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The Value of User Feedback: Healthcare Professionals' Comments to the Health Information Provider

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ABSTRACT

The construct of value is highly relevant to information. For research on the value of information, Saracevic and Kantor (1997) proposed a framework from a value perspective in philosophy. In this report, we substantiate the framework with an updated review of the literature and demonstrate its applicability to understanding the value of user feedback as one type of information. Our field study, in the setting of a health information provider whose information products serve thousands of Canadian healthcare professionals, provides an example of how this value-of-information framework can be operationalized for an organization. In addition to the theoretical and methodological contributions, this research adds to the literature by documenting the way that textual feedback data were used to optimize the content of an information resource. This contrasts with published studies that only dealt with the use of quantitative feedback by information providers not involved in content production.

INTRODUCTION

Healthcare is a knowledge-intensive profession (Hersh, 2003). At work and for their continuing education, health professionals—physicians, pharmacists, nurses, and allied health professionals—need information resources to update their knowledge (Pluye, Grad, Dawes, & Bartlett, 2007). Health information providers strive to meet that need by bringing together disparate research findings on clinical topics and disseminating research-based information (Straus, Tetroe, & Graham, 2009b).

As a not-for-profit professional organization and a health information provider, the Canadian

Pharmacists Association (CPhA) ensures that research-based information is included in its educational programs and publications, many of which are online. Among CPhA's online information products is e-Therapeutics+, a Canadian source of evidence-based treatment recommendations focusing on primary healthcare. CPhA editors continuously update and fine-tune the published content with findings from clinical research.

The CPhA disseminates Highlights derived from e-Therapeutics+. A Highlight refers to a few important sentences excerpted from an e-Therapeutics+ chapter, and is delivered by e-mail. Figure 1 shows a Highlight example.

From the e-mail, healthcare professionals can access the full-text chapter and use a web form to send comments as feedback to the CPhA. More than 6,500 Canadian pharma- cists and 17,000 physicians constitute the audience in the Highlight program, and a large amount of feedback has been generated. While this kind of feedback can be valuable for organizations to rethink their products and services (Zahra & George, 2002), the specific value of health professionals' feedback comments to the health information provider is still largely unexplored.

This paper presents a study on user feedback conducted between 2011 and 2012. The research objectives were to conceptualize the value of user feedback and document the value of health professionals' comments to the health information provider.

We focused on the feedback provided by pharmacists, as they represent a primary audience of the CPhA. Clarifying the usefulness of that feedback is a prerequisite to processing the comments systematically, which can in turn improve the critical information resource that Canadian health professionals rely on for continuing education and for delivering high-quality services.

From a value perspective in philosophy, we propose a conceptual framework for studying the value of health professionals' feedback as one type of information. Our study in the CPhA setting, demonstrates the potential of using this framework to study the value of information in general.

BACKGROUND

Between health information providers and health professionals (i.e., information users) there are two kinds of information: information that represents medical knowledge (information resources) and information that represents the user's perception of this knowledge (i.e., user feedback). The flow of information between the two entities is illustrated in Figure 2, where arrows represent the direction of this flow.

1. Information providers synthesize medical knowledge and disseminate it in the form of online

information resources;

2. Health information informs health professionals;
3. Health professionals use the information and provide feedback on the information;
4. The user feedback informs information providers of any problem related to their products.

While health information is increasingly accessed online, information users' feedback can be collected at the same time as the information is delivered (Grad et al., 2008, 2014). Pluye et al. (2009) used a validated1 Information Assessment Method (IAM) to study health professionals' feedback on the use of e-Therapeutics+. On the IAM feed- back form, respondents can submit free text comments in addition to ratings based on a checklist. In previous research, the relevance of health information to clinical practice, the cognitive impact of health information on clinicians, the use of this information for specific patients, and subsequent patient health outcomes were assessed through quantitative analysis of ratings (Budzinski et al., 2012; Grad et al., in press; Pluye et al., 2012). However, the value of qualitative user feedback comments for the health information provider has been suggested only as part of a two-way knowledge exchange between those who disseminates health information and those who use that information (i.e., the healthcare professional) and provides useful feedback (Pluye et al., 2014). Thus, our research objectives were to conceptualize the value of user feedback and document the value of health professionals' comments to the health information provider.

LITERATURE REVIEW

To glean existing knowledge with respect to our research objectives, we reviewed the literature concerning the useful- ness of user feedback that bore similarities in format and content to the feedback received by the CPhA. The search strategy and review process are described here.

A search was performed in the following sources (major providers of scientific literature published in English):

- ProQuest databases, including Confederated ABI Inform, Dissertations and Thesis, Research Library, and LISA
- Web of Knowledge (Thomson Reuters)
- Academic Search Complete (EBSCO)
- Scopus (Elsevier)
- Google Scholar (Google)

Only scholarly publications were considered due to the aca- demic nature of this study. A preliminary search found little research before the mid-1990s with a focus on user feed- back. Therefore, the searched

date range was sufficient from 1990 onwards for empirical studies and 1980 onwards for conceptual papers (e.g., reviews). Backward citation tracking expanded the date range, and combined with forward citation tracking, a few more relevant publications were included. CPhA participants also pointed out several references related to feedback from health professionals.

The synthesis of existing knowledge followed a narrative approach, which emphasizes the identification of relation- ships between the actual situation and findings in the literature (Grant & Booth, 2009). Therefore, in presenting review findings we make sense by relating to specific examples in the current research setting.

Review Findings

We found reports suggesting that textual feedback comments are particularly useful when they can contain users' knowledge potentially useful to product and service providers. No empirical studies were found with regard to health information providers' use of textual feedback, and the use- fulness of feedback comments from health professionals to the health information provider has not been studied. This review helped to position our research in the domain of user feedback, and shows that it addresses a gap in knowledge.

Constructive comments. Research on user feedback has recognized open-ended input as a best practice, because it is more direct and capable of telling what attributes should be improved than analysis of "crude" quantitative ratings (e.g., benchmarking) which only infers possible areas for improvement (Garver, 2003; Pavlou & Dimoka, 2006). In addition to identifying what attributes should be improved, verbatim analysis offers insight for acting in response to the feedback, as qualitative feedback tends to offer rich explanations about the "why" behind any patterns in the quantitative data (Barnes & Vidgen, 2003). Respondents tend to supply long, detailed textual feedback over the web (Garver, 2001), which characterizes the way the CPhA collects feed- back comments from health professionals (i.e., comments collected with a "text box" on the web-based IAM questionnaire).

While users may offer compliments or complaints in their feedback, we choose to focus on a particular type of negative feedback that may lead to revision of the information product, which is of particular interest to the CPhA (Pluye et al., 2009). Negative feedback is valuable to provide opportunities for service recovery and quality improvement (Kirpalani, 2004). Complainers are expressing problems that other users have accepted or cannot articulate, and their messages have the potential to supply valuable information (Garver, 2001; Sanes, 1993). Feedback comments received by the CPhA are deemed potentially constructive when the respondent indicates disagreement or reservation, or suggests that he did not find needed information.

Knowledge-laden feedback. Andreasen (1988) noted that negative comments about services are different from those about goods. Then, what is special about health professionals' constructive comments about health information resources?

Rather than just simple factual information, the insights found in health professionals' feedback comments have distinctive traits of knowledge—knowledge is attached to the knower (Brown & Duguid, 2000) and derives from minds at work (Davenport & Prusak, 1998); in contrast, information merely refers to data meaningful to the receiver (Floridi, 2004). In line with this, the feedback comments received by the CPhA are attached to health professionals and are generated from intense, cognitive work relying on medical expertise, and can therefore be regarded as a source of knowledge rather than just information. The type of knowledge conveyed in health professionals' feedback is more precisely defined here, and an example is provided to illustrate its specific features.

The literature on customer knowledge management has identified three types of customer knowledge that are important to the organization (i.e., the provider of products or services); these include knowledge about, for, and from customers (Desouza & Awazu, 2005; Gebert, Geib, Kolbe, & Brenner, 2003; Rollins & Halinen, 2005; Salomann, Dous, Kolbe, & Brenner, 2005; Su, Chen, & Sha, 2006). First, knowledge-about-the-customer is of most interest to organizations. This type of knowledge concerns who the customers are, how they use the product, why they purchase, their thinking about the product, and their psychological traits (e.g., preferences) regarding the product and the company (Campbell, 2003; Davenport, Harris, & Kohli, 2001; Gordon, Calantone, Di Benedetto, & Kaminski, 1993; Masiello, 1988). An accurate understanding of such attributes of the customer is emphasized by organizations in order to manage customer relationships (Gebert et al., 2003; Rowley, 2002).

Second, knowledge-for-the-customer, or customer support knowledge, includes, for example, (a) knowledge on problems with product use and their solutions and (b) knowledge on experts whom the customer can reach for help (Davenport & Klahr, 1998; Garcia-Murillo & Annabi, 2002). This type of knowledge concerns the product or service of the organization, and is offered by the organization to the customer who could benefit from using it. The challenge in delivering knowledge-for-the-customer lies with the proper identification of the customer's need for knowledge.

Third, customers have their own expertise on a product or service. This knowledge-from-the-customer is sought by the organization in customer experience, insights, creativity, and even dissatisfaction with a product or service, in order to get ideas for improvement (Garcia-Murillo & Annabi, 2002; Gebert et al., 2003; Gibbert, Leibold, & Probst, 2004; Paquette, 2008; Rowley, 2002). Knowledge transfer across the organizational boundary and the use of that knowledge by the organization is at the core of managing this type of customer knowledge.

The flow of knowledge also differentiates the three types of customer knowledge: knowledge-about-the-customer resides with and is meaningful only to the organization, knowledge-for-the-customer flows from the organization to its customers, yet in a direction opposite to the acquisition of knowledge-from-the-customer by the organization. The CPhA uses IAM to collect feedback containing both the knowledge from health information users and the knowledge about them. Specifically, the constructive comments generally reflect the knowledge from health professionals, and the ratings (e.g., analysis of IAM data can reveal whether or not the information was sought for educational needs) lead primarily to knowledge about the professionals. The following example illustrates the knowledge sought by the CPhA in health professionals' comments.

> A Highlight in e-Therapeutics+: "Avoid ASA, NSAIDs and COX-2 inhibitors in ASA-induced asthmatics and in high-risk patients (i.e., severe asthma symptoms, nasal polyps, urticaria or chronic rhinitis). Exercise caution in all patients."
> A comment on the Highlight: "I'm not sure if I agree with a blanket warning on COX-2 inhibitors. My understanding is that there is some debate as to whether the COX-2's would be useful and a few small studies to indicate they may be ok. In general I would agree they are best to avoid but the statement makes it seem as if it's 100% certain."

This example shows that the knowledge of interest to the CPhA is the healthcare knowledge that professionals use in practice. It is the same knowledge that the CPhA distributes through e-Therapeutics+ (its health information resource), and the very same knowledge that these information users apply to generate constructive comments about the information resource.

This example also demonstrates that health professionals (e.g., the pharmacist who made the previous comment) may convey substantial knowledge in their feedback. In many ways, these expert users are just as knowledgeable as the CPhA editors on the topic. This is in sharp contrast to general consumers (e.g., Wirtz, Taxis, & Dreser, 2009): professional users of health information generate messages that are knowledge laden, and rather than simple statements such as "I like/dislike it," they are very capable of expressing insights derived from their professional expertise.

We can locate two types of customer knowledge in the information flowchart shown at the outset, with knowledge- from-the-customer flowing from the information user to the provider in the form of user feedback (Figure 3).

Usefulness of user feedback. Besides the format and content of health professionals' feedback comments, we paid particular attention to the usefulness of such feedback to the health information

providers.

Organizations analyze user feedback for various purposes, such as measuring the performance of a company, understanding users' feedback behavior, user needs, developing new products, protecting a company's public image, cultivating customer loyalty, as well as continuously improving products and services (Cooper, Edgett, & Kleinschmidt, 2002; Fundin & Elg, 2010; Garver, 2001; Goodman, DePalma, & Broetzmann, 1996; Ofir & Simonson, 2001; Sampson, 1996; Stauss & Seidel, 2010).

Using inputs from the user, typical assessments of information retrieval technology have revolved around successful completion of information retrieval tasks (e.g., meeting search objectives), particularly the relevance of retrieved information (e.g., Harter & Hert, 1997; Hersh, 2003; Pluye et al., 2009; Vakkari, 2003). Nevertheless, health professionals' feedback comments may help the information provider to optimize the content of an information resource (Pluye et al., in press), which represents a focus separate from the capacity of retrieval systems. As an example, the CPhA, in response to the comment (example) just given, reexamined the research literature and removed "COX-2 inhibitors" from the e-Therapeutics+ statement, after verifying with the chapter author who is an expert in the field. This illustrates an opportunity to benefit from health professionals' feed- back, yielding a refinement to the content of the information resource. This is an outcome different than, for example, improving physical product or service design, refinement of internal processes, or development of strategic initiatives for the organization.

Discussions are found on knowledgeable users such as automobile engineers (Gibbert et al., 2004; Paquette, 2006), and two studies in particular solicited feedback from health professionals (Repchinsky, Godbout, & Tierney, 1988; Repchinsky & Masuhara, 1987). But the studies mainly relied on quantitative indicators (i.e., ratings) rather than textual data. Concerning information providers and resources, only one report (i.e., Hudson, 2008) touched on the use of textual feedback by a producer of information resources (i.e., EBSCO). In contrast, our research is focused on information providers, such as the CPhA, who differ from providers of information or library services who are not involved in content production (Agosti, Crivellari, Di Nunzio, & Gabrielli, 2011; Nichols, 2006).

CONCEPTUAL FRAMEWORK

From an information science perspective, this study is original, as it provides a conceptual research framework which presents user feedback as information. In defining the framework, we drew on Repo (1986, 1989) and Saracevic and Kantor's (1997) reviews about the definition of the value of information, which provided constructs as well as approaches relevant to studying the usefulness of user feed- back in terms of its value to the CPhA. In our framework, those constructs have been structured,

substantiated, and differentiated according to fundamental philosophy works by Perry (1926), Attfield (1987), and Floridi (2004, 2010).

Saracevic and Kantor (1997) summarized three approaches to studying the value of information. The *normative approach* applies "formal and rigorous models involving information uncertainty and/or utility in relation to decision making" (p. 532). It assumes a narrow view of information, and "calculates the difference between the expected utility of the decision made without the information and the expected utility of the best possible choice in decision made after receiving and analyzing the information" (p. 533). Measures of the expected utility are based on probabilities and on formal probabilistic reasoning, and therefore are relevant to analyses of share-prices, sales reviews, and similar situations. As this approach restricts the type of information that can be dealt with, it is not applicable to the present study dealing with health professionals' comments about recommendations for clinical practice.

Relevant to the present study are the perceived value approach and the realistic value approach. The *perceived value approach* is based on "subjective valuation by users of information, of the value or benefits of given information" (Saracevic & Kantor, 1997, p. 532). Emphasis on rigor and precision, as prioritized in the normative approach, is replaced by admitting the judgments of the user, that is, a comprehensive impression of information. Following this approach, researchers may assume that the user is able to recognize the value of information (e.g., the benefits that the CPhA could gain from using health professionals' feedback comments). This approach is the "loosest" of the three, but allows for probing dissimilar conceptions and attributes of information by means of direct solicitation from the information user (Saracevic & Kantor, 1997). The perceived value approach can be considered if the user is given non- artificial information to (subjectively) judge its value (Ahituv, Neumann, & Riley, 1994)—a condition met in the current study.

The *realistic approach* is a before-and-after approach based on the effect of information on the user and/or his/her performance (outcomes) with the information. Mid-way between the normative approach and the perceived approach, it intends to reveal the value of information with change-in-performance due to the information; in other words, this *ex post* approach hinges upon a "before-and-after" idea, allowing researchers to study the value of information as long as they can focus on outputs (Ahituv et al., 1994).

Hereafter, views on the value of information in philosophy and economics are combined to provide focal points for the realistic approach to be applied in the present study.

Saracevic and Kantor (1997) extended four philosophical views of value to information: inherent value, intrinsic value, extrinsic or instrumental value, and contributory value. In relation to the present study:

1. The value of an information object is inherent. This can be said to a piece of feedback comment that may "carry" information interesting to a CPhA editor. The inherent value is attached to the information object, and can be established by observation of the subsequent types of value, for example, intrinsic value is then attained by reading something with inherent value (e.g., a constructive feedback comment).
2. Intrinsic value does not apply to objects or people, but rather experiences or the development of capacities (e.g., a person becoming more educated), or, more generally, states of being and affairs (Attfield, 1987). The value of being informed is intrinsic. This value can be noted when a clinical editor's (inner) state of mind is (better) informed after reading a constructive feedback comment.
3. The instrumental value of information often relates to an individual's activities (e.g., a clinical editor is prompted by a feedback comment to examine the clarity of textual information). This value consideration is split into value-in-exchange and value-in-use (Floridi, 2010; Repo, 1986, 1989). Value-in-exchange depends on a price the information would bring in an open and competitive market. Although this value can be translated from the expected payoffs a for-profit organization would obtain from the information (Floridi, 2010), it is not the intention of CPhA editors to use the feedback in this manner. Value-in-use is "that benefit the user obtains from *the use and the effect of the use*" (p. 375), and can be categorized by the way information is used as described by the user (Repo, 1986). This practical orientation enables the examination of otherwise hard-to-study philosophical values—the intellectual or emotional meaning to a person—for more "objective" results can be obtained (e.g., through interviews and observations) on people's behavior and outcomes of information use (Repo, 1986).
4. The contributory value is "something that contributes to the value of a whole of which it is a part and which may be contingent upon the existence of other parts or activities [of the whole constituent]" (Saracevic & Kantor, 1997, p. 529). This can be said of the CPhA as an organization when health professionals' feedback, on top of utilization by clinical editors (i.e., intrinsic value and instrumental value that are associated with individuals' minds and activities), contributes to meeting its organizational purposes. Specifically, the link between feedback utilization and organizational purposes can be achieved through incorporating the former into the editorial process, that is, another part of the organization as the contingent factor.

While these four types of value are closely related, they are not the same (Saracevic & Kantor, 1997). The subtle differences and relations between them are elaborated here. One unique feature of inherent value is that it resides with the information object. This feature contrasts inherent value with intrinsic value and instrumental value as they are related to information users, in terms of the states of mind and the activities they are engaged with, respectively. For example, value-in-use by its instrumental nature is observable in human behavior and its consequence, which is not the case with inherent or intrinsic values.

It is possible for some states of affairs to be of both intrinsic and instrumental value. A person being educated, as an example, is both a good in itself and can be a means to ulterior goods, such as earning a living. In other words, a connection exists between intrinsic value and reasons for action (to realize instrumental value). However, the concomitant presence of these two kinds of value does not in any way remove or weaken the distinction between them (Attfield, 1987).

Unlike instrumental value, contributory value is not associated with the immediate outcome of (information) use by the actor. It is, instead, reflected in the betterment of an entity (e.g., an organization) to which the actor belongs. The relationship of part-and-whole is a key characteristic of contributory value, that is, the use of information takes places in the part yet with value reflected on the whole. It is possible for instrumental value to exist independently of contributory value. An individual's use of library books for the purpose of conducting research, before publication for the scientific community, may be such an example. It is appropriate to consider the contributory value for an organization as promoting "the mission and progress of the institution (such as providing education, advancing scientific research, or profiting through some product or service, etc.)" (Saracevic & Kantor, 1997, p. 538). A distinction can be made that the instrumental value concentrates on *what* is the use and outcome, as derived by the actor from the valued object, while the contributory value consists in the nature of *the relations of help* that the whole receives from the part (Perry, 1926).

Intrinsic and instrumental value at the individual level could be related to contributory value at the organizational level in such a way that the latter is due (only) in part to the former. For example, course materials are provided to students to learn knowledge (i.e., instrumental value as the direct outcome of the use by students), which would subsequently contribute to achieving the school's mandate of providing education (i.e., contributory value to the achievement of the school's mission) yet be also dependent on other parts of the school's system including lectures, labs, and so on.

In research, the four views or types of value represent the phenomenon which is the subject of study, and will be discovered as a matter of fact; whereas the approach to studying the value of

information is mainly considered for research design. For example, a realistic approach may reveal any type of value in a particular study. Table 1 illustrates different types of value and the situations in which they may be identified with the approaches taken in this study.

The approach defines the study method, while the philosophical view guides us to findings. Using this conceptual framework, we examined the value of health professionals' feedback comments through the perceived value approach and the realistic approach, with the latter focusing on four distinct types of value: the inherent value held by feedback data, the intrinsic value that information brings to the CPhA editors, the instrumental value thereafter exercised by the editors, and the contributory value to the organizational goal of the CPhA. Hereafter in the Methods and Results sections, we present details as to how the approach and views have been operationalized for the current study.

METHODS

Our research question was: What is the value of feedback comments from pharmacists for the CPhA? The research design uses the qualitative case study method (Patton, 2002; Yin, 2003, 2009), and the unit of analysis is one instance where the CPhA editor reviewed and responded to comments submitted by the readers of e-Therapeutics+. We employed two methods: interview and analysis of e-mail records. Ethical approval was obtained from McGill University's Institutional Review Board.

Participants and the Interview

All six clinical editors, the Editor-in-Chief, and the Senior Director of Digital Publishing at the CPhA took part in the interview. In the interview guide, probing questions were grouped into two sections: one on staff perceptions and the other on their action and experiences (documented and observed). These two sections map to the perceived and realistic value approaches as outlined in the conceptual framework. The semistructured interview helped us to remain focused on the inquiry, but unprompted probes followed a need or an opportunity for more explanation.

Participants answered an open-ended question "What did you think about the usefulness of feedback comments from pharmacists?" At the end of the interview session, the other question also generated relevant answers "In addition to what you have mentioned so far, is there anything we haven't talked about that you think is interesting or relevant to this project?" Both questions were broadly framed in order not to confine participants to any particular perspectives, and contributed to understanding the perceived value of user feedback.

In addition to the two open-ended questions, the researcher discussed with each editor what she or he had done in response to 40 constructive feedback comments. These comments were collected in a

collaborative action research project between the CPhA and researchers at the Department of Family Medicine, McGill University. In the project, pharmacists submitted comments on 94 of a total of 134 topics in e-Therapeutics+. These comments represented nine types of issues regarding e-Therapeutics+ (Tang, Bouthillier, Pluye, Grad, & Repchinsky, 2011). Because pharmacists are one of the primary audiences for e-Therapeutics+, studying the use and usefulness of their comments can serve the purpose of this research.

This part of the interview followed the realistic approach. Of the 40 selected comments, 18 led to changes to e-Therapeutics+ content. Two sets of questions were used in the discussion about these 18 and the other feedback comments, respectively.

Version 1: For discussion of "actionable" comments that led to changes:

- In your opinion, in hindsight what was the problem with the Highlight?
- Was it easy to identify the problem as reported in this comment? Did you review the e-Therapeutics+ chapter to clarify this problem?
- What were the options to address the problem?
- What did you do to make the change, and how was that done?
- Did the change affect only the highlighted text or did it concern other parts of the chapter?
- Did you talk to your colleagues about this feedback and the problem?

Version 2: For discussion of comments that did not lead to content change:

- What did you understand from this comment? (Consider probing: Was this comment difficult to understand in any way?)
- Was it difficult to do anything in response to this comment, or could you have done something in response to it?
- Did you find this comment somewhat informative, some- what useful, or not at all?
- Did you discuss this feedback comment with your col- league(s)? If yes, what did he or she say?

Some interview questions were only applicable to actionable comments (i.e., regarding what was done to correct a problem) or nonactionable comments (e.g., why was it difficult to do anything?). The reason for considering comments that did not lead to content change is to avoid being narrowly limited to immediate performance results and product deliverables (see Literature Review) by recognizing the value of feedback comments that have been identified as potentially constructive. Those questions sought

the facts of the matter (e.g., a corrective measure) as well as the interviewee's opinion about the matter (e.g., lessons learned). The objective was to uncover as much as possible about the potential value of the feedback, especially in the form of knowledge rather than just immediate tangible improvements.

To study the realistic value of feedback, the design of the interview questions took into consideration both cognition and action necessary to capture evidence of (a) the intrinsic value (e.g., improvement of personal knowledge) as well as (b) the instrumental value, because "the cognitive approach, with analysis of the tasks performed, should be used for describing the value-in-use of information" (Repo, 1989, p. 68). The appropriateness of the interview questions was recognized by participants as well, for example:

> "[The interview] went well, and your questions are appropriate." [Comment by a participant with PhD-level research training]

Analysis of Interview Data

Interviews were first transcribed and each participant received an alias to protect her/his identity. Subsequently, manual coding on the transcripts was performed using pen and paper. Data analysis followed the perceived and realistic approaches as defined in the framework.

When the participant just said what she/he thought about the general usefulness of feedback without presenting any evidence or example, that statement was considered as an indication of perceived value. If the statement was based on past experiences (i.e., answers in response to the handling of constructive comments), then it was considered evidence of realistic value. We followed the realistic value approach in data analysis, and our conceptual framework provided the philosophical perspectives oriented towards intrinsic value (e.g., improving knowledge), instrumental value (i.e., uses of feedback), and contributory value in relation to the organizational mandate of the CPhA. In contrast to the realistic approach, the analysis for perceived value did not require a strong theoretical orientation, and we followed the principles of inductive thematic analysis (Braun & Clarke, 2006).

For example, when a participant said "I think it's always useful to get some kind of feedback from the user," a code of "perceived" was assigned to the text as an indication of value perceived without a specific reference to actualities. By contrast, a code for intrinsic value was (only) applied when a fact (e.g., "it's one of those comments that . . . makes you think. . . .") was presented by the participant, hence a realistic approach.

No preexisting coding scheme was applied, and themes were identified within the data. In the inductive thematic analysis, the following key criteria were observed (Braun & Clarke, 2006; Fereday &

Muir-Cochrane, 2006):

- The coding process has been thorough and inclusive, and themes have been generated from the complete data set;
- Themes have been checked against each other and back to the original data set, that is, once definitions have been refined for the initial themes, a second iteration applied the refined themes to code the data again in order to verify the fit between themes and data;
- Data have been analyzed—interpreted and made sense of—rather than just paraphrased or described;
- Analysis and data match each other: the extracts illustrate the analytic claims;
- All relevant extracts for each theme have been collated;
- Together, the themes adequately capture the majority of the data, and there is not too much overlap between themes.

Analysis of E-mail Correspondence

During the interview, the researcher noticed that CPhA editors brought with them printed e-mails to facilitate recall of past events. The editors gave us permission to read the e-mails related to each comment discussed in the interview.

The e-mail records were analyzed using the same thematic analysis technique applied to interview transcripts, to understand the editors' cognitive and communication activities triggered by user feedback. This evidence contributed to understanding the complex nature of intellectual exchange that occurred during feedback processing (i.e., knowledge exchange among CPhA editors and between CPhA editors and chapter authors). The findings revealed the inherent and instrumental value of the feedback.

RESULTS

Results of the analysis are presented in accordance with the conceptual framework.

Perceived Value

The perceived value of feedback by CPhA editors was expressed in these terms:

- From the end users' perspective, the feedback tells the CPhA editors what information is important to be included in the product content (i.e., what the end users need to know most).

"I think it's a vehicle . . . that we gather information about what's important to our readers and how they are reacting to it, and what they need . . . or whatever" [Participant #3].

". . . the content has to be driven by the evidence . . . it also has to be driven by user needs" [Participant #5].

- Although all published content is peer reviewed, through the feedback comments the information provider can be aware of the end user's judgment about the content.

  ". . . it's always good to have a different perspective. And, you know, it's a check, too, on how clearly we are stating something . . . I think it's useful, it's always good to have opinions, things that you take for granted that other people may not" [Participant #6].

- The feedback channel provides an ongoing check for potential errors and wording issues. Although not always significant, the refinements to content are uniquely valuable through a continuous process that might not happen with planned major revisions, typically at 2-year intervals.

  "It may not make a huge, huge improvement, but usually it makes things clearer, it explains things further, and so it just brings the quality up. And, that's a continuous process that might not happen with a major revision. . . . Focus us on the spot where we could be just a little better" [Participant #5].

- Knowledgeable users may provide content that editors did not consider or were not updating quickly enough. Thus, the knowledge of end users contributes to extending or updating the knowledge of editors.

  "Even if you don't make a change, it tends to, you know, send you in the right direction, or keep you aware of some emerging issue out in the community that we may not be aware of, you know, as people doing the writing we are not practicing everyday—most of us do practice a little bit—but, you know, someone more practical, who's actually doing it, might have something valuable"

[Participant #2].

Realistic Value

Following the realistic approach—the documented and observed value as opposed to perceptions—the value of feedback comments were identified from four perspectives: the inherent value of feedback comments as textual messages, the intrinsic value as editors are informed by the feedback, the instrumental value (i.e., value-in-use) as activities performed by editors in response to the feedback, and the contributory value to the CPhA as an organizational entity.

Inherent value. The inherent value is not merely perceived, but has to be justified on the basis of observations. For example, the inherent value of an article, even though well- written, is not established until there is evidence that its understanding improves someone's knowledge. Because the justification of inherent value is not dependent on subjective perception but instead fact-based reasoning, the identification of the inherent value of user feedback complies with the realistic approach.

As noted in Literature Review, this value is philosophically established and can be justified through logical reasoning on the basis of facts: the inherent value serves as the very basis on which other types of realistic value depend in order to be established. For example, the improvement of a reader's knowledge (i.e., intrinsic value) may be used to demonstrate that an article is ipso facto valuable inherently. Another more obvious distinction here is that the inherent value is attached to an information object, while the intrinsic value to the state of mind (Saracevic & Kantor, 1997).

In the same vein as that an article can be justified in terms of its inherent value for the information it carries, a constructive feedback comment also has inherent value, because it has enabled the other types of value to be derived as below.

Intrinsic value. The intrinsic value relates to changing the state of mind of an editor, and is a prerequisite to the instrumental value of a comment being experienced by that editor.

> First, the intrinsic value is observed when a comment brings knowledge to the editor. "Knowledgeable ones are very up on their topic, and sometimes they lead us to something we didn't consider or weren't updating quickly enough" [Participant #2].

> "This user does present a good argument and illustrates the controversy of ICS (inhaled

corticosteroids) therapy in COPD. For example, he quoted a study that demonstrated increased mortality associated with ICS use and pneumonia" [Based on correspondence records provided by Participant #6].

Second, the intrinsic value is expressed through reflection. The editor is prompted to reflect from the user's viewpoint that the therapeutic information was questioned. Moreover, the editor's reflection tends to involve the overall therapeutic topic and the whole chapter, rather than being confined to just the reported issue itself.

> "In the time since [the author] had written the chapter, a lot has happened with vitamin D in the medical world, and there's much more data now. So, it's very reasonable . . . for this person to be asking the question, well 'how bad of a deficiency do you need before you would supplement?' . . . The other thing about this particular chapter is that it's one of the non-traditional chapters . . . the table is different . . . if this was a traditional chapter . . . in the drugs section, . . . there is a place to expand on that . . . whereas in the nutrition chapter, there's goals and therapeutic choices, but it doesn't go into detail about each of the things" [Participant #5].

The reflection can also occur with regard to the wording of the content.

> "I recall thinking that it was clear to me. But, you know . . . it wasn't as clear as it could be. . . . A lot of times, even though we may have correct information, are we communicating it most clearly, you know, concisely, efficiently. . . . To me, it's clear, that's because I know, right? But, someone that's looking at it without the background . . . they may agree with the user's comment" [Participant #6].

And the reflection may even be about something that is not in direct relation to the issue reported in the feedback.

> "When I was looking at all the evidence [on the topic], I wasn't comfortable with the word "at doses 1 g/day," . . . it was actually unrelated to the person's feedback. . . . As I was looking into it, I started thinking that we need to say 'at doses of up to 1 g/day,' just because the interpretations like to say 1 g/day, there are some doses lower than that which worked. So, that was kind of unrelated, you know, coincidental finding, and since I was looking at it anyway, I thought we'd

better, we should change that, but it didn't really address the person's, you know, it wasn't because of what the person said" [Participant #2].

Instrumental value. The instrumental value of information is expressed through situational relevance or utility in information science, as "relevance and value are connected" (Saracevic & Kantor, 1997, p. 536); and this value is expressed as the effect or as direct, tangible outcomes resulting from activities performed by the editor (i.e., the user of feedback comments) (Saracevic, 2007; Saracevic & Kantor, 1997). Three uses were found: investigation, communication, and content change.

1. Investigation: the feedback comment triggers clinical editors to critically re-examine the validity of knowledge as conveyed in text.

"There was a reference here, a citation for that statement [in e-Therapeutics+] . . . and I went back to see if there . . . was a number . . . associated with [it] . . . it turned out that there was another study, a review article on Gout had that statement in it. . . . So there was no easy solution" [Participant #5].

And the investigation may overlap with the ongoing editorial workflow.

"I may have a note in the file—actually, which will be part of my final review of the chapter to make sure that all my notes are addressed. So, [the issue reported in the feedback] would still probably have been caught. But it has been taken out of my mind . . . [due to this feedback] I will flag it to talk to the author about it" [Participant #5].

2. Communication and knowledge exchange: After investigation, either the validity of knowledge is confirmed, or its inadequacy is identified. When the validity of knowledge appears questionable, editors would sometimes bring the reported issue to the attention of the original chapter author of e-Therapeutics+ so that it can be addressed in a subsequent version.
   There are three reasons for communication, sometimes resulting in knowledge exchange.

Reason 1: Communicate to get a colleague's knowledge on the topic.

"At the time I might have spoken to the person who used to have this chapter, or who might have been involved in the initial writing of it, because it wasn't me. So, that totally depends on the

scenario, but I would definitely do . . . I thought if we can get any good, quick information from the person who's involved in the first place, you know, why am I going to do all the research again—if they've already done that, and this is what they've come up with" [Participant #2].

Reason 2: Communicate with the chapter author or external reviewer to make a decision on content change.

"What we usually do: I initiated it, I decide whether or not I need to talk to the author about it, so may or may not. If you do need to talk to the author, you write to them saying what we are going to do, what do you think . . . I would have to decide whether or not, either agreed with the author or not, needs to go to the reviewer? So, it depends again on the gravity of it. . . ." [Participant #2].

This is also supported by the e-mail correspondence (dated 23–28 July 2009) between Participant #3 and an author on the "Red Eye" chapter.

Reason 3: Communicate with colleagues for a solution to content change.

"Regarding the comment . . . the concern about when to avoid ASA (Re. Reye's syndrome) is mentioned in the drug table. . . . Do you think we should add it to the text as well?" [E-mail correspondence between Participants #1 and #3].

"I did consult the colleague, because I didn't know what the best way to do it was, and I consulted a colleague who's very good with English and very good with words. And, together we worked on a wording that included better bracketing of some of the extra information so that it's very clear what the main core of information was and, in brackets is the extra. You know, so . . .brackets here . . . brackets there. . . ." [Participant #5].

3. Content change: usually within 2 weeks, changes are reflected in the online version of the affected information resource, usually through the "minor revision." Changes can be in the form of correcting an error, adding a reference, or rewording a sentence.

Minor revision is the most usual workflow to follow: "I initiated a minor revision . . . means you are changing some content, but it's not like somebody is looking at the whole chapter and saying, ok,

let's make sure that everything is up-to-date, and if there is anything new we have to include it. . . . We are supposed to do that every 2 years, at the minimum . . . [with] minor revisions we do if something comes up, something like this or, a new study that really changes practice, you know, so we have to change a chapter quicker, cannot wait for the 2 years" [Participant #2].

Correcting an error: ". . . this is wrong based on what we discovered, and . . . as a result of the user feedback . . . it resulted in a very immediate change to the content" [Participant #5].

Adding a reference: ". . . we put in a more recent reference and that's all . . . we added it though, because, you know, they had become the standard of care for that condition before this more recent reference. So, we added it . . . just to show that it sup- ports, and [the recommendation is] still supported today" [Participant #3].

Rewording a sentence: "I re-crafted the sentence. I thought, ok, so which parts are complicated, which parts can be grouped together, what's the point of this? The point is . . . the message we want to send. . . ." [Participant #5].

Contributory value. Although related, contributory value and instrumental value are not the same. While instrumental value is related to activities and immediate outcomes of information use, contributory value is demonstrated through (a) a connection between the actor who performs the activities and the entity (i.e., organization) to which the actor belongs, and (b) the partial contribution that the instrumental value makes to a given purpose of the whole entity. As an example of partial contribution, feedback use by individual editors has to be integrated into the editorial process for the CPhA to better its information product.

Two findings are indicative of the contributory value of feedback comments to the CPhA as an organization:

1. Contributing to CPhA's mandate of providing quality health information to support health professionals in practice and continuing education.

"Our content—with our advisory board, our expert authors, our expert reviewers, our expert editors—is extremely solid in terms of process to deliver content . . . the comments we are receiving . . . helps us to close the evidentiary loop . . . what we are doing with feedback is huge from the point of view of being able to reinforce the evidence-based content; it makes our evidence-based content a lot

stronger . . . it's really, really helping us from the point of view of content."

2. Contributing to bringing the CPhA a competitive edge.
   "Our universe is highly, highly, highly competitive. . . . We have competitors in the US . . . Our competition is big and has a lot of money. We are small and we don't . . . But what we do have, which is unique, is this! What we do have, as unique, is the comments we are receiving . . . to reinforce our position [in the market]. It's actually becoming a competitive tool for us—not only for moving forward, but also for surviving."

These quotes are from a participant (#7) not directly involved in feedback processing; therefore, the contributory value is not an (indirect) inference or derivation from personal experience, but rather a direct effect as judged from the view of this participant at the senior management level.

Empirical evidence supporting these four types of value confirmed that it is worthwhile for the CPhA to spend effort on a formal organizational process for user feedback management. These types of value also indicate the areas where benefits can be derived from the use of feedback comments. The implications of identifying the value of health professionals' feedback are further developed in the Discussion section.

DISCUSSION

Overall, our findings contribute to the literature on user feedback management with empirical evidence indicating (a) the value of health professionals' feedback as perceived by a health information provider, and (b) four types of realistic value: (i) the inherent value being the fundamental enabler of realistic value, (ii) the intrinsic value as the feed- back impacted the state-of-mind of the feedback user (i.e., clinical editors), (iii) the instrumental value leading to optimization of (information) products, and (iv) the contributory value in terms of facilitating organizational mandates and gaining a competitive edge. The intrinsic value and the instrumental value are attributable to the knowledge-laden characteristic of both the information product and the feed- back comments, and are expressed through the knowledge work of clinical editors.

Feedback can be valuable for organizations to rethink their products and services (Zahra & George, 2002), and our findings (a) conceptualized the value of user feedback as information and (b) documented the specific value of pharmacists' feedback comments to the CPhA by illustrating how they had been useful. Key findings are summarized here in direct relation to our research question. We also point to contributions and directions for future research.

Types of Value of the Feedback

Value is both subjectively perceived by the stakeholder and observable. In terms of subjectively perceived value, the editors believed that the feedback could help them to (a) know what users need to know most, (b) know how users judge the information product, (c) make continuous refinement to the information product, and (d) extend and update their knowledge.

In corroboration of the editors' perceptions, the feedback did have an observable effect, as the evidence suggests, for example by bringing them new knowledge of the field and helping them to critically reflect on content and wording.

Situation-based uses of the feedback were also identified as occurring in (a) the examination of the validity of clinical recommendations, (b) changing the content of the information product, and (c) communication and knowledge exchange between stakeholders.

The inherent value is not only philosophically justifiable; it has also been supported by facts and effects of other derived value such as an increase in editors' knowledge and utility outcomes (e.g., content improvement).

At a higher level, links to the organizational goals of the CPhA were confirmed in two ways, that is, a contribution to the mandate of continuing education, as well as a contribution to a competitive advantage.

Limitations

In studying the intrinsic value of feedback (e.g., staff were prompted by the feedback to quickly update their knowledge), we could not observe "live" and had to rely on participants' memory of events. This element of subjectivity can lead to recall error (Patton, 2002). To offset this limitation, we compared different sources of evidence for the same participant, for example, by looking at paper documents indicating that the participant had, as described in the inter- view, looked up recent literature. However, there were instances where corroborating evidence was not documented or detailed, and we had to accept what the participant said in the interview.

Open-ended interviews with probing questions have the inherent bias of confirmatory, self-reporting data collection methods, that is, interview data are subject to reactivity of the interviewee to the way that the researcher asks questions. While the researcher may subsequently attribute effects to the relations they expect to see as a result of using data gathered this way (Calhoun & Starbuck, 2003; Patton, 2002), we were careful about prompting interviewees when their replies were too general, trying not to direct them to talking only about specific issues. After reflecting on the interview transcripts, we realized

that (only) occasionally probes improvised on the spot may have been indicative of which aspects we were particularly interested in knowing about. This reflection not only helped to critically examine the interpretation of the data, but also increased the interviewer's experience in conducting semistructured interviews.

Contribution to Knowledge

Despite these limitations, this research contributes to the advancement of scientific knowledge and provides a clear rationale to the stakeholder (information provider) regarding feedback use. A conceptualization and documentation of the value of health professionals' feedback also justifies the effort and resources expended on enhancing feedback management (Tang et al., 2011) and guides the design for effective use of feedback comments.

In light of what was identified in the literature review, our findings add to the literature in two ways. First, we found no reports on health information providers' use of textual feed- back data, as published studies have only dealt with the use of quantitative feedback by information providers who were not involved in content production (e.g., Agosti et al., 2011; Hudson, 2008; Nichols, 2006; Repchinsky et al., 1988; Repchinsky & Masuhara, 1987). This study defines a particular setting of feedback use, where the health information producer, acting also as the electronic publisher, profits from textual feedback comments provided by professional users. Moreover, in that specific context, the present study is the first to have provided a systematic conceptualization and documentation of the value of health professionals' feed- back by following the philosophical approaches to and views of value that have been extended to information studies (Saracevic, 2007; Saracevic & Kantor, 1997). The results of this research indicate that both the perceived and realistic approaches are applicable in studying the value of information, and that four types of value (inherent, intrinsic, instrumental, and contributory) can characterize information used in the organizational setting.

In relation to knowledge translation. The interaction between the health information provider and health professionals who use health information can be situated in the area termed "knowledge translation" or "knowledge transfer." In the Canadian context, knowledge translation has been defined by the Canadian Institutes of Health Research as a dynamic and iterative process that includes the synthesis, dissemination, exchange, and ethically sound application of knowledge produced in clinical research to improve the health of Canadians, provide more effective health ser- vices and products, and strengthen the healthcare system (CIHR, 2009). While health information providers are involved in medical knowledge synthesis and dissemination to various stakeholders (e.g., health professionals, patients, and

policy-makers), health professionals represent a prominent group of medical knowledge users who apply evidence- based information in the practice of healthcare (Straus, Tetroe, & Graham, 2009a).

Treatment recommendations, such as those published in e-Therapeutic+, can be applied to many aspects of clinical care: for example, when to provide certain medical services (Timmermans & Mauck, 2005). However, there are barriers specific to the application of treatment recommendations (Gravel, Legare, & Graham, 2006). As such, evidence may not be easily applied to clinical care (e.g., Majumdar, McAlister, & Furberg, 2004; McGlynn et al., 2003) and patients' information needs may not be satisfied (e.g., Kiesler & Auerbach, 2006). One of the barriers pertains to the health information resource itself (Harrison & Legare, 2009), which may fail in enabling health professionals to apply evidence in their clinical setting due to, for example, insufficiently detailed information (e.g., about the availability of interventions, or the risk of adverse events) (Glasziou, Meats, Heneghan, & Shepperd, 2008; Glenton, Underland, Kho, Pennick, & Oxman, 2006)—exactly the types of issues reported to the CPhA. Using the valuable information in health professionals' feedback comments provides an effective way for the health information provider to begin to address such barriers.

Future Work

Further research can improve understandings obtained in the present study. For example, participants have suggested differences between comments made by users of different professions, for example, physicians, pharmacists, and nurse practitioners. For example, one participant commented as follows:

> "The family physician audience was . . . looking for something they could use in their practice . . . this is a generalization, but I think when the audience was mostly pharmacists, who have more of an academic approach to the information."

This suggests that different health professionals look for different information, and may emphasize different issues in their comments. While the current study relied on responses to pharmacists' comments, a study comparing the uses of feedback from different health professionals with respect to the same health information would be interesting. Such a study would help the information provider to tailor content to better meet the specific needs of different groups of users.

CONCLUSION

Value is a concept highly relevant to information. While information could be put to many uses,

its value can be tackled from a general philosophical perspective. Such a perspective enabled us to clearly distinguish four different types of value of information, which led to the development of a framework with both explanatory power and utility features.

With this framework, we tried to articulate, besides user feedback, the respective roles of the information-carrying object (i.e., an e-Therapeutics+ Highlight), the person receiving and making use of information, and the higher level entity (e.g., an organization) benefiting from individual's use of this information. On the one hand, this differentiation of roles provides focal points which researchers may choose to target; on the other hand, the linkages between the entities and their roles conceptually represent a system where the value of information is transformed and realized.

To researchers, our framework also offers guidelines to operationalize the examination of the value of information. We empirically studied healthcare professionals' feedback comments about a single health information resource, and demonstrated that the framework is well suited to study user feedback as information. Specifically, we followed the perceived and the realistic approaches, and found evidence in support of the value of pharmacists' feedback comments to CPhA editors as well as to their organization as a whole. The evidence revealed the path user feedback passes through, following a value-generation process within the organization as well as the related activities carried out by its members. It is during this process, rather than (just) in the outcome, that we were able to obtain an overview of the transformation and realization of value.

Value is defined in terms of interest which depends on cognition and expectation associated with particular out- comes. The valuableness of information is a characteristic that can be conferred on information by the interest which is taken in it, for what it is, or for any of its attributes, effects, or implications (Perry, 1926, 1954). When information supports cognition and serves given purposes, it should be understood in terms of its value. Having elaborated four types of value and conducted our case study, we believe that our value-of-information framework can be applied in other settings to study the value of different kinds of information. We hope this will provide researchers with a handle to grapple with the subjective and somewhat elusive concept of value in information research, concerning both individuals and organizations. We also hope that this is just one step leading to many that will further explicate the value construct in relation to information.

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TABLES AND FIGURES

TABLE 1. Types of value in this study of user feedback.

Type of value	Situations
Perceived approach	
Value perceived	A CPhA editor thinks that user feedback might be useful.
Realistic approach	
Inherent value	Constructive feedback that is useful to an editor.
Intrinsic value	An editor being informed by a user's feedback.
Instrumental value	An editor uses a feedback comment in her/his work.
Contributory value	User feedback comments help the CPhA to reach organizational goals.

FIG. 1. An e-Therapeutics+ Highlight, received in e-mail and opened in browser.

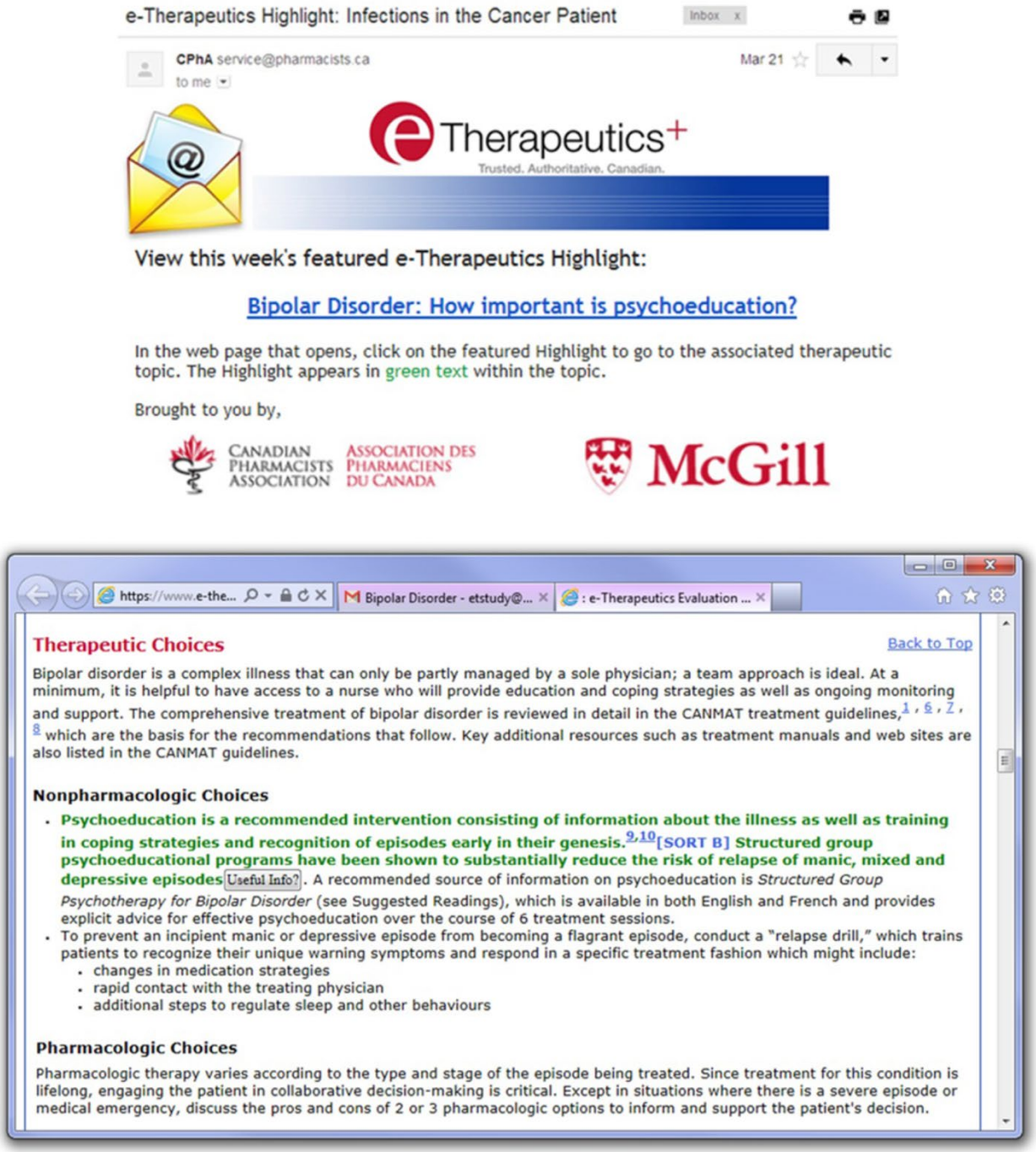

FIG. 2. The information flow between health information providers and users.

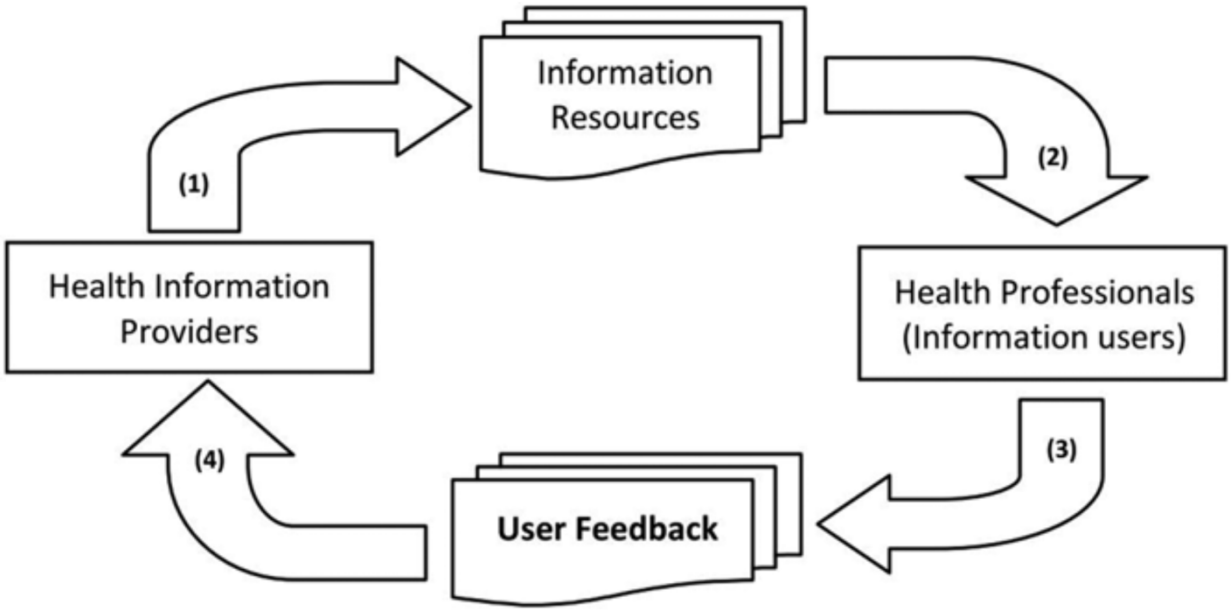

FIG.3. Customer knowledge identified in the flow of information between health information providers and users.