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Conceptual and Procedural Knowledge: A Framework for Analyzing Point-of-Need Information Literacy Instruction

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Abstract

The information literacy instruction (ILI) that occurs during a spontaneous information interaction, such as at the reference desk, is not clearly defined and not extensively researched. It differs, however, from classroom ILI, with its lesson plans, carefully considered learning outcomes, and planned learning activities. This paper uses the framework of conceptual and procedural knowledge, drawn from education research, to analyze point-of-need ILI. Digital reference transcripts were analyzed using this framework, and examples of ILI from the transcripts were categorized to make sense of how conceptual and procedural knowledge manifest in point-of-need ILI. This conceptual/procedural focus acknowledges the unique context of this type of instruction and provides a simple framework for reference service providers to improve and self-assess their point-of-need ILI.

Keywords: information literacy instruction, point-of-need, conceptual and procedural knowledge, digital reference, chat reference

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Reference and information service—whether it occurs in a library, school, or office, in person, by phone, or online—generally includes some combination of information provision and information literacy instruction (ILI). By incorporating explicit, tacit, and experiential knowledge, along with knowledge of the context in which the interaction is occurring, the information professional makes a choice (conscious or not) about what proportion of instruction and information provision to include in their response to a user's information need. The instruction that occurs during an information interaction is often called "point of need," "one-on-one," or "just-in-time" instruction. This type of instruction is not clearly defined and not extensively researched, and it clearly differs from classroom ILI, with its lesson plans, carefully considered learning outcomes, and planned learning activities.

Quality ILI must be provided not only in the classroom but also in one-on-one interactions between librarian and user in contexts such as the reference desk, the virtual reference desk, and consultations. Although there has been debate in the field about the appropriateness of instruction in the reference encounter (e.g., Schiller, 1965; Wyer, 1930), many scholars today see point-of-need ILI as an important component of reference service and as a complement to classroom instruction (e.g., Desai & Graves, 2008; Elmborg, 2002). When point-of-need ILI is provided, it must be done effectively, which requires librarians to have the pedagogical content knowledge specific to these types of interactions. Thus, the profession needs a theoretically sound and relatively simple framework for understanding point-of-need ILI in order to educate service providers and to evaluate service.

This paper conceptualizes point-of-need ILI as similar to the individual instruction a schoolteacher provides to a student who needs help. Such an interaction between teacher and student may occur during or after a classroom lesson. For example, a student expresses difficulty solving a math problem involving fractions, and the teacher provides some individual, personalized instruction that helps the student overcome their challenge or correct their error. The teacher may focus this personalized instruction on *concepts*, such as asking the student to visual the fraction as a pie, or the teacher may focus on *procedures*, such as reminding the student to multiply the numerator by the denominator. This situation closely resembles the interaction between librarian and user at a service point when a user

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expresses difficulty finding a resource, navigating a database, or creating a citation. Due to this similarity, the field of education seems a logical one from which to draw a framework for ILI.

This paper, therefore, explores the conceptual and procedural knowledge framework, used effectively for decades in mathematics education, as a possible framework for understanding point-of-need instruction in information literacy contexts. Drawn from research on teachers' responses to students' errors and challenges, this framework has been empirically tested in the field of education and is relatively simple so that professionals can recall and implement it in the dynamic point-of-need context where there is little time to plan behaviors. To apply this framework to the library and information science (LIS) context, this study identifies conceptual and procedural instruction in actual digital reference encounters.

Literature Review

Several areas of the literature provide context for this study. The existing research on point-of-need ILI is reviewed, followed by a description of the current shift in focus from behaviors to concepts in the information literacy literature. Finally, the literature on conceptual and procedural knowledge is reviewed in the areas of mathematics education and LIS.

Point-of-need ILI

As previously mentioned, ILI was not always seen as an important component of reference service. Indeed, some librarians argue that instruction is not always optimal or possible, especially in the digital reference context (Gronemyer & Dietering, 2009). However, in general, both librarians and students recognize the need for point-of-need ILI and welcome it (Beck & Turner, 2001; Jacoby, Ward, Avery& Marcyk, 2016; Massey-Burzio, 1998).

Studies conducted in the academic library environment have demonstrated that user learning occurs during in-person reference encounters with ILI (Green & Peach, 2003; Jacoby & O'Brien, 2005). In these exchanges, users tend to learn about sources and library services (Swoger & Hoffman, 2015). However, Gremmels and Lehman (2007) found that students learned what the librarians had intended to teach only "sometimes" (p. 494).

Digital reference services in libraries opened up a new opportunity for studying ILI in reference services. These instant message and chat-based services created transcripts of the

reference interaction, allowing scholars to easily collect and analyze instances of instruction in reference services. The amount of point-of-need ILI in proportion to overall service has been measured in several studies, varying from 23% (Hervieux & Tummon, 2018) to 65% (Ellis, 2004). Interpreting these findings is difficult because little research has been conducted into how often ILI should occur. Hervieux and Tummon (2018) found that opportunities for ILI existed in 43% of digital reference encounters, but librarians only provided it in 23% of their exchanges. Desai and Graves (2008) studied how often users asked for instruction and received it (46%), how often they asked for instruction and did not receive it (2%), and how often they received unrequested instruction (43%). They also identified categories of point-of-need ILI: modeling of procedures, resource suggestion, term suggestion, leading (a user to a resource), and lessons (explanations of terminology). The most common type of instruction was leading. Additionally, Daly (2007) studied the relationship between satisfaction with a digital reference encounter and particular instructional techniques and found that instruction related to "library policies, the technical aspects of using or locating information, and the exact source used to negotiate an information need" correlated with higher user satisfaction (p. 40).

Some have proposed using the Association of College and Research Libraries (ACRL) *Information Literacy Competency Standards for Higher Education* (2000) as a framework for understanding and evaluating point-of-need ILI (Avery & Ward, 2010; Daly, 2007; Ellis, 2004). However, using the *Standards* is not ideal for several reasons: it has been replaced by the ACRL *Framework for Information Literacy for Higher Education* (2015) as the guiding document for ILI in higher education, only some of its standards seemed to apply to point-of-need ILI (Avery & Ward, 2010; Ellis, 2004), and it was designed for classroom instruction. Bloom's taxonomy has also been proposed, but, as with the *Standards*, only some levels of the taxonomy were found to be appropriate for point-of-need ILI (Ward, 2011). Hunter, Kannegiser, Kiebler, and Meky (2019) used the ACRL *Framework* to evaluate ILI in digital reference and found evidence of all six information literacy frames being taught. Their study represents a new focus on conceptual ILI in digital reference research.

Current Shift in Instructional Priorities

Although the idea of focusing on conceptual and procedural knowledge in point-of-need ILI has not been explored, the profession is shifting toward a more conceptual approach to ILI. Elmborg (2012) and Jacobs (2008) called for moving from teaching tools and techniques to examining pedagogical theory and more specifically "critical information literacy." Julien,

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Tan and Merillat's (2013) survey of Canadian professionals who provide ILI found an increased emphasis over the last 15 years on instructional objectives relating to "critical evaluation" and a decreased emphasis on those relating to "locating library materials" (p. 89). This change in emphasis may reflect an increased emphasis on general information literacy concepts rather than procedural skills. Finally, a massive refocus from procedures to concepts occurred with the adoption of the ACRL *Framework*, which focuses on "threshold concepts" rather than performance outcomes. This framework of threshold concepts was introduced to the LIS literature by Townsend, Brunetti and Hofer (2011). They noted that although information literacy program statements and policies focus on "critical thinking and lifelong learning," information literacy practice tends to focus on procedural instruction (p. 853). They believed that the threshold concepts framework could help shift the focus from procedures to concepts.

The recent adoption of the *Framework* makes it an ideal time to engage in studies that explore conceptual and procedural instruction in point-of-need ILI. Hunter et al.'s (2019) study using the *Framework* provides one approach. This paper, using the framework of conceptual and procedural knowledge, provides a complementary approach. As much of the profession tries to shift its focus from procedural instruction to more concept-based instruction, studies that explore how conceptual and procedural knowledge are addressed in ILI and that facilitate reflection about these types of instruction in reference practice are needed.

Conceptual and Procedural Knowledge

This study explores point-of-need ILI through the lens of conceptual and procedural knowledge. Conceptual and procedural are two types of knowledge that people draw on to accomplish tasks or solve problems. *Conceptual knowledge* is an understanding of the definitions, rules, and principles in an area of knowledge, while *procedural knowledge* is knowledge of specific strategies or actions that are used to accomplish tasks and solve problems.

Viewing learning in terms of conceptual and procedural knowledge is common in mathematics education. According to Star and Stylianides (2013), "the origins of this framework are hard to identify precisely" (p. 169), but they attributed its common use to Hiebert's (1986) edited book on the topic. In this book, Hiebert and Lefevre compared the conceptual and procedural knowledge to the difference between "understanding and skills" (p. 1). They described conceptual knowledge as "rich in relationships" and characterized by

"abstractness" (p. 3–4) and characterized procedural knowledge as "rules for completing tasks" and "step-by-step" instruction (p. 6). They also argued that conceptual knowledge is acquired through meaningful learning; procedural knowledges is learned by rote (p. 8).

Since the publication of this book, other scholars in mathematics education have refined these definitions. Byrnes and Wasik (1991) stated that "conceptual knowledge, which consists of the core concepts for a domain and their interrelations (i.e., 'knowing that')... Procedural knowledge on the other hand, is 'knowing how' or the knowledge of the steps required to attain various goals" (p. 777). Later, Rittle-Johnson and Alibali (1999) stated, "We define *conceptual knowledge* as explicit or implicit understanding of the principles that govern a domain and of the interrelations between pieces of knowledge in a domain. We define *procedural knowledge* as action sequences for solving problems" (p. 175). In an extensive review of studies using the conceptual and procedural knowledge framework, Crooks and Alibali (2014) found that conceptual knowledge was often not clearly defined and that measurement tasks were not always aligned with the authors' definitions of the concept. As a result of their study, they recommended focusing on two types of conceptual knowledge: general principle knowledge (including definitions, domain structures, and rules) and knowledge of principles underlying procedures (why certain procedures work or the purpose of each step in a procedure) (p. 366–367). They advocated measuring general principles knowledge through explanations of concepts and explanations of examples and knowledge of principles underlying procedures through application and justification of procedures and evaluation of procedures (p. 366–368).

Faulkenberry (2013) noted that tasks themselves are not conceptual or procedural, but the strategies employed to complete a given task may reflect conceptual or procedural knowledge. An important area of research is the relationship between conceptual and procedural knowledge. For example, Rittle-Johnson and Alibali (1999) demonstrated that conceptual and procedural knowledge are used iteratively and that both can develop from the other. However, students who learned through a conceptual approach had more flexible knowledge and were better able to transfer knowledge to new situations (p. 184–186).

In LIS, the conceptual/procedural framework is somewhat familiar due to Borgman's work in online information retrieval. In her 1986 review of the literature on use of online catalogs, Borgman categorized user problems with information retrieval systems as mechanical and conceptual. Mechanical aspects of information retrieval include "syntax and

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semantics of entering search terms, structuring a search, and negotiating through the system" (p. 388). Conceptual aspects include "when to use access points, ways to narrow and broaden search results, alternative search paths, and distinguishing between no matches due to search error and no matches because the item is not in the database" (p. 388). Borgman's view of the relationship between these two types of knowledge is similar to those of the education researchers. She considered both necessary for information retrieval, but she found conceptual aspects to be necessary for full expertise, arguing that "only when the conceptual aspects are understood can the user exploit the system fully" (p. 388). In 1996, however, Borgman refined these categories, arguing that the conceptual category conflated two distinct types of knowledge: conceptual and semantic. Borgman's new model differentiated between abstract conceptual knowledge about information retrieval in general and application of that knowledge in using a particular information retrieval system. The mechanical knowledge concept from her 1986 work was renamed "technical skills" in the new model and focused on computing skills and the syntax of query entry (1996, p. 495). Despite Borgman's revised categories, conceptual knowledge and the knowledge needed to complete tasks were still considered separate areas of knowledge.

Like Borgman, Macpherson (2004) distinguished between conceptual and procedural knowledge, using the cognitive psychology term "declarative knowledge" rather than conceptual knowledge. In her development of a two-stage model of the information retrieval process, she found that both types of knowledge are critical in the information seeking process; however, declarative knowledge is activated first, followed by procedural.

Method

The aim of this study is to show how conceptual and procedural knowledge manifest in point-of-need ILI. Examples from mathematics education, where the framework is most frequently used, suggest ideas, but identifying how it actually manifests in LIS practice will provide more relevant exemplars for research and for implementation in practice. Thus, digital reference transcripts were analyzed for instances of ILI and coded for instruction that focused on conceptual or procedural knowledge. Exemplars of each type of ILI were compiled.

Drawing examples from actual practice carries the limitations of the dataset, which may not be representative of all information interactions, may not be adequately broad, or may

contain rare or unusual data. However, this approach has the advantage of authenticity and relevance.

The source of data for the study was 1,260 transcripts from text-based, online reference transactions between an actual user and a service provider, who may have been a librarian or a library staff member. Users accessed the service from academic, public, or school library webpages or from library consortia interfaces. The dataset was provided by OCLC, and the transcripts were anonymized by Lynn Silipigni Connaway and Marie Radford for the Seeking Synchronicity project (https://www.oclc.org/research/publications/all/synchronicity.html).

Descriptive coding was conducted by the author and four graduate students. The team first discussed the definitions of ILI, instruction focused on conceptual knowledge, and instruction focused on procedural knowledge. No standard definition of ILI is used in the literature. Although myriad definitions of information literacy exist, scholars assume that the definition of ILI can be inferred as teaching or facilitating student learning of information literacy. The team agreed on a working definition of "teaching or facilitating user learning of information literacy." The definition of information literacy was drawn from the American Library Association's (1989) definition: "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." In addition, the team felt that ILI was most easily defined in terms of what it is not: "not simply giving the user the answer to their question." The definition of conceptual knowledge was taken from Crooks and Alibali (2014), and the definition of procedural knowledge was adapted from Byrnes and Wasik (1991) and Rittle-Johnson and Alibali (1999).

Using the definitions in Table 1, the team together identified instances of ILI and categorized them as conceptual or procedural in 20 transcripts. Next, each team member individually read and categorized 20 more transcripts and the group discussed the results until consensus was reached. Following this initial norming, each transcript was read and categorized by one team member, indicating the line number(s) of the transcript where the instruction occurred. The initial coding was then reviewed by another team member, and any differences were discussed until consensus was reached. Simple consensus, rather than interrater reliability or other quantitative measures, was chosen in accordance with the study's aim, which was not to make claims about the amount of various types of instruction

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but rather to understand how different types of instruction manifest in point-of-need ILI and to provide exemplars of these types. The discussions to achieve consensus were a valuable opportunity to explore the concept of point-of-need ILI.

Table 1: Definitions used in initial coding

Term	Definition
Information literacy instruction (ILI)	Teaching or facilitating user learning in information literacy (including recognizing the need for information and locating, evaluating, and using it); not simply giving the user an answer.
Conceptual knowledge	General principle knowledge (definitions, rules, and principles) or knowledge of principles underlying procedures.
Procedural knowledge	Specific strategies or actions to accomplish tasks and solve problems.

The final stage of the coding process characterized specific instances of ILI as exemplars of conceptual knowledge and procedural knowledge instruction to better illustrate the two contexts. Each member of the team thematically analyzed the instances of ILI within the transcripts (e.g., instances that focused on recommending sources or developing a search strategy). Similar themes were grouped together, and the author then compiled the exemplars and revised these category names with a common terminology (e.g., "What to enter" and "Search terms" became "Specific search strategies to enter"). This process of categorizing was intended to see specific examples of ILI within the conceptual/procedural framework and to facilitate use of this framework. The final analysis resulted in six categories of conceptual knowledge relating to general principle knowledge, two categories of conceptual knowledge relating to knowledge of principles underlying procedures, and four categories of procedural knowledge.

Results

ILI occurred in 13% (164) of the transcripts. This proportion of ILI is much lower than in other studies. However, the team did not remove incomplete or training transcripts from the dataset before analysis, which may account for some of the difference. Even so, this percentage is not really a meaningful figure as there is no consensus on how often ILI should occur, and measuring the amount of ILI was not the aim of the study. The

meaningful figures for this study are the proportions of instances of ILI focused on conceptual or procedural knowledge.

Of the transcripts where ILI occurred, 26 contained conceptual instruction, 100 contained procedural instruction, and 38 contained both. Table 2 lists the sub-categories of each type of instruction along with the number of times it occurred in the dataset.

Table 2: Number of point-of-need ILI instances by category

Type of Knowledge	ILI Category	Instances
Conceptual – General principle knowledge	Explanations of the functions and purpose of the library or of information professionals	22
	Explanations of the research process or development of search strategies	21
	Explanations of the meaning of jargon, symbols, or abbreviations	18
	Explanations of source evaluation	5
	Explanations of classification of materials	3
	Explanations of scholarly communication	2
Conceptual – Knowledge of principles underlying procedures	Justification for the choice of a resource	20
	Explanations of principles of giving attribution	4
Procedural	Steps to take to accomplish an information task	77
	Specific search strategies to enter	50
	Recommended sources of information (without justification)	46
	Specific information to enter into citations	4

Exemplars from practice can help to define and clarify conceptual and procedural ILI in the point-of-need context. The Appendix provides an example of each ILI category as it appeared in the digital reference transcript.

Discussion

Within the dataset, instances of instruction that focus on procedural knowledge outnumbered those focused on conceptual knowledge or on both types of knowledge. Given

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arguments such as Rittle-Johnson and Alibali's (1999) and Borgman's (1986) that conceptual knowledge has unique and important benefits, one would like to have seen more conceptual interventions. Also, with the increased emphasis on conceptual knowledge in classroom information literacy, encouraged by ACRL's adoption of the *Framework*, the profession should be shifting to increased emphasis on conceptual knowledge in point-of-need ILI as well.

The study would have been more meaningful if it were possible to match service providers' type of intervention with users' type of need. For example, in mathematics education, researchers looked to see if teachers provided conceptual instruction in response to student errors that reflected gaps in conceptual knowledge and if they provided procedural instruction in response to student errors in knowledge of procedures (Son & Crespo, 2009; Son & Sinclair, 2010). This matching was possible in only a very few instances in the dataset. For example, one user directly asked, "What do I click on?" which indicates a more procedural mindset. Another chat user cued the service provider that he or she wanted to understand by saying, "if I get a site that says i have to pay, then it isn't that im doing something wrong, it's that my dept or school doesn't subscribe to the services. right?" The team also noticed a few user responses to ILI that could be classified as conceptual or procedural: "I need to write down these steps" demonstrated the user's desire to learn the procedures of which he or she was just informed, but "I see" signaled an understanding. Further research should focus on categorizing user requests and responses within the conceptual/procedural framework.

However, in the vast majority of cases, no information about the nature of the user's challenge was uncovered. Service providers in the dataset generally did not probe the nature of the user's question to diagnose the error or the gap in knowledge. Evidence of reference interviews appeared in the transcripts, but these reference interviews tended to probe aspects of the information need, such as type of sources needed or details about the topic being researched, rather than the specific difficulty the user was encountering. The reference interview is not designed to provide adequate information for point-of-need ILI. The interactions gave the appearance of occurring in a vacuum with the user having done nothing to solve the problem on his or her own first. In addition, users were extremely vague in articulating their challenges, using phrases such as "hasn't helped," "already looked and couldn't find anything," and sources "weren't useful." Service providers generally did not attempt to explore these vague or ambiguous comments. Therefore, determining if the

user's need was conceptual or procedural was impossible, so no analysis could be done about whether the service provider's response was appropriate or not.

Indeed, almost no interaction between the user and the service provider was evident in many of the transactions. Neither ILI nor a reference interview occurred; merely a page push or an answer was provided. The author's personal communication with an experienced provider of digital reference indicated that service providers are under intense pressure to complete interactions quickly. In addition, digital reference services experience a phenomenon called "class bombs" by providers. Class bombs occur when a teacher, intending to demonstrate to students how to get help with research projects, directs a classroom full of students to send a query to a digital reference service. Service providers identify class bombs by the number of queries occurring simultaneously, by the similarity of the questions, and by the time of day. Service providers feel pressured to respond in order to demonstrate how responsive they can be, but they also recognize that they are not responding to actual user needs. This pressure creates a challenge, then, for doing research using only a sample of artifacts of digital reference interactions. A researcher cannot tell from the data whether a service provider was doing their most high-quality work or merely responding as best they could to a special situation, such as a class bomb.

A challenge in categorizing instances of instruction is that some of them were "hidden." Service providers made strategic use of websites or instructional tools that they delivered to users via links or file sharing. Since not all of these objects were accessible to the research team, these hidden instances of ILI were not analyzed. An example of where point-of-need ILI may have been hidden is " made a super short video. It will open in another window when you click the link. http://screencast.com/t/MTg0NTZhY." Knowing whether or not these tools focused on conceptual or procedural knowledge would have contributed to this study's findings.

Future Research

A number of areas for future research could contribute to this initial study and create a stronger picture of how conceptual and procedural knowledge could be useful for understanding point-of-need ILI. As mentioned above, future research should examine users' challenges and how service providers respond to them; in other words, using the dialogue between user and service provider as the unit of analysis rather than isolated instances of instruction. Future research should also look at other contexts besides digital

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reference, such as the physical reference desk or consultations. In addition, understanding the intention of the information professional is an important area to investigate. Exploring the moment of professional judgment, when the librarian chooses whether to provide instruction and if that instruction should be conceptual or procedural, would give insight into the decision-making process, including the internal and external factors that affect this decision. A study that involves think aloud techniques, where librarians could externalize their thinking and decision-making while providing chat or email information service, or critical incident techniques, where they could reflect on an interaction, could expose this intentionality.

Implications for Research

Point-of-need ILI tends not to be understood as a form of instruction with its own particular needs. No definition of point-of-need ILI exists in the literature. Some seem to view it as a variation of classroom instruction that happens in a one-on-one context. For example, the scholars who apply the ACRL *Standards* to point-of-need ILI are viewing it in this way. However, as only three of these standards are able to be applied, the *Standards* provide an incomplete variation of instruction in comparison with classroom instruction. Viewing it, however, as a special type of instruction that is complementary but unique to classroom instruction seems advantageous and more accurate. Thus, this paper suggests a new frame for point-of-need ILI—seeing it as a librarian's response to a user's error or challenge that may target gaps in conceptual knowledge, procedural knowledge, or, ideally, both. This frame opens opportunities for scholars to explore the phenomenon of point-of-need ILI in new ways, freed of restrictions of classroom instruction. This paper proposes the framework of conceptual and procedural knowledge for other scholars to build on or refine for continued innovation in understanding, practice, and evaluation of point-of-need ILI.

Implications for Practice

The results of this study show that the point-of-need ILI in this dataset is predominantly focused on procedural knowledge. The constraints inherent in point-of-need ILI may encourage librarians to choose instruction focused on procedures as a simpler and quicker option. As librarians re-focus their classroom instruction on concepts rather than on procedures, as advocated by the ACRL *Framework*, they should consider re-focusing their point-of-need ILI as well.

Reference work, particularly the variety that happens at the physical or digital reference desk, is complex work, fraught with uncertainty and the constraints of time. Any suggestions for improving this work must recognize these challenges and be straightforward and easy to remember. The framework of conceptual and procedural knowledge fits this need for simplicity in practice in addition to its theoretical soundness. Service providers aiming to improve their point-of-need ILI can quickly scan the exemplars resulting from this study to understand what is meant by targeting users' conceptual information literacy knowledge and procedural information literacy knowledge. Then, when working with users, service providers can aim not only to provide procedures but also to interject concepts. They can do a quick reflection-in-action (Schön, 1983) by asking "Did I explain both *how* and *why*?" In this way, service providers would provide the optimal instruction advocated by education and LIS scholars and professional organizations. Mentors and managers of reference service providers can also take advantage of this framework formally or informally.

Conclusion

The opportunity for a teachable moment that occurs when users express their information challenges is invaluable. In these moments, users are motivated to learn, and an effective interaction with a service provider can make a difference for users at that moment and in the future. This invaluable opportunity merits serious theoretical consideration and research into its unique benefits and challenges. Rather than applying frameworks designed for classroom instruction, this paper advocates a framework designed for addressing user challenges at the point-of-need. This framework of conceptual and procedural knowledge, thus far only used to study information retrieval in LIS (Borgman, 1986, 1996; Macpherson, 2004), may prove to be a useful framework for both scholars and professionals in understanding, improving, and evaluating point-of-need ILI.

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Appendix: Examples of ILI by Type of Knowledge Addressed

Conceptual Knowledge: General Principle Knowledge

Explanations of the functions and purpose of the library or of information professionals

> *And if we don't have something, we can get it from ther [sic] libraries throuh [sic] Interlibrary loan.*

Explanations of the research process or development of search strategies

> *For big topics it is usually better to look at books for an overview. Articles usually discuss 1 aspect*
> *these are both interesting and big topics. For your Africa topic, I would suggest narrowing down to just a few countries (2 or 3) and possibly the same with the eu.*

Explanations of the meaning of jargon, symbols, or abbreviations

> *When instructors say "peer reviewed" they usually mean simply scholarly journals. "Peer reviewed" journals are a small subset of scholarly journals... - Most of the library databases are for scholarly journals*

Explanations of source evaluation

> *are you happy to keep searching on your own now? If so just remember that you usually get better quality information from education, government and organisation sites. Just check who controls the organisation sites as they may have a bias depending on why they are putting the information on the web.*

Explanations of classification of materials

> *There are five stack levels.*
> *Each one has a different range of call numbers.*
> *The books are arranged alphabetically and numerically by call number.*

Explanations of scholarly communication

> *Generally, the articles are reproduced exactly as they were printed. And usually they do not have illustrations. I'm not sure how to find an illustration that is missing.*

Conceptual Knowledge: Knowledge of Principles Underlying Procedures

Justification for the choice of a resource

> *You may find APA Fulltext - Australian Public Affairs useful as your topic is related to Indigenous perspectives.*

Explanations of principles of giving attribution

> *It depends what they mean by citation – do they mean any style of referencing? Because there are several methods of referencing and citing – some use footnotes (for example the numbered style), and some use in-text citations (for example Harvard and APA styles).*

Procedural Knowledge

Steps to take to accomplish an information task

> *You should see the link at the very top right corner of the screen*
> *Now go to your search results*
> *And click "select all"*
> *Then click the "save" button*
> *It will ask you to name your list*
> *Then click "create new list"*
> *Now you should be back at your search results, with a link that says "Selected item(s) have been added to your list."*
> *Click on that.*

Specific search strategies to enter

> *I'll send you what to type in.*
> *student and reading and pre-testing*
> *Be sure to type in the word AND where I have.*

Recommended sources of information (without justification)

> *I'm selecting the general reference center gold...*

Specific items to enter into citations

> *Search your term in there, and when you find an article you can use, the database can format the citation for you.*
> *When you locate the article title you want, click the title to see the abstract. Look on the upper right, there is a button marked "cite". When you click it the system provides citations in various formats that you copy and paste.*

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