross, 1999 cited in Erdelez, 2004: 1022). “In such a way the content of the cover study may be more meaningful to the respondents and inspire their deeper involvement with the task-at-hand” (Erdelez, 2004: 1022) and will therefore further test what the process of serendipity involves. In addition to this, this study should hopefully give a more in-depth account of each participant’s conceptions of serendipity or information encountering, as semi-structured interviews will also take place.
2 Literature Review

The following review of the literature will discuss the concept of information behaviour as a whole before moving on to examine those concepts of which information behaviour comprises, specifically information encountering or serendipity, and information seeking or more broadly, information literacy.

2.1 Information Behaviour

Ford succinctly describes information behaviour as comprising

“those activities entailed in the acquisition of information that may be transferred in to knowledge. It subsumes information encountering and information seeking, the latter subsuming search and retrieval” (2005: 81).

This statement does not appear to be up for dispute in the current literature. What has changed however is an apparent movement from the phrase ‘information-seeking behaviour’ to merely ‘information behaviour’. This is perhaps as a result of the work of Erdelez, a key player in the field of information encountering, who saw that:

“the label [information-seeking behaviour] is a misnomer because passive and opportunistic information acquisition [...] more resembles “gathering” than “hunting” – the active pursuit suggested in the term seeking” (Erdelez, 1999).

Thus information behaviour is a more generic, and now more widely used phrase, encompassing both ‘passive’ and ‘purposeful’ information acquisition. What is now being questioned however is the form the information behaviour models should take; this will be discussed below.
2.1.1 From Linear to Non-Linear Models

Having assessed the literature that preceded his study, Foster (2004) found that models of information behaviour suggested that the process was completely linear; something which he felt was unsuitable in an age of increasing inter-disciplinarity. As a result of carrying out semi-structured interviews with academics from the University of Sheffield who had interests in more than one area of discipline, he found that information behaviour was indeed not chronological, and in fact that the

“relationship of behaviours was described in terms of concurrent, continuous, cumulative, and looped cycles occurring throughout a research project. At a micro level, there was similarly a sense of nonsequential behaviour in which any behaviour could conceivably lead to another” (Foster, 2004: 232).

As a result of this study Foster (2004) created a non-linear model of information behaviour. He was not alone in doing so as Ford (2004: 203) also moved away from the traditional model of information behaviour, with similar key points arising. Both recognised the impact of context upon a set of core processes that they believed to be carried out in a non-linear fashion.

Taking Foster’s (2004) model, he recognised that there were three contextual elements that could impact upon the processes involved in information behaviour. The first of these was the external context, involving such things as time pressures and the environment in which a person was working; next was the internal context, that is the prior experience and knowledge of the information seeker and the impact of feelings and thoughts; finally he pointed towards the cognitive approach of the information seeker, that is whether the person is flexible, open-minded, willing to move away from their usual sources of information and perhaps take a more holistic approach (Foster, 2004: 232-233).

opening, that is moving away from orientation to actually seeking information; orientation, which includes the traditional step of problem definition, though this is continually re-defined; and consolidation, which involves deciding whether further information seeking is required, and if it is not, completing the work in progress (Foster, 2004: 233-234).

What has been ascertained therefore is that information behaviour models have become more complex, changing from that of the traditional linear models, to multi-faceted non-linear models that involve not only the process itself, but a number of contextual elements that can impact on the process greatly. Information behaviour subsumes other activities including information encountering and information seeking; the fact that information behaviour as a whole has manifested into a far more complex concept suggests that how those activities that make up information behaviour are understood has also changed. The following sections will therefore concentrate on the concepts of information encountering or serendipity, and information seeking or more broadly, information literacy, both in the context of information behaviour and as concepts in their own right.

2.2 Serendipity

2.2.1 Definition
There are many terms which have been used interchangeably with that of serendipity, such as the use of information encountering (Erdelez, 1999 & 2004) above. Incidental information acquisition (Heinstrom, 2006 & Williamson, 1998), incidental encounter (Bjorneborn, 2008), and opportunistic information acquisition (Erdelez, 1999) are other commonly used phrases. This study is not setting out to debate whether these alternatives are questionable, but to assess how serendipity and other terms that are used interchangeably with it, are perceived and understood.

The traditional definition of serendipity came from Horace Walpole who was the first to coin the term in 1754. In a letter to his friend Horace Mann, Walpole explained serendipity by
telling the fairytale of *The Three Princes of Serendip*, and how “they were always making discoveries, by accidents and sagacity, of things which they were not in quest of” (Merton & Barber, 2004: 2). That serendipity implies an element of accident and chance is not questioned by today’s literature, there is however debate surrounding the possible element of control that may be attributed to serendipity in terms of the psychological and skill elements suggested by the term sagacity. Further, while Walpole described the information found as something that the princes were ‘not in quest of’, academics of today debate this, with some suggesting that serendipity allows you to reach an already formulated goal or background problem. These issues will be discussed in more depth below.

2.2.2 The goal problem

Erdelez, the leader in the field of information encountering, has in both her earlier and more recent studies, stated that the information found in this way may solve a problem that has previously arisen for the user (Erdelez, 1999 & Erdelez, 2004: 1017); this is in contradiction with Walpole’s fairytale. Cooksey (2004) has pointed out that some authors have taken issue with this and see it as “pseudoserendipity” or “serendipity analog” (Cooksey, 2004: 24). Within academia however, this very pure definition of serendipity no longer appears to stand with the majority, Foster and Ford (2003: 324) for example state that:

“Accounts of the creative process of research do not leave serendipity as Walpole’s classic “fortuitous discovery”, but hint at something more active, opening at the edge of consciousness.”

Haywood (1997), an academic in the field of human information systems, further supports this notion of goal directed serendipity by stating that as “seekers after information we often desire a mix of specificity and serendipity”. The term ‘seeker’ suggests that there is a goal attributed to serendipity. Another way to understand this is the overlap of ‘convergent’ or more creative, and ‘divergent’ or more predictable information behaviour (Ford, 1999: 528; Bjorneborn, 2008); this is particularly well portrayed by Bjorneborn (2008: figure 2) whose model of information
behaviour shows that while an ‘incidental encounter’ can mainly be attributed to divergent thinking, it also overlaps with that of ‘convergent’, goal directed thinking, suggesting therefore that either is possible.

At the same time however, Heinstrom (2006: 580) appears to view this element of serendipity as irrelevant, purposely focusing upon the way information is found serendipitously, as opposed to whether the content is expected or not.

Thus, there are three key views to arise from the literature; firstly, relating to a very pure definition of serendipity, the belief that serendipitous discoveries are completely new to the user and are in no way related to a previously set goal; secondly, that serendipitous discoveries can relate to a known goal; and thirdly that this in fact does not matter, and that how the information is found is of key importance. The following section will therefore focus on how serendipitous information is found, looking at the issue of control and serendipity, a notion in itself which suggests that the information found is in some way related to a previously defined goal.

2.2.3 Control of Serendipity

As previously stated, Foster’s (2004) non-linear model of information behaviour places much importance upon context and its impact upon the core processes within information behaviour. It is not only the external context of the environment in which a user is seeking information that is focussed upon, but also the internal context, that is the previous knowledge and cognitive approach of the user (Foster, 2004: 232-233). As serendipity is seen as part of this information behaviour, it may be assumed that there is also an element of context related to this, and therefore that the users previous knowledge and cognitive approach impacts upon them finding information serendipitously, as suggested by Bjorneborn’s model of information behaviour (2008: figure 2). This idea of context implies that it is possible to control serendipity by changing your cognitive approach and increasing your levels of knowledge and experience. This concept will be discussed in more depth below.
2.2.3.1 Psychology and Serendipity

Both Erdelez (2004: 1023) and McBirnie (2008:608) agree with the work of Heinstrom (2006), who believes, following a large and in depth study of students from the ages of 12-53, that the psychological factors of personality traits, motivation and emotion all play a part in completing the process of accidental information acquisition. McBirnie (2008:607), refers to this as “process-perception duality”, that is the notion that the process of serendipitous discovery is in someway separate from the psychological factors involved, and explicitly states that this is an element of serendipity that may be controlled (2008: 611). Heinstrom (2006) expands further, believing that if your mood is more positive, or if your study style is a deep approach as a result of an “intrinsic motivation and personal engagement” (2006: 589) with your subject, or if you are generally an extraverted person (2006: 588), you are more likely to make a serendipitous discovery. Cooksey (2004: 25) concisely describes this theory, stating that:

“It is not the observation or a bit of information per se that makes knowledge, but the mind that sees the significance and makes the connections. As the old joke goes, Newton’s dog also saw the apple fall.”

The view that serendipitous discoveries can only be turned into knowledge if the link is made by the user is supported by many academics, including Friedel (2001), who similarly states that “insight is every bit as important as the accident”. Ford (1999: 532) likewise attributes serendipity to psychological factors, stating a need for general creative thinking:

“It would also appear that to a significant degree, creativity often depends on the relatively unplanned and often sudden recognition of a similarity between disparate entities – as opposed to the more progressive, controlled jettisoning of dissimilarity.”

If it so essential that users are able to think in a distinctive way in order to turn a serendipitous discovery into knowledge, then surely there should be some effort amongst both academics
and librarians to ‘teach’ serendipity. Michael Hoeflich, a Professor at the University of Kansas School of Law, positions himself in support of this:

“Not only must we preserve our libraries and archives, we also must teach our students to recognise serendipity when she does appear. [...] I think that it is crucial to teach our students that when they approach an archive they must remain mentally flexible” (Hoeflich, 2007: 826).

History of Science academic James McClellan similarly supports the need to help students understand how serendipity has contributed to research, and how it could indeed support their own research if they were able to keep an open mind (McClellan, 2005: 15).

Thus, academics from both outside the field of information science and those within, including McBirnie (2008), recognise the importance of serendipity and the possibility of integrating the teaching of this into academic programmes. Although McClellan (2005: 11) also provides a plausible explanation as to why there are those who would not wish to either encourage or teach serendipity, recognising that:

“Culturally, we prefer explanations that show us in charge as historical actors and as chroniclers, and it is upsetting and destructive to the historical enterprise to think otherwise. In the final analysis our narratives can not seem to be the result of accident.”

It seems therefore that much of the literature supports both the need and the ability to teach the psychological elements of serendipity, and to make students aware of its importance and existence. The chief reason for its absence in education currently appears to be a level of snobbery regarding serendipity and quality research. While there is little question surrounding the control of psychology in order to some extent control serendipity, there is much debate
within the literature regarding control of the process of serendipity, whether through facilitation and support or teaching; discussion of this will follow below.

2.2.3.2 The Process of Serendipity

Whilst McBirnie believes that you can control the psychology or perception element of serendipity, she at the same time believes that there can be no such control over the process of serendipity (2008: 611). Studies have emerged throughout and beyond the past decade which have portrayed the ability not only to facilitate the process of serendipity, but also to teach it, thus bringing McBirnie’s theory into dispute.

Perhaps the most traditional way for libraries to facilitate serendipity that has emerged from the literature arose in the nineteenth century with the creation of rational classification schemes based on subject relationships. Haywood (1997) stated that:

“as well as helping us find specific titles and subjects, [it] also realised a modicum of serendipity. The specific item would be shelved alongside related items which we could stumble across.”

However, we find here a point of contention. The classification system is understood by some as facilitating ‘browsing’ as opposed to ‘serendipity’. The nature and definition of browsing is constantly debated by academics; Toms (2000: 424) for example understands browsing to be “an activity in which one gathers information while scanning an information space without an explicit objective”; Foster (2004: 233) appears to support this conception by finding the two concepts of serendipity and browsing to be closely connected. Others however view browsing as more related to purposeful searching as opposed to passive information acquisition (Carmel, Crawford & Chen, 1992; Belkin, Marchetti & Cool, 1993; Belkin, Cool, Stein & Theil, 1995 cited in Toms, 2000: 424). A further distinction is made by Bjorneborn (2008, fig2), who in their model of information behaviour quite clearly distinguishes between ‘impulsive browsing’ and ‘systematic browsing’, with the former being more closely related to the incidental
encountering of information or serendipity. It is unclear therefore whether library classification systems, and browsing systems that have emerged with the technological age, can be directly related to the facilitation of serendipity, with a number of conceptions arising; there are however a number of other tools that could be considered as able to facilitate serendipity that are not directly related to browsing.

Those in the field of information science are constantly seeking to design and improve search systems, particularly in relation to the support of serendipity. One such example is the creation of a system called ‘Max’ (Campos & Dias de Figueirdo, 2001); the details of this are beyond the scope and complexity of this study, however a number of other less complex ideas have arisen from the literature. Stevenson et al (2008) refers to “structured serendipity”, presenting a study that discusses the creation of a large electronic collection between the New Zealand Universities. All the electronic data is completely cross-referenced, in fact the

“ability to programmatically to extract parts of the text as metadata and reconfigure for use in other systems such as reference management tools, archival finding aids, metadata aggregators, or library catalogues means that a single resource can be discovered from any number of environments.” (Stevenson et al, 2008)

The use of such hypertextuality is a common feature of databases and search engines of today and may be viewed as a way to control the process of serendipity.

Such system designs, though perhaps much improved, are still not perfect and thus the results of Spink & Greisdorf’s (1997) study may still be relevant to some extent. They found that:

“for users conducting their initial online search on a particular information problem, it was the number of items judged partially relevant [...] not items judged ‘highly’ relevant, that were positively correlated with important changes in users’ information problem and information seeking processes” (Spink & Geisdorf, 1997: 538)
Whilst knowledge of such quirks may be helpful in providing support to students in finding information serendipitously, Ford (1999: 538) quite rightly suggests that such systems need to positively support serendipity as opposed to negatively. One such positive example is that of “altruistic serendipity” which occurs as a result of the ‘send e-mail’ choices in databases (Cooksey, 2004: 28). The main implication is again that the process of serendipity can be controlled; in fact worries that “the move to digital libraries might jeopardise serendipity by reducing the number of available paths to reach a given set of material” (Foster & Ford, 2003: 323) appear to be unfounded.

An additional element that has arisen from the literature in support of control of the process of serendipity is that of personal information management (PIM). In his model of information behaviour Foster (2004: 233-234) briefly refers to ‘Eclecticism’ as being associated with serendipity; Eclecticism being defined as:

“accepting, gathering and storing information from a diverse range of both passive and active sources sometimes over considerable time periods, for later incorporation and satisfaction of information needs”.

This suggests that PIM may be directly related to serendipity. Marshall & Jones (2006) support this theory, writing a paper solely related to that of PIM and ‘encountered information’. Their theory is that there is a certain art to PIM; just by saving an item and hoping to return to it later via a search is often unreliable (Marshall & Jones, 2006: 67). They recognise that those developing the PIM tools must understand that:

“the sense-making activities that surround keeping are critical for our ability to use things later [...], whether these activities involve associating material with a particular taxonomy or establishing a stable sense of place [...]” (Marshall & Jones, 2006: 67).
It therefore seems possible that if PIM systems were to improve, then a person’s control of the process of serendipity would increase.

Moving away momentarily from a focus on academia, in their study of general life information needs of the 60 plus in Australia, taking a sample of 202, Williamson (1998: 37), concluded that “major information provision in society” should be aimed towards community needs, to inform people of information “they are sometimes unaware they need”. Thus, there is a view, though perhaps not particularly widespread amongst anyone but the world of advertising, that such vehicles of information as newspapers, television and radio, should be used in order to support the process of serendipity.

Taking the above one step further, the literature goes beyond in many cases the mere facilitation of serendipity by physical library environments and systems, to the belief that the process of serendipity can be taught, suggesting a heightened possibility for control. As outlined above, this theory has been questioned by McBirnie (2008). Cooksey however points to the reluctance of library users to ask their librarian for advice, resulting in them sticking to the same two or three databases and “limiting their possibilities of serendipity” (2004: 30). Implicit in this perhaps, is that if sound information literacy training is provided then library users are more likely to come across information serendipitously. Foster and Ford also support the notion that such skills “may have a role in engendering serendipitous information encounters” (2003: 325).

It is therefore possible that the process of serendipity may be controlled; it may be facilitated by physical libraries or system design and the skills involved in the process may even be taught. The next section will address if and how serendipity has been integrated into a variety of information literacy models and frameworks that are used in academic settings around the world, in order assess whether serendipity is in fact viewed as a process which can be taught, before finally assessing the general conceptions of information literacy that emerge from the literature.
2.3 Information Literacy

As stated in the introduction to this study, SCONUL’s ‘7 Pillars of Information Literacy’ (SCONUL, 2004) do not at first glance make a reference to serendipity. On the hand, others such as the ‘Australia and New Zealand Information Literacy [ANZIL] Framework: Principles, Standards and Practice’ (Bundy, 2004), which are adapted from the US ‘Information Literacy Competency Standards for Higher Education’ (ACRL, 2000) make an implicit reference, asserting that:

“the information literate person applies prior and new information to construct new concepts or create new understandings [...] [and] determines whether information satisfies the research or other information need [...]” (Bundy, 2004: 20-21).

McBirnie (2008: 602) argues that this statement ‘explicitly’ places serendipity within the information literacy process. This study however remains cautious in its approach; below will follow an assessment of a number of information literacy models and frameworks in order to establish any implicit or explicit references to serendipity.

2.3.1 Information Literacy Models & Frameworks

7 Pillars of Information Literacy Expanded (Webber, 2007)

In the skeleton model of the 7 pillars of information literacy outlined above, there is no mention, implicit or otherwise, of anything relating to serendipity (SCONUL, 2004), however when you dig deeper into the more in-depth framework, it is possible to make the link.

Generally the framework refers to “resources appropriate to your information need” (Webber, 2007), implying the current information need and therefore implying that this is as opposed to an: unknown, past, or future information need. The document however does also refer to PIM:

“In some contexts [...] being able to organise the information for easy retrieval and communication will be important. This may involve understanding the use of
We may perhaps infer here the implicit inclusion of serendipity into information literacy models and teaching, as PIM has previously been pin-pointed as key to the future use of information found serendipitously.

7 Faces of Information Literacy (Bruce, 1998)
Within the 7 Faces of Information Literacy created by the Australian academic Bruce (1998), it is stated in category four that: “all the information is selected on the basis of its likely value for future use in research or teaching” (Bruce, 1998: 33) and that “recognising useful information and controlling information enables future retrieval and use” (Bruce: 1998, 34). This suggests the use of information for an ‘information need’ that is not current, and therefore, may, or indeed may not, imply an element of serendipity.

The Information Literate Person (Big Blue, 2002)
The model of The Information Literate Person created as a result of the ‘Big Blue Project’ (Big Blue, 2002) states that the information literate person “selects, reviews, retains & discards results as necessary” and “reflects whether the original information need has been met”. This may implicitly suggest the saving of information that could be useful for another unexpected information need; you could again therefore infer the possible relation to serendipity.

Scottish National Information Literacy Framework (Crawford & Irving, 2008)
Even at the very highest level of education “appropriate extraction of information matching the information need” (Crawford & Irving, 2008: 45) only was mentioned, thus not pointing in anyway towards information to match a past or future need, and therefore serendipity.
The Information Education Strategy for Universities in the Czech Republic (ALCU, 2008)

The Association of Libraries of Czech Universities (ALCU) state within their information literacy standards state that:

“an information literate University student [...] knows and follows the key information sources in his/her field of study, can find relevant information on the basis of advanced methods of searching with respect to the rights and moral aspects of this activity and can organise and preserve information of various types and formats for further use in their professional work.” (Association of Libraries of Czech Universities, 2008: 18)

This hints at the need for PIM skills to access information found serendipitously in the future.

The Big 6 Information Literacy Skills (Eisenberg, 2008)

Eisenberg (2008: 42) represents the Big 6 information literacy skills within a model that portrays a feedback process. It shows how at each step it is possible to return to any of the previous steps in what seems to be represented as a very iterative process. It may be inferred from this model for example that in moving backwards from the ‘location and access stage’ to the ‘task definition’ stage, that this could be as a result of a serendipitous discovery and a change in the foreground problem.

It appears possible therefore to infer from this sample that an element of serendipity can be found within most, though not all, models and frameworks of information literacy. This is particularly with reference to the ability to recognise whether the information found meets a need beyond that of the foreground problem, and the presence of strong PIM skills in order to successfully retrieve serendipitously found information in the future. It is obviously difficult to say what the authors of these models were thinking, and whether any of them did indeed have serendipity at the back of their minds when designing them, especially as even those models that appeared within more in-depth articles were not at any point described as including
serendipity. Below will follow a further discussion of information literacy, including conceptions that have arisen.

2.3.2 Conceptions of Information Literacy

Information literacy has been defined by CILIP (2007) as “knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner” (CILIP, 2007). It has grown in importance as a phenomenon; no longer is it about the user education of the select few who go to university, but instead encompasses the world of employment and has been recognised as important for lifelong learning. Peter Drucker, a well known management guru has been quoted as stating that “executives have become computer literate…but not many executives are information literate” (Drucker cited in Eisenberg, 2008: 39). Further, information is being increasingly recognised as a currency by the government:

“This is the century of information. Our ability to compete in the global economy, to protect ourselves against crime and terrorist attack, depends not just on natural wealth or on walls or fences but on our ability to use information.” (PM Gordon Brown, 2007)

Perhaps as a result of this increased focus upon information literacy a huge number of models and frameworks have emerged in a little over a decade, a few of which have been mentioned above. These models often have many elements in common, and for Eisenberg (2008) are often based upon the shared understanding that “information skills are not isolated incidents, but rather are connected activities that encompass a way of thinking about and using information” (Eisenberg, 2008: 40). Despite this however, Foster (2004: 253; 2006: 41) believes that these models are not complex enough, and do not portray the depth of information behaviour in the real world; what may be inferred from this is that these models do not reveal the intricacies of information behaviour such as serendipity.

So, despite this increased focus upon information and information literacy skills, and the number of similar models and definitions of information literacy that have arisen, conceptions
of what information literacy is and how it should be taught are varied. Perhaps one reason for this is the increased involvement of teachers in the teaching of information literacy at the same time as a diversification of the role of the librarian into learning support, as recognised by Levy et al (2003: 302-303). This question mark over who should be teaching information literacy and how, has perhaps affected the conceptions of what information literacy is. In their study of UK academic’s conceptions of information literacy in the disciplines of English and marketing for example, Webber et al (2005: 12) found that what appeared to emerge was a conception of information literacy focussing upon resources and the use of IT, however, there were very contextual, discipline specific differences between the conceptions. As a result, they concluded that librarians must assess the context in which they are working in order to decide the approach to take with regards to the teaching of information literacy (Webber et al, 2005: 14).

Thus, in little over a decade information literacy has vastly increased in importance within business, the government, lifelong learning and education. Models and definitions of information literacy that have emerged are very similar on many levels, however, conceptions of information literacy are varied, and perhaps context and discipline specific, and not only this, may be changing as a result of the evolving roles of both librarians and teachers with regards to the teaching of information literacy. This study hopes to assess the conceptions of both librarians and librarianship students with regards to information literacy, and at the same time point any links made between this concept and that of that of information behaviour, and more specifically serendipity in order to reveal the complexities of information literacy as recognised by Foster (2004 & 2006).
3 Methodology

3.1 The Phenomenographic Approach

This study takes a qualitative approach and is inspired by phenomenography. Although the study is predominantly inductive, the idea arose from apparent gaps within the literature. The phenomenographic approach produces results of a “second order perspective”, that is, a description of “people’s conception of reality”, rather than an answer that produces a “statement about reality” as in the “first order perspective” (Marton, 1981: 178). According to Prosser et al (1994: 219) the conceptions that arise from phenomenographic studies are representative of the relationship between the individual and the task or context, as a result of this Prosser et al recognise that these conceptions are dynamic, that they change as the context changes. This may suggest that the conclusions that arise from a phenomenographic study can not be generalised, however, Prosser et al then go on to express the opinion of Marton (cited in Prosser et al, 1994: 219) who believes that only a small number of conceptions can exist with regards to any one phenomena, therefore as long as a sufficiently high sample of participants is used, the results that arise from a phenomenographic study could in fact be generalised. Those such as Bruce and Webber et al (1998 & 2005) have already successfully used the phenomenographic approach to research conceptions of information literacy, with solid conclusions reached by both. This approach is therefore ideal for this study and to gain an idea about peoples’ conception of serendipity and information literacy.

3.2 Data Collection

3.2.1 Participants and Sampling

This study involved nine participants, not including the two pilot studies that took place. There were five MA Librarianship students from the University of Sheffield Information Studies Department, and four qualified librarians; these groups were chosen using ‘purposive sampling’. That is, due to the exploratory nature of the study, participants were chosen that
should be able to discuss in most depth the concepts being considered, and in fact are most likely to experience these phenomena.

3.2.2 The Information Seeking Exercise: Facilitation of an Information Encountering Episode

A participant information sheet (Appendix 1) outlined the purpose of the study, describing this element as purely an information seeking exercise. To explain the true purpose of this element as an exercise that was aiming to facilitate a serendipitous discovery or a full information encountering episode, could have impacted on the results gained. If a person agreed to participate they were asked to describe briefly what issues or concepts are of interest to them in either the academic or working environment. The researcher then designed a search exercise for each participant based upon a broadening out of the sometimes specific information provided. Participants were provided with pen and paper during the exercise, while the researcher observed the proceedings. A closing questionnaire (Appendix 2) was completed by each participant immediately after the ‘information seeking’ exercise. This included a number of closed questions related to Erdelez’s (2004) theory of an information encountering ‘episode’ that is: noticing, stopping, examining, capturing and returning (Erdelez, 2004: 1015). The final step of ‘returning’ would ideally not have been examined until a later date, however, as a result of the pressures on both the participants and researchers time, all elements of the study were completed in one sitting. Participants were asked as part of the questionnaire of their intentions of returning to any information found. An analysis of the data based upon Erdelez’s (2004) theory will follow.

3.2.3 The Interviews

Following the questionnaire each participant was interviewed by the researcher. In the participant information sheet this element of the research was described as an interview relating to their conceptions of information literacy, as again, to have pointed towards the serendipity element of the interview may have affected the results of the ‘search exercise’. In order to take a ‘phenomenographic’ approach to this research the interviews were semi-structured with the researcher aiming to ‘bracket’ (Groenwald, 2004 : 12) their own feelings
and assumptions with regards to the research. Its objectives were to probe the participants’ conceptions of ‘serendipity’ or ‘information encountering’; to probe their conception of ‘information literacy’, and also to observe and probe further if they made any links between the two concepts. Perhaps as a result of the nature of the interview, in which the researcher aimed to allow the participants to direct the interview beyond the basic structure, the length varied greatly from 10 to 30 minutes.

3.3 Data Analysis

The interviews were recorded and transcribed. Techniques such as writing summaries, looking for commonalities and differences, looking for surprises (suggested by Riley cited in Ashworth & Lucas, 2000: 306) and picking out key quotes were used in order to draw key themes from the data. As the phenomenographic approach requires, the ‘phenomena’ as a whole were studied, and therefore any contrasting themes to emerge from an individual interview were recorded.

3.3.1 The Outcome Space

An “outcome space”, a method of recording the results of phenomenographic research, used by Bruce and Webber et al (1998 & 2005), was used to record the themes that arose from this study.

“It provides a way of looking at collective human experience of phenomena holistically, despite the fact that the same phenomena may be perceived differently by different people and under different circumstances. Ideally [...] [it] represent[s] the full range of possible ways of experiencing the phenomenon in question, at this particular point in time, for the population represented by the sample group collectively.” (Akerlind, 2005: 323).

Webber et al (2005) used a more traditional matrix to represent the different conceptions that arose relating to information literacy, whilst Bruce (1998) seemed quite unique in the use of a
hierarchy made up of number of different related conceptions that were represented by a kind of ‘bulls eye’; thus suggesting that there is no one way to create an outcome space. The literature on phenomenography is lacking in the way of a step-by-step guide for the creation of an outcome space; the study that is closest to achieving this is that by Akerlind (2005) which, quite concisely describes the iterative process that is the creation on an outcome space. Thus a combination of this article and the studies by Bruce and Webber et al (1998 & 2005) were used by the researcher to guide them in the creation of their outcome space.

3.4 Strengths and Weaknesses

Due to the time constraints placed on this study and participants, the ‘information seeking’ exercise and interview took place in the same sitting, and therefore departed slightly from the study by Erdelez (2004). In doing this, the questionnaire asked participants about their intention to ‘return’ to any information found, and therefore results may not be as reliable.

However, the fact that semi-structured interviews took place does mean that this study expands somewhat on that of Erdelez’s (2004), and the phenomenographic approach should mean that the results are valid and reliable in their description of participants’ conceptions.

3.5 Ethical aspects

This study has been assessed as ‘no risk’ by the University of Sheffield ethics procedure. All participants provided written, informed consent. All results will remain anonymous as outlined on the consent form (Appendix 3).
3.6 Pilot Study and Feedback

Two pilots took place before this study was carried out in order to assess whether any changes were required, and to allow the researcher, who is inexperienced in the carrying out of interviews, to practice their interviewing skills.

The pilot participants could see the value of the search exercise and felt that the databases they were asked to search were those that they had not before considered searching in relation to their stated interests. This was positive feedback, as by choosing those resources that are a little ‘outside of the box’, they were more likely to make serendipitous discoveries. However, Pilot 1 felt that ‘News Bank’ was poor in that the search results did not display an abstract, which would have been useful in such a short space of time. Further ‘News Bank’ contains no added features such as links to similar articles or a tool that links to newer articles citing the articles displayed in the results. SCOPUS, the database used for the search exercise during Pilot 2 received positive feedback, possibly due to the number of available tools such as tabs to show articles that cite those found and a list of references.

Both Pilots also recognised the value of the questionnaires, particularly as the questions map directly onto Erdelez’s (2004) model. Pilot 2 however pointed out that although Erdelez (2004) may represent this model in a linear fashion, it is quite possible, particularly during such a short exercise, that you may not examine or even stop to look at a search result, but may want to return in the future to information recognised as possibly useful. Further, the researcher also noted that it would be valuable to change the first question from “Did you notice any search results related to your topic of interest?” to, “Did you notice any search results related to this or any other interest?”, as serendipity is about finding information of value of any kind unexpectedly.

Finally, feedback was received with regards to the interviews conducted with the Pilots. Although they lasted around 20 and 10 minutes respectively, a similar amount of content was
gained from each, with interesting insights arising out of both. Both Pilot participants commented on the researchers’ ability to summarise their answers concisely. Due to the phenomenographic nature of this study, it was particularly positive that the pilots commented on the way in which they were able to direct the interviews with their answers, rather than the researcher leading with very structured questions.
4 Results & Analysis

Following a phenomenographic analysis of the interview transcripts of both librarianship students and information professionals, a number of similar key themes arose within both groups. These key themes are well illustrated by the following grouped quotes, which helped the researcher to facilitate an analysis.

Librarianship Students’ Key Quotations

**Serendipity**

“running into something that you hadn’t initially thought was useful [...] then maybe that will lead into other items and you might find it starts snowballing into different areas [...] it can broaden the topic that you’re looking at, but it can sometimes lead you a bit astray from what you’re doing.” (LS1)

“Luck, or chance or coincidence.” (LS2)

“coming across something that you weren’t expecting to [...] you sort of just happened upon it and it happened to be useful.” (LS3)

“you come across something you weren’t expecting and that is fortuitous”. (LS4)

“Fortunate accident”. (LS5)

“Not expecting something to happen”. (LS5)

“When I think of serendipity I think of you doing something else entirely and like bam and you see something and it could be completely unrelated.” (LS5)
Value of Serendipity

“I didn’t want to put things in just because I’ve found them, it’s got to be the right thing that you’ve found and it’s got to be useful.” (LS1)

“it doesn’t really matter how you found it.” (LS2)

“it’s just that have found it in a different way.” (LS3)

“generally I place as much value on it [...] so long as it’s valid.” (LS5)

Psychology

“I think that you need to be quite open minded about what you’re looking for because if you do go in and stick to the things that you were really looking for in the first place you’re not really going to find as useful a set of results as you might do if you were open to those new ideas”. (LS1)

“your surface search might not go deeply into everything, you might just skim over a few titles which actually for serendipitous searching could be quite useful [...] but obviously for deeper learning serendipitous search can be really valuable because then you go a lot further into the particular topics that you weren’t really aware of before”. (LS1)

“I don’t think it’s entirely luck, I think it’s partly just if you’re tuned to noticing something then you will.” (LS2)

“you have to have the motivation to do it, like if you didn’t bother to read the gazette when it came, then that wouldn’t help you to find things serendipitously.” (LS3)

“if you were a surface learner zapping through and processing a lot of information then maybe you would be less likely to notice things like references to other works and citations to other
things [...] maybe then if you’re a deep learner you do reflect more on the things you find and then apply that knowledge.” (LS3)

“people think differently, so it’s not always going to be the key words that you look for that people put in, and it might pop up something that’s completely random”. (LS4)

“You do need the motivation, and I think it probably is more of a deep learning experience because you’ve got to think about it”. (LS4)

“a lack of focus. I think that might be part of the knack”. “I do pick up on things serendipitously just because I’m easily distracted.” (LS5)

**Skills**

“if you’re looking for something really very specific then you might not have so much serendipitous encountering [...] but if you’re looking for something broader maybe it can be really helpful because you can look in different directions that you hadn’t considered”. (LS1)

“I think perhaps it does depend on the [search] techniques”. (LS1)

“there is a certain skill in searching very well to find what you want, but perhaps there is also a need to open your search a little more, so using synonyms and different search words can be a way of doing that to get some ideas flowing”. (LS1)

“I’ll have a look at the actual article itself and it will talk about other key things and other topics will come up and then I will follow up some of the citations, using things like citation indexing, people who have cited that article”. (LS1)

“maybe being observant.” (LS2)
“just knowing a bit about how databases work and how you can use citation things, and how you’re able to use things like Web of Knowledge.” (LS3)

“if it’s a conscious set of skills that you’re applying then maybe that’s less serendipitous, because serendipity implies almost an accident of finding something.” (LS3)

“I suppose if you think about it it’s a happy accident, that would be like walking down the street and a bit of information just appearing in front of me, which isn’t very likely to happen, but I suppose I the sense of searching for information it is better to think about having some kind of conscious thought behind it.” (LS3)

“I think there’s more to serendipity than browsing [...] like following citations and things.” (LS3)

“No because I think if you were actually trying to find something it wouldn’t be serendipity”.
“maybe you could try and be more receptive or pause more”. (LS5)

“I think things like citation routes would be a skill [...] it’s like bread crumbs, you’re expecting something”. (LS5)

**Browsing**

“browsing is one of the things that is related to it, especially on the internet.” (LS2)

“because it’s [CILIP Update] something library related it’s not like it’s come from nowhere, you are reading it because you want to get information but because of the nature of the publication, it’s all bits about everything, you can find bits of information you weren’t expecting to find.” (LS3)

“I think it’s like actively searching rather than passively having something jump out at you.” (LS5)
**Teaching Serendipity**

“I think half of it is probably luck, but I think you can probably remind them, or make them take note and say you can sort of happen upon things so you know to maybe keep an open mind about it”. (LS2)

“I think things like teaching people to learn, those kind of classes are quite difficult [...] But you could certainly introduce things and encourage people to use things like citation search and the similar articles and teach them to use things like Web of Knowledge, but the psychological aspect maybe not so much.” (LS3)

“[I] think the whole nature of something being serendipitous is that you aren’t expecting it, you can’t teach what you’re not expecting. I think if you were to make people aware that you might possibly come across something that’s different”. (LS4)

**Information Literacy**

“I think information literacy for me encompasses like kind of evaluative skills [...] what sets information literacy apart [from information skills] is building on once you’ve got the information what do you actually do with it?” (LS1)

“I think everybody can in someway find information [...] but I think really the thing that a lot of people don’t think about perhaps is the fact that you really need to look quite hard at what you’ve got rather than just sort of taking it at face value, you’ve got to look at it and evaluate”. (LS1)

“Information Literacy is about finding, using, evaluating information, and I sometimes don’t think it’s necessarily a conscious thing, often you’re doing it without realising [...] so yeah it’s working out what information you need, locating that information and then using it in an appropriate way”. (LS3)
“a person who is able to look for information, but look for it in a methodical way and be able to generate good results of articles and things [...] and then be able to evaluate [...] I think you need to remember where you got the results from as well.” (LS4)

“being able to read the signs and work your way through resources”. (LS5)

“all related to having an overarching knowledge of the resources you’re using.” (LS5)

**Importance of Information Literacy Skills**

“I think whenever I think about information literacy the key things I think of are being able to evaluate information and being able to evaluate whether it’s trustworthy, whether it’s current and also being able to synthesise”. (LS2)

“I think the other skills like recognising your information need and constructing your search strategies, I think they’re things that people quite naturally do anyway.” (LS2)

“you can’t really have any of the points without the others [...] so I think you need to go through all the steps. I do think though that some steps are more natural than other steps, like going out and searching for information is quite a natural skill, but actually thinking about before you start, well what exactly is it that I want to find, that’s not something that you would necessarily naturally do”. (LS3)

“I guess they all complement each other very well [...] but it’s the searching that you do that is going to generate the results [...] so if you go wrong in the first place then you create problems further down.” (LS4)

“It’s sort of a set process, people might do it in a slightly different way [...].” (LS4)
**Information Literacy and Lifelong Learning**

“you use it in many different settings, not just in a classroom but in everyday life”. (LS3)

“the course has broadened that definition [of user education] to a lifelong thing.” (LS3)

**Teaching Information Literacy**

“I think people learn best when you relate what you’re teaching to their actual need and make it specific to them so I do think it does need to be tailored.” (LS3)

“if you do it in a methodical way [like the 7 pillars] people will be able to understand”. (LS4)

**Serendipity and Information Literacy**

“I think it’s important to bring in serendipity into models of searching because it can be really productive and valuable, so I think you’re at risk of cutting people off from really useful information if you just stick to a prescribed way of doing a search, but again you do have to sign post the fact that it’s not always the best way to search.” (LS1)

“a lot of the time then if you’re searching and you come across something that you didn’t think you would, or didn’t expect to then that would fit in with serendipity”. (LS4)

“No, I think with information literacy you’re working from a knowledge base and kind of you have procedures in mind and you have resources in mind, but serendipity you kind of find something else entirely and it just comes to you”. (LS5)

**Serendipity in the 7 Pillars of Information Literacy**

“I think looking at it initially sort of pillar 3 and 4 in terms of constructing and then actually locating your information […] pillars 5 through 7, I think there you’re sort of really needing to have some organisation of the information that you’ve found, so it’s not just having found
something serendipitously, it’s really then looking at the information you did find and seeing where it fits into the topic that you’re looking at.” (LS1)

“I guess it relates to the first one, recognising your information need because I mean if you know what you’re looking for then you’re more likely to notice it if it comes up I think.” (LS2)

“I suppose it could be in pillar 4, locate and access because you’re, if you’re teaching things like citation mapping that would fit in pillar 4 [...] it could also go in construct strategies because you could say I’m going to use serendipity, browse through recent journals. But then you could say it’s also a way of addressing the information gap, and I’m going to address the gap by browsing [...] So I think potentially it could fit in more than one pillar”. (LS3)

“I would probably put it with 4 and 5 [...] definitely within locating and accessing it and then comparing it, once you start properly comparing and evaluating it you’ll find within it perhaps another article or something”. (LS4)

“perhaps you might think of it in 3 in terms of constructing strategies”. (LS4)

Information Professionals’ Key Quotations

Serendipity

“Serendipity is happening upon something by chance, maybe you weren’t looking for it, and it’s something useful.” (IP6)

“it’s just when you’re not deliberately searching”. (IP6)

“it’s being lucky, it’s not giving up, and for us it’s facilitating student’s to do that.” (IP6)

“randomly stumbling across information” (IP7)
“chance occurring” (IP8)

“It’s hitting on something that you’re not expecting, or finding something very, very helpful, very interesting, more by chance than by design.” (IP9)

**Value of Serendipity**

“that’s how your research is going to grow”. (IP6)

“if you don’t do all that previous research then you wouldn’t find things serendipitously...You’ve got to be creative in the way that you find things”. (IP6)

“If you include cited reference searching there’s a great deal of value. In all honesty though I’d probably put more value on a planned search”. (IP7)

“I think at times it could do [have as much value], you might come across something that you wouldn’t have found by doing a precise search.” (IP8)

“if it's useful information it's useful information.” (IP9)

**Psychology**

“you’ve got to have that mind set to begin with”. (IP6)

“you do need to have a certain open mindedness to search around the topic, it’s a positive in the fact that you can find very relevant things without a focus, but you need to have that focus and then once you’ve found the relevant things, then go off on tangents and you might find brilliant things that you haven’t thought of.” (IP7)
“I think if they’ve got a personal need [...] say if someone they know has been ill, and if they don’t know everything to do with the illness, or they want to find out more, then they’re motivated that way.” (IP8)

“I think anyone can come across things on an off chance [...] regardless of their learning style.” (IP8)

“I think there’s a personality element to this, and also your frame of mind at the time of approaching a search”. (IP9)

**Skills/Tools Facilitating Serendipity**

“I guess in the library shelves [...] they will stumble across something that’s maybe now what they were exactly looking for, but something else”. (IP6)

“databases [like ebsco] are combining things and thinking well maybe you would like that, so again it feels like you’re finding something that maybe you wouldn’t have found, just because the database is doing it for you”. (IP6)

“in bookshops you get ‘you might like this’ or ‘somebody else has read this’, google similar results [...] it’s using the tools that have been provided but you’re not actually finding what you’re looking for, you’re finding other related things.” (IP6)

“I’ve thought about different ways of getting the books used more, and I’ve also this summer just gone round and found any books vaguely related to [librarian’s subject area] and that maybe haven’t been catalogued in the [librarian’s subject area] just to put them somewhere where they would stumble across them, rather than being hidden in a different subject.” (IP6)

“I think there is a skill, I think the initial info skills, acknowledging that there’s various tools that you can use to find the resources that you need is really important”. (IP6)
“If you have the basics as to how to use SCOPUS earlier on and somebody tells you about cited reference search and that it’s a fantastic way of finding other related articles [then that can help to facilitate serendipity]”. (IP6)

“yes I would [relate serendipity to tools such as cited reference and similar articles]”. (IP7)

“I suppose if there’s a link, if it mentions an author’s name, and then go ooh they’ve written a book, it might have been on a different topic”. (IP8)

“Yes [things like reference and cited reference searching then].” (IP8)

“I would argue that you potentially get more serendipitous occasions of you started off in a logical fashion.” (IP9)

“If you’re not careful you can go way off track and waste a lot of time, so it’s being aware of the opportunities to find interesting information, but that it can be a distraction, a red herring”. (IP9)

“[the cited reference tool is] a way of broadening out a search, and whenever you broaden out a search, then you’ve got the opportunity for serendipity to happen, to find something that is of interest.” (IP9)

“I suspect that when people talk about serendipity there has been an element of structure.” (IP9)

**Browsing**

“I would say that was the case yes, because you weren’t setting out to search for that particular article or whatever”. (IP6)
Information Literacy

“you have to have your main tools of where you would go to find information and you know the strengths and weaknesses of each source [...] then the ability to evaluate it”. (IP6)

“It’s finding information of value [...] It’s being able to evaluate what you find, and the sources and being aware of what is relevant [...] also it’s knowing your way around databases.” (IP7)

“Being able to find information, look for information, and having an understanding of evaluating the information probably, and obviously being a bit sceptical of the information”. (IP8)

“moving towards e-books, so much more of their work is computer based as well, from word to excel as well as helping them search databases”. (IP8)

“it’s about having a competent approach to finding information [...] you need to understand how to identify key concepts in your topic and then how to use the search interface of the database, to put that information in and get the maximum out of the interface.” (IP9)

“you’ve got to analyse the information, to look at how reliable that information is, and ultimately you’ve got to then present it in some way. So a good search technique can be let down by poor analytical skills and inadequate communication skills [...] you really have to have all those skills”. (IP9)

“A circular process, where you’re actually reviewing what you do.” (IP9)
**Importance of Information Literacy Skills**

“no, I think they’re all [info skills] equal”. (IP6)

“I think [I would put more value on] evaluating the information and being able to trust the source.” (IP8)

“I think you can let yourself down at any of the stages”. (IP9)

**Teaching Information Literacy**

“I think the linear thing is a good way to explain it, but I don’t work in a linear way [...] I would be constantly jumping from one bit to another and you do the evaluation just maybe before you look at it, and you might go back to that particular one.” (IP6)

“the resources you’re talking about have to be relevant [...] you’ve got to do it in the right context”. (IP6)

**Serendipity and Information Literacy**

“I see it [serendipity] as part of the searching process [...] it could be argued that every search is serendipitous because you’re starting off with a vague idea of what you want and then these things appear, and then it sparks other ideas in your head”. (IP6)

“Only when it does come to things like cited reference [...] but that’s the only way I can really see that link. You need to have a strategic plan”. (IP7)

“I think that there is, there would be a reluctance in academic programs to focus on serendipity because I think without an underpinning of information literacy skills then it’s unlikely that serendipity is going to work for you, or have a great impact on your work, so I would not be comfortable in talking to students about serendipity.” (IP9)
**Serendipity and the 7 Pillars of Information Literacy**

“I guess I’d probably put it somewhere in the middle bit, where you’re still finding information”. (IP6)

“It would also be good if you thought about it in your strategies for locating”. (IP6)

“I suppose I’d put it in comparing and evaluating”. (IP7)

“I think it would go with distinguishing ways of addressing a gap.” (IP8)

“It kind of comes into like 2 and 3 really”. (IP8)
The result of the above themed quotes was that the decision was taken by the researcher that the conceptions that arose could be mapped onto the same outcome space.

The outcome space below is representative of the three dimensions that emerged in both groups of transcripts. Each dimension contains a continuum.

4.1 The Outcome Space

![Figure 1: Outcome Space](image)
4.1.1 Continuum 1: Luck – Conscious
This represents the variety of conceptions that arose with regards to whether serendipity is in fact as a result of pure luck, or whether it also contains some elements of conscious thought. If it is the case that in order to find a piece of information serendipitously an element of conscious thought is required then serendipity may in fact be related to information literacy; if this is not the case, and such findings are down to pure luck, then serendipity may not be related to information literacy.

4.1.2 Continuum 2: Valuable – Not of Value
This represents the variety of conceptions that arose with regards to whether serendipitous findings are valuable or not. Where such findings are considered valuable to research then they may indeed be linked to information literacy; where they are not seen as valuable, and perhaps an unwanted distraction, then information found serendipitously may not be linked to information literacy.

4.1.3 Continuum 3: Teachable – Not Teachable
This represents the variety of conceptions that emerge as to whether serendipity is a phenomenon that can be taught or not. Where it is perceived that serendipity can be taught then it may be linked to the teaching of information literacy, however, where it is viewed as a completely abstract phenomena that can not be taught, then there can be no link made to information literacy.

These continuums will be discussed in more depth below taking a separate look at the transcripts of the librarianship students and the information professions.
4.2 Librarianship Students

4.2.1 Conceptions of Information Literacy

Although conceptions of information literacy are not central to this study, information literacy was discussed in participant interviews in order to gauge any connections made between the concepts of serendipity and information literacy. As part of this it was important to ask participants what the phrase information literacy meant to them. An outline of the conceptions will follow in order to facilitate the discussion of serendipity below.

Table 1: Librarianship Students’ Conceptions of Information Literacy

<table>
<thead>
<tr>
<th>Information Literacy as...</th>
<th>Skills Involved</th>
<th>Natural/Unnatural process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different to information skills</td>
<td>Evaluation</td>
<td>An unnatural process when compared to the ability to find information.</td>
</tr>
<tr>
<td>A strategic research process</td>
<td>Assessing your information need, locating, evaluating, using information appropriately, and completing this process in a methodical way.</td>
<td>The physical search process seen as quite natural, whereas a need for a more in-depth thought process when considering your information need and evaluating what you find.</td>
</tr>
<tr>
<td>About the resources used</td>
<td>The need for an overarching knowledge of resources and the ability to chain this information using bibliographies and citation searches.</td>
<td>An unnatural process.</td>
</tr>
</tbody>
</table>

The three separate conceptions outlined in the outcome space above emerged quite clearly from the interview transcripts. There was a clear distinction made between information
literacy and perhaps more traditional user education, with more emphasis being placed upon the higher order skills such as evaluation within information literacy. LS1 for example stated:

“I think information literacy for me encompasses like, kind of, evaluative skills [...] what sets information literacy apart [from information skills] is building on once you’ve got the information what do you actually do with it?”

Information literacy was also quite clearly defined as quite a strategic research process which was clearly understand to be quite methodical and perhaps quite linear. In their interview, LS3 for example stated that:

“information literacy is about finding, using, evaluating information [...] so yeah, it’s working out what information you need, locating that information and then using it in an appropriate way.”

Further, LS4 understood information literacy as an ability to “look for information, but look for it in a methodical way”.

The third key point that emerged was the conception that information literacy is about the resources, as LS5 answered in their interview, “being able to read the signs and work your way through the resources”, which is “all related to having an overarching knowledge of the resources you’re using”.

The key thread throughout was an apparent division made between those skills that were seen as natural, almost unconscious and those that were seen to require a conscious thought process, and came less naturally. LS3 for example stated:

“I do think though that some steps are more natural than other steps, like going out and searching for information is quite a natural skill, but actually thinking about before you
start, well what exactly is it that I want to find, that’s not something that you would necessarily naturally do.”

**4.2.2 Continuum 1**

When asked the initial question as to what serendipity means to them as a term the answer was in someway related to luck or chance by each librarianship student participant. LS4 for example stated that “you come across something you weren’t expecting and that is fortuitous”.

However, as the participants began to discuss the phenomenon in more depth with regards to their own experiences and understandings, the quite pure definition provided above came in to question. LS2 for instance stated that “I don’t think it’s entirely luck, I think it’s partly just if you’re tuned to noticing something then you will.” Numerous other terms arose in interviews with other participants, with terms such as ‘open minded’, ‘motivation’ and ‘lack of focus’ emerging in relation to the serendipitous process. This may suggest a conscious, psychological element to the phenomenon of serendipity.

This conscious element of serendipity became more apparent as interviewees related their own experiences of serendipitous encounters and what may have facilitated these occurrences. LS1 discussed their dissertation in the following way:

“I keep finding more and more topics that are of interest and I’ll look at different articles and then start weaving them into my literature searching, so actually it’s been topics that have been coming up quite sort of serendipitously for me.”

When talking later about how they perceive these serendipitous occurrences to take place, LS1 states:
“I think perhaps it does depend on the [search] techniques [...] there is a certain skill in
searching very well to find what you want, but perhaps there is also a need to open your
search a little bit more [...] I’ll have a look at the actual article itself and it will talk about
other key things and other topics will come up, and then I will follow some of the
citations using things like citation indexing, people who have cited that article”.

Such ‘skills’ are also mentioned by other participants in relation to their serendipitous findings.
If serendipitous occurrences do require a certain psychological state and the application of
skills, then this suggests a conscious thought behind serendipitous occurrences as has been
suggested in much of the literature (Campos & Dias de Figueirdo, 2001; Cooksey, 2004; Erdelez,
2004; Ford, 1999; Foster, 2004; Foster & Ford, 2003; Friedel 2001; Heinstrom 2006; Hoeflich,
2007; Marshall & Jones, 2006; McBurrie, 2008; McClellan, 2005; Spink & Greisdorf, 1997;
Stevenson et al, 2008). This also perhaps represents quite a goal-oriented understanding of
serendipity, similar to that of Erdelez (1999 & 2004) and Foster and Ford (2003), which is in
contrast to the traditional definition of serendipity provided by Walpole (Merton & Barber,
2004).

A further element related to this particular dimension is that of browsing; this arises in
participants’ discussions of their own serendipitous encounters. LS3 mentioned browsing
through the CILIP Gazette or Update and ‘happening upon’ information related to essays, and
grappled with whether these were conscious or unconscious findings:

“because it’s [CILIP Update] something library related it’s not like it’s come from
nowhere, you’re reading it because you want to get information but because of the
nature of the publication, it’s all bits about everything, you can find bits of information
you weren’t expecting to find”.
This is a similar approach to that taken by Bjorneborn (2008: fig2) who, as previously stated, distinguished between ‘impulsive browsing’ and ‘systematic browsing’, placing the former closer to information encountering.

On the other hand however, while ‘skills’ and ‘browsing’ were mentioned as part of the phenomenon of serendipity, at the other end of the continuum, relating to the very pure definition of serendipity as luck, these elements were dismissed as separate to the phenomenon. LS5 for example when providing a description of a time they found something serendipitously gave an account of a purely accidental discovery that was completely unrelated to the topic that they were interested in at the time. LS5 reasoned that they had found this unexpected piece of information due to “a lack of focus [...] I do pick up on things serendipitously just because I’m easily distracted”. This suggests an understanding of serendipity as completely unconscious, a lucky occurrence that has no relation to skills or a purposeful change in mindset, perhaps instead merely relating it to your individual personality.

Thus serendipity is understood in a range of ways in relation to this one dimension or continuum. On the one hand serendipitous occurrences are understood as happening purely as a result of luck, and could therefore be in no way related to information literacy models and frameworks; on the other, serendipitous occurrences are attributed to psychological elements and information skills and techniques, this would suggest that serendipity could in fact be related to information literacy.

4.2.3 Continuum 2

The discussion of continuum 1 above suggests that the general consensus among this group of interviewees was that serendipitous occurrences require at least an element of luck. The terms luck, fortuity and fortunate accident further suggest that these findings are happy and perhaps
even valuable. It was stated by LS2 that “it doesn’t really matter how you found it [the information]”.

However, there were also elements of reservation amongst participants with LS5 stating that “generally I place as much value on it [...] so long as it’s valid”. LS1 also expresses their reservations as to the value of serendipity stating that “it can broaden the topic that you’re looking at, but it can sometimes lead you a bit astray from what you’re doing.” Perhaps these reservations can be understood as the conception of serendipitous occurrences as being red herrings, a distraction beyond the scope of your research, or as was suggested by McClellan (2005: 11) as being ‘culturally’ unacceptable. Further, in order to ascertain the validity of a piece of information it is necessary to evaluate it; this provides a link to the first continuum and the suggestion that a serendipitous occurrence requires an element of skill. This inextricably links therefore the first two continuums/dimensions that have arisen.

4.2.4 Continuum 3

As many of the interviewees described skills relating to information literacy when discussing serendipity, the natural line of questioning for the interviewer was as to whether they perceived these phenomena as being completely separate or inextricably linked. Serendipity was then not only described in relation to terms that are connected to information literacy, but also discussed in terms of the possibility of embedding serendipity into information literacy frameworks and models, the 7 Pillars of Information Literacy (see appendix 4) being the key model. LS1 for example stated that:

“I think it’s important to bring in serendipity into models of searching because it can be really productive and valuable, so I think you’re at risk of cutting people off from really useful information if you just stick to a prescribed way of doing a search”.

Teachable Not Teachable
Other interviewees discussed how they saw their future as information professionals and the need to perhaps raise awareness, or as stated by LS3 to “introduce things and encourage people to use things like citation search and the similar articles and teach them to use things like Web of Knowledge”. LS3 did however question the ability to teach the ‘psychological aspect’ of serendipity, an opinion in reverse to that of McBirnie (2008) who felt that while the psychological or perception aspect of serendipity could be taught, the process element could not.

As a result of any connection made between the two concepts interviewees were asked if and how they would place serendipity within a model of information literacy, in particular the 7 Pillars of Information Literacy (Appendix 4). Those pillars mentioned included Pillars 1 and 3 through to 7. Pillars 4 and 5 were particularly prominent in the discussions, placing serendipity within the processes of locating and accessing, and comparing and evaluating information. The prominence of Pillars 4 and 5 does fit with the conceptions that arose in the discussion of continuums’ 1 and 2, that is the skills required to locate and access information serendipitously or otherwise, and the need to evaluate information serendipitously or otherwise respectively. Thus where currently serendipity is only implicitly implied within information literacy models and frameworks such as ANZIL (Bundy, 2004), perhaps it should receive a more explicit and prominent place.

On the other hand, and at the other end of the continuum, serendipity although seen as valuable, was seen as an abstract phenomenon that you can not teach, with LS4 expressing that “you can’t teach what you’re not expecting”. LS5 moves even further to the right hand side of the continuum, distinguishing completely between the two concepts:

“I think with information literacy you’re working from a knowledge base and you kind of have procedures in mind and you have resources in mind, but serendipity you kind of find something else entirely and it just comes to you”.
The conception of serendipity as a phenomenon that can be taught ranges from right to left on continuum 3. Those whose conception is more towards that of serendipity being teachable perceive this as a result of the connection they make between the concepts of serendipity and information literacy. Where little or no link is made between the two concepts, serendipity is perceived as a phenomenon that cannot be taught, that occurs as a result of luck. Although the ability to teach the ‘psychological aspect’ as opposed to the ‘skills aspect’ is perceived as more difficult, this has perhaps in part been countered by the explanation that as future information professionals the librarianship students may be able to raise awareness of the concept in this regard and the need to remain open-minded.

4.3 The Information Professionals

4.3.1 Conceptions of Information Literacy

As with the librarianship students an outline of the conceptions of information literacy that emerged will be given below in order to facilitate the discussion of serendipity.

Table 2: Information Professionals’ Conceptions of Information Literacy

<table>
<thead>
<tr>
<th>Information Literacy as...</th>
<th>Skills Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>A circular/iterative process</td>
<td>Identifying your information need; identifying appropriate resources to meet this need; search strategy; evaluation; analysis and communication of information.</td>
</tr>
<tr>
<td>Information of value</td>
<td>Knowledge of resources; evaluation of information.</td>
</tr>
<tr>
<td>An ability to use technology</td>
<td>An ability to understand and use database and search engine interfaces. An ability to present the information in the most appropriate manner using computer packages such as Microsoft office.</td>
</tr>
</tbody>
</table>
Although the same skills arose within the conceptions of information literacy described by the information professionals as those described by the librarianship students, their descriptions and understanding were perhaps less abstract.

The information professionals recognised more the nature of information literacy as an iterative process, as opposed to the step by step linear process presented by models of information literacy such as the 7 Pillars of Information Literacy, with IP5 for example describing information literacy as a “circular process where you’re actually reviewing what you do.”

There was an emphasis within some transcripts upon the value of the information found; IP2 for example when describing what information literacy meant to them as a concept stated that “it’s finding information of value [...] it’s being able to evaluate what you find [...] and being aware of what is relevant”. IP3 appeared to strongly second this seeing the need to be “sceptical” of any information found.

The information professionals also went into greater depth with regards to the technology required in order to be an information literate person, perhaps looking at information literacy from a more practical perspective. IP5 for example, talking specifically about searching a database, stated for instance that you need to know “how to use the search interface of the database, to put that information in and get the maximum out of the database.”

4.3.2 Continuum 1

Serendipity was initially described in a very similar manner by all the information professionals as a chance or lucky occurrence that is helpful. IP6 for example stated: “Serendipity is
happening upon something by chance, maybe you weren’t looking for it, and it’s something useful”. However, as the interviewer asked the participants to discuss how and why they found information in a serendipitous way, both psychological aspects and particular skills were attributed to these occurrences, just as they had been in interviews with librarianship students.

IP9 expressed an understanding of an element of psychology to serendipitous occurrences by stating that: “I think there’s a personality element to this, and also your frame of mind at the time of approaching a search”. Other psychological explanations for serendipity that occurred during the interviews of information professionals included the need for an ‘open mind’, ‘motivation’ and a certain ‘mind set’. Again, these terms relate to the idea that serendipity is not purely a chance occurrence, and that it can in fact be related to a conscious change in mind set.

IP9 again explains quite concisely a conception shared by many of the information professionals with regards to the need for skills in order for there to be a serendipitous occurrence:

“I would argue that you potentially get more serendipitous occasions if you start off in a logical fashion [...] [the cited reference tool is] a way of broadening out a search, and whenever you broaden out a search then you’ve got the opportunity for serendipity to happen [...] I suspect that when people talk about serendipity there has been an element of structure”.

Using tools on databases that direct you to similar or related articles is a common point made and as such again suggests that there is a conscious element to finding information serendipitously. This conception of serendipity as something that can be controlled, and is a conscious thought process, is something that is highly visible within the literature (Campos & Dias de Figueirdo, 2001; Cooksey, 2004; Erdelez, 2004; Ford, 1999; Foster, 2004; Foster & Ford, 2003; Friedel 2001; Heinstrom 2006; Hoeflich, 2007; Marshall & Jones, 2006; McBirnie, 2008; McClellan, 2005; Spink & Greisdorf, 1997; Stevenson et al, 2008).
As in the interviews conducted with librarianship students there was a mention of browsing and it’s relation to serendipity; however, unlike the librarianship students, the information professionals did not appear to relate this to the conscious end of the continuum, more that a serendipitous occurrence while browsing is perceived as pure luck. That is, when IP6 was asked as a result of their description of a serendipitous occurrence that happened to them, why the information was considered serendipitous when they had found it while browsing, they explained that they “weren’t setting out to search for that particular article or whatever”. This appears to be in line with the view of that of Toms (2000: 424), whom, as has been previously stated, understands browsing to be “an activity in which one gathers information while scanning an information space without a specific objective”. 

Therefore, as with the librarianship students, the conceptions of the information professionals as to whether serendipity is the product of luck, or a change in mind set and the use of a specific set of tools range, and can be placed at a variety of points along the first continuum. If serendipity were attributed to skills, then as above the concept of serendipity could be linked with that of information literacy.

### 4.3.3 Continuum 2

![Value Continuum](image)

Like with the librarianship students, whether serendipity is attributed wholly to luck or whether this is seen as merely an element, the very term suggests that serendipity has some value to it.

The statement by IP9 “if it’s useful information it’s useful information” is again a description of what the general consensus appeared to be among the information professional’s. However, the reservations that occurred among the librarianship students similarly occurred here. IP7 for example stated that “in all honesty though I’d probably put more value on a planned search”. Although the researcher failed to gain an in-depth description as to why this was the
case, it is possible that this was due to the issues of reliability and validity of information where you may not fully trust your source. Further, we return to the red-herring theory that arose during the interviews with librarianship students, with IP9 explaining that: “If you’re not careful you can go way off track and waste a lot of time, so it’s being aware of the opportunities to find interesting information, but that it can be a distraction, a red herring”. It may again also be possible that that there is a worry about whether information found in this way is culturally acceptable, which is referred to as a possibility by McClellan (2005).

There may therefore be a certain evaluative skill to assessing whether a piece of information found serendipitously is in fact valuable, a concept which links the first two continuums and perhaps the final continuum. Further, surely if serendipitous occurrences were by their very nature accepted as valuable they would in any event be linked to information literacy. The conceptions of the information professionals may again be placed at a number of points along the continuum.

4.3.4  Continuum 3

As with the librarianship students, the information professionals had a range of conceptions with regards to whether serendipity is a phenomenon that can be taught.

At the left hand side of the continuum serendipity was understood as an important “part of the searching process” by LS1, relating it to a more ‘creative’ rather than traditional way of researching and something which as a librarian they tried to facilitate. This ‘creativity’ element is something that is highlighted by Ford (1999).

On the other hand however IP9 expressed the view that while serendipity could be important and valuable it could not be taught, stating that:
“I think that there [...] would be a reluctance in academic programs to focus on serendipity because I think without an underpinning of information literacy skills then it’s unlikely that serendipity is going to work for you [...] so I would not be comfortable in talking to students about serendipity.”

This was a view echoed by IP7, essentially that in the ‘real world’ information skills or information literacy skills are of up most importance, and that serendipitous findings may occur as a result of this, but are not important enough to be taught. This may be representative of the difference between librarianship students and those already in the profession, that is that those already in the profession have a clearer understanding of the ‘real world’ as opposed to the ‘ideal world’ created by the librarianship students.

As with the librarianship students, if the information professionals made the link between serendipity and information literacy and suggested that serendipity could in someway way be taught, the researcher then went on to ask them to describe how they would place serendipity within an information literacy model, in this case the 7 Pillars of Information Literacy (Appendix 4). Like the librarianship students, the answer to this ranged, with pillars 2 to 5 mentioned. No particular pillars were more prominent than others, perhaps signalling that a person should be aware of serendipity throughout the physical search process, and that these serendipitous pieces of information should be evaluated as any other.

Having outlined the differences and similarities that arose between the two groups of interviewees, the outcome was essentially the same, that the conceptions that arose could be placed at a variety of points along the third continuum.
4.4 The Search Exercise

The aim of the search exercise and questionnaire was to assess further Erdelez’s (2004: 1015) model of an ‘information encountering episode’ by creating a ‘self-generated’ foreground problem as opposed as an ‘artificial’ foreground problem, which had before failed to generate a complete information encountering episode (2004:1022).

Each participant, both librarianship students and information professionals were asked to inform the researcher of a topic of interest to them; from this the researcher designed a search exercise by broadening out the topic of interest, and chose a suitable search engine or database for the participant to use (A list of these is available in Appendix 5). The participants were all asked to search as they ordinarily would do so and were provided with pen and paper to do with as they wished. None of the participants were informed of the purpose of the exercise beyond it being a search exercise. Further, at the start of each search exercise, each participant was asked if they had used the search engine or database chosen for them for this particular purpose; most had not (Appendix 5). This provides evidence that the researcher thought outside the box in order to try and increase the chances of a full information encountering/serendipitous episode.

The questionnaire that followed was made up of five questions which directly mapped onto Erdelez’ model of an information encountering episode, these being noticing, stopping, examining, capturing and returning (Erdelez, 2004). As the researcher felt there was not time to carry out a second round of exercises the participants were merely asked if they planned on returning to any information they found.
Unlike the study carried out by Erdelez which failed to invoke a single information encountering episode (2004: 1021), two full information encountering episodes were invoked during this study out of nine participants (figure 2). Although this appears to be a successful result which seems to go some way to corroborating Erdelez’s five step theory, a couple of issues did arise from the questionnaire answers.

Four of what could be considered part information encountering episodes arose, that is the participants answered ‘yes’ to all answers apart from one. When asked ‘Did you stop when you saw this result?’ four participants answered ‘no’ to this question. Whenever participants answered ‘no’ they were asked to explain further, and the general answer from participants, both librarianship students and information professionals, was that they preferred to continue to look for other useful information before then returning to potential information noticed earlier. This suggests than an information encountering episode may not in fact be as straightforward as that suggested by Erdelez (2004); that is that the process may be less linear and more circular and iterative. However, due to the small number of participants used and the
exploratory nature of this study, further research would be required in order to confirm this or otherwise.
5 Conclusions

This study aimed to investigate conceptions of serendipity and information literacy, and further to this, establish if any link is made between the two concepts. This was carried out first of all by completing a literature review which firstly examined information behaviour as a wider concept, before looking more specifically at serendipity or information encountering, and information literacy or information seeking. The next stage of the study involved the use of an information seeking exercise in order to assess Erdelez’s theory of an “information encountering episode” (2004) or the process of serendipity. Finally, phenomenographic interviews took place with both librarianship students and qualified librarians with regards to their conceptions of serendipity and information literacy. The interview data was analysed using a phenomenographic approach which facilitated the creation of an ‘outcome space’. The results of the information seeking exercise were compared with Erdelez’s (2004) research in order to test her theory of an information encountering episode. For the most part this study was successful; conclusions will be put forward below followed by future recommendation for research.

Through carrying out the literature review it was found that models of information behaviour have grown in complexity with many no longer being linear and straightforward, but instead portraying the importance of context to information behaviour and reflecting a very iterative and circular process. As information behaviour comprises of both information encountering or serendipity, and information seeking or information literacy it was inferred by the researcher that both these concepts must have also increased in complexity. In fact, a number of issues arose around the concepts of both serendipity and information literacy.

With regards to serendipity, one prominent issue that appeared within the literature was as to whether information found that relates to a past, present or future goal can be considered a serendipitous finding, particularly as this is in dispute with the original definition of serendipity, however many have now come to think of this as serendipity. A second key finding was that
there appears to be a general consensus in terms of the psychology behind finding information serendipitously; that is the dependency upon such things as mood, motivation and personality in order to make the link between information found and the creation of knowledge. Inextricably linked with this was the need to teach this element of serendipity, and raise awareness of it amongst students. There was however more debate surrounding the process, as opposed to the context of serendipity. There were many tools and skills that arose in relation to the facilitation of serendipity, notably ‘hypertextuality’, a focus upon mid-ranked search engine results and personal information management skills. While many agreed that these are teachable aspects of serendipity, there was some disagreement.

Information literacy was the final key aspect of the literature review. Firstly, a variety of information literacy models were examined in order to assess whether serendipity had been either implicitly or explicitly included. There was no explicit mention of serendipity within any of the models, it was however hinted at. On more than one occasion skills were mentioned in relation to the ability to recognise information that matches a need beyond that of the foreground problem, and the need for the presence of strong personal information management skills in order to successfully retrieve this information in the future. The researcher inferred that these could be linked to serendipity, there is currently however no way of knowing whether such implicit inclusions of serendipity were intentional.

Finally, it was found that information literacy as a concept has vastly increased in importance in recent years, not only within education, but also business, government and general lifelong learning. It appears that some academics however, feel that despite our heightened understanding of information literacy and information behaviour, that information literacy models and frameworks have not changed to reflect this complexity. Further, conceptions of information literacy appear to be varied; this may be discipline specific, but may also be due to the evolving role of both librarians and teachers in the teaching of information literacy.
The literature review helped to fuel the researchers understanding of the subject area and therefore guide them in the carrying out of semi-structured, phenomenographic interviews with both librarianship students and qualified librarians, an analysis of which led to the creation of a phenomenographic outcome space. It was found that both librarianship student and qualified librarian conceptions of serendipity and information literacy could be placed upon the same three dimensions or continuums, with a range of viewpoints being represented by each continuum. Separate outcome spaces were created for each groups’ conceptions of information literacy as a concept.

The librarianship students found information literacy to be different to information skills; a strategic research process; and based upon an understanding of resources. Each of these was discussed in relation to whether they were natural or unnatural skills to the user. Information literacy for the qualified librarians, or information professionals as they were referred to by the codes used, was seen as an iterative or circular process, which was very much about finding information of value and an ability to use technology. The descriptions provided by the information professionals were much less abstract, perhaps a reflection of their position in the ‘real’ as opposed to ‘ideal’ world.

The first dimension or continuum of serendipity and information literacy reflects a variety of viewpoints in relation to whether finding information serendipitously is founded purely upon luck, or whether it involves an element of consciousness or control. Many of both the librarianship students and information professionals expressed their opinion that both psychology and skills are involved in serendipity, therefore allowing us to make the link between serendipity and information literacy. There were however those who felt serendipity to be based purely upon luck, therefore placing serendipity much further away from information literacy.

The second continuum or dimension of serendipity and information literacy reflects the mixture of opinions that arose amongst both librarianship students and information professionals in
relation to the value of information found serendipitously. In both cases, information found serendipitously was largely seen as just as valuable as that purposely sought, therefore perhaps suggesting the relationship of serendipity to information literacy. On the other hand however, reservations emerged within both groups of participants, seeing information found serendipitously as a red-herring and a distraction in some cases; if this was the case, you could not and would not include serendipity within the process of information literacy.

The final continuum or dimension to emerge represents the number of viewpoints that emerged in relation to whether serendipity can be taught. There were those within both groups who felt that serendipity could be taught, and should be included within information literacy models and frameworks, placing serendipity at various points within the information literacy process. There were however those who felt serendipity to be a completely abstract and therefore not teachable phenomenon that is completely unrelated to information literacy. Notable amongst the group of information professionals was the recognition of serendipity as useful, but the feeling that the current and perhaps basic skills of information literacy need to be met first, and that such things as serendipity would be a distraction. Thus, the three dimensions or continuums of serendipity and information literacy successfully represent a variety of conceptions with regards to whether these two concepts are linked.

Finally, the results of the ‘search exercise’ in part corroborate Erdelez’s (2004) five step model of an information encountering episode, that is noticing, stopping, examining capturing and returning, with two participants experiencing a full information encountering episode as a result of a ‘self-generated’ as opposed to an ‘artificial’ foreground problem. What the researcher has questioned however is whether the process of information encountering or serendipity is as linear as that described by Erdelez (2004), suggesting that it may indeed be more circular and iterative.
6 Recommendations

In order to improve and expand upon this study in the future the researcher recommends that:

1. Background research is carried out on a variety of information literacy frameworks and models, which may include interviews with the authors and creators, in order to assess whether the implicit inclusion of serendipity was intentional, as currently this may be disputed.

2. The research is expanded to a wider cross-section of the community, particularly as information literacy has increased in importance for those in the business sector, those in the government and for the public in general.

3. The research is carried out with a much greater number of participants in order to test the model created by the researcher concerning the three dimensions of serendipity and information literacy.

4. Databases are created for the purpose of the search exercise. This may be time consuming due the personalised data needed as a result of the ‘self generated’ foreground problem, however, this would mean that the researcher could observe and record in much more depth the process of serendipity, or the information encountering episode.

5. The research be carried out in stages over a longer time-period in order to assess whether participants do in fact return to the information they find, as opposed to asking the question as to whether they intend to return to the information that they have found serendipitously.

(Word Count: 16973)
Bibliography


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http://www.sconul.ac.uk/groups/information_literacy/headline_skills.html [Accessed 11 August 2009].


Appendix 1

Participant Information Sheet

Topic: Search Strategies and Conceptions of Information Literacy

I am an MA Librarianship student at the University of Sheffield currently looking for participants to take part in research as part of my dissertation. Please read the following information carefully and if you have questions or require clarification please do not hesitate to contact me. Thank you.

What is the purpose of the project?

This project aims to investigate the search strategies of both students and information professionals through the use of a search exercise. Further, it aims to investigate both student and information professionals’ conceptions of ‘Information Literacy’ through the use of a semi-structured interview.

Participation

Participation in this project is completely voluntary and you may choose to pull out at any time.

Should you agree to take part you will firstly be asked to complete a search exercise lasting approximately 5 minutes. This will be followed by a questionnaire consisting of 5 questions which will take approximately 5-10 minutes to complete. The final stage of the research would involve a semi-structured interview lasting approximately 30 minutes relating to the search exercise and your conceptions of information literacy.

The information that I glean through the search exercise and the answers you provide in interview will be made anonymous. Your institution will not be referred to, only your position as either a student or information professional will be included in the research. The research project will be made available to University of Sheffield students.

This project has been deemed to be ‘no risk’ by the departmental ethics review procedure, however, should you have any concerns please do not hesitate to contact either myself or my dissertation supervisor (see contact details below) at any stage of the research.
Contacts:

Samantha Abrahams
E-mail: lip08sj@sheffield.ac.uk

Dissertation Supervisor
Professor Nigel Ford
E-mail: n.ford@sheffield.ac.uk
Tel: 0114 2222 637

Do you agree to take part in this research? YES / NO (delete as appropriate)

If YES please continue...

Name:

Briefly explain a topic of interest to you in your academic/professional life:

Please provide details of dates and times that would be most convenient to you:

Thank you again for taking the time to read this information,

I look forward to hearing from you soon,

Samantha Abrahams
Appendix 2

Questionnaire (Delete as appropriate):

1) Did you notice any search results related to this or any other interest?

   YES / NO

2) Did you stop when you saw this result?

   YES / NO

   If NO please briefly explain the reasons why:

3) Did you examine this search result?

   YES / NO

   If NO please briefly explain the reasons why:

4) Did you make notes on or save any of the information for future use?

   YES / NO

   If NO please briefly explain the reasons why:

5) Do you plan on returning to this information?
   YES / NO
Appendix 3

Participant Consent Form

Name of Researcher: Samantha Abrahams

<table>
<thead>
<tr>
<th>Participant Identification Number for this project:</th>
<th>Please initial box</th>
</tr>
</thead>
</table>

1. I confirm that I have read and understand the information sheet explaining the above research project and I have had the opportunity to ask questions about the project.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. Contact number: 07989 666581 (Samantha Abrahams)

3. I understand that my responses will be kept strictly confidential.

4. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.

5. I agree to take part in the above research project.

_________________________  ________________  ____________________
Name of Participant  Date  Signature

_________________________  ________________  ____________________
Lead Researcher  Date  Signature

To be signed and dated in presence of the participant
Appendix 4

7 Pillars of Information Literacy

SCONUL Seven Pillars Model for Information Literacy
© Society of College, National and University Libraries

Basic Library Skills and IT Skills

Recognise information need

Distinguish ways of addressing gap

Construct strategies for locating

Locate and access

Compare and evaluate

Organise, apply and communicate

Synthesise and create

Information Literacy

Novice  Advanced Beginner  Competent  Proficient  Expert
Appendix 5

A table of the search exercises chosen for each participant, detailing the databases chosen and whether the participants had used the database for the purpose of this particular search before.

<table>
<thead>
<tr>
<th>Participant Code</th>
<th>Search Created</th>
<th>Search Engine / Database Chosen</th>
<th>Used for this Purpose Before?</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS1</td>
<td>Student conceptions of Information Literacy.</td>
<td>Proquest Educational Journals</td>
<td>No</td>
</tr>
<tr>
<td>LS2</td>
<td>Reader Development in Library Services.</td>
<td>SCOPUS</td>
<td>No</td>
</tr>
<tr>
<td>LS3</td>
<td>The Value of the Graduate Traineeship/Internship.</td>
<td>Google Scholar</td>
<td>Yes</td>
</tr>
<tr>
<td>LS4</td>
<td>The use of Web 2.0 in Corporate and Business Libraries.</td>
<td>ACM Digital Libraries</td>
<td>No</td>
</tr>
<tr>
<td>LS5</td>
<td>The Management of Tacit Knowledge.</td>
<td>IBSS</td>
<td>No</td>
</tr>
<tr>
<td>IP6</td>
<td>The Use of Online Tutorials to Provide Information Literacy / Skills Instruction.</td>
<td>Google Scholar</td>
<td>No</td>
</tr>
<tr>
<td>IP7</td>
<td>The Introduction of Federated Searching in Academic Libraries.</td>
<td>SCOPUS</td>
<td>No</td>
</tr>
<tr>
<td>IP8</td>
<td>The Support of Continuing Professional Development for Academic Librarians.</td>
<td>Emerald</td>
<td>No</td>
</tr>
<tr>
<td>IP9</td>
<td>Teaching Information Literacy</td>
<td>Web of Knowledge</td>
<td>No</td>
</tr>
</tbody>
</table>