Towards Optimal Management of Health Information Users’ Feedback:
The Case of the Canadian Pharmacists Association

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Dedicated to: My wife, son and parents
Abstract

There is increasing attention to information users’ feedback comments as they can be used to improve information resources. In contexts where information resources are rich in knowledge, optimal user feedback management is crucial for the information provider to make sure that users’ information needs are met.

In this dissertation, I worked with the Canadian Pharmacists Association (CPhA), which regularly uses health professionals’ feedback to improve its publications. The CPhA wants an appropriate process to enable user feedback management in an effective and efficient manner. Thus, the present research addresses the overarching question “How can user feedback management be optimized for the CPhA?”

The problem of how to optimize the management of user feedback was conceptualized in three parts: (1) the feedback comments, (2) the feedback management process, and (3) the factors affecting the development and implementation of optimal user feedback management in the organizational setting. The conceptual framework is derived from information studies, management science and organizational studies. A participatory action research approach was taken to conduct an organizational case study, using qualitative methods such as interview, observation, and document analysis.

Research findings provide empirical evidence revealing four types of value of pharmacists’ feedback comments to the CPhA, nine key issues in its user feedback management process, and twenty six factors affecting the innovation of user feedback management. Main contributions of this
dissertation are as follows: this study empirically examined the usefulness of user feedback comments based on a value perspective in philosophy; two conceptual frameworks were proposed and demonstrated as relevant to studying information use and the related innovation in an organizational setting; and lessons have been learned from a comprehensive examination of the factors that affect innovation processes related to organizational information use.
De plus en plus, on porte attention aux commentaires de rétroaction des utilisateurs d’information car de tels commentaires peuvent être utiles pour améliorer les ressources d’information. Dans les contextes où les ressources d’information sont riches en connaissances, la gestion optimale de la rétroaction est cruciale pour les fournisseurs d’information afin de bien répondre aux besoins d’information des utilisateurs.

Pour cette thèse, j’ai travaillé avec l’Association des Pharmaciens du Canada (CPhA) qui utilise régulièrement la rétroaction des professionnels de la santé afin d’améliorer leurs publications. La CPhA désire avoir un processus approprié pour gérer la rétroaction des utilisateurs d’une manière efficace et efficiente. Ce projet de recherche veut répondre à la question globale suivante: Comment la gestion de la rétroaction peut être optimisée pour la CPhA?

Le problème d’optimisation de la gestion de la rétroaction des utilisateurs a été défini en trois sections: (1) les commentaires de rétroaction, (2) le processus de gestion de la rétroaction, et (3) les facteurs affectant le développement et l’implantation de la gestion optimale de la rétroaction des utilisateurs dans un milieu organisationnel.

Le cadre conceptuel est dérivé des sciences de l’information, des sciences de la gestion, et des études organisationnelles. Une approche participative de recherche-action a été adoptée pour conduire une étude de cas organisationnelle, tout en utilisant des méthodes qualitatives telles que l’entrevue, l’observation et l’analyse documentaire.
Les résultats de recherche fournissent des données empiriques révélant quatre types de valeurs reliées aux commentaires de rétroaction des pharmaciens, neuf enjeux critiques dans le processus de gestion de la rétroaction, et vingt-six facteurs affectant l’innovation dans la gestion de la rétroaction des utilisateurs. Les principales contributions de cette recherche sont les suivantes: il s’agit de la première étude empirique qui examine systématiquement l’utilité des commentaires de rétroaction dans un contexte organisationnel selon une perspective philosophique sur la valeur; deux cadres conceptuels ont été proposés et se sont avérés pertinents pour l’étude de l’utilisation de l’information et l’innovation relative dans un cadre organisationnel; et l’étude offrent plusieurs leçons apprises lors de l’examen détaillé des facteurs qui affectent les processus d’innovation associés à l’utilisation de l’information.
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CHAPTER 1. INTRODUCTION

Health care is a knowledge-intensive profession (Hersh, 2003), and medical knowledge is updated frequently and disseminated as research-based information which is increasingly used by health professionals for work and continuing education (Pluye, Grad, Dawes, & Bartlett, 2007). To facilitate access to medical knowledge, health information providers perform knowledge synthesis by bringing together disparate research findings and identifying common patterns on a topic, and disseminate the output by creating informational tools such as clinical guidelines, decision aids, educational modules, and policy briefs (Straus, Tetroe, & Graham, 2009b). Health professionals, who rely on those tools and resources, include physicians, pharmacists, nurses, and allied health professionals such as occupational therapists.

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 users’ perceptions of the former (user feedback). The flow of information between the two entities is illustrated in Figure 1, where arrows represent the flow of information.

1. Information providers synthesize medical knowledge and distribute 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.

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1 Allied Health professionals are those involved with the delivery of health or related services pertaining to the identification, evaluation and prevention of diseases and disorders; dietary and nutrition services; rehabilitation and health systems management, among others. Allied health professionals, to name a few, include dental hygienists, diagnostic medical sonographers, dietitians, medical technologists, occupational therapists, physical therapists, radiographers, respiratory therapists, and speech language pathologists (ASAHP, 2008).
This research is concerned with organizational processes for improving information resources by using feedback provided by information users, and this dissertation is intended for: (a) organizational managers planning to initiate technology-based process innovations, and (b) researchers interested in the organizational phenomenon that is characterized by these kinds of innovations related in particular to information use by organizations. While it is based on a case study about health information, I submit that lessons can be learned from this experience which might be transferable to other contexts.

1.1. Project Background
Professional organizations have an important role to play in ensuring that research-based information is included in educational activities and clinical guidelines (Haines & Jones, 1994). As a not-for-profit professional body, the Canadian Pharmacists Association (CPhA) assumes this role and is the primary stakeholder in this project. CPhA publishes e-Therapeutics+, a comprehensive and credible Canadian source of evidence-based treatment recommendations focusing on primary health care. E-Therapeutics+ chapters are authored and reviewed by experts of
the topic. CPhA editors, being practicing pharmacists, and experts of therapeutic domains, ensure the quality of published content by following a rigorous editorial process. On an on-going basis, they read recent literature on clinical research and continuously fine tune the information in e-Therapeutics+®; and the updates are applied to the online version on a bi-weekly basis.

The CPhA has been disseminating e-Therapeutics+® Highlights to members of the College of Family Physicians of Canada (CFPC) for continuing professional development (CPD). A Highlight refers to a few important sentences excerpted from an e-Therapeutics+® chapter, and is mass disseminated through email to more than 6,500 Canadian pharmacists and 17,000 physicians. The CPhA receives a large amount of feedback, especially from the physicians who are motivated by receiving continuing education credits from CFPC for assessing the Highlights. The feedback collection process is carried out in a collaborative research project between the CPhA and researchers at the Department of Family Medicine, McGill University. Feedback data are manually retrieved from a computer (FTP) server and examined for reported issues. Feedback data are then saved into spreadsheets, circulated via email, and read by the editorial staff who then decides what to do with the feedback.

The current process of feedback handling is ad hoc, and there is an issue of sustainability (i.e., processing a continuous inflow of feedback in the long run) due to the absence of a formalized process within the CPhA. For example, the editorial process was not set up to handle user feedback, and manual processing of the feedback is very time consuming; as a result, the Editor-in-Chief can hardly go over all comments received in one batch before the next batch arrives. Making good use of this large volume of
feedback is crucial for the CPhA to act as the information provider and the CFPC as the policy-maker in continuing medical education in Canada.

Pluye et al. (2009a) used a validated Information Assessment Method (IAM) to collect and analyze health professionals’ feedback on the use of e-Therapeutics+®. Their research showed that there is a two-way knowledge exchange between the health information provider, who disseminates evidence-based health information, and the health professionals who use that information. The latter also return in their feedback comments valuable insights about the content of health information. The purpose of their research was to quantitatively assess (a) the relevance of health information to clinical practice, (b) the cognitive impact of health information on clinicians, (c) the use of information for specific patients, and (d) subsequent patient health outcomes. The possibility of improving e-Therapeutics+® with qualitative feedback comments has been just suggested (Pluye, et al., 2009b).

\footnote{The substantive validity (theoretical rationale), construct validity, and content validity of the IAM questionnaire have been documented (Pluye, Grad, Granikov, Jagosh, & Leung, 2010; Pluye, Grad, Johnson-Lafleur, et al., 2010).}
1.2. Problem Statement and Purpose

While health information is increasingly accessed online, information users’ feedback is collected at the same time as the information is delivered (e.g., Grad, et al., 2011; Grad, Pluye, Meng, Segal, & Tamblyn, 2005). The IAM can capture users’ opinions or judgments on the content, format, features and presentation interfaces of the information product. Specifically, the CPhA sends e-Therapeutics+® Highlights via emails, and within the email message there is an accessible link to click and open a web form, by which users can provide feedback while they read the Highlights. That kind of feedback can be valuable for organizations to rethink their products and services (Zahra & George, 2002). For the CPhA specifically, health professionals’ feedback comments are valuable for optimizing e-Therapeutics+®. Despite a growing concern about adapting health information to better serve health professionals, the CPhA has yet to improve the process of feedback utilization. Thus, this study seeks to address the following problem:

The lack of formal processes for user feedback management prevents health information providers such as the CPhA from making systematic and efficient use of health professionals’ feedback comments.

This problem may leave valuable feedback unattended simply because the CPhA editors could not process it efficiently and regularly. Addressing this problem is paramount in improving critical information resources that health professionals rely on for continuing education and for delivering high-quality services.
1.3. Research Questions

An overarching question arises: How can user feedback management be optimized for the CPhA? To answer it, I conceptualized the problem in three parts: (a) the nature of feedback comments (e.g., content, and usefulness), (b) the way feedback comments are utilized, i.e., the management of feedback use, and (c) factors affecting the optimization of feedback management. Accordingly, there are three groups of research questions.

1.3.1. The User Feedback

RQ 1. What types of issues are reported in pharmacists’ feedback comments?

RQ 2. How might pharmacists’ feedback comments be useful to the CPhA?

Before expending effort on optimizing the existing feedback management, it is necessary to gain an in-depth understanding about the feedback comments to be dealt with, and to establish the usefulness of feedback comments in order to justify undertaking this initiative. This research question is focused on the comments made by pharmacists, as they represent a primary audience of the CPhA. A practical reason is that a set of pharmacists’ feedback data concerning most e-Therapeutics® topics had just been collected over the previous year, and is readily available.

RQ 1 is aimed at a typology of feedback comments, and RQ 2 will lead to identifying areas where the CPhA may benefit from these comments.

1.3.2. The Management of Feedback Use

RQ 3. What issues does the CPhA encounter in making use of health professionals’ feedback comments?
RQ 4. What process can be designed for the CPhA to facilitate the use of health professionals’ feedback comments?

Regarding RQs 3 and 4, a similar process is applied in dealing with feedback from all types of health professionals who read e-Therapeutics+® Highlights, although RQs 1 and 2 are focused on what is reported in pharmacists’ comments.

In addition to the handling of individual feedback comments, user feedback management emphasizes making full use of the information in feedback as it flows throughout the organization.

To concretely meet the need of the CPhA in user feedback management, RQ 3 is aimed at identifying issues to be considered in designing a feedback management process for the CPhA. This will feed into RQ 4, and subsequently lead to the development of an appropriate process.

1.3.3. Factors Affecting the Improvement of Feedback Management

RQ 5. What are the factors involved in the development of a feedback management process?

RQ 6. What are the factors that may facilitate or inhibit the implementation of a feedback management process?

Various factors within the CPhA define the contextual environment where development and implementation of a feedback management process take place. Two separate research questions are posed here because the span of the present project only goes as far as the development stage, hence supporting RQ 5. Regarding subsequent implementation, observation is replaced by a probing approach to explore RQ 6.
These six questions define a research project in the domain of innovation through technology-based organizational process design which comprises two inseparable paradigms\(^3\): the research questions aiming for a solution correspond to the design paradigm (i.e., RQs 1-4) and the research questions related to the organization and the people within it correspond to the behavioral paradigm (i.e., RQs 5-6) (Hevner, March, Park, & Ram, 2004; Lee, 2000). The design paradigm is concerned with artifacts (e.g., technological solutions and solution development methods) for meeting particular user needs, while the behavioral paradigm seeks to explain phenomena that occur with respect to the artifact’s use. Attending to both paradigms contributes to the success of a design project for organizational process innovation (Hevner, et al., 2004; S. T. March & Smith, 1995).

1.4. Rationale and Significance

This research adopts the standpoint of the health information provider and is concerned with a specific type of information: health professionals’ feedback comments about emailed therapeutic recommendations. Research on these fronts, as suggested in the literature review section, should fill in gaps identified in the literature on information studies.

The present study is focused on a problem of information use at the organizational level, that is, the management of end-users’ feedback linked to the mission of the CPhA (Saracevic & Kantor, 1997; Tang, Bouthillier, Pluye, Grad, & Repchinsky, 2011a). It is appropriate to address this problem with an interdisciplinary approach drawing on (a) design science, particularly technology-based organizational process design, and (b) organizational behavior theories (Hevner, et al., 2004).

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\(^3\) The word “paradigm” refers to “a world view underlying the theories and methodology of a particular scientific subject” (Paradigm, n.d.). In this dissertation, this word is modified, and in the form of specific terms as “design paradigm” and “behavioral paradigm” they refer to two scientific subjects generally acknowledged in information studies.
The significance of this research lies in:

1. The knowledge generated about (a) organizational information use, (b) a design approach for improving organizational information use, and (c) lessons learned on how to successfully develop and implement organizational processes of information use.

2. A positive impact on the current practice of the CPhA through an organizational case study—improved use of health professionals’ feedback comments to optimize the content of e-Therapeutics+®.
1.5. Organization of the Dissertation
This dissertation consists of six chapters followed by a bibliography of referenced works and appendices.

Chapter 1 presents the problem, which is conceptualized into the six research questions mentioned above. The subsequent chapters of this dissertation are led and structured by these research questions.

Chapter 2 presents a three-part review of the literature, with each part identifying a gap in relation to each group of research questions. These gaps refine the foci of this research and position it in the literature.

Chapter 3 draws on literature to conceptually devise approaches and frameworks in order to answer the research questions. The approaches and frameworks guided the design and implementation of methodology in the subsequent chapters.

Chapter 4 presents the worldview that unifies the methodological approach, the research design (i.e., an organizational case study), data collection and analysis methods, and ethical considerations.

Chapter 5 presents the results corresponding to each of the research questions, by following the conceptual frameworks (Chapter 3) and referring back to the gaps identified in the literature review (Chapter 2).

Chapter 6 summarizes the contributions to knowledge and practice, and points out research directions stemming from this study.
1.6. Key Terms

The organization – The Canadian Pharmacists Organization.

The information product/resource – e-Therapeutics+®, a full-text online database of clinical treatment recommendations published by the CPhA.

The user/customer – Health professionals who consult e-Therapeutics+®, including physicians, pharmacists, and nurse practitioners.

User feedback – The comments provided by health professionals about the information product (i.e., e-Therapeutics+®).

Clinical editors – Employees of the CPhA, who (a) are responsible for the content of e-Therapeutics+®, (b) use health professionals’ feedback comments to improve e-Therapeutics+® content (i.e., the feedback user), and (c) represent the primary stakeholder.

Feedback management – The organizational process where user feedback is collected, interpreted by clinical editors, investigated to verify the reported issues, and finally applied to optimize e-Therapeutics+® content or analyzed to inform decision-making at the CPhA.

Feedback system/technological solution – An information system (prototype) developed to support the process of feedback management.

The innovation – An initiative taken by the CPhA to improve feedback management, which involves the development and implementation of an organizational process enabled by information technology.
CHAPTER 2. LITERATURE REVIEW

I reviewed the literature to gain background knowledge and to identify gaps in existing knowledge in relation to the research questions. Background knowledge helps to refine research foci, and the identified gaps help to position this research in the literature. Three gaps were identified with respect to the research questions:

1. The usefulness of health professionals’ feedback comments to the health information provider has not been studied.
2. No existing processes can be readily adopted by the CPhA for improving user feedback management.
3. Research is limited on the factors that affect the development and implementation of user feedback management processes in organizations.

This chapter provides details on the review, concerning (a) review questions, (b) the review process, and (c) synthesized findings that pinpoint gaps in relation to the research questions.

2.1. Review Questions

The research questions led to the following review questions:

Regarding RQs 1-2: What has been reported on the format, content and usefulness of user feedback that bears similarities to the feedback received by the CPhA?

Regarding RQs 3-4: What challenges are presented by health professionals’ feedback comments, and what approaches may be adopted to respond to those challenges?
Regarding RQs 5-6: What has been reported on factors related to improving an organization’s user feedback management?

The review questions are different from research questions in that they are formulated differently due to the “data” required to answer them. The review questions are answered with literature, while research questions in the present study rely on empirical evidence.

2.2. Review Strategy and Processes

I went through an “exploratory reading” stage which enabled me to make use of more focused and structured review strategies at a later stage of the literature review. I started with frequently cited articles on “user feedback” and read across multiple disciplines to gain background knowledge, then became gradually focused on specific review questions.

A first round of literature reviewing was performed between April 2008 and March 2009 when I worked on my research proposal, and an update was made in February 2011 to prepare for this dissertation.

General Search and Review Strategy

- Search was performed in the following sources that are representative of 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)
These sources jointly provide a multidisciplinary coverage of hundreds of academic journals. Some of these sources offer confederated search interfaces that enable concomitant search in multiple databases (e.g., MEDLINE through Web of Knowledge). All sources support Boolean operators (i.e., “AND”, “OR”, “NOT”) or their variations (e.g., “–” for “NOT” in Google Scholar). Various search strings were tried and used in order to cope with the particularities of each source (e.g., some sources provide automatic truncation and ranking mechanisms may vary from citation counts to relevance ranking based on the vector space model).

Only scholarly publications were considered due to the academic nature of this doctoral study. Unless specified otherwise, the date range searched is 1990 onwards for empirical studies, and 1980 onwards for conceptual papers (e.g., reviews). An EndNote® database was used to efficiently organize references (e.g., duplicates removal).

- To gain background knowledge, I identified initial readings through browsing article titles, abstracts, and cited times. To identify empirical studies, the selection process was iterative and relied on background knowledge: first, I refined my understanding of concepts in order to become clear about inclusion criteria (for relevance judgment), then multiple iterations of searches were conducted. Relevant studies were also suggested by my co-supervisors and knowledgeable study participants, e.g., CPhA editors.
• I was keen for reviews and umbrella reviews (i.e., reviews of reviews). The review sections in high-relevance and high-impact studies were also given much attention.

• Citation tracking, both backward and forward, was performed with relevant articles. Backward citation tracking was conducted through hand search in the reference lists of selected articles. Forward citation tracking was made in citation databases, and when the “seed” article was listed in more than one source (e.g., Scopus and Web of Science), tracking was done in each source.

• The literature search was based on my expertise (in information retrieval) and heuristic (as opposed to being driven by a protocol specified at the outset of the study), especially as I was improving my background knowledge at the same time. Nevertheless, the search was comprehensive. The comprehensiveness is supported by two major factors: the use of critical techniques (e.g., multiple sources, citation tracking, and the incorporation of other people’s knowledge) that guarantee coverage (Greenhalgh & Peacock, 2005), and my expertise on information retrieval (professional librarian by training, and instructor of a graduate course on information retrieval).

• The synthesis of conceptual knowledge mainly followed a narrative approach, which emphasizes the identification of critical relationships between review findings and the actual situation of the CPhA. Structured analyses (tabulations) were made when side-by-side comparison of selected documents was needed (e.g., comparing reviews and/or empirical studies that were selected for specific purposes).
Review Processes

The three review questions can be thought of, loosely, as three smaller review projects, each with its specific focus and process. Nevertheless, they were not conceived separately (and were conducted in parallel) as I deemed it one inextricable body of knowledge to be drawn on from different angles.

First review question: Feedback format, content, and usefulness

In contrast to specific review questions such as “What works best?” the review questions “What has been reported?” has a broad and general nature. I tried with alternative search terms (e.g., “user feedback”, “customer feedback”, “feedback from the user*”, “feedback” near “end?user?”, and etc.) and used a divide-and-conquer strategy to cover one or several disciplines at a time, depending on how manageable was the number of hits returned from sources searched.

During this stage, I printed potentially useful publications and organized them in a pile. Documents were added or taken out as conceptualization of the research topic improved, and the organization of the pile and (color) tagging of each document was constantly adjusted. Once I had improved my understanding of key concepts in the study, the pile became a useful resource pool as I could go back to it and quickly pull out relevant publications. CPhA study participants also pointed out some references related to feedback from health professionals.

I answered the first review question by (a) gaining general knowledge on the topic (i.e., user feedback) from multi-disciplinary literatures (e.g., information studies and management science), (b) refining concepts for identifying relevant publications, and (c) eventually pinpointing a
knowledge gap in relation to RQs 1 and 2. Review findings are reported below in the form of a narrative synthesis (i.e., sense-making specifically in relation to the CPhA situation) (Grant & Booth, 2009).

Second review question: Feedback utilization (challenges and approaches)
This second part of the review for clarification of challenges involved in feedback handling was carried out at the same time as the above review. It also followed the “expertise-based” approach. This emphasized the ability to recognize issues and, more importantly, to discern the most relevant issues. Such ability (i.e., expertise) was a prerequisite to the subsequent search for solutions through structured synthesis of the literature. As a result, I developed an understanding of the key issue (i.e., challenge) that is meaningful with respect to the situation of the CPhA and to the feedback it receives.

Finding a solution for meeting CPhA’s need for feedback management entails the question “What solutions are available?” Such a question can be answered by reviews providing knowledge support (Pope, Mays, & Popay, 2007). Three elements constituted a structured search and review process:

1. For insights from others’ experience, a systematized review⁴ (Grant & Booth, 2009) arrived at eight empirical studies that reported on the management of passively collected textual feedback (Appendix A);

2. For solutions designed to confront the challenge of managing passive feedback, citation tracking was done with the paper that provided definition for “passive feedback”;

⁴ With an attempt of comprehensive search on scholarly publications, aimed at synthesizing “best-available” evidence by incorporating multiple studies, applied critical views in synthesis, but the review was conducted by only one person while he was still under research training (including literature review).
3. For guidelines about designing feedback management systems, I performed a rapid critical review\(^5\) (Grant & Booth, 2009) of landmark articles in the design-science literature, where design guidelines are offered for technological systems in relation to various types of organizational needs (Hevner, et al., 2004; Markus, Majchrzak, & Gasser, 2002).

In this review work, synthesis of review findings was made in both narrative and tabular forms (see examples in Section 2.3 and Appendix A).

**Third review question: Contextual factors and methods to study them**

This third part of the review started with a narrative synthesis of relevant literature on customer knowledge management. A key item (i.e., Paquette, 2008) suggested by my co-supervisor was discussed in detail, and the discussion was made in particular relation to CPhA’s situation. Then, I applied the skills accrued through the prior reviews (e.g., on business process management) to formulate a more structured process for this review. Specifically, a search was performed in two relevant research domains (i.e., enterprise resource planning and customer relationship management) to identify reviews that were conducted for the purpose of identifying and summarizing factors related to technology-based organizational process interventions. Five review articles were identified.

Using the five review articles, citation tracking (forward and backward) was performed to identify 14 empirical studies on factors. Together, the reviews and the empirical studies (see Tables 2-1/2) allowed me to critically assess (a) the availability of research instruments that can be readily used or easily adopted to study factors related to a feedback management system, and (b) the comprehensiveness of reported factors that may serve as a starting point for the present study.

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\(^5\) Within a short time, applied critical analysis to compare major research streams on a focused subject for the purpose of confirming an uncertainty (as a starting point of research) rather than producing definitive answers; being explicit about methods used (e.g., relied on high impact scholarly literatures).
2.3. Review Findings

The following domains in the literature are relevant to user feedback management:

1. Customer feedback (complaints) management
2. Customer knowledge management
3. Relational marketing

They jointly provided the background for identifying knowledge gaps per the research questions, i.e., about (a) health professionals’ feedback, (b) approaches to feedback management for the CPhA, and (c) factors related to successfully improving feedback management.

2.3.1. Health Professionals’ Feedback about Health Information

With respect to the first review question “What has been reported on the format, content and usefulness of user feedback that bears similarities to the feedback received by the CPhA?” the feedback comments received by the CPhA represent the knowledge of health professionals. In addition to the format and content of user feedback, the literature was surveyed in particular regard to the usefulness of such feedback to health information providers. Review findings are connected to RQs 1 and 2.

Format of user feedback

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 them (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 is how the CPhA collects feedback comments from health professionals. This research is concerned with the feedback comments collected with a “text box” on the IAM questionnaire.

**Content of user feedback**

Users may provide both compliments and complaints in their feedback (Sampson, 1996). While both types of feedback are collected, the IAM permits focusing on particular negative feedback that may lead to revision of the information product (Pluye, et al., 2009a), which is of particular interest to the CPhA.

Negative feedback is valuable to provide opportunities for service recovery and quality improvement (Kirpalani, 2004). Complainers are just expressing problems that other users have accepted or cannot articulate, and their messages have the potential to supply valuable information (Garver, 2001; Sanes, 1993). In their study, Pluye et al. (2009a) were able to sort through the textual feedback data and develop the following criteria for identifying feedback comments that have constructive value:

- A comment that corresponds in meaning to a rating of “Disagreement”, “Potential harm”, “Dissatisfaction” or “Problem with this information” (these are the choices given on the feedback collection form);
- A comment about missing information or that more information would be better;
- A comment that includes a nuance or reserve (e.g., “I agree, but…”);
- A comment revealing the reader was not ‘convinced’ by the information;
- A comment saying the information was not found;
- A comment stating that, although correct, the highlight is ‘old knowledge’ or the equivalent (e.g., no new learning);
- A negative comment on the questionnaire or on the rating process.
Andreason (1988) noted that negative comments about services are different from those about goods. Then, what is special about health professionals’ constructive comments on 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 definition, the feedback comments received by the CPhA are attached to health professionals and are generated from intense, cognitive mind 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 below, and an example is provided to illustrate its specific features.

The literature on customer knowledge management has summarized three types of customer knowledge that are important to the organization (i.e., the provider of products or services), namely 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). Firstly, knowledge-about-the-customer is a most popular conception held by 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
attributes of the customer is emphasized by the organization for managing customer relationships (Gebert, et al., 2003; Rowley, 2002).

Secondly, 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.

Thirdly, 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 and absorption across the organizational boundary are 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 rating items (e.g., whether or not the information was sought for educational needs) lead primarily to knowledge about the professionals. While Pluye et al. (2009a) have focused on the about-type of knowledge in their study, this research is mainly concerned with the from-type by treating feedback comments as an external source of knowledge for the CPhA to optimize health information resources. The following example illustrates the knowledge sought by the CPhA in health professionals’ comments.

A statement 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 statement: “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 health care knowledge that professionals use in practice. It is the same knowledge that the CPhA distributes through its health information resource, and the very same knowledge that these information users apply to generate constructive comments about the information resource.

6 Acronyms are drug names.
This example also demonstrates that health professionals (e.g., a pharmacist who made the above comment) tend to convey substantial knowledge in their feedback. In many ways, these expert users are just as knowledgeable as the CPhA editors about the topic. This is in sharp contrast to general consumers (e.g., V. J. Wirtz, Taxis, & Dreser, 2009): professional users of health information generate messages that are knowledge laden: rather than simple statements such as “I like/dislike it”, they are very capable of expressing insights derived from complex cognitive work on the basis of their medical expertise.

It is possible to locate two types of customer knowledge in the information flowchart shown at the outset, with knowledge-from-the-customer flowing concomitantly to user feedback from the information user to the provider.

Figure 2. Customer Knowledge Identified in the Flow of Information between Health Information Providers and Users
The purpose of using user feedback

Organizations consult user feedback for various purposes, such as measuring the performance of a company, understanding users’ feedback behavior, analyzing user needs, developing new (physical) 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, & Broetmann, 1996; Ofir & Simonson, 2001; Sampson, 1996; Stauss & Seidel, 2010).

Using inputs from the user, typical assessments of information retrieval technology has 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., 2009a; Vakkari, 2003). Nevertheless, health professionals’ feedback comments may help the information provider to optimize the content of an information resource (Pluye, et al., 2009b), which represents a focus separate from the capacity of retrieval systems. As an example, the CPhA, in response to the comment (example) above, re-examined the research literature and removed “COX-2 inhibitors” from the e-Therapeutics+® statement. This features a unique opportunity to benefit from health professionals’ feedback, aiming at an outcome different than, for example, improving physical product or service design, refinement of internal processes, and development of strategic initiatives for the organization.

Given the above background knowledge, I was able to further focus the first review question (about the usefulness of user feedback) on literature specifically related to:
• Textual feedback generated by knowledgeable users, particularly from health professionals, and/or
• Information providers (i.e., producers of information resources), with particular interest in optimizing health information resources.

Concerning feedback providers, 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 study mainly relied on quantitative indicators (i.e., ratings) rather than textual data. Concerning information providers and resources, only one study (i.e., Hudson, 2008) reported on the use of textual feedback by a producer of information resources (i.e., EBSCO). Information providers are different from providers of (library) information services (Agosti, Crivellari, Di Nunzio, & Gabrielli, 2011; Nichols, 2006) because the latter is not involved in content production. No published reports were found on health information providers’ use of textual user feedback data.

To summarize, health professionals’ feedback represents knowledge that can be useful to health information providers like the CPhA. The feedback is unique in its textual format and its potential usefulness can be seen in optimizing health information resources. This review identified a knowledge gap with regard to RQs 1 and 2: The usefulness of health professionals’ feedback comments for the health information provider has not been studied.
2.3.2. The Challenge in User Feedback Management

With regard to the second review question “What challenges are presented by health professionals’ feedback comments in terms of effective utilization, and what approaches may be adopted to respond to those challenges?”, the high volume of knowledge-laden comments makes it impossible for the CPhA to interactively respond to each feedback provider, suggesting a challenge of feedback use lying within the organization. In this section, the literature is reviewed to improve understanding of this challenge, and then to search for guidance on creating a solution for the CPhA. Review findings in this section are relevant to RQs 3 and 4.

Passively collected user feedback

The way that feedback is collected in the e-Therapeutics® Highlight program is not interactive, meaning when respondents fill out and submit the web-based feedback form, the recipient (i.e., CPhA, the information provider) is not actively soliciting or concomitantly communicating with the respondents (Pluye, et al., 2009a). Although additional resources (e.g., an information specialist or marketing person) can be allocated to overcome that limitation, the feasibility in using additional staff for implementing interactive feedback solicitation is questionable.

In the literature on customer knowledge management and relational marketing, the predominant theme is increasing the organization’s absorptive capacity in acquiring, assimilating, transforming, and exploiting knowledge from the external customer (e.g., Zahra & George, 2002). However, managing knowledge from the customer has an emphasis on active interaction or “knowledge co-creation” with external users across the organizational boundary (Gibbert, Leibold, & Probst, 2002; Sawhney &
Prandelli, 2000b), which assumes that the same idea of knowledge sharing within individuals and groups in an organization also applies to external customers as a source of knowledge (Paquette, 2006). Such an assumption often holds true, and interaction with customers might be necessary, especially in the case of institutional customers. Nevertheless, there are three constraints in the CPhA setting that prevent active interaction with health information users in a substantial way.

First, maintaining a two-way dialogue with individual customers has been “proved to be labor intensive and thus had to be limited to a small subset of customers” (Goodhue, Wixom, & Watson, 2002, p. 80). When there are a large number of feedback providers (e.g., 17,000 members of the College of Family Physicians of Canada), active engagement with individual respondents from an enormous, diverse user base is time-consuming and requires expertise, which might distract the information provider from concentrating on the core tasks of knowledge synthesis. On the respondent side, health professionals might simultaneously consult multiple information sources, and it would not be feasible for busy professionals to engage in active interactions with all sorts of information providers. Considering these practical constraints, tackling customer knowledge by actively engaging with respondents is not convenient in respect to health information.

Second, the relationship between health professionals and the health information provider is different from that between, for example, the automobile manufacturer and the engine maker (e.g., Paquette, 2006; Toffler, 1980 in Gibbert, Leibold, & Probst, 2004). For the latter, a close collaboration is inherent in their common business, because they must work together (e.g., discussing the engine) in order to build cars, for
instance. In the context of this study, health professionals primarily work with patients to deliver health care, while the information provider primarily works on research-based health care literature which is synthesized and disseminated as information tools for a variety of user groups (i.e., clinical researchers, clinicians, policy-makers, and the public). The two parties are not engaged in a working relationship as tight as having to depend on direct interaction.

Third, CPhA’s feedback data are passively collected, and the flow of information between the information provider and the user is one-way, just as the flow of information shown in Figure 1. Passive feedback has been defined by Sampson (1996) as initiated by the respondent and not prompted by direct motivation, which means the feedback collector only provides an opportunity to respond and direct interaction with the respondent does not happen in the course of feedback collection. Passive feedback has its advantages of being less costly to collect than actively solicited feedback (e.g., through interviews or focus groups) and is suited to implementation on a continuous basis. The spontaneous nature of passive feedback (i.e., self-initiated) makes it less susceptible to memory bias than methods relying on respondents’ recollection. Although adequate understanding about textual feedback is critical to properly taking subsequent actions, it is difficult to pursue explanation if any question arises from reading passively collected feedback data. If the identity of the respondent is not tracked, it would be impossible to follow up with the same respondent. Self-initiation also makes passive feedback collection sensitive to extreme opinion bias—a condition that the received feedback is not representative of the customer population. One CPhA participant commented as such:
“It’s hard. There is no way to vet who’s making this comment and how much knowledge they might or might not have in that area, and if there’s any evidence behind what they say, even though it is always good for somebody to point out something that will cause you to do more research … or reassess your content.”

Therefore, to fully comprehend and adequately react to what respondents try to tell the CPhA through feedback comments is likely a complicated “in-house” job. The critical challenge due to passive user feedback has to be dealt with primarily by an internal solution, that is, a solution that does not involve external users (i.e., health professionals).

In search of a solution

A distinction has been made between feedback handling and feedback management. Feedback handling is a term mainly used to describe case-by-case response to individual comments, which aims to ensure that each case is resolved adequately (Gilly, 1987; Gilly, Stevenson, & Yale, 1991). Feedback management requires an organization to make full use of the information available in feedback: in addition to handling individual feedback comments, feedback management involves departments that might benefit from the feedback and emphasizes the management of the flow of information throughout the organization (Fornell & Westbrook, 1979; Gilly, et al., 1991; Landon, 1979). The present project falls under the category of feedback management.

Two elements appear to be essential to feedback management: process and technology. The process orientation could be entirely based on management interventions (e.g., Fundin & Elg, 2010; Gilly, et al., 1991), and the technology approach would rely on the capability of information
systems (e.g., Ramler, Wolfmaier, & Weippl, 2004). A mixed approach is characterized by the use of technology to enable process improvement (e.g., Davenport, 1993; Maguire, Koh, & Huang, 2007; Merisalo-Rantanen, Rossi, Hallikainen, & Nurminäki, 2009). The present study recognizes both elements in search of a solution for the CPhA. That is, I consider both the discussion on human and structural factors as well as substantive guidelines for developing technological solutions.

Given limited research on the use of health professionals’ feedback by information providers (Literature Review Section 3.2.1.), it is not surprising that the literature does not offer a fully developed technological solution that can be readily adopted by the CPhA. An adequate solution should help, particularly, to address the challenge that lies with passively collected feedback comments. This knowledge gap has been confirmed as I attempted, with two strategies, to search for guidance on designing solutions for organizational use of passive user feedback.

The first attempt was made by searching for empirical studies reporting on similar situations of user feedback management, i.e., textual feedback that has constructive value and is passively collected and used for product or service improvement. Insights for solution building were sought from others’ experience, and the focus was placed on the acquisition of knowledge from the customer, rather than on feedback collection. Only eight studies were identified, because passively collected textual feedback has been a less attended research theme (Merisalo-Rantanen, et al., 2009). Appendix A contains the complete review of these eight studies, and key information is presented in Table 1.
<table>
<thead>
<tr>
<th>Author (Year) Research Design</th>
<th>Stated Objectives (Activity Domains)</th>
<th>Feedback data and channeling</th>
<th>Stakeholder Perceptions (Feedback and its Use)</th>
<th>Key Points from Findings and Discussions (Relevant to the Present Study)</th>
</tr>
</thead>
</table>
| Ajayi and Smart (2008) One organizational case study using multiple sources of evidence (e.g., questionnaires, interviews, observation) | To prevent failures from recurring in manufactured products (heating, ventilation, air conditioning equipment) | • Field failure data, generated by service engineers, sent to design department  
• Options only available in the company database that describe the failure and what was done to resolve it  
• ‘Free text’ records of events, but sometimes data are omitted or missing for various reasons | • Feedback is mainly found in field failure records  
• A learning process to drive innovation in product development  
• The feedback process from field service to the design function needs to be well defined | Key findings:  
• Need to capture contextual information about product failures ‘in situ’  
• Need an appropriate classification system  
• Need to formalize the feedback process with standardized methodology and procedure  
• Need to develop understanding about the root cause, for that purpose, need to provide feedback to relevant functional departments |
| Fundin and Bergman (2003) Multiple qualitative organizational case studies | To bring customers’ problems to the new product development process (NPDP) in large industrial manufacturers | • Complaints received by employees  
• Suggestions for improvements made by employees | Feedback provides inputs about customer satisfaction that may lead to sensible actions in generating new products | Discussion about the feedback processes:  
No formal, global process structure in place to link external feedback and internal NPDP, or to share knowledge within different parts of an organization |
| Hudson (2008) One qualitative organizational case study | To design new information products, to enhance products | • From customer directly, or via sales reps, technical support and service reps  
• Phone calls and emails  
• The company’s regional offices based on what they heard in the field  
• Company’s customer groups | Feedback management serves as the communication channel between customers and developers | In conclusion:  
Feedback management helps the company to lay the foundation for matching on-going development to customer needs |
Table 1 (continued)

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| Maguire et al. (2007) Multiple qualitative organizational case studies | To facilitate customer relationship management, in express mail services, electronics & electrical engineering, financial services, business communication services | • Multiple listening tools  
• Customer complaints  
• Employee generated feedback via an intranet system | Feedback provides information about customers’ needs, preferences and their perceptions of organizational performance  
Feedback management is part of the quality effort devoted to market research | Implications based on discussion of findings:  
• Qualitative tools can add deep understanding and gain insights into customers  
• There is a need to listen continuously and foster participation. It will pay dividends to enhance data systems for sufficient information and intelligence communication.  
• It is critical for employees to have access to the data that is under their direct control  
• Stressed the need to explore how to let employees access and use data to guide their own decision making |
| Merisalo-Rantanen et al. (2009) One interpretive organizational case study | To get new ideas for service improvement, in a financial services company (banking, assets management, insurance) | • Electronic feedback received via Internet and email  
• Manual entry for phone calls, letters, and faxes through customer contact centers, quality centers, and branch offices  
• Centralized feedback management at the operational business unit (country-level) | Users with various expertise backgrounds may give extremely profound feedback, concerning service quality in branch offices and Contact Centers as well as the web pages | Key finding:  
• There are two basic processes: feedback collection and taking initiatives.  
• A variety of feedback channels are needed  
• There is a need for a filtering mechanism  
• Must be pro-activity in searching for new ideas  
• Centralized information systems are needed |

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<tbody>
<tr>
<td>Opoku (2006) Multiple qualitative organizational case studies</td>
<td>(1) To facilitate customer support, and improve service quality (2) To inform management decision making (3) To seek customer attention In computer services and selling of software and accessories</td>
<td>• Internet-based tools, particularly e-mail, but also hypertext contact-us link, online customer discussion forum and e-meeting with clients • Marketing integrated computer system to collect emails</td>
<td>• Feedback is a source of direct information from customers about: (1) what to improve, (2) the type of questions and complaints, and (3) insights into problems • Feedback management provides service indicators, acts as a reporting system, an IT system and a learning system, and is a core to operations</td>
<td>Key criteria used by the companies to assess feedback tools were found to include: • Cost-effectiveness that influences the use of IT platforms • Action-ability, i.e., information that can lead to continuous improvement • The background and nature of business Off-line tools and other feedback methods (e.g. telephone) were found to supplement internet tools for bias</td>
</tr>
<tr>
<td>Swami (2006) One quantitative case study of feedback about a product embed in a qualitative organizational case study</td>
<td>(1) To improve product quality and customer satisfaction (2) To ensure conformity to customer and regulatory requirements (3) To measure quality (product performance) In a manufacturer of aeronautical vehicles</td>
<td>• Directly from customer, and from internal service and quality records • Mixed data types – both structured questionnaire per quality system procedure and qualitative data (comments, interviews, phone calls, first-line staff…)</td>
<td>Feedback provides the organization with sources of information on product performance, indicates where improvements are possible, and is a source of enhancement ideas.</td>
<td>Key findings can be summarized as: • Actions involved investigation, corrective and preventive measures • Feedback is essential for continual improvement • Proper analyses of feedback are essential to quality improvement</td>
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</table>
| Whelton et al. (2007)       | To monitor water quality and delivery (e.g., pressure and uninterrupted supply) of drinking water utilities | - Descriptive information  
- Phone calls, emails and online forms, letters via mail and in person  
- Via call centers or direct to utility departments or forwarded by external agencies, e.g., health, fire and police depts. | - Customers are considered as onsite monitors located throughout the water delivery system  
- To some utilities, user feedback is an early indication of problems (about quality, operations and infrastructure access)  
- A feedback surveillance system is a utility monitoring tool | Key findings:  
- The lack of uniform coding (of feedback data) and terminology would make it difficult to analyze and manage feedback data or to integrate them into a utility-wide monitoring system  
- Descriptive feedback information is helpful from a troubleshooting perspective but cumbersome from a data-coding and analysis perspective  
- Links to other information systems (e.g., service request system) can improve analysis of feedback  
- Standardized terminology (consistent descriptors) would facilitate sharing data with other utilities and agencies  

Suggestions in discussion:  
- The number of codes to apply to feedback data must be limited, consistent and easy to manage  
- Customer reports should be standardized  
- A standard utility-wide policy should specify systematic procedures for logging calls and investigating, resolving, and closing out each type of customer feedback  
- Employees should be trained according to the policy for handling customer feedback  
- A historical record of customer feedback data is needed, and data should be stored in an easily analyzable form for an indefinite period of time in electronic media  
- Formal guidelines are needed to designate which dept. is responsible for reviewing different aspects of feedback data |
In general, empirical research on user feedback management is driven by fragmented best-practices emphasizing mainly the paths that feedback goes through with individuals and departments where stimuli for new ideas may be picked up or reported issues might get resolved. For example, certain ways of classifying feedback data were found to facilitate sharing for identifying the causes of reported problems, and feedback systems have been primarily designed to preserve feedback data as historical records (Ajayi & Smart, 2008; Fundin & Bergman, 2003; Hudson, 2008; Lakoff & Johnson, 1999; Merisalo-Rantanen, et al., 2009; Opoku, 2006; Swami, 2006; Whelton, Andrea, Daniel, & Roberson, 2007).

The issue of how input from external users is assimilated within the organization has not been the focus of research. Sporadically, mention has been made of feedback systems that were meant to support continuous learning from user inputs, but the target of learning was reduced to factual information in complaints that could directly be considered in decision making (e.g., Opoku, 2006; J. Wirtz & Tomlin, 2000) rather than information requiring deep processing with research-based knowledge.

At the same time, the discussion around “knowledge” and its use tended to be unclear. For example, when knowledge for innovation was related to opportunities for improving future product and service designs, details were lacking as to how such opportunities can be seized and actually realized (e.g., Ajayi & Smart, 2008; Merisalo-Rantanen, et al., 2009). Organizations reporting on feedback management often adopted a material view that is narrowly centered on quantifiable performance results and/or product deliverables. In short, this review of empirical studies (Appendix A) revealed a lack of detailed descriptions on how passively collected feedback comments have been practically managed.
from a knowledge-oriented angle—the elicitation and use of customers’ knowledge has been understudied.

The second strategy involved looking for frameworks or guidelines developed for the design of (passive) user feedback management systems. Citation tracking was performed with Sampson’s (1996) article that proposed the definition of “passively solicited customer feedback”, as well as a search for subsequent publications by the same author. Only one article was identified as having provided a framework for designing customer feedback management systems. However, the framework in this second article (Sampson, 1999) merely listed general aspects to be considered in designing organizational feedback systems (e.g., goals and objectives, functional departments involved, timing and types of feedback solicitation, and channeling of feedback within the organization). Although the difference between active and passive feedback was acknowledged, no issues were raised in regard to treating passive feedback, nor were action-oriented recommendations made for designing systems to manage passive feedback. In other words, this general framework does not offer specific guidelines for creating approaches to utilizing passive feedback after it has been received by the organization.

The design-science literature is another area where design guidelines are offered for various classes of systems, such as transaction processing systems, decision support systems, executive information systems, and emergent knowledge systems (Hevner, et al., 2004; Markus, Majchrzak, & Gasser, 2002). A user feedback management system does not appear to fit well, however, with four regular classes of systems for the reasons below:
• It cannot be structured as rigidly as data-oriented transaction systems (Gray & Reuter, 1993), mainly due to the complexity in dealing with ever evolving medical knowledge;

• Its purpose is not geared towards the effectiveness of an organization’s decision-making processes, as decision support systems are (Keen & Scott Morton, 1978);

• Its users are not executives using the information for strategic planning, as are those of executive information systems (Walls, Widmeyer, & El Sawy, 1992; Hugh J. Watson, Houdeshel, & Rainer, 1997; H. J. Watson, Rainer Jr, & Koh, 1991); and

• It is not so amorphous as an emergent knowledge system, where potential users and work contexts are unpredictable, and therefore no structure or sequence can be determined (Markus, et al., 2002).

In summary, passive feedback does not lend itself to being utilized by means of interacting with the feedback provider, and effective feedback management would involve (a) a process tailored to handle knowledge-from-the-customer and (b) a technological solution that supports process implementation. These requirements pinpointed a second gap: No existing processes or design guidelines can be readily employed by the CPhA for designing a system to meet its challenge in user feedback management.

Because routine design or system building cannot address the problem faced by the CPhA, design research needs to be conducted. According to Hevner et al. (2004), the difference between routine design and design research is such that “routine design is the application of existing knowledge to organizational problems, such as constructing a financial or marketing information system using best practice artifacts (constructs, models, methods, and instantiations) existing in the knowledge base [i.e.,
the literature]. On the other hand, design-science research addresses important unsolved problems in unique or innovative ways or solved problems in more effective or efficient ways.” (p. 81).

2.3.3. Contextual Factors That Impact Technological Innovations

With respect to the third review question “What has been reported on factors related to improving an organization’s user feedback management?”, while innovative solutions can be worked out for specific problems in unique contexts (i.e., RQs 2-3), their success requires attention not only to technology but also to the people and the organization they work in (Hevner, et al., 2004; Walls, et al., 1992). This context represents what RQS 5 and 6 intend to address.

Literature on Customer Knowledge Management

The literature on customer knowledge management rests upon the cornerstone of knowledge management, an area with much emphasis on the organization. For example, Jashapara (2004) incorporated into an integrative framework of knowledge management various factors such as an organization’s resources, strategy, culture, and technologies. When relational marketing is linked to customer knowledge management, business processes at the operational, strategic and system levels become part of the research consideration as well (Bateson, 1972; Bueren, Schierholz, Kolbe, & Brenner, 2005; Gebert, et al., 2003; Gebert, Geib, Kolbe, & Riempp, 2002; Salomann, et al., 2005).

However, a close look shows that these research streams do not offer a satisfactory framework of factors associated with the organizational and business context, where technological interventions occur. The reason is that, in these streams, research has aimed at incorporating facilitative
factors into the practice of (customer) knowledge management, i.e., a focus on the how-to. In other words, organizational factors have been subsumed into the substance and become part of the workflow per se, mainly through management approaches such as designing a customer strategy, re-engineering business processes, and human resource management (e.g., Broekhuizen & Alsem, 2002; Campbell, 2003; Chalmeta, 2006; Evans & Laskin, 1994; Gebert, et al., 2003; Malhotra, 2000). Factors that comprise the targets of innovation are different from those that define the context of innovation (Armenakis & Bedeian, 1999). Through RQs 5 and 6, I intend to address the relationship between the organizational intervention (i.e., a feedback management process) and its surrounding factors—those that are not parameters of the intervention itself.

Contextual factors, which might impact (i.e., facilitate or inhibit) technology-based innovations in user feedback management, have rarely been the focus of research on customer knowledge management. One exception was Paquette’s doctoral study (2008), which examined the impact of organizational member’s perceptions (a) on the types of customer knowledge solicited by an organization and (b) on the knowledge management system functioning in that organization. For a framework to examine the development and use of a customer knowledge management system, Paquette’s study adopted Markus et al.’s (2002) principles for designing and deploying systems for Emergent Knowledge Processes.

The present study differs from Paquette’s in three aspects. Firstly, the CPhA deals strictly with passively collected feedback without active interaction with the user, setting an enclosed environment for
interventions to be introduced. In contrast, Paquette’s study looked into two-way interactions with customers across the organizational boundary.

Secondly, the CPhA expects the degree of structure in feedback management to increase over time. Although creativity and flexibility are needed, it is possible and desirable to improve the efficiency in feedback management by better structuring, for example, the flow of feedback comments within the organization and the way they are organized and stored. The intention and feasibility in bringing structure to CPhA’s feedback management does not comply with the fundamental assumption of emergent processes, where “problem interpretations, deliberations, and actions unfold unpredictably” (Markus, et al., 2002, p. 182), and differs from Paquette’s study.

Thirdly, as CPhA stakeholders represent the only actors in the feedback management process, their requirements can be determined for process improvement and for the design of a support system. This contrasts with another characteristic of emergent processes and Paquette’s study, where (a) types of actors in the process and their work contexts are unknown, and (b) systematic requirements analysis cannot be conducted due to the unpredictability of “when and why the process is performed and whether support tools will be used” (Markus, et al., 2002, p. 183).

The strength of Paquette’s study lies with the consistency between the framework and its case situation. Although it is not useful to directly refer to its findings here, I aimed to attain the same consistency.
Literature on business process management

Technological innovations represent a major phenomenon of business process improvement. Using the text mining technique of Latent Semantic Analysis, Sidorova and Isik (2010) conducted a semi-automated review of research on business processes which draws from organization theory, management science, computer science and industrial engineering. One of the most important findings, relevant to the present study, is that there has been significant growth in research on implementation issues and organizational factors that influence the success and failure of business process changes. The cause is a high failure rate of business process re-engineering initiatives observed in the nineties. This trend is most evident in the literatures on two core themes of business process research:

1. **ERP** – *Enterprise Resource Planning* (e.g., Finney & Corbett, 2007; Hong & Kim, 2002; Motwani, Subramanian, & Gopalakrishna, 2005; F. F. H. Nah & Delgado, 2006; Ngai, Law, & Wat, 2008; Parr, Shanks, & Darke, 1999; Somers & Nelson, 2001), and

2. **CRM** – *Customer Relationship Management* (e.g., Alt & Puschmann, 2004; Chen & Chen, 2004; Croteau & Li, 2003; King & Burgess, 2008; Wilson, Daniel, & McDonald, 2002).

ERP is “based on the idea that many core business processes are similar across organizations and an information system can be developed to automate these common BPs” such as financials, logistics, and manufacturing (Sidorova & Isik, 2010, p. 578). CRM refers, from a technological perspective, to using information technology in implementing relationship marketing strategies (Ryals & Payne, 2001). In dealing with business processes, ERP and CRM are similar in the application of technology at the organizational level. But, they differ in terms of “the back-office focus of traditional ERP versus the front-office
focus of CRM” (King & Burgess, 2008, p. 424). That is, CRM aims at gaining insights into customer behavior and preferences, while ERP tends to focus on supply and demand for key resources and materials.

The similarities and dissimilarities between ERP and CRM led to two relevant notions to be considered in the present study. First, there is much overlap between factors explaining success and failure in systems implementation. Appendix B lists the factors reported by ten articles (reviews and studies with substantial review sections). A core set of factors have been identified by both ERP and CRM literatures, including:

- Implementation planning
- Project management
- Top management support
- Project champion
- Change management practice
- Communication
- Resources
- Organizational culture for change
- User involvement

This overlap suggests that the literature of organizational theories and management science is an appropriate source in the determination of relevant factors with respect to a technological intervention for improving feedback management.

The second notion arises from the divergent factors, e.g., the reviewed ERP research emphasized the management of the project team, while CRM research highlighted the importance of knowledge management and technological readiness (King & Burgess, 2008). Such divergence tends to be more significant with respect to technical factors than organizational factors such as management support and resources (Wixom & Watson, 2001). The divergence can also be attributed to the nature of a specific approach. For example, as ERP mainly involves transaction-oriented data
management (Boonstra, 2006), it was natural that when Finny and Corbett (2007) classified 26 categories of “critical success factors” for ERP systems, many categories appeared to be closely connected to data processing technology, such as the selection of ERP software package, accuracy of data conversion, system testing, and implementation of a basic version of the system with no or minimum customization. Therefore, concerning user feedback management, the relevance of each factor needs to be established in specific relation to user feedback management systems, because such systems bear similarities to both ERP and CRM (i.e., in-house and back-end driven), yet requiring a focus on external customers’ knowledge in this research.

Usefulness of the business process literature
Although the above discussion on ERP and CRM implies relevance to the present study, two issues hinder the application of the various factors reported from the business process literature in the current research. First, different authors have framed the factors from different angles, making it difficult to merge the factors without losing the context in which they had been identified. For example, some researchers organized implementation factors by organizational, project and technical success (Al-Mashari, Al-Mudimigh, & Zairi, 2003; Parr, et al., 1999; Shang & Seddon, 2000; Stratman & Roth, 2002); some distinguish between strategic factors and the ones that are tactically critical (Finney & Corbett, 2007; Holland & Light, 1999); still others took a phased approach (e.g., a stabilizing stage after the development stage) and identified factors pertaining to each phase (Chalmeta, 2006; King & Burgess, 2008; Markus & Tanis, 2000). Citation tracking of the review articles did not find any umbrella review that effectively unified the majority of disparate sets of factors.
The second issue concerns an adequate operationalization of the various factors so that they can be examined through empirical studies. More specifically, no comprehensive and validated instruments exist that can be adapted for the present study.

Nineteen reviews and empirical studies were identified as focusing on the study of contextual factors related to technological process interventions in the organization. These articles represent research in the domains of enterprise resource planning and customer relationship management. The selection of studies took into account the following inclusion criteria:

1. Stated an intention to compile a “compressive” factors list;
2. Reported as a review, or in the case of an empirical study, has a clearly identifiable review section;
3. Recent (i.e., since 2000) and comprehensive (i.e., considerations given to various types of factors). For example, one article (Dowlatshahi, 2005) focused on strategically critical factors only, and therefore was excluded.

Table 2-1

Fourteen Empirical Studies on Factors Affecting Business Process Innovations

<table>
<thead>
<tr>
<th>1st Author, Year</th>
<th>Number of Factors</th>
<th>Instrument Reported</th>
<th>Instrument Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Mashari, 2003</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt, 2004</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bhatti, 2005</td>
<td>12</td>
<td>Yes</td>
<td>Reliability, construct and content validities; validation through 53 applications</td>
</tr>
<tr>
<td>Croteau, 2003</td>
<td>7</td>
<td>Yes</td>
<td>Reliability, construct and content validities; validation through 57 applications</td>
</tr>
<tr>
<td>Ehie, 2005</td>
<td>8</td>
<td>Yes</td>
<td>Reliability, construct validity not achieved; validation through 36 applications</td>
</tr>
<tr>
<td>Huang, 2004</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Motwani, 2005</td>
<td>7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nah, 2006</td>
<td>7</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Somers, 2001</td>
<td>22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Somers, 2004</td>
<td>22</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>Stratman, 2002</td>
<td>8</td>
<td>Yes</td>
<td>Reliability, construct and content validities; validation through 79 applications</td>
</tr>
<tr>
<td>Summer, 2000</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Umble, 2003</td>
<td>9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wilson, 2002</td>
<td>14</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 2-2

<table>
<thead>
<tr>
<th>1st Author, Year</th>
<th>Total Number of Factors Identified</th>
<th>Instruments Reported</th>
<th>Instruments Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finny, 2007</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gargeya, 2005</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Loh, 2004</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nah, 2001</td>
<td>11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ngai, 2008</td>
<td>18</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The above tables show a common effort of pooling together a list of success/failure factors from the literature. But only 6 studies provided data collection instruments, and even fewer (i.e., 4 studies) validated their instruments. Nonetheless, the representativeness of the four validated instruments is questionable: more recent literature reviews (e.g., Finney & Corbett, 2007; Ngai, et al., 2008) have identified a range of 18 to 26 factors, while those four studies, published between 2002 and 2005, listed just 7 to 12 factors. It could be argued that the 7-12 factors have been consolidated through construct validation (e.g., by principle component analysis) and that the authors have chosen to focus on ‘critical’ factors only. However, none of the four studies presented formal review processes to demonstrate a comprehensive starting point from which their initial factors list had been derived and then consolidated.

Moreover, the study environments, where evidence was gathered for merging constructs, were highly specific to ERP or CRM implementations. This raises the question of whether or not the factors would converge when placed in the (specific) context of a user feedback management system. The issue is further complicated by the possibility that a different set of factors may come into play (as the second issue suggested above). In short, had the identification of factors been approached from a more
general perspective and the validation of instruments based on a greater variety of environments (e.g., technology-based organizational process change, rather than being ERP- or CRM-specific), the reported instruments might offer greater suitability of adaptation for the present study.

In summary, a range of contextual factors can be associated with technological interventions concerning organizational processes, and their scope and due effects are specific to the nature of the intervention and the given purposes of the intervention. A third gap in existing knowledge can be established in relation to RQs 5 and 6: Very little research has been conducted on the contextual factors that affect the development and implementation of user feedback management processes in the organization.

Despite this gap, the above discussion revealed that the literatures on management science and organization theories, on which business process research is based, provide fundamental concepts relevant to the present study. In the next chapter (Section 3.3), a framework is constructed based on that literature.
CHAPTER 3. CONCEPTUAL FRAMEWORK

The previous chapter, by identifying gaps in existing knowledge, confirms that research is needed to answer the research questions. The present chapter proposes conceptual frameworks to guide data collection and analysis, specifically by drawing on the following literatures.

With regard to RQs 1-2 (i.e., the feedback), Repo (1986; 1989) and Saracevic and Kantor (1997) reviewed definitions of the value of information and provided constructs and approaches relevant to studying the usefulness of user feedback in terms of the value of information.

With regard to RQs 3-4 (i.e., feedback management), the notions of “process” in philosophy, management and information science were reviewed to devise a framework for the examination of current feedback use at the CPhA, in order to develop an improved process.

With regard to RQs 5-6 (i.e., factors affecting the improvement of feedback management), a conceptual framework is constructed by drawing on literature on innovation and organizational change. This framework guides a systematic examination of factors within the CPhA that took part in the innovation in user feedback management.

3.1. Approaches to Studying the Value of User Feedback

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 (decision maker’s) 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 (p. 532)”; while the realistic approach is a before-and-after approach based on the effect of information on the user and/or his performance (outcomes) with the information (Saracevic & Kantor, 1997).

In the perceived value approach, emphasis on rigor and precision, as prioritized in the normative approach, is replaced by admitting the judgments of the user, i.e., 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 most “loose” of the three approaches, 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 this study.
The realistic approach, lying at the middle of the normative approach and the perceived approach, is so called as 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, e.g., 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’s being educated), or, more generally, states of being-affairs (Attfield, 1987). The value of being informed is intrinsic. This value can be noted when a clinical editor’s (inner) state of mind experiences worthiness or is (better) informed with 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 in using the feedback. 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, i.e., 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 below.

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.

It is possible for some states of affairs to be both of intrinsic and of 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 a whole entity 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. Individuals’ use of books for writing, without 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 upon 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).
The relation between (intrinsic and instrumental) value at the individual level and contributory value at the organization level is that the latter could be due (only) in part to the former. For example, a student may use course materials to learn knowledge (i.e., instrumental value as the direct outcome of the use by the student), which would 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 upon other parts of the school’s system including lectures, labs and so on.

In sum, RQ 2 can be answered by examining the value of health professionals’ feedback comments through the perceived value approach and the realistic approach, with the latter assuming four distinct types of value: the inherent value held by feedback data, the intrinsic value that data bring to the CPhA editors, the instrumental value thereafter exercised by the editors, and the contributory value to the organizational goal of the CPhA. An illustrative example is given to each type of value in Table 3.

Table 3

Types of Value Applicable in the Study of Information

<table>
<thead>
<tr>
<th>Types of Value</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived approach</td>
<td></td>
</tr>
<tr>
<td>Perceived value</td>
<td>A scholar thinks that a book might be useful.</td>
</tr>
<tr>
<td>Realistic approach</td>
<td></td>
</tr>
<tr>
<td>Inherent value</td>
<td>A book that is useful to scholars.</td>
</tr>
<tr>
<td>Intrinsic value</td>
<td>A scholar learning from a book.</td>
</tr>
<tr>
<td>Instrumental value</td>
<td>A scholar uses a book to write an article.</td>
</tr>
<tr>
<td>Contributory value</td>
<td>Knowledge accrues to the scientific community due to the book, the scholar’s work, and the publication of the article.</td>
</tr>
</tbody>
</table>

53
3.2. A Process View on User Feedback Management

In this section, the notion of “process” is reviewed in philosophy, management and information science, in order to guide the examination of user feedback management at the CPhA.

Process, of ontological concern, is construed as a “sequentially structured sequence of successive stages or phases”, and is characterized as a unity of distinct stages or phases. It has (a) a certain temporal coherence and (b) a structure. In a process view “temporality, activity and change … are the cardinal factors for understanding of the real” (Rescher, 2009).

The present research adopts Saracevic and Kantor’s (1997) model of information use to delineate the temporal dimension of the feedback management process with three constructs: acquisition, cognition, and application. These constructs form the top level of a hierarchical three-level structure of the process. Each construct is further divided into a number of task-level objectives (i.e., the second level) which can then be practically examined in terms of the activities (i.e., the third level) performed to attain the task objectives.

*The temporal dimension of a process of information use*

To consider feedback management as an organizational process, one should also refer to the discussion about information in management science. March (1991) stated that process gives meaning to life, and meaning is the core of an organization’s life. Hammer (1996, p. xii) defined an organization’s process as “a complete end-to-end set of activities that together create value for a customer.” Focusing on process is invaluable for organizations and can generate impressive results when a linear view of how they work can be well-defined. That is, when inputs and outputs
can be clearly measured (i.e., something passes from A to B ending with C) and when the flow of information can be clearly targeted (Brown & Duguid, 2000). In terms of inputs and outputs, primary feedback data pass from screening of constructive comments onto analysis for problems and finding solutions, ending with actionable knowledge of what improvements can be made. A process view based on the flow-of-information is appropriate for examining the existing practice used by the CPhA to deal with feedback comments. The flow of user feedback is:

1. Health professionals submit feedback to CPhA;
2. Partners at the university retrieve pharmacists’ feedback data from an FTP server, and receive physicians’ feedback data from a third party contractor;
3. University partners identify the feedback comments that have constructive value, and send them to the CPhA;
4. Constructive feedback comments pass through different CPhA staff who review and investigate reported issues and propose solutions;
5. Where appropriate, reported issues result in content changes made to e-Therapeutics+®.

In information science, Saracevic and Kantor (1997) postulated an Acquisition-Cognition-Application (ACA) model of information use, where the notion of information is connected with cognition and intentionality of the user: cognition results in the state of a mind being affected by information, which serves to address the problem at hand. Of the three constructs, Acquisition is the process of getting information, Cognition the process of absorbing, understanding and integrating the information, and Application the process of using this cognitively processed information.
These three constructs are adopted to represent the flow of user feedback, where the construct of *Acquisition* represents feedback collection, *Cognition* represents the analysis of feedback data and investigation into reported issues, and *Application* represents the optimization of e-Therapeutics+® content. These three constructs are connected throughout the flow of information (i.e., user feedback) in the CPhA.

*The hierarchical structure for process examination*

The process view requires paying attention to the internal workings of staged tasks, and to the particular activities for achieving task goals (Brown & Duguid, 2000). The relationship between processes, tasks, and activities is conceived as one between whole and part. Specifically, an organizational *process* is a related group of tasks that together create a result (Hammer, 1996, p. 5), such as an improved information resource in the present study; a *task* is characterized by goal-achieving (e.g., identifying constructive feedback comments, discerning issues from brief comments, and finding a way to resolve the issues) and is achieved by a “composite method” requiring more than one simple physical or mental operation or activity (Chandrasekaran, Johnson, & Smith, 1992; Stammers & Shepherd, 1995); and *activities* refer to what are carried out to accomplish the task goal and how (Leplat, 1989, 1990), e.g., rule-based identification of constructive comments, and email communications/discussions on reported issues.

In information studies, the relationship between processes, tasks and activities has also been well recognized. For example, task analysis on searching has been performed in a process-oriented approach (Vakkari, 1999). A task, in particular, has been thought of as (a) goal oriented (i.e., to result in a meaningful outcome) and (b) consisting of a series of actions
undertaken in pursuit of a goal; and the performance of a task includes physical and cognitive actions and has a recognizable beginning and ending (Bystrom, 1999; Hackos & Redish, 1998; P. Hansen, 1999; Shepherd, 1998). Further, information scientists suggested that tasks can be analyzed at different levels of granularity (Hackos & Redish, 1998), and that the definition of a task and its subtasks (i.e., actions) is “a practical matter dictated by the research questions of the study” so that “it is sufficient to characterize [a task] in a way that helps to identify it for the purpose of the analysis” (Vakkari, 2003, p. 417).

In sum, a process delineates the flow through which inputs (e.g., user feedback) are turned into outputs (e.g., content changes to an information resource); tasks define ordered stage-objectives (e.g., the task goal of validating the reported issue) within the process; and activities refer to details of conduct (e.g., reading clinical studies). This “Process-Task-Activity” (PTA) framework provides three focal points for examining the current practice of feedback handling at the CPhA. In addition, a process-based approach as such could allow close examination of how difficulty evolves over stages of information transfer for designing a process that facilitates knowledge work (Szulanski, 2000).

To this end, a framework diagram is constructed below, which represents the sequential dimension and the hierarchical structure explained above. This framework is meaningful to the present study, because it can guide (a) data collection and analysis of the CPhA’s current practice of feedback handling (i.e., RQ 3) and (b) the identification of improvement opportunities and improvement planning (i.e., RQ 4).
Figure 3: The Two Dimensional ACA-PTA Framework
3.3. A Framework for Studying the Process Innovation

This section presents (a) the rationale for the study of factors affecting the innovation of a feedback management process, and (b) a conceptual framework for conducting the study. The framework will eventually lead to a model representing the case of the CPhA (in Discussion Section 6.1). As suggested in the literature review (Section 2.3.3), organizational theories and management science provide the foundation literature on organizational process innovation, on which this framework is based.

While organizational process innovations can address the problem of information use *per se*, an undertaking as such is shaped by the environment (and its natural laws, or behavioral theories) where resides the problem to be addressed (Hevner, et al., 2004; Simon, 1981; Walls, et al., 1992). The literature on innovation and change management is brought together to construct a framework for study of the factors within the CPhA that define the contextual environment for feedback process design.

**Contextual factors within the organization**

Hansen and Wernerfelt (1989) stated that organizational outcomes may be influenced by establishing “context”, and that context is the result of a complex set of psychological, sociological, and physical interactions. Research built on the behavioral and sociological paradigm sees those factors as the major determinants of success. The role of contextual factors has been emphasized in bringing about changes to organizations (Howard & Associates, 1994; Pettigrew & Whipp, 1993). Researchers believe that attention should be paid to variables pertaining (a) to the organization (e.g., the organizational structure) (DeCanio, Dibble, & Amir-Atefi, 2000; Kim, 1980; Kimberly & Evanisko, 1981; Saleh & Wang, 1993) and (b) to other groups of factors such as organizational members’ values, personalities, and perceptions, as well as to the external environment of an organization (Damanpour, 1987).
Organizational changes can happen in various dimensions, for example, in an organization’s strategy, composition, structure, process, behavior, or culture (Armenakis, Harris, & Mossholder, 1993; Bowditch & Buono, 2001), and changes can come about in different forms, such as restructuring, reengineering, re-strategizing, acquisitions, downsizing, quality programs, and cultural renewal, and as a result of organizational innovation (Kotter, 1996). Any study of the factors that affect organizational change in terms organizational innovation has to begin with characteristics of the innovation, as certain factors are related to specific types of innovation (e.g., Koberg, Uhlenbruck, & Sarason, 1996; Weiner, Amick, & Lee, 2008).

**Innovation, definition and types**

In the organizational context, innovation has been defined as changing the outputs, structure or processes of an organization by introducing something new (Aiken, Bacharach, & French, 1980; Daft & Becker, 1978; Damanpour, 1987; Zaltman, Duncan, & Holbek, 1973). A preponderance of literature on organizational innovation has focused on the adoption and implementation of new ideas, because of the argument that innovation cannot influence performance until its actual utilization by organizational members has begun (e.g., Damanpour, 1987). However, before ideas can be implemented, they need to be present as concrete artifacts (e.g., methods and processes) amenable to implementation. The development of organizational processes, for example, is a step preceding implementation in the journey of innovation (Van de Ven, 1999). Consideration of the development of an ‘implement-able’ process is especially relevant to the present study, as no feedback management process is readily available for the CPhA to adopt (see Literature Review Section 2.3.2).
About this unique type of organizational change, Damanpour (1987) proposed a typology of three categories. *Technological innovations* occur as a result of the use of a new tool, technique, device, or system. They produce changes in products or services, or in the way those products are produced or services are rendered. *Administrative innovations* are those that change an organization’s structure or its administrative processes, and are only indirectly related to the basic work activity of the organization and are more immediately related to its management (Kimberly & Evanisko, 1981). *Ancillary innovations* are organization-environment boundary innovations. Cooperation of other organizations in the environment is necessary for the implementation of these innovations. The successful adoption of ancillary innovations depends on factors (such as customer participation) that are outside of the organization's boundary, hence not fully controllable by the organization's management. Damanpour also noted that all types of innovations do not have identical attributes; thus they do not relate equally to the same organizational factors. For example, distinct differences exist between organizational factors that influence the adoption of technological or administrative innovations. Some other factors (e.g., administrative intensity), on the other hand, have a positive and significant influence on all three types of innovations. Weiner et al. (2008) noted similarly that organizational characteristics and employee attributes are often quite specific to the type of change being discussed. Therefore, organizational factors cannot be thought of as independent of the types of innovations.

*First proposition: The development of a feedback management process is a unique technological innovation, which tends to be affected by a particular set of contextual factors.*
Stages of innovation

Innovation through organizational change is not an instantaneous event, but rather unfolds over time (Weiner et al., 2008). Although organizational change is complex and nonlinear (Rothwell, 1992; Van de Ven & Huber, 1990; Van de Ven & Poole, 1995), scholars find it analytically useful to regard the change process as a sequence of linear stages (Rogers, 1995; Zaltman, et al., 1973; Zmud & Apple, 1992). They believe the temporal sequence of events that unfolds as an organizational change occurs would facilitate examination and understanding of the dynamics of change (Armenakis & Bedeian, 1999; Van de Ven & Huber, 1990). Zaltman et al. (1973) made a distinction between two major stages of innovation as initiation and implementation. Some considered the innovation to be adopted when a new idea is generated, or a decision for its adoption is made (Aiken, et al., 1980; Daft & Becker, 1978); while others considered a new idea as an innovation only when it is implemented, and an innovation is not considered in use when the decision for its adoption is made, but rather when its actual utilization by organizational members has begun (Damanpour, 1987; Damanpour & Evan, 1984). The second view is based on the argument that different organizational characteristics may be related to the initiation or implementation of innovations (Duncan, 1976; Zaltman et al., 1973). Consistent with the two-stage view, this study distinguishes between factors involved respectively in the stage of developing a feedback process and in the subsequent stage of implementing the process.

Second proposition: The innovation of user feedback management unfolds over two general stages, namely development and implementation, and each stage may involve different factors.
Conceptual domains and levels of research focuses

The hierarchy displayed in Figure 4 shows the domain and levels of focus in the present study. Despite this focus, environmental factors (i.e., factors external to the organization) are taken into account, if the stakeholder believes that they are significant and should be addressed.

![Diagram of hierarchies](image)

The focus in this study

The innovation of feedback management possesses mainly the traits of a technological innovation. In contrast to characteristics that are inherent to this particular type of innovation, contextual variables (i.e., factors) that are not attached to the target of innovation impact the former when it is taking place (Holt, Armenakis, Feild, & Harris, 2007; Weiner, et al., 2008). This research chose to focus on the contextual factors because they provide insights into the impact of factors and reflect the organization’s effectiveness in carrying out the innovation (Armenakis & Bedeian, 1999).

Three research perspectives are the most prominent in addressing the factors that are contextual to organizational innovations: those based on the environment, on the organization, and on the individual (Mehrtens, Cragg, & Mills, 2001; Weiner et al., 2008; Molla & Licker, 2005a; Hansen & Wernerfelt, 1989). One stream of research has considered factors in the
organization’s external environment (e.g., state policy, government regulation, market forces, support industries) to be the major determinants as opposed to factors within the organization (Choucri, Maugis, Madnick, & and Siegel, 2003; Molla & Licker, 2005b; Gibbs, Kraemer, & Dedrick, 2003). Technological innovations, however, are less linked to factors outside the organization’s boundary, as compared with ancillary innovations (Damanpour, 1987). For example, Teo, Tan and Buk (1997) concluded that organizational factors, especially culture, infrastructure and management support, were more important than external environmental factors in adopting particular types of innovation (i.e., the Internet).

There is yet another consideration that has directed this research to focus on the internal factors. Systematically developing a feedback management process requires deliberate efforts from the CPhA staff. This type of change moves an organization from its present state to some desired future state to increase organizational effectiveness (Weiner et al., 2008). In contrast to emergent or “self-organizing” forms of organizational change, this kind of intentional change occurs in a proactive approach rather than in a reactive, crisis-driven way (Hailey & Balogun, 2002). While internal drive is the key, researchers should pay attention to an organization’s internal change context.

For conceptual clarity, it is meaningful to distinguish between two predominant levels within the organization by referring to factors pertaining to the organization as a whole in contrast to those at the individual employee level (Weiner et al., 2008). The organization-level factors are often described in structural terms, emphasizing the organization’s financial, material, human, and informational resources, while the individual-level factors are usually formulated with psychological
terms, such as the state in which members of the organization feel committed to implementing an organizational change and confident in their abilities to do so (Lehman, Greener, & Simpson, 2002; Demiris, Courtney, & Meyer, 2007; Snyder-Halpern, 2001; Weiner, 2009). Organizational innovation is more complex than an individual’s (e.g., Rogers, 1995). Studies with an individual-level focus (e.g., Gefen & Straub, 2000; Tan & Teo, 1997; Taylor & Todd, 1995) provide only a partial explanation of organizational innovations (Molla & Licker, 2005b).

On the other hand, even if two organizations have the same level of resources and operate in the same context, members of the organization might make different decisions about adopting changes. The reason is that individuals’ perceptions may vary depending on unique interpretations of the context they experience in common (Eby, Adams, Russell, & Gaby, 2000), and this variation will lead to different decisions (Molla & Licker, 2005a; Molla & Licker, 2005b). Ultimately, organizations will accept or reject change through the actions of their members (Armenakis et al., 1993; Armenakis, Harris, & Feild, 1999). For this reason, the extent to which organizational members are psychologically and behaviorally prepared to implement organizational change is also worth research attention (Armenakis et al., 1993; Herscovitch & Meyer, 2002; Weiner et al., 2008).

A clarification has to be given for factors that exist at the organizational level. Depending on the dimension of change, some factors could appear as either contextual factors or as the very change itself. Such factors include the organization’s strategic orientation, its structure, and performance-incentive system. For technological innovations (e.g., the feedback management process for CPhA), they are treated as contextual factors at the organization level; in other cases, they may become the target of innovation and thus characterize the content in which change will be made (Armenakis & Bedeian, 1999).
As to the relationship between organization-level and individual-level factors, it can be assumed that the latter would be influenced by the broader, former factors. However, an organization might have all the necessary human, financial, and material resources to implement a change, yet raw potential does not automatically translate into action (Weiner et al., 2008). For organizational members to activate this potential, they must perceive not only that they have the potential, but also that they can activate it in an efficacious matter (Bandura, 1986; Bandura, 1997). That is, they must perceive they have at hand the requisite expertise, resources, and opportunities, and that they can skillfully execute those courses of action that are necessary to implement the change successfully (Cunningham et al., 2002). So, factors at the individual level are not as simple as being subject to those at the organizational level. The interaction between the two levels is worth exploring.

In addition, some researchers have considered organizational members’ collective behavior at the group level (e.g., Holt et al., 2007). This view is useful when introducing changes, such as new service programs, that are dependent on the collective effort of most or all departments and employees of the organization, where each contributes something to attain the final outcome. Such programs entail multiple, simultaneous changes in staffing, workflow, decision making, communication, and reward systems (Weiner, 2009). In the present study, collective behavior is not deemed a determinant for feedback processing, because this project is concerned with individual employees’ work, and just a few individual members of the organization are involved in carrying out the activities.

Third proposition: The innovation of feedback management may be affected by distinct factors at the individual level and the organizational level.
A Framework for studying factors affecting organizational innovation

Following from the propositions made above, a two-by-two framework is constructed to guide research on organizational factors (Figure 5).

![Figure 5. A Conceptual Framework for Studying Contextual Factors within the Organization](image)

Organizational factors have been modeled in various ways in the broader field of organizational change (Burke, 2002; Cummings & Worley, 2005; French & Bell, 1999). The present research uses seven studies, which measured various factors with regard to organizational changes, to define the stages of the framework and the potential factors to be considered at both the individual and organizational levels (Herscovitch & Meyer, 2002; Holt, Armenakis, Feild, et al., 2007; Ingersoll, Kirsch, Merk, & Lightfoot, 2000; Jansen, 2004; Lehman, Greener, & Simpson, 2002; Molla & Licker, 2005a, 2005b; Sen, Sinha, & Ramamurthy, 2006; Simpson, 2002).

These studies were identified by Weiner et al. (2008) in an extensive review of peer-reviewed articles published between January 1990 and July 2007, covering the literature of health services, education, sociology, psychology, and business research. The benefits of using these seven
studies are threefold. Firstly, these studies represent a comprehensive foundation of theories relevant to organizational change. They incorporate the literature on technology transfer (Backer, David, & Soucy, 1995; Davis, 1989), organizational development and change (Judge, Thoresen, Pucik, & Welbourne, 1999; Porras & Robertson, 1992), diffusion of innovations (Fichmann, 1992; Rogers, 1995), organizational behavior (Ajzen, 1985; K. J. Klein & Sorra, 1996), organizational climate (Furnham & Gunter, 1993; James & McIntyre, 1996; Koys & DeCotiis, 1991), psychological theory of self-efficacy (Bandura, 1997), and the theory of reasoned action (Fishbein, 1995).

Secondly, they jointly provide me with a broad range of preliminary factors to be considered as the starting point. Previous studies have been designed with a pre-determined focus. For example, Damanpour (1987) examined six organizational variables, among which five had been suggested by prior research to have positive influence on innovation. Some decided to define and consider one aspect, for example, Moos and colleagues’ workplace environmental assessment measured physical resources, variables of the treatment program (e.g., program goals, patient involvement), and staff characteristics (Moos & Moos, 1997; Moos & Finney, 1987; Finney & Moos, 1984). Others have chosen to study only those variables that had been repeatedly supported with empirical evidences in the literature. For example, Premkumar and Ramamurthy (1995) focused on selected organizational variables that were the most significant variables appearing in the literature of innovation research related to Electronic Data Interchange.

Thirdly, they provide the actual data collection instruments, and according to Weiner et al. (2008), the reliability and validities of each of
those instruments have been explicitly addressed. For example, the free-to-use survey instrument of Texas Christian University’s (TCU) Organization Readiness for Change (ORC) assessment (Simpson, 2002; Lehman et al., 2002) includes 115 Likert-type (5-point agree-disagree) items for measuring 18 domains. It focuses on motivation (i.e., program needs, training needs, and pressures for change), program resources (i.e., offices, staffing, training, and equipment), staff attributes (i.e., growth, efficacy, influence, adaptability, and orientation), and organizational climate (i.e., mission, cohesion, autonomy, communication, stress, and change), and has been used and tested extensively for construct validity and reliability (Weiner et al., 2008). Carefully adapted, these instruments together form a pool of preliminary items that are useful for designing data collection instruments to examine potential factors related to the development and implementation of a feedback process.

*Two stages of innovation*

The “stage” dimension has been frequently mentioned in the literature, both in specific relation to business process (e.g., King & Burgess, 2008; Loh & Koh, 2004; Markus & Tanis, 2000; Sidorova & Isik, 2010; Somers & Nelson, 2001; Somers & Nelson, 2004) and in general relation to organizational change (e.g., Holt, Armenakis, Feild, et al., 2007; Holt, Armenakis, Harris, & Feild, 2007; Simpson, 2002, 2009; Simpson & Dansereau, 2007). For example, Simpson’s (2002; 2007) framework has an explicit feature of stages, which as reflected in TCU’s ORC measurement, are to be administered over a four-stage (Simpson, 2002) or simplified three-stage (Simpson, 2007) sequential process that is meaningful to introducing substance abuse treatment programs into health institutions. The three-stage model consists of (a) adoption, (b) exploratory use, and (c) routine use, and the four-stage model additionally requires training
before adoption. In the framework proposed here above, a simpler two-stage process is defined, beginning with the “Development” stage and followed by the “Implementation” stage. These two stages are in line with the “Initiation” and “Implementation” stages in Damanpour’s (1987) definition of innovation, and are conceptually appropriate and sufficient for the present study. The development stage will replace adoption and pre-adoption training, because there is no knowledge-oriented feedback process readily available for CPhA to adopt. Through development, the idea of an innovative feedback process takes shape. The implementation stage would include exploratory use, but differs from routinizing treatment programs in that the feedback process will not reach the level of complexity or require the magnitude of change as health service programs would do to the organization (i.e., to entail multiple, simultaneous changes in staffing, workflow, decision making, communication, and reward systems). However, implementation is not a one-shot task. It concerns initial setup as well as on-going execution of the process and system maintenance. This suggests that, at the research design stage, the two conceptually general stages could be specified with more concrete dimensions per given situation (see Methodology Section 4.3.10).

*Two levels of theoretical constructs*

Four of the seven studies and their instruments had an individual-level focus (Herscovitch & Meyer, 2002; Holt et al., 2007; Ingersoll, Kirsch, Merk, & Lightfoot, 2000; Jansen, 2004); one was at the organizational level (Sen, Sinha, & Ramamurthy, 2006); and two spanned both levels (Molla & Licker, 2005a; Molla & Licker, 2005b; Lehman et al., 2002). This research draws on these studies to compile a list of constructs—definitions to represent the theoretical meaning of various factors that may potentially deliver impact in reality. It should be noted, however, that the translation
from theoretical constructs to organizational factors is not strictly one-to-one. Theoretical constructs were used by the studies to guide the search for factors, and the outcomes were those factors that correctly reflect the construct definitions, account for the majority of explanations for the examined organizational phenomenon, and do not substantially repeat one another. At the same time, measurements of some distinct constructs had the propensity to clustering on the same factor. For instance, respondents tended to view as a unitary factor the items measuring the extent to which members felt that a change was needed and the items designed to measure the extent to which members felt the change would be beneficial to the organization (e.g., Holt, Armenakis, Feild, et al., 2007).

For each level of the framework, two sets of constructs have been compiled from the seven studies. In doing so, some constructs from the original studies are selectively incorporated according to their definitions. The purpose is to (a) avoid duplicating constructs that appeared in more than one study, (b) keep only those that have been operationalized with specific items (e.g., decision-making culture is retained and adapted but not the broader organizational culture), and (c) remove any that were designed simply as indicators rather than factors of performing impact (e.g., the frequency of interaction on the change topic is a behavioral indicator). Appendix C provides a complete list of factors that were identified in the seven studies following these constructs.

To summarize, this chapter proposes (a) two approaches to studying the value of feedback, (b) a process-oriented framework for examining the practice of feedback handling, and (c) a two-by-two framework for structured exploration of contextual factors in the organization.
CHAPTER 4. METHODOLOGY

To address six research questions using multiple frameworks is complex. To cope with the complexity, this chapter explains, from general to specific, the worldview (pragmatism), the approach (participatory action research), and the research design (organizational case study). This qualitative study employs multiple methods and sources of evidence.

I adopted the pragmatism worldview, where utility and theory are considered two sides of the same coin, and where scientific research is evaluated in light of its practical implications (Aboulafia, 1991; Hevner, et al., 2004). This worldview emphasizes (a) descriptions which help one decide what to do, and (b) descriptions of situations which facilitate prediction and control (through understanding achieved with explanation) (Rorty, 1991). These emphases underpin objectives of this research; its process orientation also fits well with pragmatism (Rescher, 2009).

A qualitative research methodology was taken, because the rich phenomenon of (process) design that emerges from the interaction of people, organizations, and technology needs to be qualitatively assessed in order to yield an understanding adequate for problem solving as well as theory development (Hevner, et al., 2004). Specifically, I took an interpretive stance by relying on social constructions such as meanings expressed in documents, and by recognizing the complexity of sense making in organizational situations (H. K. Klein & Myers, 1999). In terms of a technological solution, an interpretive research methodology is useful for understanding both the situation where the need for an information system arose and the path over which a system was introduced into the organization as well as the way it was influenced by various contextual factors within the organization (Walsham, 1993).
4.1. Participatory Action Research in the Organization

Collaboration between researchers and industry not only supports organizational change but also creates opportunities for revealing important new theory that is closely connected to the deepest challenges of organizational change (Senge & Scharmer, 2006). The present study followed the principles of participatory action research (PAR).

PAR has been closely associated with organization development (Burke, 1994; Whyte, 1991). In PAR, research findings are used to inform stakeholders in action (Lewin, 1946), and the outcomes from a PAR project should meet three different audiences with different interests and preferences: the research community’s interest in knowledge (research findings), the participants’ desire for immediately practical insight (solutions), and the requirements of academic research (Ospina, Dodge, Foldy, & Hofmann-Pinilla, 2008). With regard to this study, the PAR components are explained below.

Action — One central question that motivates primary researchers is: “What works?” (Trochim & Donnelly, 2007). This question articulates the link between research and practice, and answering it provides the most practical justification for research to come full circle. In particular relation to organizational learning, Argyris and Schön (1978) considered it necessary to conduct action research, in collaboration with practitioners, in order to reach empirically generalizable propositions about organization. In terms of how action is taken in order for change to happen in the organization, Burke (1994) provided an outline quite pertinent to this proposed project—“once a diagnosis has been made …, it is time to plan the appropriate steps to take so that problems identified
in the diagnostic phase are addressed and a more ideal future state for the organization can be determined. Guiding this planning phase should be a set of coherent and interrelated concepts—a theory, model, a conceptual frame of reference” (i.e., Literature Review Section 3.3).

**Research** — Rather than just providing solutions, Ospina, Dodge, Foldy, & Hofmann-Pinilla (2008) asserted that the ultimate purpose of researchers is to conduct research and advance knowledge. My goal, as stated at the outset, is to advance knowledge about user feedback management and about the factors that impact organizational innovation in feedback management. PAR creates the conditions necessary to conduct an organizational case study in order to reach that goal. Such conditions are reflected and detailed in the Research Design (next Section 4.2).

**Participation** — As the relationship between researchers and participants appears to be one of interdependence and mutual influence, the participatory characteristic has been addressed through an emphasis on building relationships (Gustavsen, 2006). Gustavsen and Engelstad (1992; 1986) underscored recognition of participants’ experience, shared understanding of the research topic, and a platform for joint action. Such relationships should be built by interpreting experiences, exploring possibilities for a number of plans, and pursuing respective needs together through the research project (Gustavsen, 2006). This participatory principle coincides with one of Argyris’s (1970) criteria—*free choice*. “By free choice, Argyris means that ‘the locus of decision making [is] in the client system’ (p. 19) and that the client [organization] is provided alternatives for action” (Argyris, in Burke, 1994, p.141).
In line with the above, this research set the following PAR objectives:

1. Collaboration between the stakeholder (CPhA) and the researcher (me) as equal partners throughout the project;
2. The integration of the intervention and research components;
3. The creation of a project that represents learning opportunities for all those involved;
4. The produced work can be sustainable into the future.

These objectives are shared by PAR researchers in both organizational settings and community-based research work (Macaulay, et al., 1997; Potvin, Cargo, McComber, Delormier, & Macaulay, 2003; Whyte, 1991), and supported by PAR methodologists (Reason & Bradbury, 2006).

Partner involvement and equality were promoted throughout the design process. Most importantly, features of the technological solution were co-determined (i.e., the first PAR objective). Characteristics of the design process include:

- Stakeholders were involved throughout the process of technology design;
- Using paper prototypes, I elicited suggestions from stakeholders and then let them know if it was feasible to incorporate their suggestions into the design of a technological solution;
- A functional prototype was used to support continuous iteration of the design, keeping it pertinent to the actual user situation;
- I guided the stakeholders to gain a concrete understanding of the features of the prototype, enabling them to provide feedback for improvement (i.e., the third PAR objective);
- Equality between partners was promoted by clarifying roles of expertise and contribution (below), meeting the first PAR objective.
Partner contributions and benefits

The CPhA partners contributed with working knowledge on their existing practice of feedback handling and evaluated whether or not my findings were relevant to or applicable to their practice (providing knowledge about practices meets the third PAR objective).

When implemented, the feedback management process would benefit CPhA in the long run (i.e., the fourth PAR objective).

I contributed by (a) examining the problem faced by the CPhA and (b) finding a technological solution to the problem.

I benefited by having a real organizational setting for research data collection.

The stakeholders contributed by providing feedback on the technological solution I proposed to them.

Stakeholders were involved in interpreting implications for the research findings (e.g., the usefulness of the typology), and in developing a technological solution (e.g., functional prototyping).

Following my probes, stakeholders had an opportunity to reflect on their practices for inadequacies and oversights. For example, a participant commented after discussing with me how feedback has been filed: “I didn’t always print a hard copy and put it in here, so I should do that.” In an interview, another participant indicated that the feedback under discussion reminded her of something needing follow-up attention that she should have been keeping.
4.2. Organizational Case Study

The research design is an organizational case study, and the scope is defined by the organizational boundary of the CPhA, where IT staff set up web based feedback collection mechanisms and clinical editors review feedback comments made by health professionals and use the comments to improve e-Therapeutics+® content. This case study is concerned with the way in which feedback comments have been processed by CPhA’s members and with the development and implementation of an optimal feedback management process in the organizational environment.

There were twelve participants from the CPhA including editorial and IT staffs as well as the Senior Director responsible for digital publishing. They represent the whole population of members of the organization who have knowledge about feedback collection and use. I worked with the CPhA participants on feedback process optimization, and collected research data at the same time.

The research design ensures internal validity by integrating action and academic research as two aspects of the same case, and attends to both the design paradigm and the behavioral paradigm—the specific initiative of innovation in a feedback process takes place exactly where research is conducted on factors affecting the innovation.

Relevance to the study of an organizational process: The case-study research design can substantiate the process perspective, as it has been frequently used to evaluate organizational processes (Yin, 2003). Following Yin (2009), the strategy of this case study has three features: (a) relying on an analytical perspective (i.e., process perspective) to encompass data (i.e., feedback comments) from beginning to end of the feedback management
process, (b) using multiple sources of evidence, and (c) integrating findings with a general theoretical perspective, i.e., a synergy between design and organizational research. This strategy provided the foundation for individual evidence sources to be integrated with one another.

Relevance to the study of contextual factors: In using case studies, Yin (2003) suggested “relying on the literature to specify a priori the critical characteristics for describing the phenomenon to be examined, as it may provide major support in structuring data collection in the first place and preparing for an aimed data collection process” (pp. 25-26). The theoretical constructs laid out in the conceptual framework (Section 3.3) served this purpose. That is, for the present case of technological innovation, there are two general stages (i.e., development and implementation) and two levels of conceptual focus (i.e., organizational and individual) in capturing active factors within the organization.

Validity of the study: The validity criteria (i.e., internal validity, external validity, and reliability) for qualitative research carry distinct notions as compared to parallel terms in quantitative research. In qualitative research, internal validity means that the obtained knowledge can be attributed to what is studied (i.e., credible); external validity refers to the obtained knowledge being useful outside the scope of the particular study (i.e., transferable); and reliability requires the researcher to be transparent about how the study has been conducted (i.e., dependable) (Lincoln & Guba, 1985). To strengthen its validity and reliability, the present case study followed the recommendations made by Yin (2009):

1. Using multiple sources of evidence to ensure internal validity;
2. Subjecting interview questions to content validation: two other PhD students critically reviewed the interview guide and the merging/conversion process for items included in the instrument (see Appendix L);

3. For external validity (i.e., about the domain to which findings can be generalized), using existing theoretical knowledge, including types of innovation, stages of innovation, and the factors related to organizational innovation that have been established in organizational theories and management science (Conceptual Framework Section 3.3);

4. For reliability (about the procedures through which this study reaches findings), transparently documenting all research methods used in the project.

Using multiple sources of evidence constitutes a key characteristic of case studies. Taking place in the natural setting of the ‘case’, researcher participation (i.e., as a key partner in the development stage of process design) was the most productive of various sources of evidence, as this role offered the possibility to perceive reality from the viewpoint of someone “inside” the case rather than external to it (Gans, 1962 in Yin, 2009). Yin (2009) believes that “a perspective, based on personal exposure to the issues being studied, is invaluable in producing an accurate portrayal of the case” (p. 109). This insider view, in addition to multiple evidence sources that are used to compare and corroborate research data, can give me true exposure to what is going on in the CPhA environment, and serves as the cornerstone for internal validity to be established.
4.3. Methods

Table 4 summarizes methods with respect to the research questions.

Table 4

*Research Methods per Research Questions*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Methods</th>
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<tbody>
<tr>
<td>RQ1 (issues reported in user feedback)</td>
<td>Analysis of feedback comments</td>
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<tr>
<td>RQ2 (value of user feedback)</td>
<td>Semi-structured interview*</td>
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<td></td>
<td>Analysis of email correspondence’</td>
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<tr>
<td>RQ3 (Issues in feedback management)</td>
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<td>Analysis of email correspondence*</td>
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<td>RQ4 (Development of an improved feedback management process)</td>
<td>Semi-structured interview on current practice*</td>
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<td>Proposal for system features</td>
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<td>RQ5 &amp; 6 (Factors related to innovating feedback management process)</td>
<td>All-hands meeting’</td>
</tr>
<tr>
<td></td>
<td>Semi-structured interview on factors</td>
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</tbody>
</table>

* Each of these methods served to answer multiple research questions.

Technology was employed to facilitate data collection. For example, as the CPhA and I are located in two cities 200 km apart, remote observation was conducted on a computer for task analysis; and telephone interviews were used after the participants and I got to know each other.
4.3.1. Analysis of Feedback Comments

The dataset comprised 313 constructive feedback comments that were collected between August 2008 and March 2009 in the Pluye et al. study (2009a). Pharmacists made these comments on 94 of a total 134 topics in e-Therapeutics+®. To re-analyze previously collected data that were gathered by others is considered secondary analysis, and its focus is on analyzing rather than collecting data (Neuman, 2000; Trochim & Donnelly, 2007). The advantages of secondary analysis of already existing data is that it is efficient and saves cost and time of data collection, so long as the existing dataset can serve the purpose of the research. In this case, (a) pharmacists are CPhA members, and represent a primary audience group of e-Therapeutics+®, (b) participant recruitment and data collection was rigorously designed and carried out in the Pluye et al. study, and (c) the therapeutic topics used to generate user feedback, as selected by the expert editors, were representative of the content of e-Therapeutics+®.

The feedback was collected through a web form designed according to the Information Assessment Method developed by Pluye et al. It is composed of items with Yes/No options as well as a textbox for entering open-ended comments. These comments were the subject of analysis in the present study. The online feedback form is provided in Appendix D. Respondents submitted feedback via the Internet. The quality of data is very good, as they have been saved in structured spreadsheets and are clearly readable.

The aim of this analysis was a typology of issues reported about the e-Therapeutics+® product. The unit of analysis is one comment, typically short, such as “Please give some examples of low doses of antipsychotics.” I used inductive thematic analysis (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006) where themes are identified within the data (no pre-
existing coding scheme). Coding was done at the latent level, as opposed to the explicit semantic level, by reading each comment in order to pick up the underlying ideas and assumptions held by the feedback provider that may sometimes be beyond what has been written. For example, I could interpret “not convinced” based on a feedback comment that did not actually say that, i.e., not explicitly expressed at the semantic level (e.g., the respondent simply describes a scenario that does not comply with the given treatment recommendation) (Braun & Clarke, 2006; Krippendorff, 2004). “Latent coding tends to be less reliable than manifest coding, by which only the visible, surface content is considered, but the validity of latent coding can exceed that of manifest coding because people communicate meaning in many implicit ways that depend on context, not just in specific words” (Neuman, 2000, p. 296).

The following key criteria, proposed by Braun and Clarke (2006) were observed in data analysis:

- Each data item (comment) has been given equal attention in the coding process;
- Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive with regard to the complete dataset;
- All relevant extracts for each theme have been collated;
- Themes have been checked against each other and back to the original dataset (i.e., 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, made sense of—rather than just paraphrased or described;
• Each theme is represented with three components: a label (e.g., “Missing details”), a definition (e.g., “The information is so general that it cannot be used to guide practice”), and one or two examples;
• Analysis and data match each other: the extracts illustrate the analytic claims (see Results Section 5.1);
• Together, the themes can adequately capture the majority of the data (in fact all of the present dataset), and there is not too much overlap between themes (i.e., only partial overlap between two of a total nine themes as a result of this thematic analysis).

4.3.2. Semi-structured Interview on Current Practice

Semi-structured interviews were used to answer RQs 2, 3 and 4. In the interview guide (Appendix E), probing questions are grouped into two sections: one on staff’s perceptions and the other on their experiences (i.e., facts). This structure complies with the perceived and the realistic value approaches outlined in the conceptual framework (Section 3.1). The semi-structured interview guide helped me to remain focused on the topics (i.e., research questions), but unprompted probes followed whenever I felt there was a need or an opportunity for more explanation. I refined the wording of the interview guide with a native English speaker with a PhD in Education in Curriculum and Literacy Studies, and then reviewed the guide with my co-supervisors.

All six clinical editors, the Editor-in-Chief and the Senior Director at the CPhA responsible for digital publishing answered the following open-ended question:
• What did you think about the usefulness of feedback comments from health professionals?
The following question, asked at the end of the interview session, 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/phrased to not preoccupy or confine participants to any particular perspectives, and contributed to understanding the perceived value of user feedback with regard to RQ 2 (i.e., on the value of feedback).

In addition to the two open-ended questions, I discussed with the six editors what they had done in response to 40 constructive feedback comments that are representative of reported issues (themes) as identified in the above Section 4.3.1. Of the 40 comments, 18 led to changes to e-Therapeutics+® content (see Appendix F for the interview schedule). Two versions of questions were used in the discussion about the two types of feedback comments.

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, somewhat useful, or not at all?
- Did you discuss this feedback comment with your colleague(s)? If yes, what did he or she say?

Some interview questions are applicable to only actionable comments (i.e., regarding what was done to correct a problem) or non-actionable comments (e.g., why was it difficult to do anything?) The reason for considering comments that did not lead to content change is that it overcomes being narrowly limited to immediate performance results and product deliverables (see Literature Review Section 2.3.1) by recognizing the value of feedback comments that have been identified as potentially constructive. Those questions sought facts of the matter (e.g., a decision, a corrective measure) as well as the interviewee’s opinion about the matter (e.g., difficulties, lessons learned). The objective was to uncover as much as possible the potential value of feedback, especially in the form of knowledge rather than just immediate tangible improvements.

The above questions served (a) to study the realistic value of feedback with regard to RQ2, and (b) to clarify task objectives of feedback processing and to reveal any issues encountered with regard to RQ3.

For RQ2, the design of 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). For RQ3, the questions covered the lifespan of a feedback comment from its initial reception by the editor to the resulting content change, representing the complete temporal dimension of feedback processing (see Conceptual Framework Section 3.2). This feature served to answer the third research question. The interview questions were reviewed by my co-supervisors, and their appropriateness was also confirmed by a participant:

“The interview … went well, and I think your questions are appropriate …” [Comment made by a participant with PhD-level research training]

In terms of data analysis, the perceived and realistic approaches (proposed for studying the value of information in Conceptual Framework, Section 3.1.) were taken in order to answer RQ 2. Interviews were first transcribed and each participant received an alias name to protect identity, then I read the transcripts and did manual coding using pen and paper.

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 as evidence of realistic value. Following the realistic value approach, the analysis of data was theoretically driven by 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, as these three types of value have been conceptually defined in Section 3.1. In contrast to the realistic approach, the analysis for perceived-value did not require a strong theoretical orientation, and I followed the principles of inductive thematic analysis (Braun & Clarke, 2006), as explained above in methodology (Section 4.3.1).

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 …”) had been presented by the participant, hence a realistic approach.

With regard to RQ3 (i.e., the feedback process and any issues within), inductive thematic analysis (Braun & Clarke, 2006) of interview transcripts was performed (a) to clarify task objectives of feedback processing, and (b) to reveal any issues encountered by the CPhA. For example, task clarification revealed an essential three-step procedure: read/interpret – investigate/communicate – change/no change (to e-Therapeutics+®). Then, themes in feedback processing were determined in relation to each of the three steps. Such themes are often characterized by cognitive activities taking place in a sequential order: for instance, the editors often need to critically re-examine the content and the way content is presented (e.g., the clarity of wording). When e-Therapeutics+® content is in question, an investigation ensues and during the investigation, editors would sometimes bring the reported issue to the attention of the original chapter author so that it could be addressed in a subsequent version.
Analyzing current practice is (just) a prerequisite to identifying opportunities for improvement. Specifically, every attempt by CPhA staff to elicit knowledge from the feedback comment and the difficulty in making that attempt was associated with task objectives and activities in the process. Subsequently, I examined whether the activity adequately supported the task objective. For instance, the editor sometimes wishes to group comments pointing to the same issue, but this activity has not yet been adequately supported with tools currently in use. Hence this identifies an issue with regard to RQ 3.

During data analysis, particular attention was paid to (a) the decisions made in interpreting and responding to the feedback comments, and (b) any difficulties in learning from them, since a good understanding of what has been done in response to reported issues and what may be improved concerning these issues could guide the design of a better feedback process (i.e., RQ 4) (Carroll & Johnson, 1990, in Yin, 2009; Szulanski, 2000).

For RQ4 (i.e., an improved feedback process), the following open-ended question was posed for the editors’ perceptions about the way feedback has been handled in general and the areas requiring improvement.

- What is your general perception about the way that feedback comments are currently being collected and processed?
  (Further probe: possibilities of improvement?)

This open question and the accompanying probe proved to be effective, as some editors suggested features that an information system could offer to make feedback handling less cumbersome and better organized (e.g., organizing comments per chapter, reminding to follow up on
investigation and communication, and clearly marking the conclusion of each comment). Moreover, all editors, in responding to this question, pointed out that the screening of comments for investigation is a laborious task, and suggested that it should be facilitated as much as possible.

4.3.3. Structured Questionnaire
With respect to RQ3, a questionnaire (Appendix G) was constructed to examine the current practice of feedback handling. The structure of the questionnaire followed the conceptual framework (Section 3.3.2) for outlining a complete and detailed process of (feedback) information use in the organization, which would enable further identification of issues and opportunities for improvement (Hammer, 1996). The scope of the questionnaire covered a wide span, from feedback data retrieval to making a change in e-Therapeutics+. Based on my knowledge as a participant, I listed tasks essential to the feedback handling process. Under each task, I first described what was done in order to complete a task (e.g., “An FTP server stores the feedback data file, which is updated regularly.”) and then listed the items designed to clarify the activities and the tools involved in feedback handling (e.g., “What is the backup frequency/period, e.g., weekly?”). The items solicited responses in four different forms: (a) multiple choice, (b) Yes/No; (c) open-ended questions, and (d) free-text comment boxes. A comment box followed each task to capture information not mentioned in the structured items. In addition to being able to represent the conceptual framework, a structured qualitative research instrument as such allows easy consolidation of responses from different participants (Lindlof & Taylor, 2011; Patton, 2002).

The questionnaire was reviewed by one of my supervisors, who leads the umbrella participatory research program between McGill University and
the CPhA, and has expertise in instrument development. My knowledge about the CPhA and research instrument development led to improving the validity (i.e., item descriptions as well as clarity) of the questionnaire.

The questionnaire was created as a fillable PDF form, and the Editor-in-Chief and the IT Director completed the questionnaire, as their two departments performed all functions of feedback processing.

The objective of data analysis was a detailed overview of the whole process from feedback collection to problem investigation and communication with external parties (e.g., chapter authors and reviewers), decision-making (i.e., change or no change), and finally implementation of content changes. Not only did I map out the complete process, but details were scrutinized to the finest possible degree at the activity level. This included how to deal with the information at all stages (e.g., a text file containing feedback data to be imported into an Excel spreadsheet) and what actions were taken. These actions included, for example, screening constructive feedback comments for investigation, reviewing the literature, and communicating with the author. The time required for each activity was also taken into account. For example, screening would take less than one minute per comment but investigation could take a few days. Particular attention was paid to the cognitive activities that occurred during task performance (e.g., the feedback was interpreted in the context of the whole chapter). Facts documented in this questionnaire were then combined with other evidence sources such as email correspondence between editors and authors of e-Therapeutics® chapters, my observation about how the stakeholder performed the screening of comments, and my own hands-on experience.
4.3.4. Analysis of Email Correspondence

Of the essential steps identified in the interview, investigation and communication between editors and chapter authors represents a crucial step in deciding whether a change is needed. During the interview, I noticed that editors brought with them printed emails to facilitate recall of past details. Then, I asked for their permission to read the email correspondence. Not only did the CPhA editors readily agree, they stapled related emails together with each comment discussed in the interview. By adding data collection methods not pre-built into the research plan, I kept myself open to opportunities that appeared by serendipity in the unique project setting. This flexibility resonates with Eisenhardt (1989) that it is legitimate to alter and even add data collection methods during a case study because it helps me “to understand each [organizational] case individually and in as much depth as is feasible” (p. 539).

The email records were analyzed using the same thematic analysis technique as detailed in Section 4.3.1 (interview transcripts), particularly to understand the communication and collaborative activities which occurred during and after an investigation was triggered by a comment.

This evidence effectively contributed to RQs 2 and 3 by identifying the complex nature of intellectual exchange that occurred during feedback processing (e.g., one email thread might deal with single or multiple comments, and a thread could take from hours to weeks to resolve, using the knowledge of both internal colleagues and external chapter authors).

4.3.5. Remote Observation

The Editor in Chief performs the critical task of screening comments for investigation. This task was closely observed because it was a bottleneck
in feedback handling. Because the CPhA and I were in separate cities 200km apart, on-site observation was inconvenient. Remote desktop software was employed to conduct the remote observation.

After a review of software tools that support remote desktop observation, TeamViewer® was selected. The key selection criteria were:

- No need for installation,
- No training with minimal intervention required at the observed end,
- Capability of recording screen activities continuously for one hour or longer in an efficient video compression format.

A pilot test of the software tool was conducted successfully with two sessions each lasting over four hours; this was deemed more than sufficient for the data collection (observation) need.

I scheduled a time with the Editor-in-Chief, and deployed the software via email with a direct link for download-and-run. The task of screening feedback comments was observed for 45 minutes, during which the Editor-in-Chief remained on the phone with me to explain what she thought might not be obvious through observation.

Analysis of the task was focused on activities of collating comments for investigation by the responsible editor. This involved copy/pasting comments into an email of instruction. Following the structured conceptual framework for process examination (Section 3.2), activity-level analysis pinpointed exactly what was causing the bottleneck. By collecting evidence at this high level of granularity, remote observation provided a microscopic view of the screening task which could not be obtained in
the interview, and contributed to RQ3 by revealing issues in feedback processing.

4.3.6. **Hands-on Practice**

I took part in feedback processing by performing the task of identifying new constructive feedback comments. Specifically, I retrieved feedback data in plain text format from an FTP server, imported the text file (‘~’ delimited) into an MS Excel spreadsheet, and compared the data sheet with the previous one to identify new feedback records. Then, I read each new comment, and applied rules (previously developed in partnership by university researchers with CPhA editors) to identify comments that had potential constructive value (e.g., a comment saying that the wording was unclear). Then, a report with selected feedback comments was created and emailed to the Editor-in-Chief at the CPhA.

This participation activity directly contributed to my knowledge about a key task in the process, which is immediately relevant to RQ4. Using knowledge gained through this practice, I was then able to make suggestions for a support system by specifying technical requirements related to this task.

4.3.7. **Proposal for System Features**

Combined evidence from the above methods provided me with detailed knowledge of exactly how the feedback comments were handled and what issues were encountered by the CPhA. Based on that knowledge, a proposal (Appendix H) was made with suggestions for improvement, many of which were expressed in operational terms, e.g., in what way a system could help editors with certain tasks. The proposal followed the same presentation style as the questionnaire designed for process audit.
With regard to each task objective, I first presented my observation by integrating all the above evidence, then followed with my suggestions (e.g., to use a database for registering feedback data instead of a text file). Finally, suggestions and comments were invited, for instance, on a virtual server for hosting the new feedback system.

The proposal was sent to ten participants, including eight editorial, IT and production staff at the CPhA, and two other university researchers who have been involved in the broader participatory research program. The proposal served as a medium for documenting discussions on (a) the system features required by the user (staff) and (b) the available conditions (e.g., time, budget) and factors (e.g., operational goals, related parallel projects) that should be taken into account within the organizational context.

Data collected by the proposal directly contributed to determining requirements for a technological solution to address identified issues, so that task objectives can be attained in a more efficient way. The outcome consisted of a package of features that were likely to be feasible.

4.3.8. Prototyping
To enable a better feedback process, a key task of this action research project is to design an information system. This action component characterizes one important aspect of this participatory action research project, as it generated practical insights about what would work for the CPhA and served as an effective link between research and practice (see Section 4.1 for the rationale of integrating action in research), contributing to adequately answer RQ 4 “What process can be designed from the CPhA to facilitate the use of health professionals’ feedback comments?”
An effective approach to information system design is to adapt and combine useful elements from various design methodologies in order to suit the particular needs of the current project. Such an approach has been proven effective by Large and colleagues (Large, Beheshti, Nesset, & Bowler, 2004) in designing Web portals with/for children. Through this integrative approach, the various techniques of disparate design methodologies can be combined. Large, Nesset, Beheshti, and Bowler (2006) conducted a literature review of design methodologies in order to arrive at one of their own fit. Following the same approach, I summarized six system design methodologies in Appendix I, and applied useful elements in guiding this prototyping.

In particular, the review suggests that prototyping is an effective method for (a) confirming system features required by the user, (b) proving technical feasibility, and (c) carrying out a design project in an iterative way. In this study, prototypes were also crucial in providing a concrete subject of discussion, which ensured consistent understanding between all participants who were to be involved in subsequent interviews. Actually developing prototypes minimized the distance of an academic research project from the actual practices in question, hence the truthfulness to the real-world project.

As the first step, electronic paper prototypes were used to confirm features and interfaces of a feedback management system. Eight interface prototypes were created as MS Word documents (Appendix J). The editorial staff (i.e., end-users of the feedback system) used MS Word’s “Track Changes” to make suggestions on the documents and subsequently emailed them back to me. Then, I used my expertise to
consolidate the suggestions. A few iterations were completed before a functional system prototype (i.e., software application) was developed.

The technical nature of the functional prototype was rather simple. It was comprised of a light-weight database (just a few fields) using the open-source MySQL. The application interfaces were developed with PHP and HTML. The outcomes of prototyping included a functional system, which was demonstrated at a CPhA all-hands meeting, and a document of system requirements that can be referenced in future development work.

4.3.9. All-hands Meeting
Group meetings are widely used in design projects (Tang, Bouthillier, Pluye, Grad, & Repchinsky, 2012). On 16 May 2011, an all-hands meeting was held at the CPhA. Attendants included CPhA members that have been or may become involved in the feedback project. With the presence and help of a co-supervisor, I achieved three objectives at that meeting:
1. Demonstrate and solicit feedback on the functional prototype representing a new feedback process and system;
2. Prepare a common understanding for subsequent interviews;
3. Conduct verbal and non-verbal observations about the organizational context (i.e., with regard to RQs 5 and 6).

The presentation was given in four parts:
1. I reviewed the feedback project (progress update);
2. I presented the prototype by explaining each functional module in relation to issues identified in the feedback management process (RQ 3) and in response to stakeholder needs;
3. A question-and-answer session ensued;
4. I explained the next steps (e.g., interview).
While I delivered the presentation, one colleague of mine took notes of verbal questions and my co-supervisor took notes of non-verbal interaction between the attendees. These notes provided a fuller picture of the group dynamics. For example, participants’ questions indicated that both the feedback process user (i.e., editors) and the support staff (i.e., IT staff) contributed to designing a feedback system (i.e., RQ 4); however, the questions also indicated that there was no shared understanding as to whether it would be better to have a tool that simply facilitates the existing workflow or to build a completely new workflow and system.

In relation to RQ5 (i.e., on contextual factors), the observations provided evidence that members of the organization may hold different views about what might be considered as appropriate features of a technological solution, hence a factor of functional appropriateness (see Results Section 5.6). The non-verbal notes also captured signs that there were different views between participants from different departments.

When the prototype was presented at the meeting, participants actively discussed and reached a common understanding about the feedback management process being proposed. This alignment of understanding facilitated subsequent data collection through interviews, and ensured that views expressed in the interviews were consistently based on the same context.

4.3.10. Semi-structured Interview on Factors
For RQs 4 and 5, interviews were conducted to examine various factors defined in the conceptual framework (Section 3.3). Participants came both from staff that have been directly involved in process development (e.g., senior management overseeing organizational development), as well as
from those who have not. English is the working language at the CPhA, and the interviews were conducted in English at CPhA’s office or over the phone. The interview guide can be found in Appendix K, and its design is explained below.

Structure of the interview guide (research instrument)

Having gone through the development of a feedback management process, CPhA participants and I were able to reflect on what took place during that development and to identify any relevant factors based on that experience. Factors that would become involved in process implementation could only be anticipated and explored through discussion, because by the time of the interview the feedback management process had not been implemented. Consistent with the conceptual framework (Section 3.3), interview questions were organized sequentially: from development through to implementation of the feedback management process.

Four dimensions were further specified to enable the development of a research instrument in a way that fits with the specific organizational case. With respect to development, the motivation dimension concerns factors (both individual and organizational)\(^7\) that contributed to the orientation of the organization towards improving feedback management, whereas other factors were associated with the functional design dimension for a new process/system. The implementation of a feedback process, as noted in the Frameworks section, is not a one-shot action and involves first the deployment of the new process/system, as well as the continuous execution of the process and on-going maintenance of the support system,

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\(^7\) Organizational motivation refers to “the basic orientation of the organization towards innovation, as well as supports for creativity and innovation throughout the organization” (Amabile, 1996, p. 8).
i.e., sustainability. The definition of these four dimensions provides a basis for adapting factor-specific items (i.e., questions) from the literature for this study, in terms of instrument development and data analysis.

Interview questions regarding the individual-level factors were presented together, prior to questions regarding the organization-level factors. This structure allowed participants to easily focus upon one subject (individuals) before moving on to thinking at another level (about the organization).

Instrument development
As noted in the conceptual framework (Section 3.3), seven studies operationalized research variables (i.e., factors) with validated items. I adapted instruments from six of those studies, and the exception (i.e., Ingersoll et al. 2002) was due to a copyrighted instrument (i.e., the organizational culture inventory).

Instrument adaptation is a common research practice. For example, the wide use of Texas Christian University’s ORC assessment (Organizational Readiness for Change) supports such adaptation. While the major focus of ORC was to identify organizational and staff factors related to adoption of new technologies and more broadly organizational change, OCR authors developed the instrument to represent the most relevant variables for studying innovation and change efforts in substance abuse treatment agencies (Lehman et al., 2002). However, alternative versions of the ORC instrument have been developed for other applications (i.e., more than 4,000 surveys by over 650 organizations between 2002 and 2007), representing wide variations in the structure, purpose, and locations of those organizations (Weiner et al., 2008).
Another reason for adaptation can be attributed to the objective of this research, that is, to understand the working of factors. The seven studies and their instruments were designed to assess organizational readiness for change. For the purpose of prediction, they collected data through surveys and quantitatively indexed each factor (Weiner et al., 2008). The survey method takes a snapshot of the organizational factors at one point in time, usually before the outcome is measured for the change. However, two constraints have to be addressed with respect to the present study. First, the choice of factors to be included in the surveys was based on selective propositions in the literature: authors of the seven studies aimed at devising measurement items that can adequately reflect the constructs’ theoretical content (internal validity), and each study represented a limited range of factors. The second limitation is inherent in the survey method. Scalar measurements (i.e., Likert scale items) allow the use of factor analysis to ensure an acceptable level of statistical reliability as well as predictive and convergent validities, but there is no explanation of the impact of each factor on the change initiative being examined. That is, no details were presented as to how the active factors would then perform in order to deliver their impact over the course of change (e.g., in what way a lack of IT skills would slow the adoption of new software tools). In contrast, the present research used the qualitative interview method and emphasized relevant features of content validity for the interview guide, e.g., representativeness defined as the degree to which a research instrument represents all constructs under study (Haynes, Richard, & Kubany, 1995).

Construction of the interview guide was done in five steps, with the objective of arriving at a valid instrument following principles outlined in the literature (Haynes, et al., 1995; Vogt, King, & King, 2004):
1. Clarify definitions of factors in specific relation to the CPhA setting;
2. Group items from original instruments (six studies) for each factor;
3. Determine items relevant to the four dimensions specified;
4. Merge similar items and re-word them to suit the present case study;
5. Perform content validation: (a) a critical review of item translation, using two doctoral students to maintain adequate representativeness of targeted factors over the adaptation process, and (b) a review of the clarity of wording, using two native English speakers, one PhD and one MLIS, both with training in literacy. The validation covered the individual items (probes) as well as verbal instructions.

The adaptation process has been documented in Appendix L.

According to the differing involvement of participants (examples below), questions were presented in different versions to ensure relevance, that is, appropriateness of asking the right question to the right person.

- Editorial staff – carry out the feedback management process, use the system, and respond to user feedback by editing the information resource;
- Senior management – whose decisions and support are important for realizing the new feedback management process;
- IT personnel – their work and knowledge about the organization’s IT resources are crucial for initial system deployment and on-going maintenance.

The following examples illustrate how unique questions were formulated:
For editors: Did you recommend any specific features or changes for the feedback management system?
For senior management: Have you stated your support for developing a formal feedback management process in the CPhA?

For IT staff: What do you think about the conditions required for sustaining the long-term operation of the feedback management system?

**Data Analysis**

Interviews were transcribed. The first step of analysis was to consolidate discussions with different participants under each factor. Because each interview question was created in association with just one factor (see interview guides, Appendix K), consolidation was done by copy/pasting all participants’ responses to the same question into one document which was named after the targeted factor.

Coding was done manually at two levels. I read through answers pertaining to each factor and made judgments about (a) whether facts (evidence) were presented as showing the active performance of the associated factor (referred to as an ‘expressive’ factor in this study), (b) whether the factor might, as suggested by the participant, play an active role even though it was not observed (referred to as a ‘latent’ factor), (c) on which dimensions the factor had/would have an impact, (d) in what way the factor has/would have interacted with other factors, (e) whether the evidence involved factors other than the targeted factor, and (f) whether evidence presented by different participants was inconsistent. Participants did not represent a homogeneous group. Differences can be found between staff and managers, as well as between users of the process (driven by perceivable benefits such as efficiency improvement) and those in a supporting role to enable (but not benefiting directly from) the new
feedback management process/system. Inconsistent responses are compared and reported to present a full picture of factors in action.

The above can be considered as first-order sense-making from the observed phenomenon, and based on which I was able to generate second-order understanding of “ideal types” (Fereday & Muir-Cochrane, 2006)—the derivation of theoretical knowledge—in two forms. First, I summarized what lessons can be learned from the first-order understanding how factors (would) have played out in the CPhA. The lessons learned can be useful to the CPhA stakeholder and/or be further tested and potentially generalized to other settings.

The following example shows how a lesson learned was produced based on a first-order finding.

**The finding:** Senior management has not specifically expressed support because specific requirements for implementing a new feedback process had not been clarified.

**The lesson learned:** To secure support from the senior management, it is important to clearly specify the required conditions.

Second, relationships between factors and dimensions were modeled according to the conceptual framework proposed in Section 3.3. In order to model the organizational phenomenon in terms of relationships between factors and dimensions, a factor would be registered in a dimension as long as it had been suggested by at least one participant. When a factor was mentioned in relation to multiple dimensions, it would be registered with all of them. When evidence representing another factor was observed or when the presence of another factor could be inferred, it would be related to the targeted factor and I would determine their inter-
relationships. For example, communication (i.e., factor B) was mentioned during the discussion about trust and cooperation (i.e., target factor A), and I observed it as being able to facilitate the latter, that is, a facilitative relationship between the two factors.

4.4. Ethics

Ethical issues, including confidentiality, informed consent and secondary use of previous research data (subject to stakeholder approval) are addressed by ethical guidelines approved by the university and guiding principles agreed by the CPhA for this participatory action research.

Because this study is an extension of Pluye et al.’s ongoing research, and involved the same participants in an identical research environment, Guiding Principles for PAR are adapted from those used in the original study. The main elements of adaptation were that (1) I conduct the project primarily in an apprentice’s role rather than as an independent investigator, hence the special role of my supervisors, and (2) there is a technology component. The first consideration is reflected in the Guiding Principles, and the second was discussed above in Section 4.1.

Ethical approval was obtained from McGill University’s Research Ethics Board (REB-II) before the research project began. Interview guides were reviewed by the REB as part of this review process.

Separate consent forms were designed for the interview on the current practice of feedback handling and for the interview on the study of factors.

As an amendment to the on-going Pluye et al. study, consent for secondary analysis of data was obtained from the lead investigator.
CHAPTER 5. RESULTS

Research findings are summarized in relation to RQs in Table 5 and then presented in this chapter following the order of the research questions.

Table 5

Summary of Results

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Research Findings/Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ 1: Issues reported in the feedback.</td>
<td>● A typology of nine reported issues</td>
</tr>
<tr>
<td>RQ 2: Usefulness of feedback to the CPhA.</td>
<td>● The perceived and realistic value of feedback comments to the CPhA</td>
</tr>
<tr>
<td>RQ 3: Issues in feedback handling.</td>
<td>● An 11-task feedback handling process</td>
</tr>
<tr>
<td>RQ 4: Process for improving feedback use.</td>
<td>● Nine issues in feedback handling</td>
</tr>
<tr>
<td></td>
<td>● A technological solution to address the identified issues</td>
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<tr>
<td>RQs 5-6: Factors affecting the development and implementation of a feedback process.</td>
<td>● The impact of individual factors</td>
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<tr>
<td></td>
<td>● The inter-relationships between factors</td>
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<tr>
<td></td>
<td>● Factors identified in addition to the predefined ones</td>
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<tr>
<td></td>
<td>● Insights (i.e., lessons learned) based on findings about each factor</td>
</tr>
</tbody>
</table>

5.1. A Typology of Reported Issues

With respect to RQ1 “What types of issues are reported in pharmacists’ feedback comments?” nine categories of reported issues were identified, representing a typology of issues reported with respect to the 98 highlights extracted from e-Therapeutics+. For each category, a definition is provided where the label is not self-evident, as well as a comment example. A corresponding highlight is listed to help better understand the comment. Findings are based on the analysis of feedback comments (Methods Section 4.3.1).
1. Missing details (i.e., unspecific information)

Definition: The information is so general that it cannot be used to guide practice.

Comment: “This information is too vague. I would like to see "occasional" and "short-term" replaced with specific guidelines, i.e., not more than once a month and each period not to exceed 3 days (or whatever is appropriate). Even if there isn't clear evidence to support the recommendation, there are likely expert recommendations or suggestions.”

Highlight: “For symptomatic relief (decreased redness, edema) of allergic or viral conjunctivitis or minor eye irritation, ophthalmic vasoconstrictors should be reserved for occasional and short-term use. Overuse may cause rebound hyperemia.”

2. Missing relevant information (i.e., incomplete information)

Definition: the integrity of the information is complete and the information is usable in practice, but something that is relevant to the given information and can be potentially useful has not been mentioned; asking for the given information to be expanded, without questioning the given information.

Comment: “Where is Abreva (OTC8) positioned as a cold sore remedy?”

Highlight: “Topical antiviral creams are effective but require frequent applications and carry a risk of self-inoculation … Provide patients with prescriptions for antivirals to enable them to self-initiate therapy at the onset of symptoms.”

---

8 All acronyms in this section (e.g., OTC, COX-2, ASA, and etc.) refer to disease or drug names.
3. Reservation or disagreement (i.e., incorrect information)
Definition: different personal opinion stated, may be backed up by research-based evidence or judgment based on personal knowledge.
Comment: “Very important and relevant info. I'm not sure if I agree with a blanket warning on COX-2 inhibitors. ... In general I would agree they are best to avoid but the statement makes it seem as if it's 100% certain.”
Highlight: “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.”

4. Suggestion for other evidence that would put the given information in question (i.e., conflicting with other evidence)
Definition: rather than just questioning the given information, specific information is provided in the feedback that may corroborate, refine, or contradict the given information per se, rather than expanding the given information (i.e., missing relevant information). This makes the given information questionable (i.e., expanding by providing other additional information does not address the issue in lieu of the suggested evidence).
Comment: “From a clinical perspective, if pts are on ACEI +/- ARB + spironolactone, I would suggest at least monthly monitoring of K+ — see heart failure study with spironolactone.”
Highlight: “Closely monitor potassium after introducing or changing the dose of any medication that could induce hyperkalemia such as ACE inhibitors ... Measure potassium one week after the introduction of these medications and after any change in the dose.”
5. Difficulty of understanding (i.e., confusing information)
Definition: unable to (easily) get the meaning of the given information due to grammatical errors, verbose or ambiguous wording, or the statement is obscure, self-conflicting, misleading or incomprehensible.
Comment: “This statement is not clear - does it mean that the duration has been shortened by 24 to 60 hours (i.e., typical duration is 7 days, with treatment duration is 2-6 days) or does it mean that the influenza will endure for 24 to 60 hours.”
Highlight: “Studies in otherwise healthy adults taking a neuraminidase inhibitor show a reduced duration of illness of 24 to 60 hours compared to placebo in otherwise healthy adults.”

6. Ineffective presentation of content (i.e., badly structured/formatted)
Definition: understanding of the meaning can be achieved, but the display format and/or structure of the information object (i.e., e-Therapeutics+® chapter) hinders comprehension.
Comment: “I didn't like the use of an acronym SPB because I didn't know what that was and then had to scroll back to find out what I was reading about.”
Highlight: “Use prophylactic antibiotics only after a patient has experienced one episode of SBP.”

7. Impracticability or irrelevance for practice (i.e., inapplicable)
Definition: the given information contradicts or is irrelevant to or impractical in clinical practice in general.
Comment: “The information in interesting, but beyond the scope of my practice. An ophthalmologist would be advising me on this subject.”
Highlight: “Dorzolamide/timolol, brimonidine/timolol, latanoprost/timolol and travoprost/timolol are all more effective than the individual agents, and they have similar ocular hypotensive effects.”

8. Lack of quality, novelty or value in the conveyed knowledge, or in the way the information is disseminated (i.e., unreliable/stale)
Comment: “the [referenced] study is poorly designed.”

9. Usability problem with features of the information resource (i.e., poor usability)
Comment: “… It would be really helpful if a list of similarly spelled drug names to what you entered came up instead of "nothing matched your criteria" (e.g. when I enter "cephazolin" it would offer me the alternate spelling of "cefazolin" instead of nothing). I often have to go Google to find alternative spellings (or the correct spelling) before I can come back and use e-CPS. This is time consuming and annoying.”

This typology of nine reported issues contributes to CPhA’s understanding about the feedback comments from health professionals. Except the issue related to usability, eight of the nine issues are related to the content of e-Therapeutics+. This indicates that addressing them through effective feedback management is immediately relevant to improving the content of the information product and to the editorial work. Potential use of this typology is elaborated in the discussion and contributions (Sections 6.1 and 6.3.2).
5.2. Value of the Feedback Comments to the CPhA

With respect to RQ2 “In what way might pharmacists’ feedback comments be useful to the CPhA?” the data were collected through semi-structured interviews (Methods Section 4.3.2) and records of email correspondence (Methods Section 4.3.1), and the analysis of the value of feedback comments followed the conceptual framework outlined in Section 3.3.3.

Findings following the perceived value approach are as follows:

• 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).

“This is a vehicle...that we gather important information about what’s important to our readers and how they are reacting to it, and what they need...or whatever.” [Interview with participant No. 3]

“...the content has to be driven by the evidence... it also has to be driven by user needs.” [Interview with participant No. 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.” [Interview with participant No. 6]
• The feedback channel provides an on-going 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.” [Interview with participant No. 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.” [Interview with participant No. 2]

Following the realistic approach (i.e., the observed value as opposed to that which is perceived and might happen), the value of feedback comments are examined in 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 as a whole.
Inherent value

The inherent value is not merely perceived, but has to be justified on the basis of facts. For example, a well written article can (only) be established of inherent value when 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 Section 3.1, this value is philosophically established and can be justified on the basis of logical reasoning: 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., the 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 an article can be justified as to its inherent value for the information it carries, a constructive feedback comment also has inherent value when it has derivatively enabled the other types of value as detailed 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 exercised 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.”
[Interview with participant No. 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 No. 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.” [Interview with participant No. 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.”
[Interview with participant No. 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 un-
related, 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.” [Interview
with participant No. 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 can be
observed 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 utilities 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...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.” [Interview with participant No. 5]

And, the investigation may overlap with the on-going 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.” [Interview with participant No. 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.” [Interview with participant No. 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 …” [Interview with participant No. 2]

This is also supported by the email correspondence (dated 23-28 July 2009) between participant No. 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?” [Email correspondence between participant No. 1 and No. 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…” [Interview with participant No. 5]

3. Content change – usually within two 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 re-wording 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 two 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 two years.” [Interview with participant No. 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.” [Interview with participant No. 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 supports, and [the recommendation is] still supported today.” [Interview with participant No. 3]

Re-wording 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 …” [Interview with participant No. 5]
Contributory value

Although related, contributory value and instrumental value are not the same (see Section 3.1). While instrumental value ascribes to activities and immediate outcomes of information use, contributory value is demonstrated through (a) a connection to a whole that the actor (who performs the activities) belongs, and (b) an often partial contribution to promote a given purpose of the whole (e.g., feedback use by individual editors alone is contingent upon other parts of the organization such as the editorial process to be contributive to the CPhA as a whole entity).

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.” [Interview with participant No. 7]

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.” [Interview with participant No. 7]

These quotes are from a participant (No. 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 the above 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 explained in the discussion and contributions (Sections 6.1 and 6.3.1).

5.3. The Ad hoc Process of Feedback Management

In order to answer RQs 3 and 4 regarding issues to be addressed for improving the feedback management process, the first step was to map out the entire process as it had been practiced at the CPhA. This was done by scrutinizing every detail in the existing process, in order to identify issues at the task or activity level. Five sources of evidence contributed to the mapping of the feedback process and the identification of issues in it, including semi-structured interviews (Methods Section 4.3.2), a structured questionnaire (Methods Section 4.3.3), analysis of email correspondence (Methods Section 4.3.4), remote observation (Methods Section 4.3.5), and hands-on practice by myself (Methods Section 4.3.6).
The final ‘map’ of the feedback handling process consists of eleven tasks, starting from feedback collection to problem investigation and communication with external parties (e.g., chapter authors and reviewers), decision-making (i.e., change or no change needed), and finally implementation of changes to e-Therapeutics+® content. Following the structured process framework proposed in Section 3.3.2, Table 6 presents 11 task objectives grouped under the ACA constructs.

Table 6
Process Constructs and Task Objectives

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Task Objectives</th>
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<tbody>
<tr>
<td>Acquisition</td>
<td>1. Identify the opportunity to be informed by e-Therapeutics+® users</td>
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<td></td>
<td>2. Stimulate users to submit feedback</td>
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<td></td>
<td>3. Provide the access point (i.e., a button) in e-Therapeutics+® for users to initiate feedback</td>
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<tr>
<td></td>
<td>4. Provide the interface (i.e., feedback form) for users to fill in and submit feedback</td>
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<tr>
<td></td>
<td>5. Receive user feedback submissions (i.e., textual data)</td>
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<td></td>
<td>6. Organize and store feedback data to be retrieved/used</td>
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<tr>
<td>Cognition</td>
<td>7. Identify new feedback entries</td>
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<tr>
<td></td>
<td>8. Identify constructive feedback comments</td>
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<td></td>
<td>9. Screen feedback comments for investigation</td>
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<tr>
<td>Application</td>
<td>10. Conduct investigations</td>
</tr>
<tr>
<td></td>
<td>11. Make and document changes</td>
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</tbody>
</table>

After receiving a comment from the user (task objective 5), each subsequent task objective represents a discrete stop of the (feedback) information in the flow. Appendix G illustrates how each task objective and detailed activities have been defined.
A feedback comment may be determined as not requiring further investigation after review by the Editor-in-Chief (i.e., Task 9); it can be assigned a no-change decision after investigation (i.e., Task 10); or, it may finally result in a change to the e-Therapeutics® content (i.e., Task 11). These three tasks are the most crucial, and have therefore received particular attention during the study. In fact, the structured questionnaire was designed with just 10 task objectives throughout, having investigation and change implementation mixed together as one last objective. These two objectives were identified as being distinct through the interview. Some evidence is presented below regarding tasks 9, 10 and 11 respectively to illustrate the crucial cognition and application stages of feedback (information) use in detail.

Task 9: Screen comments for investigation

- Screening is necessary because not all comments are worth investigation.

“... because they are just expressing an opinion that isn’t really tell[ing] us anything that is clear ... so, there is a lot of work to go through them. Basically, it distills down to a small amount of high quality feedback that ends either changing or not changing our content ... I think of it as a valuable thing, but there’s a lot of extra work to get to the juice.” [Interview with participant No. 3]

Task 10: Investigate reported issues

- Usually, the editor needs to refer back to the whole chapter in order to appreciate the reported issue.

“I need the context of the chapter to get a better sense ... I’ve found the feedback we’ve got over the various ones that I’ve looked at ... hum ... I think sometimes it’s taken out of the context ... that’s how you tried to locate
the meaning of this problem within the context of the whole chapter … the reader doesn’t always do that.” [Interview with participant No. 2]

- Investigation is typically but not necessarily carried out once the reported problem is understood.
  “No, [we didn’t really bother going back to the chapter specifically for this comment]. Well, we looked at it, we looked at the state of affairs for that chapter, but didn’t need to go any further than that, because it was already in the way – does that make sense?” [Interview with participant No. 3]

- Investigation can be very swift, even instantaneous, while interpreting the comment of issues.
  “Well, in this case, it was pretty clear to us that, you know, adding a more recent reference would satisfy that particular reader, because they specifically stated that ‘I am surprised that the reference cited for this reference was from 1994’.” [Interview with participant No. 3]

- Searching for a solution can happen at the same time as the investigation, which may involve communication with other parties.
  “In reviewing the literature it does seem there is some disagreement over the conclusions of some major studies and I felt we should have the author’s view as well. His reply was …” [Correspondence records provided by participant No. 6]

- Options are explored for the most appropriate solution.
  “So, if [the sentence] can’t be shortened, can it be clarified? So, that was my thought process.” [Interview with participant No. 5]
• A legitimate problem does not necessarily result in a change to the content.
   “... to us, it’s probably just to leave it the same as it is, because there isn’t enough information [evidence] to be more specific about SNRIs, otherwise we would have done so. So, that’s sometimes what happens ... that was our plan to do so. As we went through to completion, it did not happen. So, there was just an intention to do something as mentioned in the email.” [Participant No. 1, in response to a comment asking for specific details on a group of drugs]

Task 11: Make and document changes
The types of change (e.g., updating references, making corrections, and rewording) have been illustrated in section 5.2 (Instrumental value of feedback), and are not repeated here. And, there are three types of actions to implement changes.

Major revisions – “when the authors look at the entire Chapter, and they can make major changes...hum... or maybe not depending on how much the topic has changed.” [Participant No. 5, this and below quotes]

Minor revisions – “which would we say, a new drug was added, and we want to put it in quickly, then we do a minor.”

Quick fixes – “which are generally more technical type of fix where we have a broken link [for example].” “The quick-fix is reserved for scientific editors to implement, and is not intended for content changes.”
Simply put, “there’s fewer steps in the quick-fixes, middle steps in the minor, and lots and lots of steps and a long time in the major.”
The required change may coincide with an on-going editorial process, obviating the need for additional actions.

“Well, it was already sufficient through the workflow to see that those things were addressed … it wasn’t complete yet, but it looked like that it was on the way to addressing that naturally … So, we knew at that point that section of the chapter had at least begun to change on its own … So, it was basically the whole change that was made to the chapter that covered this, this little issue here.” [Interview with participant No. 3]

To some extent, changes are documented in CPhA’s in-house content management system (CMS).

The CPhA uses a commercial CMS (the Documentum software) to archive all versions of an e-Therapeutics+® chapter. However, the CMS does not indicate/highlight the change (e.g., a sentence that has been modified) between two different versions of a chapter. The CMS is not used to keep record of the reason for making a change. [Interpretation of the response of participant No. 1 to a structured questionnaire]

Following the process based framework proposed in section 3.2, the above detailed mapping of CPhA’s current practice is the necessary first step to enable the identification of issues in dealing with user feedback comments.
5.4. Issues in Current Feedback Management

In regard to RQ3 “What issues does the CPhA encounter in making use of health professionals’ feedback comments?” nine issues were identified specifically concerning bottlenecking tasks, interpretation and preservation of understanding, knowledge exchange, collaborative decision-making, information flow, personal information management, the lifecycle of feedback, editorial workflow, and efficiency of work. All these issues relate to the cognition and application phases of feedback use.

1. As a critical but bottlenecking task, the screening of comments for investigation must be streamlined.

“We are depending [on her] to review them first, decide whether they need to be passed on ... if she feels it’s a valid comment that needs to be investigated ... then it comes to us.” [Interview with participant No. 5]

“I know that ... she gets a lot of them, and it takes her a lot of time to go through them, and you know, she only passes on to us a small percentage. So, my general perception is that there is a lot of work for her on that part.” [Interview with participant No. 2]

“... at her end, it can be quite cumbersome [to screen comments and decide which ones should be investigated].” [Interview with participant No. 6]

2. An editor often consults with others in order to cognitively process the acquired information in an adequate manner. When knowledge exchange and transfer are required, they should be facilitated, and the knowledge should be preserved by the organization to avoid loss due to reassignment of responsibilities or personnel turnover.
“I certainly would [discuss with colleagues] … if it was a nausea chapter, which isn’t mine anymore … That would be my first step.” [Interview with participant No. 2]

“Where there may be things falling into the cracks is where one person did the research, and now it’s another person’s chapter, because when staff change, we have re-assigned responsibilities. So, I know there are, there were a couple of things that belonged to one person who researched them, then I took over the chapter, she gave me a bunch of files…I wasn’t involved in this, it just goes into the drawer, and if I ever need it, I will go look at it, you know.” [Interview with participant No. 5]

3. Once an investigation is triggered by a reported problem, the communication and collaborative activities involve a complex intellectual exchange and require varying amounts of time to complete. For example, one email thread might deal with single or multiple comments, and a thread could take from hours to weeks to resolve, involving both internal editors and the authors of e-Therapeutics+® chapters who are experts in the field and are external to CPhA.

“...this one [comment] I did have to involve the author in it. For example he quoted the study that...And, reviewing the literature, there is some disagreement over the conclusions, and ... when I spoke to him, the author said ‘I think the statement was well balanced’, and he didn’t want to change it.” [Interview with participant No. 6]
4. Rather than being fixed or predictable, the best course of action, after investigation, is determined by multiple factors such as collaborative decision-making and established business processes. A few examples are given below to illustrate possible different courses of action in terms of making changes to content.

“It’s when I am all finished my part … and this is my recommendation to [the manager] and then, if she wants me to change something, she lets me know.” [Interview with participant No. 2]

“Normally, the clinical editors initiate the so called minor revision workflow … in this case, the reference specialist would want [to] see that to make sure the link is correct to PubMed, etc… So, it allows us to send to whoever would need to see it, when change was made.” [Interview with participant No. 3]

“The reader is correct … The problem is this chapter is in a major workflow right now; I’m expecting it back from the author next week. If we want to make a change, we would need to export the current published file. If we do I would suggest we just remove ‘COX-2 inhibitors’ from the sentence and deal with the wording in the workflow [of a major revision].” [Email correspondence provided by participant No. 6]

“Well, in this case, the chapter was already in the major revision workflow, and that section of the chapter was changing anyway. So, that went out for review, and came back, and was changed. And, I know we felt that everything was addressed … basically, [another colleague] and I ended it at that point – our interaction about this highlight, that the chapter is changing anyway, then
let it take its course. So, that’s how that happened. It was already in the workflow, as part of our normal processes … Well, we looked at it, we looked at the state of affairs for that chapter, but didn’t need to go any further than that, because it was already in the way.” [Interview with participant No. 3]

5. It is technically challenging to effectively follow through the execution of a content change, as it involves a workflow that overlaps at various points with the editorial process.

“In our content management system, we have the task … minor revision for this chapter, nausea, and attached to it is the current XML file, which means the current source of what will get printed or published, you know, and so you touch that, that’s what gets published. So, we kind of have one that’s our current published version, and then when we started the workflow, we take that and work from there – make the changes and keep on. So, I would change the XML documents … next step in the workflow, which is production coordinator … she creates a PDF, sends it to the reviewer, they gives us comments, send it back. If there are comments, I relay them to the author, you know, we decide again, blah… blah… changes the XML and then it goes through the other process. Once, the content is finalized, [another colleague] would see it and make sure she agrees, then the referencing would be checked, the copy editing, all that stuff, all the technical things at the end.” [Interview with participant No. 2]

“I did not have a proper system. Like I had thought I would deal with it in the next month or two… because that’s how long a Chapter would take to be revised, but in fact the authors took almost a year to revise this chapter … I need to have a method to make sure that the change planned is done when the chapter comes up. Because you can say, um, done with the next revision, but if you don’t have something to remind you, or you have to write it down,
or something, in a file somewhere, so that the next time you open up the file to update it, you say, oh yeah, I have to deal with this.” [Interview with participant No. 5]

6. The life-cycle of information (i.e., a feedback comment) does not end after a change is made to e-Therapeutics+® content. Systematic documentation of every instance of feedback handling for future consultation is an area yet to be adequately addressed.

“If the highlights are re-pushed then there is a chance that you may get similar comments back again. In that case, you would definitely want to have access though, to the old comments … because it might be exactly on the same thing all over.” [Interview with participant No. 2]

7. Members of the organization have different ways of handling feedback comments and the information gathered for an investigation. Personal information management is idiosyncratic, which is illustrated with three examples below.

Example 1:
RESEARCHER: How do you keep file of it [the feedback]?
PARTICIPANT: Well, how do we do it, we...uh...print out a copy of the emails and I put them into the chapter file...so that, you know, or sometimes I put..., it depends [on] what we are going to do with it. If it’s going to be done as a matter of [minor revisions], you know, or this could wait until we are, you know, doing the chapter [major revisions], then that would go into the file with the chapter.
[Interview with participant No. 3]
Example 2:

RESEARCHER: And, do you keep your research, for example, your literature attached to the comment; or, how do you organize your investigation file?

PARTICIPANT: Um...I have the highlight written, the comment, and my conclusion, like my answer...summarizing...

RESEARCHER: So, it’s per highlight-comment per case?

PARTICIPANT: Yes.

RESEARCHER: Then, how do you know which case pertains to which chapter?

PARTICIPANT: [flipping through papers]...well, I guess it’s usually written somewhere.

RESEARCHER: Okay, so you just go open the case and then you know which chapter it was talking about.

PARTICIPANT: Yeah, yeah.

RESEARCHER: Ok, alright. So, that link is established in your mind, right?

PARTICIPANT: Yeah. I guess the only thing that perhaps I could do differently is have it associated with a chapter, although I like these together, but...

RESEARCHER: So, currently it’s in one folder, the 10 cases.

PARTICIPANT: Yeah, yeah. Although, when I was going through them, I realize, oh...; I think I haven’t been consistent: some are in here some are still, like only electronic, and I should get more organized.

[Interview with participant No. 6]

Example 3:

PARTICIPANT: ... I have a sheet now inside my file folder where, you know things to remember, and I’ll make notes...as I revise the file, don’t forget before you finalize, you have to deal with this issue...
I have perfected my process since then ... They get filed in the chapter file, like as if there is ... references whatever, then they would get filed with the, just these or whatever ... I will put in all of the rationale ...if I have to research then I will put it in ...

RESEARCHER: Ok.

PARTICIPANT: ... I imagine that she keeps it ...and I, I have a file it says e-T highlights, and I just throw the final answer into there.

RESEARCHER: Ok. So, it's not the comment or the highlight that becomes a thread to keep those reference materials together, it's really the chapter itself...

PARTICIPANT: ... it's the chapter, right!

[Interview with participant No. 5]

8. The processing of feedback comments passes through several members both within and outside the organization, each with a specific function to perform. Methods are required to relay information and coordinate between the members.

To relay constructive comments (from University partners to CPhA stakeholders):

“Every two weeks I would ask you to send me the spreadsheet you are working on and not to touch it for 24 hours within which I would return it to you with new comments inserted but leaving your remarks intact; then you could continue, for each chapter/highlight, with the comments which you did not remark on. This would require you to put a change/no change remark on every comment you have gone through in order to differentiate those yet to be worked on.” [Email correspondence between a university researcher and the CPhA, 19 July 2011].
To initiate review of comments (from the Editor-in-Chief to clinical editors):

“We are depending on [the Editor-in-Chief] who has to review them first, decide whether they need to be passed on [for investigation].” [Interview with participant No. 5]

To assign a change or no-change decision (among the editors):

“Sometimes, I haven’t heard back from [another colleague] … But I don’t always get it at the end, a couple times I wondered what happened with that, you know, and then I assume that ‘no change’ is going to happen because I never heard otherwise … It’s when I am all finished my part, yeah, and this is my recommendation … and then, if she wants me to change something, she lets me know. I guess her policy is that if she doesn’t, I won’t hear anything. But I don’t think it has been stated outright, so you know, I think I am used to it now, I sort of know if I don’t hear from her, it’s okay.” [Interview with participant No. 2]

9. The overall time needed to process a comment (i.e., from feedback collection to action in response to reported problems) is determined by the inter-dependency of all involved parties, both internal and external.

The internal party:

“I think she batch processes a lot of them, so we may not see any for months, and we might see a couple in two weeks.” [Interview with participant No. 5]

“… consider all the research in the first place, which probably took half a day, to the author …, and two weeks later, we try to get … a bill to … update our online version every two weeks.” [Interview with participant No. 2]
The external party:

“Because I knew that my hands were tied in terms of doing any changes because we didn’t have an author … [about making changes, there are] issues out of our control. There were issues to impede this change that were out of our control.” [Interview with participant No. 5]

These nine issues, as identified above, provide the basis on which design research can be systematically carried out to develop a formal user feedback management process as well as a supporting system.
5.5. A Technological Solution for Improving Feedback Management

This section presents the outcome in specific regard to RQ4: “What process can be designed for the CPhA to facilitate the use of health professionals’ feedback comments?” Supporting this question are the understanding gained from semi-structured interviews (Methods Section 4.3.2), participant inputs on the proposal for system features (Methods Section 4.3.7), system prototyping (Methods Section 4.3.8), and an all-hands meeting held at the CPhA (Methods Section 4.3.9).

Given the existing ad hoc process of feedback management completely mapped out and the issues identified throughout the process, it was then possible to re-design the process for improvement. I arrived at four design objectives to be achieved through a technological solution. The objectives were set to address the nine identified issues, and Table 7 presents their associations.

In performing thematic analysis that arrived at four design objectives, I found that issues 5 and 7 are associated with more than one objective each. In other words, two objectives need to be met in order to address those two issues. Key messages that explain associations between issues and objectives are underscored in Table 4 to facilitate reading.
<table>
<thead>
<tr>
<th>Objectives</th>
<th>Issues to be Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increase efficiency</td>
<td>(1) As a critical but bottlenecks task, the screening of comments for investigation must be streamlined. (9) The overall efficiency of information use (i.e., from feedback collection to action in response to reported problems) is determined by the inter-dependency of all involved parties, both internal and external.</td>
</tr>
<tr>
<td>2. Support knowledge work</td>
<td>(2) To adequately understand the feedback, knowledge exchange and transfer is necessary as clinical editors often consult with each other in order to cognitively process the acquired information in an adequate manner; and the knowledge should be preserved in the organization. (3) Once an investigation is triggered by a reported problem, the communication and collaborative activities involve a complex intellectual exchange. For example, one email thread might deal with single or multiple comments, and a thread could take from hours to weeks to resolve, involving both internal editors and the authors of e-Therapeutics® chapters who are experts in the field and who are external to CPhA. (4) The best course of action to change content, after investigation, is determined by multiple factors such as collaboration in decision-making and established business processes.</td>
</tr>
<tr>
<td>3. Support information management</td>
<td>(5) Constructive feedback comments pass through different members of the organization, each with a specific function to perform. Systematized methods are required to relay information and coordinate information use between the members. (6) Members of the organization have different ways of handling feedback comments and the information gathered for an investigation. Personal information management is idiosyncratic. (7) The life-cycle of information (i.e., a feedback comment) does not end after a change is made to e-Therapeutics® content. Systematic documentation of every instance of feedback handling for future consultation is an area yet to be adequately addressed.</td>
</tr>
<tr>
<td>4. Enable specific tasks</td>
<td>(5) Constructive feedback comments pass through different members of the organization, each with a specific function to perform. Methods are required to relay information and coordinate between the members. (8) It can be challenging to effectively follow through the execution of an investigation and the resultant content change, as it involves a workflow that overlaps at various points with the editorial process. (7) The life-cycle of information (i.e., a feedback comment) does not end after a change is made to e-Therapeutics® content. Systematic documentation of every instance of feedback handling for future consultation is an area yet to be adequately addressed.</td>
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</tbody>
</table>
Screenshots (taken from a functional system prototype) and descriptions of the functions are provided below with respect to each design objective. Although these outcomes of the “action” component of this “participatory action research” do not directly constitute research findings, they are crucial for (a) capturing and reflecting the complexity of feedback use, and (b) the development process provided a “live” setting where contextual factors could be studied as to how they actually played out.

1. Increase Efficiency
The cause of the bottleneck has been identified as (a) frequent switching between an MS Excel spreadsheet and an email tool (i.e., Outlook), (b) inconvenient text manipulation in spreadsheet software (e.g., scrolling a partial column or row to adjust text display is not possible), and (c) a need for format adjustment to the body of an email message, as comments pasted from the spreadsheet often carried undesired styling.

The solution comprises a single interface, on which the Editor-in-Chief can review incoming comments, use radio buttons to select those that require investigation and then send them off to the responsible clinical editor. This interface replaces the spreadsheet and email tools that she had to switch back and forth in performing this task.
2. Support Knowledge Work

Feedback comments are organized by chapter, as is the processing (i.e., investigation and making changes) of each instance of the comment. This fits with the way clinical editors manage their topic areas.

**Screenshot 1**: Editor-in-Chief operating interface

**Screenshot 2**: Summary interface for editors
3. Support Information Management
The Editor-in-Chief and clinical editors have special operating interfaces designed for them. The operating interface below coordinates feedback comments flowing from investigation, to change implementation, and to file a comment after completion, as represented by tables in different colors.

![Screenshot 3: Clinical editors’ operating interface](image)

4. Enable Other Specific Tasks
Features recommended by the editors are integrated into the system. For example, the reminder feature allows an editor to send herself an email on a given date to follow-up on investigation and communication, and a document organizer enables the archiving of email records and research materials related to an instance of comment processing.
Functional prototyping (Methods section 4.3.8) demonstrated feasibility in a technological solution. However, the re-designed process is not to impose rules on the intellectual activities that are characterized by knowledge work. There are two reasons. First, it is practically inconvenient to regulate all workplace behavior with an information system, as one participant said “usually, the final decision that we come to is usually [through] conversation.” Second, with regard to the complex nature of cognitive processing, intellectual exchange between members
within and outside the organization involves much subtlety and requires flexibility, and hence cannot be bound to rigid regulation in terms of communication channel, style, or format. Below is an example of a participant explaining how she had worked in collaboration with an author.

RESEARCHER: Did you have an idea, at that point, whether or not the change that’s taking place [to a chapter] will adequately address the concern raised by this reader?
PARTICIPANT: Well, we were optimistic. It looked that way at that point, yes.
RESEARCHER: Okay, so that was based on your knowledge with this author?
PARTICIPANT: Yes, and with what we had received from him.

The above section presents key features of a solution representing an optimal feedback management process for the CPhA. This result corresponds to the design paradigm which is concerned with technological solutions for meeting particular needs, i.e., user feedback management in this particular case. On the other hand, the development and implementation of such an organizational process, as explained in the literature review (Section 2.3.3), do not happen in vacuum, and are inevitably affected by multiple factors that are contextual to the initiative. The next section provides findings on how the effects of context factors.
5.6. Factors Related to the Innovation in User Feedback Management

Based on interviews (Methods Section 4.3.10) and an all-hands meeting at the CPhA (Methods Section 4.3.), this section presents two results with respect to:

RQ 5. What are the factors involved in the development of a feedback management process?
RQ 6. What are the factors that may facilitate or inhibit the implementation of a feedback management process?

The first result is comprised of descriptions of how each factor has played out and interacted with the others in the specific setting of the CPhA. Such descriptions are concerned with the following five aspects.

First, a factor may have bearings on one or more of four dimensions that were defined in the methodology (Section 4.3.10).

*Motivation* – motivate the initiation of the innovation for the organization

*Design* – inform staff about the functional design of the process/system

*Deployment* – facilitate the successful implementation of the process/system in the organization

*Sustainability* – contribute to sustained operation of the process/system in the long term

While the framework guided instrument development in terms of data collection, these four dimensions helped with data analysis.

Second, a factor, as defined in the methodology (Section 4.3.10), has been identified as ‘expressive’ if it was found to have played an active role in
the present study. And, a factor that might become expressive but had not (yet) have an impact in the present study is then considered ‘latent’.

Third, interaction between factors could have occurred in three ways: a factor may be influenced or moderated by other factors; a factor may depend on other factors to be expressive; and some factors tend to concur.

Fourth, on the same factor, non-homogeneous groups (e.g., manager vs. staff, process users vs. support staff) may express different effects.

In addition to the factors specified in the conceptual framework for study of innovation (Section 3.3.3), five more factors were identified. They are staff rationality, parallel projects, established organizational processes, culture of the organization, and department politics and tensions.

Based on findings related to each factor, the second result consists of lessons learned that can help to enhance the contributory effects of the factors, for example, by turning latent factors into expressive ones in order to maximize their positive impacts. Lessons learned form the basis of an important type of knowledge in management theories related to information systems research (e.g., Hevner, et al., 2004; Markus, et al., 2002; Walls, et al., 1992). Specifically, this type of knowledge distinguishes itself from descriptive knowledge that is for the purpose of improving understanding (i.e., the first result) by providing how-to suggestions for the purpose of action (Gregor, 2006; Gregor & Jones, 2007; Iivari, 2007; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). In addition, lessons learned can be further tested to potentially become the prelude to generalizable guidelines (i.e., theories in information systems research).
Reported below are 14 individual level factors, and 12 organizational level factors. They are summarized in Table 8.

Table 8
List of Contextual Factors Examined

<table>
<thead>
<tr>
<th>Individual-level Factors</th>
<th>Organization-level Factors</th>
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<tbody>
<tr>
<td>1. Conceptions about innovation</td>
<td>1. Organizational needs for assistance</td>
</tr>
<tr>
<td>2. Personal valence</td>
<td>2. Competitive advantage</td>
</tr>
<tr>
<td>3. Awareness of org. mission</td>
<td>3. Staffing</td>
</tr>
<tr>
<td>4. Pressure for innovation</td>
<td>4. Resources</td>
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<tr>
<td>5. Commitment</td>
<td>5. Fact-based decision-making</td>
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<tr>
<td>6. Functional appropriateness</td>
<td>6. Governance and management</td>
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<tr>
<td>7. Efficacy</td>
<td>7. Autonomy</td>
</tr>
<tr>
<td>8. Training needs</td>
<td>8. Communication</td>
</tr>
<tr>
<td>10. Momentum</td>
<td>10. Established organizational processes</td>
</tr>
<tr>
<td>11. Senior management support</td>
<td>11. Culture of the organization</td>
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<tr>
<td>12. Trust and cooperation</td>
<td>12. Department politics and tensions</td>
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<tr>
<td>13. Mutual influence</td>
<td></td>
</tr>
<tr>
<td>14. Rationality</td>
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</tbody>
</table>

In presenting findings pertaining to each factor, a number (preceded with “I” referring to factors at the individual level or “O” the organizational level) is assigned to each factor which is accompanied with its definition and the attributable dimensions (e.g., motivation). Empirical evidence, such as quotes from interview, is provided when it is needed to understand the interpretation and when it cannot be used to identify the participant. The bullet-point format is employed in the section below, in order to clearly identify discrete findings about each factor.

Individual level factors

I-1. Conceptions about innovation\(^9\) is defined as those that the staff perceive to be opportunities and risks to innovation. This factor is attributable to three dimensions: motivation, implementation, sustainability.

Findings about this factor include:

\(^9\) Factors are italicized when mentioned in findings.
A global understanding of the process requiring innovation—for example, appreciation of the systematic productivity issue experienced by all involved parties—is required for this factor to be expressive.

With managers this factor was expressive as a motivator. In contrast, staff in general was only able to apprehend an overall understanding when the innovation was shared and explained by the manager, but did not themselves recognize the opportunity for process innovation until it had been initiated.

Both managers and staff were able to anticipate issues and risks with respect to the implementation and sustained process operation, which contributed to their preparedness in these two respects.

The following lesson is learned from the above findings:
To enable staff to contribute to initiating organizational innovations, managers should share, when feasible, their understanding about global issues in the work process.

I-2. Personal valence is defined as feeling of benefiting one’s job performance. This factor is attributable to the motivation dimension. Findings about this factor include:

- This factor was positively expressive with (a) those performing labor intensive tasks in the process and (b) the managers who are able to relate their jobs to the goals of the process.
- This factor was not expressive with the staff involved only in the part of the process that was not bottlenecking.
- Perception of performance benefits varied between members of different functional departments. For example, the factor was expressive in the editorial group which will be the user of the
process, but not in the IT group. The benefits perceived by those responsible for the e-Therapeutics+® content are different from the benefits perceived by staff responsible for marketing and business development.

- This factor was negatively expressive with those concerned about workload increase arising from the implementation of a new process. For example, negative personal valence was perceived by one participant: “I am sure it would be more [work for me], because I don’t think all the feedback necessarily comes to me at the moment right now. I think a lot of it ends up with [another employee]. I don’t know if everything that could come to me is coming to me … I think the system makes [it] easier for this.” [Participant No. 4]

The following lesson is learned from the above findings:
Innovation leaders should clarify the expected impact on staff workload to avoid unnecessary concerns that could negatively impact this factor.

I-3. Awareness of organizational mission is defined as associating the organizational mission with the need for process innovation. This factor is attributable to the motivation dimension. Findings about this factor include:

- This factor was expressive with the managers but not the staff.
- Even with the managers, the association between the innovation and the organizational mission was indirect, which could have made this factor a latent one.
- Managers can share their awareness of organizational mission with the staff through communication.
The following lessons are learned from the above findings:

- Managers should try to clarify any (indirect) links between the innovation and the organizational mission.
- Managers should communicate with their staff about the clear connection of the innovation with the organizational mission so that this factor can become expressive with the staff.

I-4. *Pressure to innovate* is defined as feeling pressure exercised by internal (e.g., managers) or external (e.g., customers) entities of the organization to innovate. This factor is attributable to the motivation dimension. Findings about this factor include:

- With all but one participant, this is not an expressive or latent factor in the present study.
- The one participant, who expressed a sense of pressure, commented that "when I’d be in a group, and when there is obviously an interest in an organization to develop it, then I think there is an obvious pressure that you will be involved in developing it." [Interview with participant No. 4]

I-5. *Commitment* is defined as spending effort due to a sense of obligation and/or affection. This factor is attributable to the motivation dimension. Findings about this factor include:

- This factor was expressive in the present study, but can be attributed to both personal reasons and work related reasons. Personal reasons included (a) curiosity in new projects and new ways of doing thing and (b) an “academic” interest in findings related to an innovative project (e.g., patterns that can be generalized from practically oriented projects as knowledge).
Work related reasons included (a) benefits to work (more general than individual job performance) and (b) improved job satisfaction.

- Commitment can be obtained without making a direct link to one’s job responsibility. For instance, a participant commented that “I guess that’s just something that we wanted to do, that I wanted to … not directly related [to my job responsibility] …, not directly part of our work, my work, strictly speaking …” [Interview with participant No. 5]

- This factor is influenced by two other factors: (a) personal valence and (b) pressure to innovate (see quote above in I-4, as answer to a probe on normative commitment: “Did you feel obliged to participate in this feedback process innovation?”).

The following lesson is learned from the above findings:
Because commitment can occur due to reasons other than direct job related benefits, the organization should try to gain not only normative but also affective commitment of staff to facilitate innovation.

I-6. Functional appropriateness is defined as agreeing on the appropriateness of the functional features of a given technological solution (innovation). This factor is attributable to the functional design dimension. Findings about this factor include:

- User needs assessment (i.e., research for RQ3) for system development contributed to end users’ agreement on functional appropriateness.

- At a preliminary review (i.e., all-hands meeting) of the system functions, members of a department, who had not been directly involved in user needs assessment, expressed different views on functional appropriateness.
The following lesson is learned from the above findings:
Involving end users’ participation in the development stage of an innovation project can facilitate their agreement on functional appropriateness.

I-7. *Efficacy* is defined as being confident about one’s ability to carry out tasks related to implementing the innovation. This factor can be attributed to the implementation dimension. Findings about this factor include:
- From the end user’s perspective, this factor is influenced by the usability of the technology involved.
- The end users gained confidence from seeing the concrete technological solution.
- From the perspective of the development team, this factor is influenced by key technical issues that must be taken into account.

The following lesson is learned from the above findings:
Providing end users the opportunity to get a concrete feel for the technologies involved can help them build confidence in the purported innovation.

I-8. *Training needs* is defined as requiring training for successful implementation (e.g., of a technological solution, or new procedures). This factor is attributable to the implementation dimension. Findings about this factor include:
- This factor was more expressive with participants who showed concerns about their technical skills than those who did not.
- This factor is moderated by the difficulty level of the technological solution.
The following lesson is learned from the above findings:
Solutions requiring relatively low levels of technical skills should be considered with priority, in order to minimize training needs.

I-9. **Workload** is defined as being able to spare enough time for the innovation project while simultaneously completing normal workload. This factor is attributable to two dimensions: functional design and implementation. Findings about this factor include:

- Rather than a constant, the impact of this factor fluctuates due to the influence of another factor: other on-going projects (i.e., new factor: *parallel projects*) in the organization. In the present project, this factor was negatively expressive with some participants, who were unable to spend time as needed to take part in functional design of the system prototype, because they had other deadlines to meet.

- For the same reason, implementation may be negatively affected by this workload factor, as it is anticipated that the ramp-up of a new process will require additional time of involved staff members.

- A proper design of the technological solution can mitigate the impact on workload by minimizing deployment issues.

The following lesson is learned from the above findings:
The planning of the design and implementation of an organizational process innovation should take into account the parallel projects that are taking place in the organization, in order to avoid competing for staff work time.
I-10. Momentum is defined as feeling energy and enthusiasm toward the goal of innovation. This factor is attributable to the implementation dimension. Findings about this factor include:

- This factor is influenced by another factor: the culture of the organization. That is, the CPhA has an “association” culture, more conservative than a private sector’s culture where it might be easier to build up momentum.

- Inter-personal variability exists in this factor due to personal valence and personality (e.g., “It’s definitely my personality—I feel if I’m going to do something, then embrace it and do it as well as possible. So there might be a bit of personality bias there …” as opposed to “… I wouldn’t say I am enthusiastic. I am not adverse to it either. I am just kind of, maybe, indifferent – not even indifferent, just kind of … [although] it’s something probably good to have.” [Interview with participant No. 8])

- Rationality, as another individual level factor, moderates momentum. A few participants suggested that, although generally supportive, they would like to know more about the new process on a day-to-day basis, and not until the new process is put to actual use would momentum likely happen to them.

The following lesson is learned from the above findings:

To facilitate implementation, momentum should be built up by demonstrating concrete benefits that the innovation can bring to staff’s day-to-day work.
I-11. Senior management support is defined as providing support (by senior managers) to implement the new process. This factor is attributable to the implementation dimension. Findings about this factor include:

- This factor depends on another factor, awareness of organizational mission, to be expressive, because the latter is what senior managers usually consider in justifying and agreeing to provide needed support. In the present study, organizational mission is the implicit context referred to by CPhA’s senior management in discussion of support.

- However, the expressive awareness of organizational mission in the present study did not result in expressive support from the senior management. CPhA’s senior management was not expressive on this factor because specific requirements for implementing the new process have not been clarified.

“I think this is a very important initiative. So, is it that I would like to promote and foster? The answer is yes. But what I have to know is to see what’s needed, what are the parameters, and what can we commit to … and then, we can build from there … I don’t think I can give a blanket support unless I understand what’s involved. So, how does it require staff time, does it require finances, and what am I directly responsible for, meaning in terms of resources and budgets; does it mean to go somewhere else that I don’t have any hierarchical authority … those are the types of thing. Before committing [you] have to know what you are committing.”

[Interview with participant No. 7]

The following lesson is learned from the above findings:
To secure support from the senior management, it is important to clearly specify the conditions required for implementation.
I-12. *Trust and cooperation* is defined as trusting and being willing to cooperate with other staff. This factor is attributable to the implementation dimension. Findings about this factor include:

- This factor was perceived as positive by members of two independent departments involved in the present study, but it was latent in action between the two departments.
- *Communication* between departments can facilitate this factor.
- *Departmental politics and tensions* were mentioned as another factor that tends to moderate this factor; however this was only at the inter-department level and not at the intra-department level.

The following lesson is learned from the above findings:
Installing mechanisms of inter-departmental communication throughout the project can help achieve a positive effect of this factor between different departments involved in the innovation project.

I-13. *Mutual influence* is defined as influencing others in terms of the feasibility and the methodology of the implementation of the process. This factor is attributable to the implementation dimension. Findings about this factor include:

- The way in which this factor plays out is influenced by personal *conceptions about innovation* (e.g., if all staff see the same value and commit to the project, no one needs to be persuaded to participate) and by *organizational politics* (e.g., “The organizational politics may dictate whatever reasons ... different views ... So, ... a selling job to do.” interview with participant No. 7).
- The effect of this factor is exercised through *communication*. 
• The need to exercise influence is affected by parallel projects going on in the organization that may be competing for resources. Indications of the need to exercise influence were also seen at the all-hands meeting where staff of one department was enthusiastic and engaged while another department appeared more critical.

• Across departments, certain members, department managers being most likely, will assume the role of exercising influence on behalf of other members of the department.

• The ability to influence others depends on the level of experience in the organization, personal relationships, moral authority, and positions of power (e.g., managers, as compared to staff, tend to express confidence in exercising influence). This is in line with organizational information processing models assuming that “those in formal positions of power, such as managers, have a great deal of influence in organizations (Daft & Lengel, 1984, 1986; Galbraith, 1977)” (Gilly, et al., 1991, p. 304).

The following lesson is learned from the above findings:
When exercising influence (e.g., trying to get buy-in from others), one should be aware that other members of the organization may assume different views or may not have the same vested interest.

I-14. Rationality, as an individual level factor, was identified in addition to those specified a priori in the framework. It is defined as thinking and behaving logically based on sensible reasons and conditions. This factor was found to be moderating momentum, as some participants noted that they would like to know more about how the new process would actually function if they were to be enthusiastic about it. Following momentum, this factor is classified under the implementation dimension.
Organizational level factors

O-1. *Organizational needs for assistance* is defined as needing assistance to initiate and carry out the innovation. This factor is attributable to three dimensions: motivation, functional design, and implementation. Findings about this factor include:

- The CPhA-University partnership has proved essential in meeting the needs of CPhA in bringing forth this innovation in making efficient use of health professionals’ feedback comments. University partners have effectively contributed to CPhA’s needs in innovation by:
  - Identifying the opportunity for innovation by clarifying the problem in feedback management;
  - Guiding the design of a technological solution;
  - Providing on-going assistance in developing a production system and continuously expanding its potential capabilities in making use of user feedback comments (see Research Agenda Section 6.2.2).

The following lesson is learned from the above findings:

It is important to collaborate with external partners that can assist the organization in discovering, articulating, initiating, and realizing innovation opportunities.

O-2. *Competitive advantage* is defined as being able to gain competitive advantages through the innovation. This factor is attributable to the motivation dimension. Findings about this factor include:

- This factor was expressive only with CPhA’s senior management who oversee marketing. Other CPhA members perceived some
benefits, but did not make a connection to the concept of competitive advantage and were not motivated by this factor.

The following lesson is learned from the above findings:
The marketing department may consider articulating this factor for other members of the organization to increase their motivation.

O-3. *Staffing* is defined as having enough capable staff to enable and support the innovation project. This factor is attributable to two dimensions: implementation and sustainability. Findings about this factor include:

- This factor is influenced by another factor: *parallel projects* in the organization.
- An increased load on this human resource factor can be anticipated for the process implementation, and is likely to ease off into operation.
- Hiring may help to mitigate the negative impact of this factor.
- This factor is facilitated if the skill sets of the staff match the technical requirements of the innovation.

The following lesson is learned from the above findings:
The workload plans and skill sets of the present staff should be taken into account in adopting and/or developing a technological solution.

O-4. *Resources* is defined as having adequate facility, equipment and financial resources. This factor is attributable to two dimensions: Implementation and sustainability. Findings about this factor include:

- This factor is determined by another factor: *established organizational processes* (i.e., the budget process).
“... it will be for the appropriate people to turn everything into budget stuff ... so, the determination of whether or not CPhA has the resources, financial or whatever, to do this really boils down to the budget process.”

[Interview with participant No. 9]

- This factor is impacted by the design of the technological solution, which determines what resources are required.
- Resource issues are moderated by the planning of parallel projects, as the resource needs of a particular project occur in steps and require various groups to sustain and coordinate by taking into consideration other on-going projects in the organization.

The following lesson is learned from the above findings:

Project planning and technical design of an innovation project should take into account available resources as well as the budget process of the organization.

O-5. **Fact-based decision-making** is defined as relying on facts (i.e., objective evidence) rather than intuition in analyzing problems and making decisions. This factor is attributable to the motivation dimension. Findings about this factor include:

- The CPhA has a strong culture of correctly and effectively using external users’ feedback as evidence in decision-making. This represented an expressive contributory factor in terms of cultural compatibility.
- This factor has influence on personal conceptions about innovation.
- Contrary to expectations, this factor did not produce any direct impact in the dimension of functional design in this study.
The following lesson is learned from the above findings:
Proper alignment of innovation goals with the organizational culture in relation to decision-making can positively impact the innovation.

O-6. *Governance and management* is defined as having (a) the accountability of individual staff and functional departments in performing tasks related to the innovation, and (b) the ability to resolve management issues arising during the innovation. This factor is attributable to two dimensions: implementation and sustainability. Findings about this factor include:

- This factor has an overarching effect on resolving not just issues arising from the given innovation project, but also those related to *parallel projects* taking place in the organization.
- In addition to the general management structure and approval processes that are part of the organizational routine, special mechanisms of *communication*, such as a properly designated liaison, can facilitate this factor both within and between departments.
- *Staff commitment* has been found to facilitate this factor.

The following lesson is learned from the above findings:
In addition to the general management structure, it is advisable to designate appropriate liaisons to coordinate for the particular project.

O-7. *Autonomy* is defined as granting staff members the freedom of action with respect to their judgments and decisions. This factor is attributable to the functional design dimension. Findings about this factor include:

- This factor was more expressively felt at the managerial level than the staff level, in the present study.
This factor is influenced by another factor: *established organizational processes* (i.e., the change management process).

This factor is moderated by *organizational culture*, and in the present study, this factor tends to play out along with the *communication* factor as the CPhA has a culture of open discussion and joint decision-making.

“… [we] are a publishing house. We have consistently applied very rigorous standards to what we do—procedures and practices. So, while thinking creatively is definitely [encouraged] and a great part of our group, we share with others and make sure before we would just run with something.” [Interview with participant No. 3]

“There is always a discussion … and usually the solution is based on all involved.” [Interview with participant No. 8]

Autonomy granted for specific situations has to be justified by demonstrating benefits and is backed up by the proven competence of an individual.

The following lesson is learned from the above findings:

To promote innovation, staff should be encouraged to discuss novel ideas, be facilitated in the change management process, and be guided to justify their ideas by showing beneficial results.

O-8. *Communication* is defined as having open and frequent communication among members of the organization, and with external members involved in the innovation. This factor is attributable to three dimensions: motivation, functional design, and implementation. Findings about this factor include:

• In this project, useful communication is function-based, that is, when the formal mechanism of a meeting is used to allow the
future end-users the opportunity to feed into the innovation, it engenders useful discussions to hone the method for each iteration—prototype, pilot project, and the final (but still able to be refined) product.

“I assume that we would have some kind of group training or [there] is going to be a pilot system we would see … to discuss and provide feedback. Then, there will be some kind of pilot [testing], then we would all provide feedback again … listening to each other and agree.” [Interview with participant No. 2]

“I imagine that [communication] will be a step-wise thing where whatever that needs to be developed or implemented—i.e., the template will go up, we will try it, and from there we will see what works and what doesn’t … I imagine we will have lots of meetings, feedback meetings … say, you have it in place for a week and then you have a meeting to troubleshoot what’s working and what’s not working …” [Interview with participant No. 5]

- In this project, group meeting proved to be more effective than casual communication that randomly occurred between individuals. “Some people might be more tolerant of things, or they might find workarounds. If it’s only me [I] work around it, but if there’s other people too, then we need to fix it. I think there’s where group communication would be essential … otherwise, we will be all working around our own little problems, right? So, for smoothness, it would be good that everybody was dealing with the same problem in the same way.” [Interview with participant No. 5]

- Communication was less likely to be a problem within a department than between departments. Inter-departmental communication can be fostered by the involvement of key people from each department.
The following lesson is learned from the above findings:
Formal iteration throughout the innovation project (e.g., a series of group meetings, both within and across functional departments, with key member attendance) should be planned to enable effective communication.

O-9. *Parallel projects* is one of the four organizational factors (also O-10, 11, 12) identified in addition to those specified a priori in the framework. It is defined as carrying out other projects simultaneously. This factor impacted two individual level factors: (a) the need for exercising *mutual influence*, in order to obtain resources for the given project, and (b) staff’s *workload*; however, its impact was found to be moderated by *governance and management*. Because of its impact on *mutual influence* and *workload*, this factor is classified under the design and implementation dimensions of the project.

O-10. *Established organizational processes* is defined as formalized ways in which the organization operates as a matter of routine. This factor has substantial impact on *resources* and *autonomy*, and is therefore relevant to three dimensions: functional design, implementation and sustainability.

O-11. *Culture of the organization* was mentioned by one participant and, in this study, specifically reflected in the style that characterizes how members of the organization work as a whole—e.g., (a) an “association” culture in the case of CPhA (i.e., the participant reported an impact of this factor on an individual level factor, *momentum*, in that the Association is more conservative than private organizations), and (b) the CPhA has a culture of open discussion and joint decision-making, which moderates *autonomy*. Inherent in the other two factors, it can be associated with two dimensions in the present project: functional design and implementation.
This cultural factor was observed at a more general level than the analytic decision culture reported in the literature (Sen, et al., 2006), from which the fact-based decision making factor was derived. The latter can be considered as a sub-culture element characterized by a specific need (for evidence) in the method that organizational members apply in work.

O-12. Department politics and tensions represented an organizational level factor which was mentioned by one participant, and can be defined as the interrelationships between the people of an organization involving power and influence or conflict. This factor, according to the participant, might play out during new process implementation by moderating an individual level factor, trust and cooperation between staff of different departments.

Findings on the above factors correspond to the behavioral paradigm which seeks to explain phenomena that occur with respect to the design of an optimal feedback management process. In addition to mere descriptions of these factors per se, lessons learned from understanding how these factors function were given, which fit with a pragmatism worldview because they can help the CPhA to better decide what to do.

This chapter presents detailed findings as the result of data analyses with respect to the individual research questions. These findings are further summarized in the next chapter to provide the basis on which scientific knowledge can be generated by connection to existing literature in relevant fields.
CHAPTER 6. DISCUSSION AND CONCLUSION

This last chapter concludes by summarizing key findings and pointing out the contributions of this research and potential directions for future research.

6.1. Discussion of Results

Key findings are summarized below as direct answers to the research questions. In addition, this section also clarifies exactly how research questions have been addressed and gaps have been filled with links to existing knowledge identified in the literature review section. The discussion is presented in the order of the research questions.

With respect to RQ1 “What types of issues are reported in pharmacists’ feedback comments?” a typology of nine problems was derived from 313 constructive feedback comments, which include:

(1) Unspecific – Missing details
(2) Incomplete – Missing relevant information
(3) Incorrect – Reservation or disagreement
(4) Conflicting – Suggestion to consider other evidence
(5) Confusing – Difficulty of comprehension
(6) Badly structured/formatted – Ineffective presentation of content
(7) Inapplicable – Impracticability or irrelevance for practice
(8) Unreliable/stale – Lack of quality or value in conveyed knowledge
(9) Poor usability – Problem with features of the information resource

These categories are not mutually exclusive. For example, suggestion of other evidence and disagreement could concur. In that case, the comment is more informative to the editor as compared to a mere statement of disagreement in personal opinion.
While these categories are not mutually exclusive, they suggest different consequences at the user’s end and might require different corrective measures on the part of the information provider. For example, “Missing details” would result in the information not being usable in practice, while “Missing relevant information” only suggests more would be better (i.e., the given information can be understood and usable). Also, different actions would be required in response to the two categories. For example, relevant information might not be provided in order to keep a chapter focused within allowable length, while missing details (e.g., dosage details) are likely to be supplemented in order to enable clinical application. As another example, the problem of “Difficulty of understanding” would require re-wording for a correction but “Ineffective presentation” would not, as in the latter case correct comprehension is still attainable.

These nine categories appear to expand prior research findings about problems with health information use (Grad et al. 2007; Pluye et al. 2009; Pluye et al. 2005). For example, the usability issue adds to the list below.

(1) Too much information
(2) Not enough information
(3) Information poorly written
(4) Too technical [to be understood]
(5) Disagree with the content of the information
(6) Potentially harmful information

The prior research used different methods (i.e., literature review, interview, cohort study) to study different information users in the pull context (e.g., clinicians searching for information) as opposed to the push context of the present study (e.g., pharmacists receiving information without looking for it).
The CPhA participants expressed their opinions on the typology. Some agreed that each category of the typology represents a unique type of issue, while others felt that some categories could potentially be merged. In addition, one participant suggested a category that was not discovered from the set of data that I had analyzed. The possibility of merging the above categories is further discussed in the Research Agenda (Section 6.4).

With regard to RQ2 “In what way might pharmacists’ feedback comments be useful to the CPhA?” a value perspective guided the clarification and justification of the usefulness of the feedback comments. 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 the knowledge of editors.

In corroboration of the editors’ perceptions, the feedback did have an effect, as evidence suggests, by bringing them new knowledge of the field and making them critically reflect on content and wording.

Situation-based utilities of the feedback were also identified as occurring in (a) the examination of the validity of clinical recommendations, (b) communication and knowledge exchange between stakeholders, and (c) changing the content of the information product.
The inherent value is not only philosophically justifiable but also has 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 Association’s goals were confirmed in two ways, i.e., contribution to the mandate of professional development and continuing education, as well as contribution to a competitive edge.

The above findings fill a gap in the literature of user feedback management with empirical evidence (i.e., participants’ views and facts) demonstrating (a) the value of health professionals’ feedback as perceived by CPhA editors and (b) three types of realistic value: (i) the intrinsic value as that feedback impacted the state-of-mind of the feedback user (i.e., clinical editors), (ii) the instrumental value leading to optimization of (information) products, and (iii) the contributory value in terms of facilitating organizational mandates and gaining a competitive edge. To be noted is the fact that the intrinsic value and the instrumental value are attributable to the knowledge-laden characteristic of both the information product and the feedback comments, and are expressed through the knowledge work of clinical editors.

A clarification of the value of health professionals’ feedback is useful, because it (a) justifies the effort and resources expended on enhancing feedback management (Tang, Bouthillier, Pluye, Grad, & Repchinsky, 2011b), (b) guides the identification of design objectives for a feedback management system, and (c) clarifies goals to attain through feedback use.

In light of what has been identified in the literature review (Section 2.3.1), the above findings add to the literature in two ways. First, published
studies have only dealt with the use of quantitative feedback data 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), and no reports were found on health information providers’ use of textual feedback data. This study defines a particular setting of feedback use, where the health information producer, acting also as the information provider, profits from textual feedback comments provided by professional users. Second, in that specific context, the present study is the first to have provided a systematic clarification of the value of health professional’ feedback by following the philosophical approaches to and views of value that have been extended to information studies (Saracevic, 2007; Saracevic & Kantor, 1997). Results of this research indicate that both the perceived and the realistic approaches are applicable in studying the value of information, and that four types of value (perceived, intrinsic, instrumental, and contributory) can characterize information used in the organizational setting.

With regard to RQ3 “What issues does the CPhA encounter in making use of health professionals’ feedback comments?” a complete audit and mapping of the existing ad hoc feedback handling process was performed to identify 11 task objectives sequentially linked together by the flow of information (i.e., feedback comments). The passive nature of feedback collection means more attention should be paid to how comments are understood and responded to. For this reason, three essential tasks were found towards the end of the 11-task process, including (T9) screening comments for investigation, (T10) investigating reported issues, and (T11) making and documenting changes to e-Therapeutics+® content. These were scrutinized at the activity level, revealing the cognitively intense nature of these tasks. Specifically, nine issues were identified as revolving
around the three critical tasks. The clear identification of these issues, on one hand, echoes the second gap identified in the literature review that feedback management does not lend itself to any familiar type of business process/system solutions, and on the other hand, revealed the areas where improvements are possible.

In light of existing knowledge identified in the literature review (Section 2.3.2), this study builds upon Sampson’s (1996) notion of passive feedback, but a close examination had to be performed for the specific issues faced by the CPhA because of the fact that existing knowledge relying on active interaction has been geared towards a different set of issues such as knowledge co-creation across organizational boundaries (e.g., Gibbert, et al., 2004; Paquette, 2006; Sawhney & Prandelli, 2000a; Zahra & George, 2002). The identification of issues pertaining to passive feedback use by the CPhA not only expands the territory of customer knowledge management, but also points out the need for a different approach to dealing with the type of issues identified in this study.

With regard to RQ 4 “What process can be designed for the CPhA to facilitate the use of health professionals’ feedback comments?” the nine issues were summarized at a higher level into four areas that together define what a technological solution needs to provide: improved efficiency by streamlining bottleneck tasks, support for the cognitively intensive knowledge work of editors, support for information management over the feedback life-cycle, and means for fulfilling special tasks (e.g., reminder).

Paper prototyping was useful in validating the requirements of the feedback system user, and functional prototyping helped to ascertain the possibility of realizing the desired capacities. The positive responses from
clinical editors strongly confirmed the feasibility of a technological solution for feedback process improvement. At the same time, suggestions for additional functions indicated that the prototyping would benefit from more iterations to further clarify user expectations. The results for RQs 3 and 4 also showed that an action research approach—using research findings to inform action—was effective in addressing an issue insufficiently informed by the existing literature (i.e., the second gap of lacking a ready solution as identified in literature review, Section 2.3.2).

Outcomes with respect to RQ 4 contribute to the literature by addressing the lack of process-oriented technological solutions for the management of passively collected textual feedback (Merisalo-Rantanen, et al., 2009). As noted in the literature review chapter, empirical research on user feedback management has been driven by fragmented best-practices emphasizing mainly the paths that feedback goes through with individuals and departments. The issue of how inputs from external users are assimilated within the organization has not been the focus of research (e.g., Ajayi & Smart, 2008; Fundin & Bergman, 2003; Hudson, 2008; Lakoff & Johnson, 1999; Merisalo-Rantanen, et al., 2009; Opoku, 2006; Swami, 2006; Whelton, et al., 2007). This study suggests that attention be paid to four aspects: bottlenecking tasks, knowledge/cognitive work, information management, and particular task enablers. On arriving at a functionally adequate design of a user feedback management system, this research also suggests a novel approach to process/system solutions that may be considered in addition to the familiar types of system design approaches (e.g., for strategic planning or the management of emergent knowledge processes) (Hevner, et al., 2004; Markus, et al., 2002; Walls, et al., 1992).
Two other implications can be considered about what has been happening with the existing feedback handling process in general.

1. The Applicability of the A-C-A Model in the Organizational Setting
The CPhA uses feedback to optimize the content of information products which support the practice and continuing education of health professionals. In line with the A-C-A model (Saracevic & Kantor, 1997), feedback collection corresponds to Acquisition, investigation into reported problems corresponds to Cognition, and making changes to the information product corresponds to Application. While the A-C-A model was proposed using an example of library information use by individual scholars, this work suggests the three constructs are relevant to the study of information use at the organizational level, that is, information use linked to the mission of the organization.

2. Sense-Making of Passive Feedback in the Cognition Stage
The CPhA editors need to consider the situation in which health professionals’ use of health information takes place in order to capture the information gaps expressed in the feedback comments. Such gaps are not limited to users’ informational needs, and can be caused by dissonance between their own knowledge and the medical knowledge carried in the information products. “Discontinuity” is the term Dervin (2003) used to refer to such variants, and there are three components—the discontinuity, the situation that the user is in, and the way that the user may be helped—constituting her Sense-making Triangle. These components need to be identified to deal with health professionals’ feedback comments. Dervin emphasized that it is necessary to consider the situation where feedback has arisen, in order to understand the gap (problem) perceived/conveyed by the respondent.
The difficulty in comprehending feedback comments arises because users do not generate feedback from the standpoint of the information provider, but rather from their own situation. Dervin (2003) suggested that seeking and using information is best predicted based on how information users see their situations, because when situated in actual circumstances the logic of what they say is validated. To consider her sense-making model, specificities are needed in regard to health information users. A variation can also be pointed out in contrast to Dervin’s original model. That model relies on a dialogue method called interactive Time-Line Interview, which does not suit passive feedback collected via a one-way channel. Health professionals’ working or learning situations are not easily accessible via two-way interactions (e.g., interviews, telephone surveys). Instead, self-reported effects of health information (see Appendix D for feedback form) can be used for this purpose. The ‘situation’ of each comment can be described by using the respondents’ answers such as “I learned something new” or “I am reassured”, as these user situations reveal health professionals’ needs as well as the way they are helped by the health information they receive. By referring to a classic sense-making model, a better understanding has been obtained about the complexity involved in the Cognition stage of the A-C-A process, and that complexity can be attributed to the (passive) Acquisition of feedback.

Regarding what affects the innovation of feedback process, RQs 5 and 6 are discussed together as they represent two aspects of the same concern for contextual factors. RQ 5 “What are the factors involved in the development of a feedback management process?” is related to the development of a solution, and RQ 6 “What are the factors that may facilitate or inhibit the implementation of a feedback management process?” to the subsequent implementation.
Additional factors

In addition to the 21 factors specified a priori in the framework (Section 3.3.3), five factors were identified: individual rationality, parallel projects in the organization, established organizational processes, culture of the organization, and interdepartmental politics and tensions.

Two reasons might explain why these five factors were not included in the conceptual framework (Section 3.3.) in the first place. First, to enable measurement, broad concepts like the general culture of an organization have been narrowed down to, for example, specific elements (e.g., fact-based decision-making representing just analytic decision culture) in the literature (Sen, et al., 2006), and therefore were not in the instruments from which I had drawn. Second, the studies from which this research derived candidate factors shared a common focus on measuring organizational “readiness for change”, that is, before any change occurs. In contrast, the present study is conducted at the same time as the change actually unfolds, and open-ended interview probes have been designed to be sensitive to both pre- and post-implementation factors. This allowed closer examination of the conditions necessary for the successful carrying out of the complete project span as well as into the future (i.e., sustainability). The additional factors were found to be most relevant to the two latter dimensions: process implementation and sustainability, which are subsequent to initial stages of the project.

Similar to these five additional factors, the ERP and CRM literatures have mentioned factors such as culture (Wilson, et al., 2002), cost planning (Finney & Corbett, 2007), and interdepartmental cooperation (King & Burgess, 2008; Somers & Nelson, 2001). Because those factors, when reported, had not been systematically validated, they were not
incorporated into the research instrument of the present study. The emergence of the five additional factors through data analysis indicates, nonetheless (a) their presence in this study as well as (b) the adequacy of the research methods applied here, which detected their presence.

**Modeling contextual factors for the case of CPhA**

Table 9 lists the factors pertaining to each of the four dimensions (i.e., motivation, functional design, implementation, and sustained operation), with the organization level separate from the individual level.

**Table 9**

*List of Factors Corresponding to Four Project Dimensions*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Individual-level Factors</th>
<th>Organization-level Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation</strong></td>
<td>Conceptions about innovation</td>
<td>Organizational needs for assistance</td>
</tr>
<tr>
<td></td>
<td>Personal valence</td>
<td>Competitive advantage</td>
</tr>
<tr>
<td></td>
<td>Awareness of org. mission</td>
<td>Fact-based decision-making</td>
</tr>
<tr>
<td></td>
<td>Pressure for innovation</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td>Commitment</td>
<td></td>
</tr>
<tr>
<td><strong>Functional Design</strong></td>
<td>Functional appropriateness</td>
<td>Autonomy</td>
</tr>
<tr>
<td></td>
<td>Workload</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parallel projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Culture of the organization</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>Conceptions about innovation</td>
<td>Organizational needs for assistance</td>
</tr>
<tr>
<td></td>
<td>Efficacy</td>
<td>Staffing</td>
</tr>
<tr>
<td></td>
<td>Training needs</td>
<td>Resources</td>
</tr>
<tr>
<td></td>
<td>Workload</td>
<td>Governance and management</td>
</tr>
<tr>
<td></td>
<td>Momentum</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td>Senior management support</td>
<td>Parallel projects</td>
</tr>
<tr>
<td></td>
<td>Trust and cooperation</td>
<td>Established organizational processes</td>
</tr>
<tr>
<td></td>
<td>Mutual influence</td>
<td>Culture of the organization</td>
</tr>
<tr>
<td></td>
<td>Rationality</td>
<td>Department politics and tensions</td>
</tr>
<tr>
<td><strong>Sustainable Operation</strong></td>
<td>Conceptions about innovation</td>
<td>Staffing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Governance and management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Established organizational processes</td>
</tr>
</tbody>
</table>
Figures 6 model the above factors in such a way that the model represents (only) the observations about the specific phenomenon in the CPhA. This type of model does not serve to interpret laws and axioms of a theory that can be generalized (Frigg & Hartmann, 2009). By representing the narrative findings (Section 5.6) in a diagrammatic form, this model supports nevertheless the discussion of findings. The usefulness of this model, as a contribution of this research, is further explained in Section 6.3.1. In Figure 6-1, each factor is shown in relation to the associated dimension(s), and some factors span over two or three dimensions.

To spell out the connections between these factors, Figures 6-2/3/4/5 present diagrammatic overviews of all 26 factors and the relationships between those that impact or moderate others. The presentation is divided into four graphs, one for each dimension. Each graph (dimension) shows (a) the factors identified as immediately relevant to this dimension and (b) the factors that directly impact the former (e.g., organizational culture actively moderates and is displayed alongside autonomy in the Functional Design dimension, but the latter does not appear on the graph of the Implementation dimension with which the former is associated). The arrow represents the direction of impact between two involved factors.
Figure 6-1: Dimensions of Innovation Broken Down by Factors
Figure 6-2: Factors Related to the Motivation Dimension

Figure 6-3: Factors Related to the Functional Design Dimension
**Figure 6-4:** Factors Related to the Implementation Dimension

**Figure 6-5:** Factors Related to the Sustainable Operation Dimension
Modeling narrative findings in Section 5.6 into the above diagrams reveals the following characteristics of the involved factors.

Figure 6-4 clearly shows that the implementation dimension involves more factors directly than any of the other three dimensions (i.e., 9 organization-level factors + 9 individual-level factors = 18 factors in total), while sustainable operation (Figure 6-5) involves the least number of factors (i.e., 3 organization-level factors + 1 individual-level factor = 4 factors in total) and is mainly affected by organization-level factors.

The majority of factors (i.e., 20 out of 26) interacted with other factors, and interactions were observed between organization-level and individual-level factors (e.g., on-going parallel projects have an impact on individual staff’s workload). In fact, it is this inter-relationship that helped me to identify the five additional factors.

The visualized modeling also reveals that certain factors are more pervasive than others in terms of involvement in interaction with other factors. For example, communication and parallel projects each demonstrated impacts on four other factors.

By the direction of arrows, some factors appear to be involved in the interaction in a relatively passive way, i.e., tend to be affected by others, such as mutual influence (impacted by communication, parallel projects, dept. politics and tensions, and personal conceptions about innovation) and resources (impacted by parallel projects and established organizational processes).
It can be observed that the contextual factors, at both organizational and individual levels, also interact with features of the technological innovation itself (e.g., the enabling technology). For example, *efficacy* and *training needs* are influenced by the usability of the technology, and the (negative) impact of *workload* and *resources* can be mitigated by a properly designed feedback system.

It is not surprising that this project sees many factors being expressive, as having been reported in the literature, and that only a few additional factors were identified beside those well established in the literature. The present study also confirms Wixom and Watson’s (2001) argument that organizational factors tend to not vary across different project settings—ERP, data warehousing, and user feedback management.

Nevertheless, findings with respect to RQs 5 and 6 represent novelties that add to existing literature. Although important, the distinctive role and effects of contextual factors (as opposed to factors constituting parameters of the intervention itself) has rarely been addressed by the literature on customer knowledge management (Armenakis & Bedeian, 1999; Hevner, et al., 2004; Walls, et al., 1992). Based on literature review section 2.3.3, there is only one other study (i.e., Paquette, 2008) sharing a contextual perspective in examining organizational use of customer feedback. The difference, however, is that Paquette adopted Markus et al.’s (2002) framework to study an emergent knowledge process co-created by the organization and the customer, while this research is concerned specifically with the internal management of passive feedback.

One strength of the present study is the comprehensiveness in identifying various factors, which was based on an extensive review of multi-disciplinary literatures including, for example, customer knowledge

In summary, this study expands empirical research on factors involved in developing and implementing user feedback management processes in organizations, addressing the third gap identified in the literature review (Section 2.3.3), i.e., very little research has been conducted on the contextual factors that affect the development and implementation of user feedback management processes in the organization. It achieved so by pulling together a comprehensive list of factors from validated instruments and identifying five additional factors observed during the course of the study. The relevance of each factor is supported by empirical evidence (i.e., interviews), and all the factors and their inter-relationships have been modeled to represent the present case situation.

6.2. Generalization, Strengths, and Limitations

This research is not intended to offer broad generalizations based on a single case study, but the work does permit literature reviewers (e.g., comparative case studies) to synthesize results from this study with evidence that resides in independent reports (e.g., Armenakis & Bedeian, 1999; Pope, et al., 2007).

Because the organizational case is not a “sampling unit”, the mode of generalization is analytic generalization, in which a previously developed theoretical model (i.e., factors that are related to organizational innovation) is used as a template to compare the empirical findings of the case study (Yin, 2009). Analytic generalization can be used with single-case studies,
such as this research. Findings from this innovation in feedback management, with specificities due to its type (technology enabled) and project dimensions (from development to implementation), not only elucidate the current organization but may also be relevant to researchers and information providers engaging in similar innovations (detailed in the next Contributions section).

Replicating the final feedback management process in a different situation (e.g., when an organization does not produce research-based information products) will require the design phase in particular to be re-staged for adjustment to the specific situation. Similarly, the effects of organizational factors and the possibility of directly using them to interpret other organizations will be subject to variations depending on the resemblance of other organizational situations to this study. The research instruments of this study (e.g., interview guides), with adaptation, can be used to gain understanding about other organizational contexts.

**Strengths**

The strengths of this work reside with (a) a three-level conceptualization of the problem, (b) an inter-disciplinary approach to address the problem, and (c) the use of multiple sources of evidence following a PAR approach.

The research problem—a lack of adequate feedback management—could be narrowly seen as one at the process level. I have nevertheless paid detailed attention to the feedback comments dealt with in the process, and this micro-level attention led to findings (i.e., the issues reported in feedback, and the usefulness of feedback) that serve as a direction for process improvement. In addition, I looked beyond the feedback management process per se, and holistically attended to its introduction.
into the organizational setting. This macro-level focus led to knowledge that can be useful in undertaking the initiative of process innovation.

A multi-disciplinary body of literature was consulted, both in the review of literature and in the construction of conceptual frameworks, which enabled answering research questions proposed at all three levels (i.e., feedback comments, the feedback management process, and factors in the organizational setting).

To support this complex qualitative research, ten different methods were employed. I was able to coherently unify many methods under a pragmatism worldview and coordinate their application in a single organizational case study. Not only did I effectively draw evidence from a variety of sources through collaboration with the CPhA partners (e.g., interviews, observations, questionnaires, system prototyping, and etc.), the PAR approach has two advantages in methods application. First, the action component (e.g., system prototyping) engendered a research setting where I was able to examine while experiencing what was actually going on during process/system development, as opposed to retrospectively search for clues on what has happened in the past. Second, following participatory guidelines, participants and I worked together to verify and make sense of the findings, which ensured an accurate understanding and interpretation for knowledge to be generated from the research project. Both components significantly enhance the internal validity of this qualitative case study.

Limitations
Admittedly, there are a few limitations mainly due to the nature of this project as conducted by a doctoral student while still in research training.
Firstly, the literature review was conducted at the same time as I was being trained to do research. Systematic documentation of the complete protocol (e.g., search terms and queries) was not made at the same time as the review started. Nevertheless, a few critical elements—expert searcher, use of different search strategies and sources, incorporation of references suggested by knowledgeable contacts, and particularly citation tracking on all relevant publications—ensured that a sufficient number of relevant literatures have been identified for the purpose of identifying gaps in existing knowledge (Greenhalgh & Peacock, 2005).

Secondly, the typology of issues reported in feedback was derived from an existing dataset consisting of comments made by pharmacists. Physicians, nurse practitioners and other health professionals may raise different types of issues based on their unique backgrounds. This issue of sampling can be addressed by collecting and analyzing comments made by health professionals other than pharmacists. Data from different user groups may lead to a more representative typology of issues with respect to RQ 1.

Thirdly, in studying the intrinsic value of feedback (e.g., staff were prompted by the feedback to quickly update their knowledge), I could not observe “live” and had to rely on participants’ recounts of past events. The reliability of this method is subject to personal bias and recall error (Patton, 2002). To offset this limitation, I tried to compare different sources of evidence for the same participant, for example, by looking at traces in paper documents indicating that the participant had, as being described in the interview, looked up recent literature. However, there are instances where corroborating evidence was not documented or detailed, and I had to accept what the participant told me in the interview.
Fourthly, 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, and 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). I was careful about how to prompt interviewees when their replies were too general, trying not to direct them to talking only about specific issues. After reflecting on the interview transcripts, I realized that (only) occasionally probes improvised on the site may have been indicative of which aspects I was particularly interested in knowing about. This reflection not only helped me to critically examine my interpretation of the data, but also increased my experience in conducting semi-structured interviews.

And lastly, in four aspects, the present study is shaped by the particular characteristics of CPhA’s organizational setting and is representative only of the innovation approach taken by partners of this project.

1. The “association” culture, as pointed out by one participant, may have dampened the effect of pressure for innovation that would come from outside the organization.

2. The technological solution is not a sophisticated one, which would otherwise involve a steeper learning curve for staff (i.e., the training factor) and require heavier resource investments.

3. The degree of innovation/change is rather moderate, represented by incremental improvements that tend to be easily accepted by staff of the organization, and no drastic changes to existing practice were required. The findings on how factors played out with respect to incremental innovations may be different from those of more radical forms of innovation.
4. Feeling a strong need for a better feedback management process, all participants were very supportive of this project. This ruled out the possibility of examining situations where unwilling staff were involved in the project (i.e., observation of negative impacts).

Given the above unique features of the CPhA, findings from this single-case study should be treated with caution if they are to be considered for another organization. This limitation in terms of transferability is obvious when contrasted with a multiple cross-case study (Eisenhardt, 1989). Nevertheless, distinctive case characteristics, as have been articulated in this dissertation, can be valuable to researchers (e.g., when conducting literature reviews) because divergence between this and other case studies on relevant topics can lead to analysis for nuances and even generate new or expanded perspectives (Greene, 2007; Patton, 2002; Pope, et al., 2007).

In the research agenda (Section 6.4), I propose how some of the above limitations can be addressed with specific research projects.
6.3. Contributions

Despite the above limitations, this research contributes in a number of ways (a) to the advancement of scientific knowledge (at both conceptual and methodological levels) and (b) to supporting stakeholder practice. Table 10 summarizes all contributions; both the paradigm (design or behavior) and the level (conceptual or methodological) are indicated.

Table 10

Summary of Contributions to Science and Practice

| Contributions to Science (Design paradigm) | • Value approaches to studying information (conceptual) |
| • A framework for analysis of information processes (conceptual) |
| • Applicability of the ACA model at the organizational level (conceptual) |
| • Suggestions for using multiple evidence sources in information system design (methodological) |
| Contributions to Science (Behavioural paradigm) | • A framework for studying factors in the organization (conceptual) |
| • An empirical model of contextual factors related to organizational innovation, representing the case of the CPhA (conceptual) |
| • A checklist of contextual factors, interview guides (methodological) |
| Contributions to Practice | • A typology of issues reported in the feedback comments |
| • An improved feedback management process enabled by technology |
| • Lessons learned from understanding the contextual factors |
| • Contribution to knowledge translation in health care |

6.3.1. Contributions to Scientific Knowledge

As is evident in the present case study of the CPhA, the challenge that arises from a technology-based organizational process innovation concerns both design and behavioral paradigms (Hevner, et al., 2004). To adequately respond to this challenge, researchers need to take an
interdisciplinary approach by bringing together (a) principles for solution
design (i.e., information studies) and (b) theories that offer guidance on
successful development and implementation of the solution (i.e.,
organizational theories and management science).

This section summarizes the manner in which the present study connects
to the broader scientific domain by advancing conceptual and
methodological knowledge with respect to the two paradigms. In other
words, how knowledge acquired through this research can, in addition to
addressing the specific issues encountered by the CPhA, be useful to
researchers and practitioners working in broader yet relevant areas.

The design-science paradigm
The design-science paradigm is concerned with information artifacts,
broadly defined as constructs, methods, models, and systems (Hevner et
al., 2004).

DsgnCtr-1. Value approaches to studying information (conceptual)
This study is the first to formally investigate the value of health
professionals’ feedback comments for the health information provider.
It was accomplished by applying the “value” construct proposed in key
literatures of information studies (e.g., Repo, 1986), including the
philosophy of information (e.g., Floridi, 2010). The findings show that the
perceived and the realistic value approaches (see Conceptual Framework
Section 3.1), while combined with three philosophical perspectives (i.e.,
intrinsic, instrumental, and contributory), were appropriate for collecting
empirical evidence of the value of health professionals’ feedback. This
demonstrates that these approaches may be useful in studying the value
of other types of information utilized by the organization.
DsgnCtr-2. Framework for analysis of information processes (conceptual)
In Section 3.2., a structured framework comprising a sequential process dimension and a hierarchical dimension (i.e., process-task-activity) was formulated to analyze the processing of user feedback at the CPhA. The successful application of this analytical structure in the present study indicates that it might be used to analyze other types of organizational processes that are characterized by flow-of-information. Such information-oriented process analysis is crucial for process improvement, and this structure can serve as a conceptual framework.

DsgnCtr-3. Applicability of the ACA model at the organizational level (conceptual)
With respect to the sequential process dimension of information use, this research demonstrated that Saracevic and Kantor’s (1997) Acquisition-Cognition-Application model can be relevant to the analysis of information use at the organizational level (Tang, et al., 2011a) (see Results Section 5.3). Specifically, this three-phase model was sufficient to cover the span of user feedback processing in the CPhA. Extending the ACA model from individuals to organizations can help categorize information activities in organizational settings, resulting in (a) higher conceptual clarity for examination (by researchers) and (b) improvement of the management (by practitioners) of activities involved in information use.

DsgnCtr-4. Suggestions for integrating multiple sources of evidence for the determination of system requirements (methodological)
In designing a feedback management system, this project employed multiple data collection and analysis methods to determine requirements of a feedback management system (see Methodology Section 4.3).
The respective merits and limitations of each method allowed me to (a) address design objectives at different levels (i.e., task, workflow, and context) and (b) attend to not only technology but also the people and the organization they work in, which is critical to the success of a design project (Hevner, et al., 2004; Walls, et al., 1992). Moreover, experience on how multiple sources of evidence can be effectively integrated was summarized. The idea of integrating multiple sources of evidence, a technique adopted from organizational case study, can enhance system designers’ working knowledge and contribute to user-involved system design methodology (Tang, et al., 2012).

The behavioral-science paradigm
The behavioral-science research is concerned with explaining phenomena that occur with respect to the artifact’s use and the relationship it has within its organizational context (Hevner, et al., 2004).

BehavCtr-1. A parsimonious framework for studying factors in the organization (conceptual)
To enable the study of contextual factors, a conceptual framework was constructed in Section 3.3. The framework combines two research perspectives in studying organizational innovation: a staged view of innovation and a two-level focus on contextual factors. The structure of this framework is simple, comprising just two temporal phases (i.e., development and implementation) and two levels of factors (i.e., those related to individuals and those pertaining to the organization). This concise “two-by-two” construction makes the framework potentially applicable to a variety of settings. Its applicability is also sustained by its roots in the general organizational science literature, broader than any derivative research streams such as health program interventions (see
Methodology Section 4.3.10) and business process re-engineering (see Literature Review Section 2.3.3). The generic nature of this framework means it can be flexible in application and is inclusive in scope, making the framework easy to use. For example, the present study further manifested the two temporal stages into four dimensions (i.e., motivation, functional design, system implementation, and sustained operation) that are specific to CPhA’s project of feedback management; factors uncovered beyond the pre-defined (data collection) instrument were found to fall under this framework as well, indicating the embracing capacity of this framework. A broad and versatile framework as such is useful.

BehavCtr-2. An empirical model about the roles of contextual factors related to organizational innovation (conceptual)

Models can (a) represent selected parts of the world (e.g., phenomena of target systems) and (b) interpret laws and axioms of a theory (Frigg & Hartmann, 2009). Of the former type, the model produced in Section 6.1 is a representation of observations about the particular case of the CPhA, explaining the effect of 26 factors on the innovation of feedback management and the inter-relationships between those factors.

An important contribution of this model (study) is that it represents the inter-relationship between the involved factors. As the literature suggests, this is a relatively understudied area, in part due to the fact that quantitative studies (e.g., using surveys) designed to measure the impact of factors do not provide insight into how factors interact with each other (at their best, quantitative studies can only assess the degree of statistical correlation between factors) (Akkermans & Van Helden, 2002; Dezdar & Ainin, 2011; Grabski, Leech, & Schmidt, 2011; Ngai, et al., 2008). The detailed descriptions about the behavior of individual factors (Results
Section 5.6) explain, rather than merely identify, the interactive effects (e.g., *communication facilitates trust and cooperation*).

This model has two uses. First, it provides a vehicle for learning about this study. Second, it can be used by researchers to compare with other case studies. In other words, it provides literature reviewers with data for performing comparative analysis with other case-based models in the literature so as to reach a higher level of summarization/understanding.

**BehavCtr-3. List of contextual factors, interview guides (methodological)**

Sections 5.6 and 6.1 provide a complete list and explanation about contextual factors summarized from this study. The list serves as a useful tool (a) for managers who want to plan and prepare for projects similar to the one carried out at the CPhA, as well as (b) for researchers wishing to conduct studies of similar types of projects. For managers, understanding their organizational contexts before actually engaging in the development and implementation of new processes is important, because such projects often involve substantial costs and decisions, which need to be made on an informed basis. For researchers, a list of representative factors, based on comprehensive literature reviews and with improvements as to its representativeness (see Methodology Section 4.3.10.), can be used to (a) quickly focus on studying the phenomenon of interest without having to start over with a literature review, (b) further expand the coverage of constructs in the list, for example, with regard to particular organizational scenarios, and (c) develop other types of research instruments (e.g., survey).

While the list of factors is comprised of conceptual constructs, the interview guides (Appendix K) may be used directly or easily adapted for use in another organization. The items in the interview guides have been
independently reviewed by two other doctoral students to ensure that they adequately represent the factors they intend to query, and the wording of each item has been reviewed by three native English speakers, including two doctoral students and a research librarian with an English literature background. Practitioners may find the ready-to-use interview guides handy, i.e., with different versions for directors, managers, and general and IT staff, while researchers may wish to create complementary versions for particular research purposes by modifying those given.

It should however be noted that the additional factors identified in the discussion (Section 6.1) of this dissertation are not represented by items in the given instruments which were used in the present study. This represents an opportunity of instrument improvement (see also Section 6.4.4 for future research directions).

6.3.2. Contributions to Practice

I adopted a pragmatism worldview which emphasizes the application of knowledge discovered from practice to improve practice. Combined with the purpose of the CPhA, which wants to make sense of user feedback to optimize health information resources, this worldview has been utilized to suggest implications for practice, i.e., how the CPhA can improve organizational processes as a result of this project.

Typology of reported issues

Clarifying different issues reported in the feedback is a prerequisite to taking action in response to them. The typology of nine reported issues could help the stakeholder to avoid anecdotal treatment of single comments by looking at each topical chapter as a whole. Relying on
anecdotal comments can be dangerous, as one participant commented: “anecdotal comments can come from one or two or three. And if then you take that ... generalize that, and make changes based on that, you may then discover it was just one or two or three people who thought that way, while the vast majority didn’t.” The typology, in the words of a stakeholder, may help them in the following ways:

“... if we could see patterns of negative feedback, then that would be useful in a big picture way when you present to the author how to write a chapter ... if we could group the mean to patterns to analyze trends and negative responses it might be useful then to use those to develop a different way of presenting the information ... We have the idea that we are bottom-line, evidence-based, maybe people keep looking for something else that we are not giving them. If there’s a way to capture that from pooling all the feedback via something like this [typology] that would be useful. If we got a ton of missing details, maybe it’s telling us they want more than the bottom line ... maybe we would change our policy about the kind of stuff we put into the chapter, if there’s enough feedback that is pointing that way ... because when you get big numbers, you can start to place value on them.”

[Participant No. 2]

Using the dataset (i.e., 313 pharmacist comments), from which the typology was derived, Table 11 shows one example of organizing and presenting feedback as the participant has suggested. While the table is not for answering research questions of the present study (i.e., not part of the results), it illustrates the possibility of answering questions that might be interesting to CPhA editors, for example “How frequently are different issues reported in relation to each of the therapeutic chapters/topics?”
The rationale for content analysis using a two-way frequency table to analyze reported issues in relation to topics is as follows. Content analysis particularly suits coding of themes inferred from open-ended, qualitative feedback comments, because this technique is applicable to unstructured content and can provide understanding about ideas in people’s minds (Krippendorff, 2004). Because frequencies are indicators of emphasis (Berelson, 1952) and “can be used as basis for the correlation between two variables” (Krippendorff, 1980, p. 106), the relative frequencies of the occurrence of different problems indicate which problem tends to be the most prominent pertaining to a certain situation/effect of information use.

In the above table, frequency analysis is done by grouping feedback items that all relate to a therapeutic topic under the respective problematic themes and then totaling the occurrences per theme. It can be seen that among all identified problems, the problem with the highest relative frequency has the greatest tendency to occur in relation to certain topics.

For example, for all feedback related to the “Cardiovascular Disorders” chapter, the problem of “Missing specific details” has the highest frequency of occurrence as compared with other problems reported on this topic. That indicator could provide a sign calling for attention to be...
paid to the “Unspecific” problem. This kind of correlation would also show the different expectations that users may have for each chapter—e.g., Fluid and Electrolyte tends to be incomplete, and Cardiovascular unspecific. In other words, it could provide insights for editors by suggesting what to pay attention to while working on each specific therapeutic topic/chapter.

Of the nine issues comprising the typology, eight are related to the content of the information product and only one (i.e., poor usability) is feature related. This indicates that feedback management is highly relevant to the editorial work, as problems received in the feedback are addressed through the editorial workflow and eventually contribute to optimizing the editorial output.

An improved feedback management process enabled by technology
In this project, the main contribution to practice is made through (a) the identification of issues confronted by the CPhA in feedback handling, and (b) the design of a better process that addresses the issues. As a result, the CPhA can efficiently and systematically incorporate into research-based evidence health professionals’ knowledge based on their practice, so that the health information becomes better suited for practice.

A simple yet usable prototype system was built that provides adequate functionalities to enable process implementation (Results Section 5.5). The functional prototype has the potential to be further developed, tested and deployed for production use by the CPhA. During the course of developing this prototype, user requirements and technical specifications were documented. As another option, they provide a starting point for developing a production system even if a different technical platform
(e.g., Java) is chosen by the stakeholder, instead of the platform on which
the prototype is based (i.e., PHP), to host and run the feedback system.
The information system serves as the enabler for the improved feedback
management process, and can effectively minimize the workload incurred
by installing yet another process in the organization’s daily operation.

The usefulness of understanding the contextual factors (lessons learned)
As summarized below, the lessons learned from understanding how the
various factors perform (Results Section 5.6) are particularly relevant to
the CPhA. They are also potentially relevant to any organization engaging
in technology-based organizational innovations.

Lessons related to individual level factors
Conceptions about innovation: To enable staff to contribute to initiating
organizational innovations, managers should share, when feasible, their
understanding about global issues in the work process.

Personal valence: Innovation leaders should clarify the expected impact on
staff workload to avoid unnecessary concerns that could negatively
impact this factor.

Awareness of organizational mission:
- Managers should try to clarify any (indirect) links between the
  innovation and the organizational mission.
- Managers should communicate with their staff about the clear
  connection of the innovation with the organizational mission so that
  this factor can become expressive with the staff.
Commitment: Because commitment can occur due to reasons other than direct job related benefits, the organization should try to gain not only normative but also affective commitment of staff to facilitate innovation.

Functional appropriateness: Involving end users’ participation in the development stage of an innovation project can facilitate their agreement on functional appropriateness.

Efficacy: Providing end users the opportunity to get a concrete feel for the technologies involved can help them build confidence in the purported innovation.

Training needs: Solutions requiring relatively low levels of technical skills should be considered with priority, in order to minimize training needs.

Workload: The planning of the design and implementation of an organizational process innovation should take into account the parallel projects that are taking place in the organization, in order to avoid competing for staff work time.

Momentum: To facilitate implementation, momentum should be built up by demonstrating concrete benefits that the innovation can bring to staff’s day-to-day work.

Senior management support: To secure support from the senior management, it is important to clearly specify the conditions required for implementation.
Trust and cooperation: Installing mechanisms of inter-departmental communication throughout the project can help achieve a positive effect of this factor between different departments involved in the innovation project.

Mutual influence: When exercising influence (e.g., trying to get buy-in from others), one should be aware that other members of the organization may assume different views or may not have the same vested interest.

Lessons related to organizational level factors

Organizational needs for assistance: It is important to collaborate with external partners that can assist the organization in discovering, articulating, initiating, and realizing innovation opportunities.

Competitive advantage: Marketing department may consider articulating this factor for other members of the organization to increase their motivation.

Staffing: The workload plans and skill sets of the present staff should be taken into account in adopting and/or developing a technological solution.

Resources: Project planning and technical design of an innovation project should take into account available resources as well as the budget process of the organization.

Fact-based decision making: Proper alignment of innovation goals with the organizational culture in relation to decision-making can positively impact the innovation.
Governance and management: In addition to the general management structure, it is advisable to designate appropriate liaisons to coordinate for the particular project.

Autonomy: To promote innovation, staff should be encouraged to discuss novel ideas, be facilitated in the change management process, and be guided to justify their ideas by showing beneficial results.

Communication: Formal iteration throughout the innovation project (e.g., a series of group meetings, both within and across functional departments, with key member attendance) should be planned to enable effective communication.

These lessons can directly improve action and serves a different purpose than descriptive knowledge which helps to improve understanding of such-and-such is the case. This type of applied knowledge is valued not only by practitioners but also researchers of management science (Gregor, 2006). For example, one of the lessons is to clarify the required resources for implementing the new feedback process, so that the Senior Director can plan and commit to the initiative with concrete measures of support.

Statements as such can be tested and potentially generalized as principles of best-practice for project managers when they intend to secure upper management support, and can therefore be relevant to other organizations should they embark on similar initiatives (i.e., organizational process innovations using information technology).
**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 translational research. In the Canadian context, Knowledge Translation has been defined by the Canadian Institutes of Health Research as a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge produced in clinical research to improve the health of Canadians, provide more effective health services and products, and strengthen the health care 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 health care (Straus, Tetroe, & Graham, 2009a).

Treatment recommendations, such as those published in e-Therapeutic+®, can be applied to many aspects of clinical care: how and when to order diagnostic or screening tests, when to provide certain medical services, and how these should be performed (Timmermans & Mauck, 2005). However, there are barriers specific to this group of users in taking full advantage of recommended, high-quality evidence (Gravel, Legare, & Graham, 2006), leading to consequences of such evidence not being applied to clinical care (e.g., Majumdar, McAlister, & Furberg, 2004; McGlynn, et al., 2003) and the concomitant inability to satisfy patients’ information needs (e.g., Kiesler & Auerbach, 2006). One of the barriers pertains to the health information resource (Harrison & Legare, 2009), which may fail in enabling health professionals to identify, appraise and then apply evidence in clinical settings due to, for example, insufficient 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 address that barrier.

To summarize, this project helps the CPhA to enhance their core editorial process (i.e., based on expert authors, expert reviewers and expert editors) by integrating a user feedback management process. The end product of this enhanced editorial process is evidence-based health information better suited for clinical practice.

6.4. Research Agenda
Six directions are considered for future research. Some are related to the identified limitations, and the agenda suggests how to overcome them.

6.4.1. Validation of the Typology
There are pros and cons associated with simpler or more specific thematic categories respectively, and it is up to the researcher to decide what counts as a theme so long as consistent (Braun & Clarke, 2006). I consider the evaluation of convergent and discriminant relationships between themes as an area that deserves further examination, because clarifying the similarity and dissimilarity between the constructs may lead to new analytical constructs (Vogt, et al., 2004). Two methods can be considered for theme refinement:

1. To improve the definition of each theme, two researchers may independently apply the typology to rate the same set of feedback comments. If the themes are not clear enough to be used reliably by
different raters to achieve sufficient agreement in ratings (e.g., judged by the inter-rater reliability using the Kappa statistic), then the discrepancies can be considered as pointing to areas where theme definitions should be improved. This exercise may lead to naming and phrasing themes more clearly, or to splitting one theme into two separate and more specific ones.

2. Factor analysis can be used to decide if two (or more) themes should be merged. Factor analysis can be applied as a similarity measure to a correlation matrix (between themes) (Darlington, 2004). Themes that are highly and positively correlated would provide candidates for merging.

The feedback comments used in this study represent a sample related to one information product (e-Therapeutics+®). The typology of reported issues may not be applicable to other information products, thus new thematic categories may emerge for other information products. Nevertheless, the IAM provides a way to solicit and record health professionals’ feedback in a uniform format. Thus this study’s method of developing analytical constructs can be applied to content analysis of other sources of feedback comments.

6.4.2. Automatic Clustering of Feedback Comments

Techniques such as Latent Semantic Coding and multidimensional scaling can be used to compare similarities between textual information. By combining those with the typology of reported issues, two next steps can be taken:

1. Use clustering algorithms (e.g., Latent Semantic Coding and/or multidimensional scaling) to automatically identify and classify constructive feedback comments, which can help to cope with large amounts of data (i.e., the issue of high data volume).
2. Clustered new comments can be linked to comments previously received with regard to the same issues, and solutions from the past (e.g., how content on a topic was optimized) can be automatically recommended to the editor to handle the new comments.

6.4.3. Occupational Difference
Participants have suggested differences between comments offered by users of different professions (e.g., physicians, pharmacists and nurse practitioners). For example, one participant commented as follows:

“The family physician audience was … looking for something that could use in their practice … this is a generalization, but I think when the audience was mostly pharmacists, who have more an academic approach to the information.” [Participant No. 1]

Such differences suggest that the reported issues might have different emphases, or that different professions may report different issues. While the current study analyzed only a sample of pharmacists’ comments, it would be interesting to commission a study comparing feedback from different occupation groups with respect to the same health information. Findings from such a study may help the information provider tailor content to meet specific needs of different audience groups.

6.4.4. Representativeness of the Factors List
Instead of empirical observation, the implementation and sustainability dimensions are only explored (through interviews) in this research. A subsequent research project could take place as the CPhA moves into later stages; this would provide the opportunity to examine exactly which factors play a role and in what way in practice. Findings can add to and/or modify what has been reported in this study. For example, additional factors may be discovered, which will contribute to the
representativeness of the factors list and further improve the instruments (e.g., Appendix K) based on the factors list.

6.4.5. Evaluation of Improvements in Feedback Management
The impact of the new process (based on the given technological solution) has to be evaluated. Post-evaluation is part of the design-science research paradigm. A study can be designed to use, for example, DeLone and McLean’s (2003) dependent variables that represent information system success to examine impacts on individuals as well as on the organization (Torkzadeh & Doll, 1999; Weill & Vitale, 1999).

6.4.6. Model Refinement and Generalization
In terms of refining the model produced in this study, once implementation and sustainability of the innovation have been studied, empirical data based on observation can be generated to combine with those generated in the interviews, and consequently add richness and specificity to the present model.

The present model, created to represent the situation of the CPhA, is specific to the present case study. To turn such a model into a generalizable one would require a number of similar case studies to be conducted and their respective models to be compared and consolidated. In addition to the CPhA, IAM has been used by other institutions such as the College of Family Physicians of Canada and the Canadian Medical Association, to collect health professionals’ feedback on various information resources. The need for a user feedback management system exists in these institutions as well, which may justify similar projects being commissioned in other environments. If that can be done, models representing different organizational settings can be studied together and possibly lead to a more generic model with higher theoretical value.
6.4.7. System Generalization in Application
Triggers for content optimization do not only arise from external users’ feedback. Internally, clinical editors receive other types of triggers that may lead to investigation into e-Therapeutics+® content. It is likely that the technological solution created for user feedback can also accommodate the management of other types of triggers. As suggested by some CPhA participants, this is a topic worthy of consideration in further development of the system requirements.

The idea of using a user feedback management system to address product quality issues can potentially be generalized for products other than information resources. Different organizational processes may be involved in identifying, verifying and acting in response to reported issues. The methodology applied in the present study may be used to identify commonalities in system requirements, so that the system can be developed in a way to suit a number of organizational settings.

6.5. Concluding Remarks
This study set out to address the overarching question: How can user feedback management be optimized for the CPhA? The objective has been met through a holistic strategy with three levels of focus on (a) the feedback comment, (b) the feedback management process, and (c) the factors affecting the development and implementation of optimal user feedback management in the organizational setting. Outcomes of this participatory action research project demonstrate that this strategy (a) is effective in dealing with knowledge-intensive feedback comments, and (b) might be transferable to organizations that want to maximize the benefit of inputs from users knowledgeable about the organizations’ products and services.
I hereby conclude this dissertation by answering three questions: Who is this research for? Why would it work? And, what is next?

Who is this research for? The outcomes of this research are immediately useful to the CPhA, because they address the current problem: the lack of an appropriate process for using health professionals’ feedback comments. The methodology and findings from this research are relevant for consideration by researchers and practitioners facing similar problems.

Why would it work? This research attended to both the design of a technological solution that directly addresses the problem, as well as to the factors that influence the development and implementation of the solution. Supporting these two paradigms is interdisciplinary knowledge drawn from information studies, organizational theories and management science. Close collaboration between stakeholders and researchers ensures the appropriate application of research findings in guiding actions that fit well with the real-world organizational setting.

What is next? As the present project ended in 2011, the CPhA has been well prepared to develop a production system and implement a more efficient feedback management process. Specifically, operational and technical feasibilities have been discussed and proved (using prototypes), and the risks and success factors have been identified and understood through research. In 2012, the CPhA has launched an accreditation program for Canadian pharmacists, which might generate an even larger volume of feedback through integrated professional education (i.e., CPhA members will receive continuing education credits for providing feedback about e-Therapeutics+®). With a systematic approach ready in place, many benefits can be anticipated, including increased productivity and possibilities of new member services (e.g., user feedback can lead to discussion of highlighted therapeutics in the community), and the CPhA is well positioned to advance its mandate.
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Appendix A
Review of literature on empirical studies of feedback management

This review looks into empirical studies of user feedback management regarding practices, solutions, and lessons learned.

1. Search method
Databases:
- ABI Inform, Dissertations and Thesis, and Research Library (ProQuest)
- Web of Science (Thomson Reuters)
- Academic Search Complete (EBSCO)
- Scopus (Elsevier)
- Google Scholar (Google)

Search was first performed up to March 2009 and then updated in February 2011.

The controlled subject term of “customer feedback” was used to search the ProQuest and EBSCO databases, and Boolean keywords “customer”, “user”, “feedback” were applied to multiple fields (e.g. topic, title) to query the Web of Science because it does not provide controlled subject terms.

The difference between user and customer is that the latter implies who makes the purchase. When controlled subject vocabularies are available as with the ProQuest and EBSCO databases, “customer feedback” was found to be the authoritative heading that also covered the subject of user feedback. In presenting this review I follow the convention of information studies to use the word ‘user’, and be consistent with the thesis.
presentation, as institutional subscribers are referred to as customers and individuals end users.

Publications were limited to academic or scholarly journals when such an option is available.

Limitations of the database search method include coverage (e.g. time period and journals) of the databases, and possible human mistakes in classifying and assigning controlled vocabularies to articles.

First step: abstracts were browsed to identify entries that may be relevant. In addition to direct hits of case studies, reviews and conceptual papers were also retrieved, and references in the latter were used to find empirical studies that were not found directly.

Second step: potentially relevant articles were read, and selected if they furnish sufficient descriptions to be analyzed, meaning their relevance can be judged per the characteristics of feedback data as described in the following section. Not selected were the articles devoted to feedback collection methods, or those in which feedback were discussed as a user-to-user phenomenon and not meant primarily for vendors. However, feedback data collected by first-line employees from customer sites (e.g. Ajayi & Smart, 2008) were essentially external inputs, and studies of such were included. Findings reported in reviews and conceptual papers were jointly presented in the discussions section.
2. Characteristics of the Feedback data

The uniqueness of user feedback imposes some important criteria for filtering articles. These criteria define the subject data, and highlight some issues specific to our study.

1) Passively collected (unsolicited)
Passive feedback was defined by Sampson (1996) as initiated by customers and not prompted by direct motivation. Compared to the opposite active type, passive feedback is less costly to collect, more sensitive to extreme bias but less susceptible to memory bias (due to spontaneousness), likely to receive low response rate, and yet able to be collected on a continuous and ongoing basis. The feedback collector only provides an opportunity to be replied at, and direct interactions cannot happen as in interviews or focus groups. Therefore, no explanation can be pursued if any question arises from reading the feedback data. For such open-ended responses, it becomes a challenge to fully comprehend what the respondent tried to tell. Another limitation noted by Sampson is that since the responding population is self-selected, one is unable to gather follow-up information.

2) Negative or constructive
Negative feedback is valuable as providing opportunities for service recovery and quality improvement (Kirpalani, 2004). Complainers are just expressing problems that other customers have accepted or cannot articulate, and their messages have the potential to supply valuable information (Garver, 2001; Sanes, 1993).

3) Qualitative (verbatim comments)
Research has recognized taking open-ended input as a best practice, because it is more direct in telling what attributes should be improved
whereas quantitative analysis (e.g. benchmarking) only infers them (Garver, 2003). In addition to identifying what attributes should be improved, verbatim analysis offers insight into how and what level the improvement should be made. Qualitative user feedback may also add richness and helps to explain the ‘why’ behind any patterns in the quantitative data (Barnes & Vidgen, 2003), linking this study to the previous research focus of quantitative IAM. Also, respondents tend to supply longer, more detailed responses over the web (Garver, 2001), same is the feedback channel in this study. In analyzing qualitative feedback data, more attention should be paid to how they are understood rather than how they are processed.

4) Leading to improvements
Various purposes of consulting user feedback include measuring the performance of a company, understanding users’ feedback behavior, analyzing user needs, protecting company’s public image, and cultivating customer loyalty (Garver, 2001; Goodman, DePalma, & Broetzmann, 1996; Ofir & Simonson, 2001; Sampson, 1996). Different purposes entail different reactions in response to the feedback received. For example, to give users a good impression, timely acknowledgement of receipt of feedback is important; and to maintain the trust of user, helping them resolve the immediate need might be the priority. On the other hand, opportunities of improvement may exist at different levels (i.e., ranging from product and service design, to internal working processes, and to strategic initiatives).

It is common to find studies that apply both passive and active feedback collection methods (e.g., Maguire, Koh, & Huang, 2007), collect quantitative and qualitative data, and equally value positive and negative responses. Collected data are often analyzed for multiple purposes. The
above criteria (characteristics) were, meant to ensure relevancy rather than to exclude articles having extra information. So, a study would be included as long as sufficient detail can be gathered from it to compare side by side with other studies. Eight empirical studies were identified and synthesized below.

3. Analysis
Although no dateline was specified in the search, the eight studies were all published within ten years, one in 2009, two in 2008, two in 2007, two in 2006 and one in 2003. This indicates a recent research interest in the type user feedback management per above criteria. Four of the publications appeared in science and engineering journals (Ajayi & Smart, 2008; Merisalo-Rantanen, Rossi, Hallikainen, & Nurminäki, 2009; Swami, 2006; Whelton, Andrea, Daniel, & Roberson, 2007), two in business and management (Fundin & Bergman, 2003; Opoku, 2006), one in library and information studies (LIS) (Hudson, 2008), and one in an interdisciplinary journal of industrial management and electronic data processing (Maguire, et al., 2007). Interestingly, only one study came from LIS, a field having long tradition of user-orientation. It is possible for information research, being interdisciplinary in nature, to appear in titles of adjacent fields such as management, but article-level examination confirmed none of the other six studies fell in the field of LIS. The implication might be that although user feedback has been as much reported in LIS literature as actively engaged in projects for information service quality improvement (e.g. Agosti, Crivellari, Di Nunzio, & Gabrielli, 2011; Chiranov, 2011; Nichols, 2006; Smart & Whiting, 2002), passively collected qualitative feedback has received little attention.
Table 1 organizes key elements of these studies at two levels:

At the *applied level*, the interest of examination is reflected under four headings.

1. Fields (industries) that apply feedback processes, and the size of organizations.
2. Types and channeling of data. Channeling is about where the feedback goes in the company and has to do with the cost and quickness in reaction (Sampson, 1999).
3. Data handling processes, e.g. storage, the interpretation and the tools used.
4. Actions taken and what outcomes were realized.

At the *conceptual level* are the views and purposes held by organizations in those studies as well as the reported findings, discussions and conclusions.

1. Stated objectives of implementing feedback management.
2. Who or which departments were responsible for handling user feedback. The various functional areas of a company (e.g. design, marketing, production and customer support) represent how feedback information is used throughout the organization with regard to their specific objectives (Sampson, 1999), and the standpoint and capacity of responsible parties determine and limit the viewpoint and capacity in which solutions of feedback handling are sought. So, implications in this regard are of conceptual importance.
3. How were feedback data and systems perceived by the organizations?
4. The discussions and findings reported by researchers reflecting their research foci.
<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Industry (size)</th>
<th>Feedback data and channeling</th>
<th>Tools and data processing</th>
<th>Uses of feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajayi and Smart</td>
<td>Heating equipment</td>
<td>- Field failure data, generated by service engineers, sent to design department</td>
<td>Register into the company database</td>
<td>• Use ‘nearest’ option to describe the problem (free text allowed, but not to create options)</td>
</tr>
<tr>
<td>(2008)</td>
<td>(multinational)</td>
<td>- Options only available in the company database that describe the failure and what was done</td>
<td></td>
<td>• Understanding about the root cause is desired but stifled due to missing and incomplete data capture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to resolve it</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ‘Free text’ records of events, but sometimes data are omitted or missing for various reasons</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundin and Bergman</td>
<td>Manufactured goods</td>
<td>- Complaints received by employees</td>
<td>Codify into databases</td>
<td>Used cross-functional discussion</td>
</tr>
<tr>
<td>(2003)</td>
<td></td>
<td>- Suggestions for improvements made by employees</td>
<td>• Personal communication within the organization</td>
<td>• Service as agreed in warranty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Also considers the working process</td>
<td>• Customer relationship care</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(No details on sharing and interpretation of data)</td>
<td>• Instate new services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Redesign</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Improve development process</td>
</tr>
</tbody>
</table>
### Applied-level Summary (continued):

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Industry (size)</th>
<th>Feedback data and channeling</th>
<th>Tools and data processing</th>
<th>Uses of feedback</th>
</tr>
</thead>
</table>
| Hudson (2008)          | Online resource publishing                                                      | • From customer directly, or via sales reps, technical support and service reps  
                          |  
                          |                                      | • Phone calls and emails  
                          |  
                          |                                      | • The company’s regional offices based on what they heard in the field  
                          |  
                          |                                      | • Company’s customer groups  
                          |  
                          |                                      | • Enter into a project management system  
                          |  
                          |                                      | • Review weekly  
                          |  
                          |                                      | • Have regular meetings to discuss enhancements and problems, and whether customer needs can be met with current functionality  
                          |  
                          |                                      | • Assign an agenda action item to an enhancement build, and items are prioritized. Go back for more information if validity and need cannot be determined  
                          |  
                          |                                      | • Use investigative polls to determine how many customers could benefit from changes  
                          |  
                          |                                      | • Catalyze more advanced development than original requirements from customers  
                          |  
| Maguire et al. (2007)  | Four large companies in mail services, electric engineering, financial services, and business communication services | • Multiple listening tools  
                          |  
                          |                                      | • Customer complaints  
                          |  
                          |                                      | • Employee generated feedback via an intranet system  
                          |  
                          |                                      | • Real-time internal audit system.  
                          |  
                          |                                      | • Identify the nature of complaints  
                          |  
                          |                                      | • Publish results and send to key people and branch offices  
                          |  
| Merisalo-Rantanen et al. (2009) | Financial organization providing e-banking service to a large user base   | • Electronic feedback received via Internet and email  
                          |  
                          |                                      | • Manual entry for phone calls, letters, and faxes through customer contact centers, quality centers, and branch offices  
                          |  
                          |                                      | • Centralized feedback management at the operational business unit (country-level)  
                          |  
                          |                                      | • Feedback management system as part of centralized customer relationship management systems  
                          |  
                          |                                      | • Classify feedback as positive, negative or neutral  
                          |  
                          |                                      | • Look for existing response to similar issues. Distribute feedback to responsible business units or to IT helpdesk  
                          |  
                          |                                      | • Check “novelty” and “innovativeness”, may involve multiple departments  
                          |  
                          |                                      | • Product manager decides on initiatives. Interact with feedback providers and assess their satisfaction about responses  
                          |  
                          |                                      | • Share successful uses of feedback within the organization  
                          |
### Applied-level Summary (continued):

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Industry (size)</th>
<th>Feedback data and channeling</th>
<th>Tools and data processing</th>
<th>Uses of feedback</th>
</tr>
</thead>
</table>
| Opoku (2006)  | Small- and medium-sized enterprises | • Internet-based tools, particularly e-mail, but also hypertext contact-us link, online customer discussion forum and e-meeting with clients  
• Marketing integrated computer system to collect emails | • Emails are put under different headings  
• Emails are logged against customer accounts, and forwarded by a schedule officer  
• Put under different headings of a database  
• Manually analyze online feedback. | • Help all staff get the feel about the type and nature of feedback  
• Resort to Q/A databases for answer to similar questions that has been responded earlier  
• Processes to give insights to the management, but feedback systems are not fully integrated into mainstream management activities  
• Integrate online tools with mainstream feedback collection, e.g. telephones, for reporting |
| Swami (2006)  | Aeronautical equipment development. | • Directly from customer, and from internal service and quality records  
• Mixed data types – both structured questionnaire per quality system procedure and qualitative data (comments, interviews, phone calls, first-line staff...) | • Feedback pro-forma per quality system procedure  
• Classification per seriousness  
• Statistical analysis of defective components. | • Defect investigation to find root cause, then followed by remedial measures  
• Both corrective and preventive actions were triggered |
### Applied-level Summary (continued):

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Industry (size)</th>
<th>Feedback data and channeling</th>
<th>Tools and data processing</th>
<th>Uses of feedback</th>
</tr>
</thead>
</table>
| Whelton et al. (2007) | Drinking water supply (13 utilities). | - Descriptive information  
- Phone calls, emails and online forms, letters via mail and in person  
- Via call centers or direct to utility departments or forwarded by external agencies, e.g., health, fire and police depts. | - Store with paper files when first received  
- Not always recorded into file during initial contact, resulting in lost data. Historical data were not kept  
- Varied electronic and paper filing to track and store feedback data  
- Use Central database  
- Electronic storage linked to work order management system  
- Non-standardized categories (created as deemed appropriate) with varied focuses by different utilities  
- Non-consistent descriptors | - No detail on interpreting  
- Share data with other utilities and agencies such as public health and municipal services |
<table>
<thead>
<tr>
<th><strong>Author (Year) Research Design</strong></th>
<th><strong>Stated Objectives (Activity Domains)</strong></th>
<th><strong>Involved Parties (organizations, departments)</strong></th>
<th><strong>Stakeholder Perceptions (Feedback and its Use)</strong></th>
<th><strong>Key Points from Findings and Discussions (Relevant to the Present Study)</strong></th>
</tr>
</thead>
</table>
| Ajayi and Smart (2008) One organizational case study using multiple sources of evidence (e.g., questionnaires, interviews, observation) | To prevent failures from recurring in manufactured products (heating, ventilation, air conditioning equipment) | In a multinational manufacturing organization, service engineers log failure records, and design engineers perform failure analysis | - Feedback is mainly found in field failure records  
- A learning process to drive innovation in product development  
- The feedback process from field service to the design function needs to be well defined | Key findings:  
- Need to capture contextual information about product failures ‘in situ’  
- Need an appropriate classification system  
- Need to formalize the feedback process with standardized methodology and procedure  
- Need to develop understanding about the root cause, for that purpose, need to provide feedback to relevant functional departments |
| Fundin and Bergman (2003) Multiple qualitative organizational case studies | To bring the customer’s problem to the new product development process (NPDP) in large industrial manufacturers | In three organizations:  
(1) The unit that caused the problem being complained about, e.g. design & operations.  
(2) Within the service dept.  
(3) Case management team, and a cross-functional team for high-priority problems | Feedback provides inputs about customer satisfaction that may lead to sensible actions in generating new products | Discussion about the feedback processes:  
No formal, global process structure in place to link external feedback and internal NPDP, or to share knowledge within different parts of an organization |
| Hudson (2008) One qualitative organizational case study | To design new information products, to enhance products | Customer service/support representatives and the product design and development staff are involved in feedback use (inferred from the article) | Feedback management serves as the communication channel between customers and developers | In conclusion:  
Feedback management helps the company to lay the foundation for matching on-going development to customer needs |
<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Stated Objectives (Activity Domains)</th>
<th>Involved Parties (Orgs. and Depts.)</th>
<th>Stakeholder Perceptions (Feedback and its Use)</th>
<th>Key Points from Findings and Discussions (Relevant to the Present Study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maguire et al. (2007)</td>
<td>To facilitate customer relationship management, in express mail services, electronics &amp; electrical engineering, financial services, business communication services</td>
<td>In four large (national, or multinational) organizations: Central/special teams coordinated by senior executive were tasked to manage complaints</td>
<td>Feedback provides information about customers’ needs, preferences and their perceptions of organizational performance Feedback management is part of the quality effort devoted to market research</td>
<td>Implications based on discussion of findings: • Qualitative tools can add deep understanding and gain insights into customers • There is a need to listen continuously and foster participation. It will pay dividends to enhance data systems for sufficient information and intelligence communication. • It is critical for employees to have access to the data that is under their direct control • Stressed the need to explore how to let employees access and use data to guide their own decision making</td>
</tr>
<tr>
<td>Merisalo-Rantanen et al. (2009)</td>
<td>To get new ideas for service improvement, in a financial services company (banking, assets management, insurance)</td>
<td>In the organization: Contact centers relayed the feedback, and various business units (e.g., business, IT) took initiatives for service improvement</td>
<td>Users with various expertise backgrounds may give extremely profound feedback, concerning service quality in branch offices and Contact Centers as well as the web pages</td>
<td>Key finding: • There are two basic processes: feedback collection and taking initiatives. • A variety of feedback channels are needed • There is a need for a filtering mechanism • Must be pro-activity in searching for new ideas Centralized information systems are needed</td>
</tr>
<tr>
<td>Author (Year) Research Design</td>
<td>Stated Objectives (Activity Domains)</td>
<td>Involved Parties (Orgs. and Depts.)</td>
<td>Stakeholder Perceptions (Feedback and its Use)</td>
<td>Key Points from Findings and Discussions (Relevant to the Present Study)</td>
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<td>--------------------------------</td>
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<tr>
<td>Opoku (2006)</td>
<td>(1) To facilitate customer support, and improve service quality (2) To inform management decision making (3) To seek customer attention In computer services and selling of software and accessories</td>
<td>Common in five small-to-medium enterprises: (1) Marketing/sales and support service staff (2) Sales engineer dealing with respective clients or jurisdiction areas</td>
<td>• Feedback is a source of direct information from customers about: (1) what to improve, (2) the type of questions and complaints, and (3) insights into problems • Feedback management provides service indicators, acts as a reporting system, an IT system and a learning system, and is a core to operations</td>
<td>Key criteria used by the companies to assess feedback tools were found to include: • Cost-effectiveness that influences the use of IT platforms • Action-ability, i.e., information that can lead to continuous improvement • The background and nature of business Off-line tools and other feedback methods (e.g. telephone) were found to supplement internet tools for bias</td>
</tr>
<tr>
<td>Swami (2006)</td>
<td>(1) To improve product quality and customer satisfaction (2) To ensure conformity to customer and regulatory requirements (3) To measure quality (product performance) In a manufacturer of aeronautical vehicles</td>
<td>Mainly, the work-center where problem investigation is conducted, and All parties involved in reporting, dispatching, investigation and dissemination of investigation results</td>
<td>Feedback provides the organization with sources of information on product performance, indicates where improvements are possible, and is a source of enhancement ideas.</td>
<td>Key findings can be summarized as: • Actions involved investigation, corrective and preventive measures • Feedback is essential for continual improvement • Proper analyses of feedback are essential to quality improvement</td>
</tr>
<tr>
<td>Author (Year) Research Design</td>
<td>Stated Objectives (Activity Domains)</td>
<td>Involved Parties (Orgs. and Depts.)</td>
<td>Stakeholder Perceptions (Feedback and its Use)</td>
<td>Key Points from Findings and Discussions (Relevant to the Present Study)</td>
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</tr>
<tr>
<td>Whelton et al. (2007)</td>
<td>To monitor water quality and delivery (e.g., pressure and un-interrupted supply) of drinking water utilities</td>
<td>Of the 13 utilities visited: two broad departments were involved in dealing with feedback: (1) The operations department which is responsible for the daily production and delivery functions of the supply source, treatment facilities and distribution system (2) The water quality department which is responsible for regulatory compliance testing and customer response beyond operations</td>
<td>• Customers are considered as onsite monitors located throughout the water delivery system • To some utilities, user feedback is an early indication of problems (about quality, operations and infrastructure access) • A feedback surveillance system is a utility monitoring tool</td>
<td>Key findings: • The lack of uniform coding (of feedback data) and terminology would make it difficult to analyze and manage feedback data or to integrate them into a utility-wide monitoring system • Descriptive feedback information is helpful from a troubleshooting perspective but cumbersome from a data-coding and analysis perspective • Links to other information systems (e.g., service request system) can improve analysis of feedback • Standardized terminology (consistent descriptors) would facilitate sharing data with other utilities and agencies Suggestions in discussion: • The number of codes to apply to feedback data must be limited, consistent and easy to manage • Customer reports should be standardized • A standard utility-wide policy should specify systematic procedures for logging calls and investigating, resolving, and closing out each type of customer feedback • Employees should be trained according to the policy for handling customer feedback • A historical record of customer feedback data is needed, and data should be stored in an easily analyzable form for an indefinite period of time in electronic media • Formal guidelines are needed to designate which dept. is responsible for reviewing different aspects of feedback data</td>
</tr>
</tbody>
</table>
4. Findings and Discussion
Each case was reviewed and empirical details were extracted and compiled into the summary table. Terms and phrases were kept as is in the original articles. In discussing the findings from these recent empirical studies, historical insights were also incorporated from reviews and conceptual papers, some published earlier.

4.1 Findings
Except one study (i.e. Hudson, 2008), which is in the field of electronic publishing, service and manufacturing industries are equally represented with three studies for each.

The following questions were used to synthesize reported empirical data:
- What is common and representative in these studies?
- What are the research focuses, and to what extent they are examined?
- What other angles and focuses of research may potentially extend the scope or increase the depth of understanding about the topic?

These questions lead to the following findings:
- The reported organizations tended to be large. Only one study (Opoku, 2006) was conducted with small- and medium-sized enterprises (SMEs). Our empirical research setting, to be situated in CPhA, will be an organization of relatively small scale.
- Certain ways of classifying feedback data were acknowledged to be useful to facilitate sharing of feedback information and to help identify root causes (Ajayi & Smart, 2008; Merisalo-Rantanen, et al., 2009; Swami, 2006; Whelton, et al., 2007). Although the importance of classification had been long stressed (Goodman, et al., 1996) critical issues were not addressed as to what rules were followed for setting up categories, how the classification system evolved over time to be
able to sufficiently handle new complaints never received before, and how one classification system could suit different departments whose primary concerns vary at different functional levels. In practice, it is also questionable whether the staff can fully understand and make proper use of a classification method in both organizing and retrieving feedback data.

- Interpretation of feedback data, both quantitative and qualitative, was implicitly deemed to be straightforward. One case (Ajayi & Smart, 2008) spoke of detailed failure data as contextual knowledge, but which was indeed the same type of information about product, only in more detail. Unexplained was the way in which data were interpreted and translated, whether and how the feedback system was designed to facilitate interpreting, or what were required to adequately understand passively collected inputs from users external to the organization.

- In terms of responsible parties, four studies mentioned cross-functional team collaboration in utilizing feedback data (Ajayi & Smart, 2008; Fundin & Bergman, 2003; Merisalo-Rantanen, et al., 2009; Whelton, et al., 2007). But no detailed evidence was presented about how collaboration took place and what particular benefits were derived from any of such collaborative activities.

- All cases implemented some sort of feedback systems to store primary feedback data as historical records. Once a solution was found, however, it was implicitly believed to be turned into employees’ working knowledge or to become part of the standardized organizational procedures. None of those systems bothered to remember (or reported) what corrections, changes and adjustments had been made against the old product or procedure. Future use of feedback data was mentioned in pass by two studies (Opoku, 2006;
Whelton, et al., 2007). As a result, complete histories were lost about how products or services had existed before modifications were made, making it difficult to re-evaluate previous decisions.

- The organizations generally confined their attention to quality issues and customer satisfaction. Three studies mentioned about using the feedback systems to provide inputs for continuous learning and improvement. In one study (Opoku, 2006), learning was simply knowing the type of questions, complaints or contributions that may immediately inform decision making, and did not specify the breadth of knowledge at either individual or organizational levels. In the other two studies (Ajayi & Smart, 2008; Merisalo-Rantanen, et al., 2009), knowledge for innovation referred to opportunities to improve future product and service designs, rather than something substantial as internalized or generalizeable knowledge. Besides, neither of those two cases provided details about how exactly knowing (to be precise) was supported by feedback management.

- Most organizations in these studies adopted a material perception that is narrowly related to performance results and product deliverables. None of the cases gave consideration to feedback management as having strategic impact on the organization. Data-system-procedure dominated the scene, and consequently turned feedback related activities into functional tasks rather than efforts of strategic significance. Top-down implementation of feedback management did not expect change of organizational structures or norms, and the value of external user feedback was more informative than generative.

- As a result, operational management received the most visible attention by researchers. Discussions and findings were found at a much applied level of how to maximize the final output by tooling with feedback processes. The system track was prominently noted,
while the people element as related to employees’ working knowledge development was much less discussed.

- All studies used retrospective methods (most frequently interviews) in investigation, although people tend to forget details over time. Alternatively, more complete facts can be captured while the matter is going on and memories are fresh. Overlooked were methodologies such as ethnographic, participatory research that might yield more detailed and truthful documentation.

4.2 Discussion
Based on the above discussion, the present study appears to have unique characteristics. First, failure is not the cause of negative feedback. Unlike hardware defects or service lapses, there may be no immediately observable consequences in information use, which is different from, for example, an unpleasant experience at the reception desk of a hotel. The negative tone in constructive comments is content-sensitive when referring to information products. One reason is that knowledge may become obsolete or gets revised over time (the same reasons that CPhA continuously updates their information products). For example, users might raise hands for explanations about constantly updated information resources. Content-sensitive also means that every piece of feedback comment has to be considered in relation to a specific piece of information content (e.g., a treatment recommendation), and there is no way to mass process all feedback comments. Second, feedback interpretation needs to be based on understanding of the situation where recommendations are used, and the staff may develop different understandings about the same user feedback (e.g., based on their own judgment about the user situation). Then, it could become difficult to reach a common interpretation.
The gap consists in and can be addressed by the following:
1. The research focus will be placed on processes and/or mechanisms for the health information provider (i.e., the CPhA in this case) to be able to make efficient use of feedback comments on an on-going basis;
2. To specifically address feedback management in knowledge-intensive situations, tackling issues raised by the complexity of health information content as well as the cognitive knowledge users.
3. A participatory action research will be able to yield complete and detailed documentation for an empirically based research project.

Bibliography


Appendix B

Success factors reported in enterprise resource planning (ERP) and customer relationship management (CRM) literatures

<table>
<thead>
<tr>
<th>Factors Grouped into 11 Categories</th>
<th>Studies (see bibliography)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1. <strong>Motivation and Goals</strong></td>
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</tr>
<tr>
<td>Goals and objectives</td>
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</tr>
<tr>
<td>Business plan and vision</td>
<td></td>
</tr>
<tr>
<td>Perceived benefits</td>
<td></td>
</tr>
<tr>
<td>Strategic initiatives (proactive, reactive)</td>
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</tr>
<tr>
<td>2. <strong>Top Management Support</strong></td>
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<tr>
<td>Top management support*</td>
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</tr>
<tr>
<td>3. <strong>Project Champion</strong></td>
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<tr>
<td>Project champion*</td>
<td>X</td>
</tr>
<tr>
<td>4. <strong>Project Management</strong></td>
<td></td>
</tr>
<tr>
<td>Project management*</td>
<td>X</td>
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<tr>
<td>Steering committee</td>
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<tr>
<td>Building a business case</td>
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<tr>
<td>Definition of requirements</td>
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<tr>
<td>Defining the architecture</td>
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<tr>
<td>Use of process management</td>
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<tr>
<td>Business process reengineering</td>
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<tr>
<td>ERP strategy and implementation methodology</td>
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</tr>
<tr>
<td>Project cost planning and management</td>
<td>X</td>
</tr>
<tr>
<td>Implementation planning (strategy, timeframe)*</td>
<td>X</td>
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<tr>
<td>Software development, testing, and troubleshooting</td>
<td>X</td>
</tr>
<tr>
<td>System Analysis, Selection and Technical Implementation</td>
<td></td>
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<tr>
<td>5. <strong>Change Management Practice and Culture</strong></td>
<td></td>
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<tr>
<td>Change management practice*</td>
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<tr>
<td>Organizational redesign</td>
<td>X</td>
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<tr>
<td>Management of expectations</td>
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<tr>
<td>Troubleshooting/Crises management</td>
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<tr>
<td>Cultural readiness for change and learning*</td>
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<tr>
<td>Organizational readiness for new technology</td>
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</tr>
<tr>
<td>Appropriate business and legacy systems (environments)</td>
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<td>IT infrastructure</td>
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<td>Technological readiness</td>
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<td>Culture change</td>
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<td>Organizational characteristics</td>
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<tr>
<td>Alignment of business processes to software implementation</td>
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<tr>
<td><strong>Linking the IT system to business objectives</strong></td>
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<tr>
<td>National culture</td>
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<tr>
<td>Country-related functional requirements</td>
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<tr>
<td>Empowered decision makers</td>
<td>X</td>
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<tr>
<td>Team morale and motivation</td>
<td>X</td>
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<tr>
<td>Vanilla ERP (Commitment to basic version implementation)</td>
<td>X</td>
</tr>
<tr>
<td>Willingness to change processes</td>
<td>X</td>
</tr>
</tbody>
</table>

**6. Interdepartmental Communication and Cooperation**

| Communication of plan and strategy* | X X X X X |
| Interdepartmental cooperation | X |
| Network relationships | X |

**7. Project Team Capacities**

| ERP teamwork and composition | X X X |
| Project team competence | X X X X |
| Balanced team | X |
| Compensation | X |
| Learning capacity | X |
| Information technology capacity | X |
| Knowledge management capabilities | X X |
| Process change capability | X |

**8. Resources**

| Dedicated resources* | X X |

**9. Data, Systems, Vendor Support**

| Data management (analysis, conversion) | X X X |
| Software package selection | X X X |
| Minimal customization | X |
| Ease of use | X |
| Integrated system architecture of standard components | X |
| Business process and software configuration | X |
| Vendor support | X X X |
| Use of vendors' development tools | X |
| Use of consultants (selection and relationship) | X X |
| Vendor/customer partnerships | X |

**10. User involvement and training**

| User involvement/consultation* | X X |
| Training, education, and job redesign | X X X |
| User experience with IT and of support | X |

**11. Other**

| Method and sampling frame | X |
| Customer or market orientation | X |

* Indicates factors mentioned in relation to both ERP and CRM.

**Bibliography**

Appendix C
Constructs and factors from seven studies on organizational change

INDIVIDUAL-LEVEL CONSTRUCTS

From Herscovitch and Meyer (2002):

- Commitment – a force that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative. It is characterized by a strong belief in and acceptance of the organization's goals and values, a willingness to exert considerable effort on behalf of the organization, and a strong desire to maintain membership in the organization. This factor affects compliance with requirements that entail modest sacrifices such as exerting extra effort.
  - Affective commitment: a desire to provide support for the change based on a belief in its inherent benefits.
  - Continuance commitment: a recognition that there are costs associated with failure to provide support for the change.
  - Normative commitment: a sense of obligation to provide support for the change. That is, employees can feel bound to support a change because they want to, have to, and/or ought to.

(Also in Jansen, 2004; Ingersoll, Kirsch, Merk, & Lightfoot, 2000; Molla & Licker, 2005a)

From Holt et al. (2007):

- Self-efficacy (i.e., confidence) – the extent to which someone feels that he or she has or does not have the skills and is or is not able to execute the tasks and activities that are associated with the implementation of the prospective change (as Feasibility in Jansen, 2004; as confidence in professional skills in Lehman, Greener, Simpson et al., 2002, 2007).
• Need for change (i.e., appropriateness) – the extent to which someone feels that there are or are not legitimate reasons and needs for the prospective change (also in Jansen, 2004).

• Personal valence (i.e., personally beneficial) – the extent to which someone feels that he or she will or will not benefit from the implementation of the prospective change.

• Organizational valence (i.e., beneficial to the organization) – the extent to which someone feels that the organization will or will not benefit from the implementation of the prospective change.

• Senior leadership support (i.e., management support) – the extent to which someone feels that the organization’s leadership and senior management are or are not committed to, and support or do not support, implementation of the prospective change.

From Ingersoll, Kirsch, Merk, and Lightfoot (2000):

• Organizational members’ previous experience with organizational change—the ways in which previous experience with organizational change affect response to current or planned change. The experience consists of the organization’s history of success in making changes, available resources, and the social and technical systems. If the organization has been successful in implementing innovative processes and the resources available are perceived as appropriate, members are likely to accept than to resist the change. The experience factor was also mentioned by Armenakis & Bedeian (1999) and Holt et al. (2007). Also, Jansen (2004) has defined a very similar concept, “subsequent momentum”, meaning that enhanced performance due to past success becomes a contextual antecedent which helps to build energy for future efforts. In contrast, a negative effect of the past experience can decrease subsequent momentum.
From Jansen (2004):

- Change-based momentum – a dynamic force whose presence or absence determines the ultimate success of a transformation, and is influenced by:
  - Constructive drama: the feeling of an atmosphere to create energy for the change.
  - Feasibility: the feeling of being able to do something (i.e., make the change happen).
  - Progress: as change unfolds the feeling of how we are doing. This feeling gradually replaces the sense of feasibility before the change begins.

From Lehman, Simpson, and colleagues (2002, 2007):

- Perceived Needs
  - Training needs: staff perceptions of training in several technical and knowledge areas.
  - Pressure for change: pressures perceived to come from internal (e.g., target constituency, staff, or leadership) or external (e.g., regulatory and funding) sources.

- Staff attributes
  - Growth: the extent to which staff members value and use opportunities for their own professional growth.
  - Efficacy: staff confidence in their own professional skills and performance.
  - Influence: staff interactions, sharing, and mutual support.
  - Adaptability: staff ability to adapt effectively to new ideas and change.
- Organizational climate
  - Staff awareness of agency mission and clarity of its goals.
  - Trust and cooperation.
  - Perceived strain, stress, and role overload.
  - Attitudes about agency

From Molla and Licker (2005a, 2005b):
- Level of awareness – the overall perception, comprehension, and projection of the benefits and risks about the change.
- Senior management support – the extent to which key members of the organization (e.g., the CEO) are or are not committed to, and support or do not support, implementation of the prospective change. (Classified as an individual-level construct according to Weiner et al., 2008; also in Holt et al., 2007.)

ORGANIZATION-LEVEL CONSTRUCTS

From Lehman, Simpson and colleagues (2002, 2007):
- Needs of the organization
  - Program (innovation) needs: the organization’s strengths or weaknesses and issues that need attention, specifically relating to goals, performance, staff relations, and information systems.
- Institutional resources
  - Offices: the adequacy of office equipment and physical space.
  - Staffing: the overall adequacy of staff numbers and skills. (As human resources in Molla and Licker, 2005a, 2005b)
- Training resources: staff training and education in terms of the emphasis put on them by the program and scheduling.
- Equipment: the adequacy and use of computerized systems and equipment.
  (As technology resources in Molla and Licker, 2005a, 2005b)
- Internet: staff access and use of e-mail and the Internet for professional communications, networking, and the exchange of work-related information.

- Organizational climate
  - Autonomy: the freedom and latitude staff members have in doing their jobs.
  - Communication: the adequacy of information networks to keep staff informed and the presence of bidirectional interactions with leadership.
  (As business resources in Molla and Licker, 2005a, 2005b)

From Molla and Licker (2005a, 2005b):

- Technology resources – the IT base of an organization, the extent of computerization, and experience with network-based applications.
- Business resources – the organization’s capabilities and assets, including openness of organizational communication, risk-taking behaviour, nature of existing business relationships, and financial resources, e.g., availability of slack finance to develop and maintain innovative systems. (As organizational slack in Sen, 2006.)
- Governance – the strategic, tactical, and operational model that defines the way organizations structure to establish objectives, allocate resources, and make decisions. An organization’s governance model defines the priority given to the change initiative.
From Sen, Sinha, and Ramamurthy (2006):

- **Alignment of Architecture** – aligning innovation with business strategies so as to account for long-term productivity.

- **Project management process** – A function of how the project is managed and assessed, with criteria of meeting critical deadlines, keeping costs within budget, supporting important functionalities, etc. Project managers specify, measure, analyze and optimize process objectives. The project management process needs to be planned in advance but flexible, resolve any conflicting situations that may arise, and continue to engage and retain stakeholder support throughout the process of change.

- **Management related to the change of existing routines** – satisfactory resolution of technical challenges and interpersonal challenges (e.g., political resistance in the context of data ownership and management) that occur during the project.

- **An analytic decision-making culture** – use of analytic decision-making as the leverage point for organizations to identify, plan, and judge the success of innovation. Such a culture is related to the workflow, and represented by valuing:
  - Fact-based decision making
  - Rewarding system for fact-based decision making
  - Openness in sharing information
  - Specificity in data/information sharing
  - Currency of data/information.

**Bibliography**


Appendix D
The IAM feedback data collection instrument

<table>
<thead>
<tr>
<th>Evaluate e-Therapeutics Highlight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re: Beta-blockers are no longer indicated as first line treatment for vasovagal syncope. This is based on 1 adequately powered, randomized placebo-controlled trial and 4 smaller studies.</td>
</tr>
</tbody>
</table>

Q1. What is the impact of this e-Therapeutics Highlight on you or your practice? Check Yes or No for each item.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Yes</th>
<th>No</th>
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<tr>
<td>My practice is (will be) changed and improved</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I learned something new</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am motivated to learn more</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>This information confirmed I did (am doing) the right thing</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am reassured</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am reminded of something I already knew</td>
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<td>☐</td>
</tr>
<tr>
<td>I am dissatisfied</td>
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<td>☐</td>
</tr>
<tr>
<td>There is a problem with this information</td>
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<td>☐</td>
</tr>
<tr>
<td>I disagree with the content of this information</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>This information is potentially harmful</td>
<td>☐</td>
<td>☐</td>
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If this e-Therapeutics Highlight has no impact at all on you or your practice, check here ☐

Your feedback is important to us. Please help us investigate any concerns by filling in the Comment Box at the end of this questionnaire. Include an e-mail address so that we may contact you for clarification if necessary. Thank you for helping us improve e-Therapeutics.

Q2. Is this 'e-Therapeutics highlight' relevant for at least one of your patients?

<table>
<thead>
<tr>
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<tr>
<td>Not relevant</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q3. Will you apply this e-Therapeutics Highlight to at least one patient? ☐ Yes ☐ No

If YES, how will you apply it? Check Yes or No for each item.

<table>
<thead>
<tr>
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<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>To better understand a particular issue related to this patient</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To justify or maintain the management of this patient</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To modify the management of this patient</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To persuade other health professionals or patients to make changes</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q4. Do you expect any health benefits from applying this e-Therapeutics Highlight to a particular patient? ☐ Yes ☐ No

If YES, what are these benefits? Check Yes or No for each item.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing patient knowledge about health or healthcare</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Preventing disease or health deterioration (including acute episode of chronic disease)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Improving patient health or functioning or resilience (i.e., how well the patient faces difficulties)</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Appendix E
Semi-structured interview guide on current practice

<table>
<thead>
<tr>
<th>INTERVIEW GUIDE (On the Use of Feedback Comments)</th>
<th>FIELD NOTES</th>
</tr>
</thead>
</table>

Please allow me to briefly explain the context of this interview:

SOME feedback comments have led to changes to eT+.
By re-visiting ____ comments with you, I would like to understand how they have helped you to improve the content of eT+.

ALSO, I would like to look into another ____ comments with you, which did not lead to any improvement. With regard to this 2nd type of comment, I am interested to know what happened in using them.

Our interview will last about _________________.
Before we start, do you have any questions?

1. FIRST, let’s look at ____ feedback comments with which you were able to improve the corresponding chapters in eT+.
   I will present each comment on a piece of paper to facilitate your recall. Then, I will ask the same ____ questions regarding each comment to guide our talk, but please feel free to mention anything that you think might be relevant:

SHOW PAPER…
1. In your opinion, in hindsight what was the problem with the Highlight?

2. Was it easy to identify the problem as reported in this comment?
   a) Did you review the Chapter to clarify this problem?

3. What were the options to address the problem?

4. What did you do to make the change, and how was that done?
   a) Did the change affect only the highlighted text or did it concern other parts of the Chapter?

5. Did you talk to your colleague(s) about this feedback and the problem?
I have a general question regarding these comments:

1. On the feedback form, users also report on the impact of using the information, in addition to any problem they report in the comments – e.g., they may indicate “I learned something new”.

   Do you think there may be a relationship between the reported problem & the reported impact of information use?

2. NOW, let’s look at comments that did not lead to any change, and I am interested in any issues in dealing with these comments.
   I will ask some different questions, but please feel free to mention anything that you think might be relevant:

   SHOW PAPER...

   1. What did you understand from this comment?
      a) Was this comment difficult to understand in any way?

   2. Was it difficult to do anything in response to this comment, OR could you have done something in response to it?

   3. Did you find this comment somewhat informative, somewhat useful, or not at all?

   4. Did you discuss this feedback comment with your colleague(s)?
      • If yes, what did he or she say?
SHOW PAPER...

1. What did you understand from this comment?
   a) Was this comment difficult to understand in any way?

2. Was it difficult to do anything in response to this comment, OR could you have done something in response to it?

3. Did you find this comment somewhat informative, somewhat useful, or not at all?

4. Did you discuss this feedback comment with your colleague(s)?
   • If yes, what did he or she say?
Finally, I have several general questions:

1. When you review a comment, are you usually aware if it is made by a pharmacist or by a physician?
   a) Do you perceive any difference between pharmacists’ comments and physicians’ comments?
   b) What is your general perception about pharmacists’ feedback comments? (in terms of usefulness)

2. What is your general perception about the way that feedback comments are currently being collected and processed? (possibilities of improvement)

3. Do you sometimes feel there is a need for searching old feedback comments in order to re-visit previously reported problems?

4. Is there any difference between the way that pharmacists’ comments are reviewed and changes are made to eT+ and the way that physicians’ comments are reviewed and changes are made?

Conclusion
This concludes our interview today, and I thank you very much.
Do you have any comment about the study or the interview?
### Appendix F
### Interview schedules

<table>
<thead>
<tr>
<th>Highlight</th>
<th>Comment</th>
<th>Decision</th>
<th>Time (length)</th>
</tr>
</thead>
<tbody>
<tr>
<td>c0038n00209 \n Avoid ASA, NSAIDs and COX-2 inhibitors in AYA patients</td>
<td>Very important and relevant info. I'm not sure if I agree with AYA patients</td>
<td>Change planned - remove COX-2 inhibitors from statement</td>
<td>Participant 6</td>
</tr>
<tr>
<td>c0092n00120 \n Studies in otherwise healthy adults taking a \n This statement is not clear - does it mean that the duration has</td>
<td>Change planned - rewrite of sentence</td>
<td>Participant 6</td>
<td></td>
</tr>
<tr>
<td>c0040n00413 \n Inhaled corticosteroids (ICS) are no longer recommended.  \n Only if there is a reversible constrictor does this information apply.</td>
<td>No change planned</td>
<td>Participant 6</td>
<td></td>
</tr>
<tr>
<td>c0070n00145 \n Children may show paradoxical excitation rather than \n The reference given for the statement that neither older nor</td>
<td>No change planned</td>
<td>Participant 6</td>
<td></td>
</tr>
<tr>
<td>c0091n00123 \n There is no evidence to support the use of in \n The Canadian COPD guidelines (CTS) suggest a 10 day course of</td>
<td>No change planned</td>
<td>Participant 6</td>
<td></td>
</tr>
<tr>
<td>c0095n00126 \n A systematic review of adjunctive steroid therapy \n The systematic review results don't differ from RCT results which</td>
<td>No change planned</td>
<td>Participant 6</td>
<td></td>
</tr>
<tr>
<td>c0058n001121 \n Uricosuric agents such as probenecid and sulfinpyrazone \n The term &quot;renal insufficiency&quot; is probably too vague. Would be</td>
<td>Change being considered nonurgently with next major review</td>
<td>Participant 5</td>
<td></td>
</tr>
<tr>
<td>c0073n00593 \n Smoking and hypertension increase the risk \n Unrelated to highlight; There is a potentially dangerous error in</td>
<td>Change planned. Note: Outside highlight. Based on the neg</td>
<td>Participant 5</td>
<td></td>
</tr>
<tr>
<td>c0075m00287 \n Add-back hormone therapy, consisting of co- \n I usually find the highlights to be &quot;short and snappy&quot; updates, but</td>
<td>Change planned - have rewritten the sentence to be more clear.</td>
<td>Participant 5</td>
<td></td>
</tr>
<tr>
<td>c0106n00064 \n Institutionalized persons and those who \n Would have been helpful to give some sort of guideline re how</td>
<td>Change planned - will clarify doses of vitamin D in different</td>
<td>Participant 5</td>
<td></td>
</tr>
<tr>
<td>c0002n00296 \n SSRIs and SNRIs have become first-choice agents for depression \n I am surprised the reference cited for this highlight is from 1994.</td>
<td>Change planned - add a reference. See above.</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0003n00171 \n Atypical antipsychotics have been used in \n Not enough information is provided and information not comp</td>
<td>Change planned - wording change</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0005n00263 \n When asked specifically about SSRI-induced \n Is there any comment on this s/e for SNRIs as an option for</td>
<td>Change planned to add comment about SNRIs</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0008n00181 \n After withdrawal from methadone therapy (7) \n Please give some examples of low doses of antipsychotics. It is</td>
<td>Change planned - will refer to another chapter</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0016n000128 \n There is a risk of oral contraceptive \n This information is too vague. Not sure how to “occasional”</td>
<td>Change planned – add more information. The reader is in the dark.</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0019n00308 \n For symptom relief (decreased desire, distress) \n This is information too vague. I would like to see “occasional”</td>
<td>Change planned - add monitoring parameters</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0110n00029 \n Avoid frangible mouthwash with topical steroids \n I think that including this statement would be misleading and</td>
<td>Change planned - I. the author adequately addresses the u</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0129n00136 \n Fentanyl administered sublingually can also \n Under “starting doses”, I think it is more appropriate to list the</td>
<td>Change planned - will add doses in mcg and route</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0102n00221 \n Intermittent oral analgesias, given as early as \n I would not give children under 12 years old due to Reye’s</td>
<td>No change planned</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0011n00130 \n Amethocaine is superior to EMLA in preventing \n Without having read the Cochrane review or the studies it is</td>
<td>No change planned</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0122n00196 \n TN (also known as tic douloureux) is confined \n Suggest include dose normally used for TN</td>
<td>No change planned</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0119n00057 \n Quinine sulfate has been used for decades to \n This topic does not include the caution that this dose of quinine</td>
<td>No change planned</td>
<td>Participant 3</td>
<td></td>
</tr>
<tr>
<td>c0021n00613 \n All possible combinations of first-line agents \n From the other alerts I’ve read on this topic lately I think you</td>
<td>Change planned - will clarify situation where combo is appropriate.</td>
<td>Participant 4</td>
<td></td>
</tr>
<tr>
<td>c0024n00103 \n Transdermal nitroglycerin lowers blood pressure \n I’m a student still so I don’t have patients to care for yet, so I</td>
<td>Change planned - referred to product enhancements.</td>
<td>Participant 4</td>
<td></td>
</tr>
<tr>
<td>c0087n00209 \n Closely monitor potassium after introducing \n From a clinical perspective, if pts are on ACEI I/ ARB + spironol</td>
<td>Change planned - time to monitor</td>
<td>Participant 4</td>
<td></td>
</tr>
<tr>
<td>c0021n00614 \n All possible combinations of first-line agents \n This has been quite an issue of contention among local doctors.</td>
<td>No change planned</td>
<td>Participant 4</td>
<td></td>
</tr>
<tr>
<td>c0020n00429 \n The use of sildenafil, tadalafl or vardenafil in \n I understand that the action of some of the PDE-5 inhibitors last</td>
<td>No change planned</td>
<td>Participant 4</td>
<td></td>
</tr>
<tr>
<td>c0031n00159 \n Several herbal or alternative products interact</td>
<td>I would like to pinpoint two essential citations I have found in the</td>
<td>No change planned</td>
<td>Participant 4</td>
</tr>
<tr>
<td>c0031n00159 \n Several herbal or alternative products interact with</td>
<td>There is not enough information for a person (health professional)</td>
<td>No change planned</td>
<td>Participant 4</td>
</tr>
<tr>
<td>c0120n00073 \n There is no conclusive evidence that omega-3</td>
<td>I agree that there may be no conclusive evidence to suggest omega-3</td>
<td>No change planned</td>
<td>Participant 4</td>
</tr>
<tr>
<td>c0050n00337 \n Based on a systematic review, the alternative</td>
<td>This needs to be updated a bit as there is a newer 2005 Cochrane</td>
<td>No change planned</td>
<td>Participant 2</td>
</tr>
<tr>
<td>c0069n00164 \n A systematic review of once-daily versus more</td>
<td>Please define which potent corticosteroids were in the review.</td>
<td>No change planned</td>
<td>Participant 2</td>
</tr>
<tr>
<td>c0301n00030 \n Fetal alcohol syndrome: growth impairment \n There should be a statement that no amount of alcoholic ingestion</td>
<td>No change planned</td>
<td>Participant 2</td>
<td></td>
</tr>
<tr>
<td>c0112n00146 \n Ginger (Zingiber officinale) has been studied</td>
<td>Whenever you mention using any agent in pregnancy it’s a good place</td>
<td>No change planned</td>
<td>Participant 2</td>
</tr>
<tr>
<td>c0029n00271 \n Use only immediate-release dosage forms when possible \n What the heck is &quot;pill in the pocket&quot; therapy?????</td>
<td>Change to wording planned – content is OK.!!First Comment</td>
<td>Participant 2</td>
<td></td>
</tr>
<tr>
<td>c0034n00058 \n Newer, unproven and off-label therapies, su</td>
<td>Advocacy for unproven medications that have not undergone p</td>
<td>No change planned</td>
<td>Participant 1</td>
</tr>
<tr>
<td>c0053n00154 \n For acute or recurrent back pain of less than \n Avoid unnecessary bedrest for uncomplicated back pain as well</td>
<td>No change planned</td>
<td>Participant 1</td>
<td></td>
</tr>
<tr>
<td>c0058n00121 \n Uricosuric agents such as probenecid and sulfinpyrazone \n Colchicine under-appreciated for patients with poor renal function</td>
<td>No change planned</td>
<td>Participant 1</td>
<td></td>
</tr>
<tr>
<td>c0071n00105 \n Although time-consuming and tedious, lice are</td>
<td>The timing of this information does not really match the season</td>
<td>No change planned</td>
<td>Participant 1</td>
</tr>
<tr>
<td>c0037n00170 \n There is no published evidence to support the</td>
<td>Highlight did not offer reasonable alternatives for children under</td>
<td>No change planned</td>
<td>Participant 1</td>
</tr>
</tbody>
</table>
Appendix G
Questionnaire for auditing feedback handling

Questionnaire on the Collection and Analysis of Feedback Comments

In 4 steps, the present questionnaire examines 10 objectives of the CPhA-McGill process of collecting and analyzing the constructive feedback comments from eT+ users. Regarding “objective 1”, the numbers collected are for David only to consider in designing a feedback management system, and will be confidential and never mentioned in his thesis or papers. Interviews will further focus on steps 4 and 5.

Instructions:
- Please read David’s observations and answer the questions.
- With regard to each objective, you may provide any comments.
- Do not answer when you feel a question is inappropriate.
- Please save the questionnaire, and email to david.tang at mail.mcgill.ca when completed.
- If any question is unclear, please call David (514—) to complete together.

This section is for [editor name] to advise
(Q.1.1—Q.1.10: [editor name] may opt to verbally tell David the approximate numbers instead of filling in the form)

STEP I. STIMULATING USERS TO PROVIDE FEEDBACK

Objective 1. Identify the opportunity to be informed by e-Therapeutics+® users

David’s observation:
In the PULL context, the opportunity is when subscribers search e-Therapeutics+®.

Questions: (Your answer would indicate the volume of data that needs to be processed by the feedback system)

Q1.1. Approximately how many pharmacists subscribe to e-Therapeutics+®?
Answer: <1000  1001-3000  3001-5000  >5000

Q1.2. Approximately how many physicians subscribe to e-Therapeutics+®?
Answer: <1000  1001-3000  3001-5000  5001-10000  >10000

Q1.3. Approximately how many other clinicians, e.g., nurse practitioners, subscribe to e-Therapeutics+®?
Answer: <1000  1001-3000  3001-5000  5001-10000  >10000

David’s observation:
In the PUSH context, the opportunity is when weekly eT+ Highlights are emailed to pharmacists and physicians.

Questions: (Your answer would indicate the volume of data that needs to be processed by the feedback system)

Q1.4. Approximately how many pharmacists currently receive eT+ Highlights on email?
Answer: <1000  1001-3000  3001-5000  5001-7000

Q1.5. Approximately how many physicians currently receive eT+ Highlights on email?
Answer: <2000  2001-5000  5001-10000  10001-15000

Q1.6. Approximately how many other clinicians currently receive eT+ Highlights on email?
Answer: <2000  2001-5000  5001-10000  10001-15000

Questions for planning the future, e.g., needs for 2012 or 2015:

Q1.7. Approximately how many pharmacists WILL receive eT+ Highlights on email?
Answer: <1000  1001-3000  3001-5000  5001-7000

Q1.8. Approximately how many physicians WILL receive eT+ Highlights on email?
Answer: <2000  2001-5000  5001-10000  10001-15000

Q1.9. Approximately how many other clinicians WILL receive eT+ Highlights on email?
Answer: <2000  2001-5000  5001-10000  10001-15000

Q1.10. Approximately how many consumers/patients WILL receive eT+ Highlights on email?
Answer: <2000  2001-5000  5001-10000  10001-15000
Objective 2. Stimulate users to submit feedback

David's observation:

Physician members of the CFPC can earn MainPro M1 credits (each completed questionnaire qualifies for 0.1)

Questions: (Your answer would be an indication of continued feedback response from physicians and pharmacists)

Q2.1. In your opinion, is this the only motivation for physicians in providing feedback? Yes No
    If no, what may be the other motivations for physicians?
    Answer:

Q2.2. In your opinion, what is the motivation for pharmacists in providing feedback?
    Answer:

Comments with regard to Objective 2:

This section is for [participant name] to advise – [editor name], you may go directly to STEP III ([participant name]'s answer will help with the design of a feedback system that is pertinent to CPhA’s IT setting)

STEP II. COLLECTING FEEDBACK DATA

Objective 3. Provide the access point (i.e., a button) in eT+ for users to initiate feedback

David’s observation:

A button in the e-Therapeutics+® content page allows the user to initiate feedback, for example:

The combination amoxicillin-clavulanate should be considered for soft-tissue infections caused by *animal bites* (e.g., cat, dog) given the presence of *Pasteurella multocida*; resistance of this organism to cloxacillin, cephalosporins and clindamycin is documented. [Useful Info]

Questions:

Q3.1. Is it CPhA that determines the IT architecture of the entire e-Therapeutics+® product with regard to, e.g., web server, database engine, and web scripting languages? Yes No
    If no, who determines the IT architecture?
    Answer:

Q3.2. Briefly, what is the IT architecture of the eT+ product (i.e., server, database, scripting language)?
    Answer:

Q3.3. Does CPhA host/manage the entire e-Therapeutics+® product? Yes No
    If no, who (also) hosts/manages the e-Therapeutics+® product?
    Answer:

Q3.4. Is it CPhA that integrates the button into eT+ content page (example above)? Yes No
    If no, who does this?
    Answer:
Objective 4. Provide the interface (i.e., feedback form) for users to fill in and submit feedback

Clicking the button (example in Objective 3) opens a feedback form in a new web browser window; The content of the feedback form is designed and continuously improved by the eT+ study partners (i.e., CPhA, MediResource, CFPC, McGill University, and etc.)

Questions:

**RE: Pharmacists’ feedback form**

Q4.1. Does CPhA manage the web server that renders the feedback form for pharmacists?  
Yes         No  If no, who manages it?  Answer:

Q4.2. Does CPhA determine the IT architecture (e.g., web server, database engine, and scripting language) of the feedback form for pharmacists?  
Yes         No  
If no, who determines?  Answer:

Q4.3. Briefly, what is the IT architecture of the web-based feedback form for pharmacists?  
Answer:

Q4.4. Is the web script of pharmacists’ feedback form created in-house by CPhA?  
Yes         No

**RE: Physicians’ feedback form**

Q4.5. Does MediResource manage the web server that renders the feedback forms for physicians?  
Yes         No

Q.4.5.1. If no, does CPhA manage it?  
Yes         No

Q.4.5.2. If yes, could you explain the working relationship between MediResource and CPhA?  
Answer:

Q4.6. Does CPhA determine the IT architecture (e.g., web server, database engine, and scripting language) of the feedback form for physicians?  
Yes         No  
If no, who determines?  Answer:

Q4.7. Briefly, what is the IT architecture of the web-based feedback form for physicians?  
Answer:

Q4.8. Is the web script of physicians’ feedback form created in-house by CPhA?  
Yes         No

Comments with regard to Objective 4:
Objective 5. Receive user feedback submissions (i.e., feedback data)

Questions:

RE: Pharmacists' feedback data capture

Q5.1. Is it the same server that renders pharmacists’ feedback form and saves the returned data?  
Yes  No  If yes, skip Q5.2.

Q5.2. Does CPhA manage the server that receives pharmacists’ feedback data?  
Yes  No

If no, who manages it?  Answer: 

Q5.3. Are pharmacists’ feedback data saved in (a) text files or (b) a database or (c) else?  
Text file  Database  Else

Q5.3.1. If text file, what is the field delimiter?  Answer: 

Q5.3.2. If database, what is the database engine (e.g., MS SQL)?  Answer: 

Q5.3.3. If else, please specify: 

Q5.4. What is the server-side scripting language (e.g., ASP, JSP) that handles the data posted back from the pharmacists’ feedback form and writes to the text file or the database?  
Answer: 

Q5.5. Is the script for handling pharmacists’ feedback data created/maintained in-house by CPhA?  
Yes  No  If no, who does this?  Answer: 

RE: Physician feedback data capture

Q5.6. Is it the same server that renders physicians’ feedback form and saves the returned data?  
Yes  No  If yes, skip Q5.7.

Q5.7. Does MediResource manage the server that receives physicians’ feedback data?  
Yes  No

If no, who manages it?  Answer: 

Q5.8. Are physicians’ feedback data saved in (a) text files or (b) a database or (c) else?  
Text file  Database  Else

Q5.8.1. If text file, what is the field delimiter?  Answer: 

Q5.8.2. If database, what is the database engine (e.g., MS SQL)?  Answer: 

Q5.8.3. If else, please specify: 

Q5.9. What is the server-side scripting language (e.g., ASP, JSP) that handles the data posted back from the physicians’ feedback form and writes to the text file or the database?  
Answer: 

Q5.10. Is the script for handling physicians’ feedback data created/maintained in-house by CPhA?  
Yes  No  If no, who does this?  Answer: 

Comments with regard to Objective 5:
Objective 6. Organize and store feedback data to be retrieved/used

David’s observation:
An FTP server stores the feedback data file(s) to be retrieved, which is(are) updated regularly.

Questions:

RE: Pharmacists' feedback data file storage

Q6.1. What is the frequency of updating pharmacists' data file to be retrieved by the McGill partner?
   Instantly  Daily  Weekly  Other – specify:

Q6.2. Does CPhA make backups for the data?  Yes  No
   If yes, what is the backup frequency/period (e.g., weekly)?
   Answer:

Q6.3. Is the FTP server the same as that receives and saves pharmacists’ feedback data?
   Yes  No  If yes, please skip Q6.4. and Q6.5.

Q6.4. Does CPhA manage the FTP server that hosts pharmacists’ feedback data to be retrieved?
   Yes  No

Q6.5. What is the FTP server system (e.g., Apache server)?  Answer:

RE: Physicians’ feedback data file storage

Q6.6. What is the frequency of updating physicians’ data file to be retrieved by the McGill partner?
   Instantly  Daily  Weekly  Other – specify:

Q6.7. Does CPhA make backups for the data?  Yes  No
   If yes, what is the backup frequency/period (e.g., every month)?
   Answer:

Q6.8. Is the FTP server the same as that receives and saves physicians’ feedback data?
   Yes  No  If yes, please skip Q6.4. and Q6.5.

Q6.9. Does CPhA manage the FTP server that hosts physicians’ feedback data to be retrieved?
   Yes  No

Q6.10. What is the FTP server system (e.g., Apache server)?  Answer:

Comments with regard to Objective 6:

[editor name] and [participant name] may comment on this step which is currently done by the McGill partner.

STEP III. IDENTIFYING NEW CONSTRUCTIVE FEEDBACK COMMENTS

Objective 7. Identify new feedback entries

David’s observation:

On a weekly basis, the McGill partner:

- Retrieves feedback data in plain text format from the FTP server at ftp://72.1.218.180/eqPush.txt or eqPull.txt;
- Saves the text file to the local computer;
- Imports the text file (’~’ delimited) into an MS Excel spreadsheet;
- Compares the new data spreadsheet with the previous one to identify new feedback entries.
Comments with regard to Objective 7:

Objective 8. Identify constructive feedback comments (CFB)

David’s observations:
- On a weekly basis, the McGill partner:
  - Reads each comment of the new feedback entries, and compare with the CFB rules;
  - Adds new CFBs to “eTstudyPRpartConstructiveFeedbackReportYY-MM-DD.xlsx”;
  - Emails the Report to [editor name] and [editor name] at CPhA.

Comments with regard to Objective 8:

This section is for [editor name] to advise

STEP IV. RESPONDING TO CONSTRUCTIVE FEEDBACK COMMENTS

Objective 9. Read CFB report, identify problems, and make decisions

David’s observations:
- [editor name], the Editor in Chief, reads CFBs and decides “no change / change / undecided”. If “no change”, she writes “no change planned” in the report. If “change” or “undecided”, she contacts the corresponding editor for final co-decision “no change / change”; if "no change", she writes "no change planned" in the report; if “change” she describes the planned change in the report.

Questions:
- Q9.1. How are the data in CFB reports manipulated by CPhA (e.g., copy/paste, sort, highlight)?
  
  Answer:

- Q9.2. How are CFB comments circulated among the editors (e.g., via email, on printed copy)?
  
  Answer:

- Q9.3. After the Editor in Chief initially reads and indicates “change / undecided” for a CFB comment, how many editors in general would read a comment and get involved in identifying the problem?
  
  Answer:

- Q9.4. Generally, how long does it take to read a comment and identify a problem?
  
  Answer:

- Q9.5. Is the eT+ Highlight or chapter read along with a CFB comment?  Yes No

- Q9.6. Are reference and/or literature resources used in identifying a possible problem?  Yes No

  If yes, what resources are often consulted?
  
  Answer:
The orange section continues for [editor name] to advise

Q9.7. What are the usual forms of discussion among editors (e.g., email, phone conversation, meeting)?
   Answer:

Q9.8. If meetings are held, are meetings organized periodically (e.g., weekly) or based on ‘need’?
   Answer:

Q9.9. Other than the editors, who else may be involved in the discussion/decision-making process?
   Answer:

Comments with regard to Objective 9:

Objective 10. Ensure that changes are made as decided above, and the changes are documented

Questions:
   Q10.1. Who is/are responsible for making changes to an affected eT+ chapter?
      Answer:

   Q10.2. Under what circumstances, changes are (can be) immediately made?
      Answer:

   Q10.3. If (some) changes are to be made at a later time, could you explain why and when?
      Answer:

   Q10.4. How does CPhA follow through on changes to be made, especially when they are to be made at a later time?
      Answer:

   Q10.5. Does CPhA keep track of the changes (iterations) made to each eT+ Highlight/Chapter?
      Yes  No
      If yes, could you explain how this is done?
      Answer:

      If no, do you think there is a need for keeping track of changes to eT+ (please explain why)?
      Answer:

   Q10.6. What are (can be) the challenges/difficulties in keeping tracking of changes to eT+, if any?
      Answer:

Comments with regard to Objective 10:
IN CONCLUSION — Two general questions for [editor name] to advise:

- Is there any difference between the way that *pharmacists’* comments are reviewed and changes are made and the way that *physicians’* comments are reviewed and changes are made? If yes, please briefly explain, and we will further discuss the difference during the interview.
  Answer:

- Do you sometimes search old feedback comments to re-visit previously reported problems?
  
  **Yes**  **No**
  
  If yes, how often does this happen, Answer:

  and for what reason(s)? Answer:

  If no, is it because there is no need for doing so or because of any other reason(s)?
  Answer:

Please save this PDF file, and email it to david.tang at mail.mcgill.ca when completed.

Thank you very much for completing this questionnaire!
A Proposal for Improving the Collection and Use of User Feedback Comments

INTRODUCTION

The purpose of this document is to get your input on how current feedback handling may be improved.

David’s suggestions are presented through a process consisting of 4 steps and 11 objectives, and a computer system is proposed to facilitate feedback data handling (referred to as ‘new feedback system’ hereafter). The process can be briefly described as:

The new feedback system would import data from existing repositories of feedback data (e.g., MS SQL Server database at MediResource). The McGill partner will flag new and constructive feedback comments. [Participant name] can then browse those comments as grouped under the corresponding chapter titles, and forward selected comments for editors to investigate. The editors can setup reminders for following through on discussions and changes. Decisions will be saved in the system. Feedback comments and investigation notes can be saved and retrieved by chapter title for future consultation.

You are invited to comment on David’s observations and suggestions, and to answer his questions. You are very welcome to make suggestions with regard to the 11 objectives, or propose additional objectives to be attained through the process. While some issues mainly pertain to [participant A and others to B], please feel free to comment on any issue.

Should you find anything unclear, please call David (514 - ...) for clarification.
When completed, please save the document and email to david.tang@mail.mcgill.ca.

START OF THE FEEDBACK MANAGEMENT PROCESS

STEP I. STIMULATING USERS TO PROVIDE FEEDBACK

Objective 1. Identify the opportunity to be informed by e-Therapeutics+® users

David’s observation:

- In the PULL context, the opportunity is when users search in e-Therapeutics+.  
- In the PUSH context, the opportunity is when weekly eT+ Highlights are emailed to pharmacists and physicians.

S1.1. David’s suggestion:

- Enlarge the recipient base of weekly Highlights in order to increase the volume of feedback inflow.

Your comment:
Objective 2. Stimulate users to provide feedback

David’s observation:
Physician members of the CFPC can earn MainPro M1 credits.

Q2.1. David’s question:
Would it be possible to provide similar incentives to pharmacists, so that more feedback will be submitted by them?

Your answer and/or comment:

STEP II. COLLECTING FEEDBACK DATA

Objective 3. Provide the access point (i.e., a button) in eT+ for users to initiate feedback

David’s observation:
A button in the e-Therapeutics+ content page allows the user to initiate feedback, for example:

The combination amoxicillin-clavulanate should be considered for soft-tissue infections caused by animal bites (e.g., cat, dog) given the presence of Pasteurella multocida; resistance of this organism to cloxacillin, cephalosporins and clindamycin is documented. 

David’s comment:
No suggestion for change.

Your comment:

Objective 4. Provide the interface (i.e., feedback form) for users to fill in and submit feedback

David’s observation:
Clicking the button (example in Objective 3) opens a feedback form in a new web browser window.

Ref: Pharmacists’ feedback form

The web server that renders pharmacists’ feedback form is managed and hosted by IBM. Currently, the feedback form is html and the data captured from the questionnaire is stored in text files (at the time this project was done, we were not using a database in our solution). The web script of pharmacists’ feedback form was created in-house by the CPhA.
David’s comment:
No suggestion for change.

Your comment:

David’s observation:
RE: Physicians’ feedback form

MediResource manages the web server that renders the feedback form for physicians. MediResource has been sub-contracted by CPhA to develop the feedback form in use by CFPC, to collect and store feedback data, and to generate reports from these data for the CME credits. CPhA did not determine the IT architecture (e.g., web server, database engine, and scripting language) of physicians feedback form with regard to the form itself; however, CPhA was directly involved in defining the architecture of the system interface between the three parties (CPhA, CFPC, MRI). The IT architecture of the web-based feedback form for physicians comprises: IIS web server hosting an ASP form that writes to an MS SQL Server 2005 database.

David’s comment:
No suggestion for change.

Q4.1. David’s questions for [participant name]:
Could you briefly explain why physicians’ feedback collection was sub-contracted to MediResource? In the future, would CPhA consider having MediResource collect pharmacists’ feedback, or would CPhA consider collecting physicians’ feedback in the same way as it is done now for pharmacists’ feedback?

Your answer and/or comment:

Objective 5. Receive user feedback submissions (i.e., feedback data)
David’s observation:
When the ‘Submit’ button is pressed, the feedback form posts back to the server where the submitted feedback data are saved.
RE: Pharmacists’ feedback data capture

The same server that renders pharmacists’ feedback form also saves the returned data into a plain text file (~ delimited).
The server side script language is JSP and JAVA, for receiving the data posted back from the pharmacists’ feedback form and writing them to the text file.
The script for handling pharmacists’ feedback data was created and is maintained in-house by CPhA.
IBM hosts and manages the server. However, the resultant text file is copied to another server at CPhA’s location and is managed by Harris Computers.

Q5.1. David’s question for [participant name]:
Pharmacists’ feedback records do not seem to have any unique identifier, do they?

Your answer:

S5.1. David’s suggestion for [participant name] to consider:
If no, would it be possible to assign an ID for each feedback record as it is received? With a unique ID for each feedback record, the new feedback system can reliably identify new feedback submissions. Please see also below related question and suggestion.

Your comment:

Q5.2. David’s question for [participant name]:
Would it be possible to post and save pharmacists’ feedback data directly into a database?

S5.2. David’s suggestion for [participant name] to consider:
(1) CPhA would provide a (virtual) server platform for running a MySQL database for example;
(2) McGill or CPhA would develop a database for receiving and storing pharmacists’ feedback data;
(3) CPhA or McGill would modify the web form for posting pharmacists’ feedback into the database.

See also Q6.1: this server could also host the new feedback system.

Your answer and/or comment:
David’s observation:

RE: Physician’s feedback data capture

MediResource manages the server that receives physicians’ feedback data and saves them into an MS SQL Server 2005 database.
The server-side scripting language is ASP for handling the data posted back from the physicians’ feedback form and writing them to the database.
The script for handling physicians’ feedback data has been created and maintained by MediResource.

David’s comment:

No suggestion for change.

Q5.3. David’s question for [participant name] to answer:

Is it possible for the new feedback system to access and import feedback data directly from the SQL Server database? This feature can obviate the need for manually downloading physicians’ feedback data and then uploading them into the new feedback system.

Your answer and/or comment:

Objective 6. Organize and store feedback data to be retrieved/used

David’s observation:

RE: Pharmacists’ feedback data file storage

The server containing pharmacists’ feedback data is backed up every 15 minutes (delta) at Harris Computers, the hosting company.
The CPhA manages the FTP server that hosts pharmacists’ feedback data to be retrieved. The FTP server (Filezilla FTP Server) that stores pharmacists’ feedback data file (plain text format) is updated every 4 hours with feedback received from the user within the last 4 hours. No backup is made for data on the FTP server.
Context: the CPhA is in the process of making some system upgrades, and the content management system for publishing eT+ is also being evaluated.

David’s comment:

See S5.2 re saving pharmacists’ feedback data to a database. The same backup schedule may apply.

Your comment:
David’s observation:
With regard to physicians’ feedback data, there is no FTP server involved. Reports are sent as an Excel attachment to McGill.

David’s comment:
See Q5.3 re reading physicians’ feedback data directly from the MS SQL Server database hosted by MediResource.

Your comment:

S6.1. David’s suggestion for [participant name] to comment on:
The new feedback system may be developed with PHP and a MySQL database. This configuration may be an inexpensive choice, but also depending on the available IT resources at CPhA.

Q6.1. David’s question for [participant name]:
See also S5.2 re saving pharmacists’ feedback directly into a database.

Would it be possible for CPhA to provide a (virtual) server (e.g., MySQL, Apache and PHP) for running the new feedback system? If yes, how soon could that be arranged? Or, would another configuration (i.e., Web server, database engine) be available more easily?

This question concerns the feasibility of deploying the new feedback system into operation.

Your comment and answer:

STEP III. IDENTIFYING NEW CONSTRUCTIVE FEEDBACK COMMENTS

Objective 7. Identify new feedback entries

David’s observation:
On a weekly basis, the McGill partner:
- Retrieves feedback data in plain text format from the FTP server at ftp://72.1.218.180/eqPush.txt or eqPull.txt;
- Saves the text file to the local computer;
- Imports the text file (~ delimited) into an MS Excel spreadsheet;
- Compares the new data spreadsheet with the previous one to identify new feedback entries.
David’s comment:
See S5.1 and S5.2 re assigning a unique ID to each feedback record and saving feedback data into a database. The ID can be used to identify new feedback records.

Your comment and/or suggestion:

Objective 8. Identify constructive feedback comments (CFB)

David’s observation:
On a weekly basis, the McGill partner:
- Reads each comment of the new feedback entries, and compare with the CFB rules;
- Adds new CFBs to “eTstudyPRpartConstructiveFeedbackReportYYY-MM-DD.xlsx”;  
- Emails the Report to [participant names] at the CPhA.

David’s suggestion:
The McGill partner will flag constructive feedback (CFB) comments in the new feedback system, indicate the criterion (listed below) for qualifying each comment, and notify CPhA.
- A comment that corresponds in meaning to a rating of “Disagreement”, “Potential harm”, “Dissatisfaction” or “Problem with this information” (these are the choices given on the feedback collection form)
- A comment about missing information or that more information would be better
- A comment that includes a nuance or reserve (e.g., “I agree, but... “)
- A comment revealing the reader was not ‘convinced’ by the information
- A comment saying the information was not found
- A comment stating that the highlight is ‘old knowledge’ or the equivalent
- A negative comment on the questionnaire or on the rating process.
This list of CFB qualifiers will assist new McGill participants in identifying the comments that have constructive value. It may also enable future statistical analysis of, for example, the correlation between the perceived constructive value of comments and their actual value (i.e., result in changes).

Your comment:
STEP IV. RESPONDING TO CONSTRUCTIVE FEEDBACK COMMENTS

Objective 9. Select feedback comments to be investigated (Editor in Chief)

David’s observation:

The Editor in Chief reads CFBs and decides “no change / change / undecided”. If “no change”, she writes “no change planned” in the report and sometimes, a brief note. If “change” or “undecided”, she contacts the corresponding editor for final co-decision “no change / change”: if “no change”, she writes “no change planned” in the report; if “change” she describes the planned change in the report.

To screen out comments for investigation, [participant name] reads them consecutively on an MS Excel report, and try to consolidate comments about the same e-T highlight by copy/pasting into an email to the appropriate clinical editor (lately, the comments have been grouped per chapter to facilitate her screening). Then, [participant name] await reply by email, discuss if necessary, and fill in the blanks on the report.

S9.1. David’s suggestions:

1. A system interface will present a summary as follows:
   i. Total new CFB comments awaiting review by [participant name]: N
   ii. A list of chapter titles associated with the new comments: the number of CFBs/chapter
   iii. A list of chapter titles that [participant name] has requested for comments to be investigated
   iv. A list of chapter titles under investigation by editors
   v. A list of chapter titles that decisions for change have been made and changes are in workflow.
   This summary page will provide [participant name] with an overview of the feedback being processed.

2. On above point (ii), clicking a chapter title will open the associated new CFB comments, each accompanied by a radio button of either “No change” or “To investigate”;

3. After selecting some comments for investigation, [participant name] can choose the editor to receive them;

4. Regarding the selected comments, [participant name] can type a message (e.g., “Please look into these comments, and let me know by ... Thank you.”) into a textbox for the editor;

5. By clicking a “Send” button, the selected comments and the message will be dispatched via email to the designated editor with a copy to [participant name]’s mailbox.

The above features are meant to provide a direct way of collating comments for investigation and sending them with a ‘standard’ format message to the editor, instead of copy/pasting to emails.

Your comment and/or suggestions:
Objective 10. Conduct investigations (Clinical Editors)

David’s observation:
When the editor receives [participant name]’s email of comments for investigation, s/he opens the chapter to read the comments and the eT+ Highlight in context.
Reference and/or literature resources are used in identifying a possible problem, e.g., primary literature, systematic reviews, clinical practice guidelines.
Discussions happen between editors via both meetings and emails.
Chapter authors can be involved in discussion/investigation, and peer reviewers are also a possibility although this hasn’t happened so far.

S10.1. David’s suggestions:
(1) The editor will receive an email message from [participant name] with a list of feedback comments grouped under the corresponding chapter title;
(2) Clicking on the chapter title in the email will open the eT+ Highlight (this feature concerns the content management system and can be realized in the way Highlights are pushed via emails);
(3) Then, the editor will initiate the usual investigation and communication activities (e.g., literature search, discussing with the author, ..., and finally requesting confirmation from [participant name] about a recommended change or no-change decision);
(4) If the editor anticipates that the investigation will take more than a few days before a decision can be made, s/he will set an “Investigation reminder” in the new feedback system for an email message to be sent to her/himself in two weeks for example.

Your comment and/or suggestions:
Objective 11. Make and document changes (via major or minor workflow)

David’s observation:
The clinical editor recommends changes for the Editor-in-chief to approve, then makes the changes through the major or minor workflow upon confirmation. Non-urgent considerations such as adding information will be considered at the next scheduled revision (i.e., the major revision workflow), while errors will be corrected immediately (i.e., the minor revision workflow). It is possible that a change could be neglected by being forgotten or if the clinical editor changed and documentation was not noticed by the new editor. The clinical editor notes to address the issue with the author. All versions of a chapter are archived in the Content Management System (CMS). However, neither does the CMS keep records of the reasons for making specific changes, nor are changes highlighted.

S11.1. David’s suggestions:
(1) When a decision is made with regard to a chapter (i.e., after investigation and confirmed by Caro), the editor will follow two scenarios (radio button options) to conclude the related CFB comments:
   a) No change
      • Select the “No change” option for the comments;
      • Write a brief note of investigation [e.g., sources consulted] and/or copy the email with [participant name] to a textbox which will be associated with these no-change comments in the system;
      • Click the “Conclude” button.
   b) Change
      • Select the “Change reminder” option for the comments by setting a date to receive an email message reminding of a follow-up check on the chapter content (online);
      • From a list, checkmark the type(s) of problem as reported in the comments, such as:
        i. Missing details
        ii. Missing relevant information
        iii. Disagreement (different opinion)
        iv. Suggestion of alternative or contradictory evidence
        v. Difficulty in understanding
        vi. Poor wording
        vii. Impracticability or irrelevance regarding practice
        viii. Lack of quality or value in the conveyed knowledge
        ix. Usability problems
    Overtime, accumulated statistics on the reported problems may (a) provide an indicator of the needs and preferences of different user groups (e.g., pharmacists, physicians, nurses are identified on the feedback form), and by comparing with the changes made (b) show what have been done in response to user feedback.
- Write a brief note on the investigation (e.g., sources consulted) and/or copy the email with [participant name] to a textbox which will be associated with the “to-change” comments;
- The reminder can be reset to a later date, if more time is required for the change to be reflected online (e.g., missed a 2-week update circle) or a major revision is taking longer than expected (e.g., the author needs a few more weeks to complete a new version);
- When the change is correctly made, terminate the reminder (i.e., conclusion).

(2) An option will be provided for saving attachments of an investigation (e.g., a literature review in PDF format);
(3) The two CMS version numbers (i.e., before and after a change of chapter content) will be registered in the new feedback system. This feature concerns the CMS;
(4) The new feedback system will allow (a) browsing all previous feedback comments (sort by: e.g., investigated or not, led to change or not) under chapter titles, and (b) for the comments that have led to changes, tracing back the versions (archived in the CMS) before and after the changes.

The above suggestions might turn the feedback system into a knowledge repository, which can:
(a) provide a historical overview of users’ feedback on one chapter (e.g., if an increasing number of comments point to a same issue), (b) help to organize the investigation materials and communication records under each chapter title for easy retrieval, and (c) facilitate knowledge transfer between the editors (e.g., change of responsible topics/chapters, or staff change).

Your comment and/or suggestions:

Q11.1. David’s question:
Currently, if a certain (old) version of the chapter needs to be retrieved from CMS, how is that done?

Your answer:
David’s question for [participant name] and/or Sandra:
Does the forthcoming content management system have an application/development interface that would allow another software application to retrieve a certain version of a chapter?

Your answer:

END OF THE FEEDBACK MANAGEMENT PROCESS

Please save and email this document to David (david.tang@mail.mcgill.ca) when completed.
Thank you very much for contributing to this proposal!
Appendix I
Six information system design methodologies

User-centered design:
- Focused on the impact of the technology on users, but traditionally these users were only involved after the technology had been designed (Nesset & Large, 2004; Scaife & Rogers, 1999; Scaife, Rogers, Aldrich, & Davies, 1997);
- Users are not directly involved throughout the process but only at the beginning or end;
- Users are involved only as evaluators or testers at the end of the design process and therefore their feedback is based on reaction rather than initiation, and it is the designers who translate and interpret the users’ reactions (Scaife, et al., 1997);
- Users themselves have little or no control over the design process, meaning that they cannot initiate changes but only reveal design shortcomings;
- Common methods include participant observation, transaction logs, surveys, and interviews;
- From the designers’ perspective, an advantage of user centered design is that they can accomplish their work more quickly because they maintain control over the design process (Druin, 2002).

Contextual design (Beyer & Holtzblatt, 1999):
- The intention is to reveal the details of, and motivations behind, people’s [current way of] work and to use this as the basis for decision making (Beyer & Holtzblatt, 1999);
The method consists of observing users performing typical activities, and developing a low-tech prototype of the system for testing with users, as prototypes support continuous iteration of the new system, keeping it faithful to the users’ needs;

Refining the design with users gives designers a customer-centered way to resolve disagreements and work out the next layer of requirements (Beyer & Holtzblatt, 1999), but interaction between researchers and users is minimal.

Learner-centered design (Soloway, Guzdial, & Hay, 1994):

- Professionals become learners when they learn to develop their expertise, and the way in which computers are being used in the workplace provides precisely the right conditions under which learning should take place;
- The main focus is to ensure that the design is adapted to the interests, knowledge, and styles of the learners who will use it: How will the learner learn by using it; how will it motivate a learner; how can it support different user approaches; and how will it accommodate learners as they change (in what way)?
- The task, the tool and its interface introduced to the learner should offer structure and guidance to help the learner gain expertise in performing the task and eventually do it alone with full control—a process called scaffolding by Soloway et al.

Participatory design:

- Emphasizing a premise at the viewpoint level, that users are the best qualified to determine how to improve their work, and that their perceptions about technology are as important as technical specifications (Carmel, Whitaker, & George, 1993);
While promotion of equality for all team members is emphasized, it asks the user to move into roles such as peer co-designer, design owner, expertise contributor, and self-advocate (Fleming in Bilal, 2002, p. 208).

Users can contribute by: teaching about their work practices, and designing and learning by creating low-tech prototypes with tools such as blackboards, index cards, and drawings;

Can be effective for a team of adult users who can view each other as peers (Scaife, et al., 1997).

**Informant design (Scaife, et al., 1997):**

- The basic assumption is that in the design process, the informants are most helpful at suggesting ideas (e.g., children can provide for the motivational and fun aspects of educational software), but that they do not have the time, knowledge, or expertise to fully participate in collaborative participatory design;
- The designer tries to elicit suggestions from the informant and then lets them know if it is possible to incorporate them into the working design;
- It is suited for the design of interactive software for non-typical users or those who cannot easily be equal partners (e.g., children).

**Cooperative inquiry (Druin, 1999):**

- It involves a multidisciplinary partnership, field research, and iterative low-tech and high-tech prototyping;
- Good for developing “flexible, creative software” by using for example “brainstorming sessions”;
• The designer and the user work together in small groups, brainstorming about what is wrong with existing technologies and developing low-tech prototypes;
• Users are treated as full design partners alongside the designers, but at the same time, full participation of users requires training and active cooperation.

Key references were taken from a review of design methodologies (Large, Nesset, Beheshti, & Bowler, 2006).

References


Appendix J
Paper prototypes

Screen 1 - Summary (Interface user: Editor-in-Chief)
N.B. The numbers (e.g., 355 new CFB comments) are for illustration only.

Total new CFB comments: 355

- **Neurologic Disorders: Fever in Children** (55) [See: Screen 2 Illustration.]
  There is insufficient evidence to support the practice of alternating acetaminophen and ibuprofen. Moreover, there may be an increased risk of parental confusion and subsequent dosing errors when this strategy is employed.

- **Genitourinary Disorders: Urinary Incontinence in Children** (100)
  Relative to desmopressin, alarms are superior in that once the child achieves dryness there is less chance of relapse.

- **Sexual Health: Dysmenorrhea** (200)
  All NSAIDs, except ASA which has minimal effect, are effective in about 80% of cases of dysmenorrhea. In practice, there appears to be minimal difference among NSAIDs. The choice depends more on tolerance of side effects and cost. With short-term use, side effects of all NSAIDs are generally minor. NSAIDs should be taken with food, starting immediately at the onset of symptoms or menses and continued on a regular schedule for 2 to 3 days.

Investigation requested: 200

- **Respiratory Disorders: Croup** (100) [See: Screen 3 Illustration.]
  Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress. Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

- **Infectious Diseases: Community-acquired Pneumonia** (100)
  For patients who are well enough to be treated on an ambulatory basis, a minimum of 5 days of antibiotic therapy is required. Patients who are hospitalized and who respond to treatment within 48 hours can be treated with 10 days of antibiotics. Specific etiologies may require longer treatment such as 21 days for severe Legionnaires’ disease, 14 days for bacteremic aerobic gram-negative bacilli pneumonia and up to 21 days for pneumonia caused by Pseudomonas aeruginosa.

Under investigation: 45

- **Respiratory Disorders: Viral Rhinitis** (25) [See: Screen 4 Illustration.]
  Pseudoephedrine is an effective oral treatment for nasal congestion in adults. Multiple doses of pseudoephedrine over a 3-day period are safe. Evaluations of the effectiveness of oral phenylephrine have yielded conflicting results.

- **Genitourinary Disorders: Urinary Incontinence in Children** (20)
  Relative to desmopressin, alarms are superior in that once the child achieves dryness there is less chance of relapse.
Pending changes: 5

• Genitourinary Disorders: Lower Urinary Tract Symptoms and Benign Prostatic Hyperplasia (3)
  Saw palmetto is the most popular and studied plant extract used to reduce symptoms related to BPH. Some
  patients report a favourable response but published trials fail to show any benefit greater than placebo.8,9
  Identification and pharmacokinetics of active ingredients are often unclear in phytotherapeutic mixtures. Until
  more information regarding their mode of action and long-term efficacy and safety becomes available in
  quality studies, their use cannot be recommended.

• Musculoskeletal Disorders: Polymyalgia Rheumatica and Giant-Cell Arteritis (2)
  Two retrospective studies have suggested that use of low-dose ASA (81 mg/day) may lower the risk of
  developing blindness in patients following the diagnosis of temporal arteritis.44,45 Cytoprotection with a
  proton pump inhibitor or misoprostol should be considered during concomitant therapy with prednisone and
  ASA to reduce the risk of gastrointestinal toxicity.

- END -
Screen 2 – Screening for investigation (Interface user: Editor-in-Chief)
Use this interface to select and send comments for investigation, or to conclude with “No change”. N.B. “Click to open...” is just a feature description in this interface prototype.

CFB comments on:

Neurologic Disorders: Fever in Children

There is insufficient evidence to support the practice of alternating or combining acetaminophen and ibuprofen. Moreover, there may be an increased risk of parental confusion and subsequent dosing errors when this strategy is employed.

<table>
<thead>
<tr>
<th>Feedback Comments</th>
<th>Investigate</th>
<th>No change</th>
<th>Notes (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout, that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
<td></td>
<td></td>
<td>Type in the reason for making no changes.</td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. the listed reference15 said nothing to back up the high-lighted statement(at least in the abstract available on line.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
<td></td>
<td></td>
<td>Type in the reason for making no changes.</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Send investigation request to:

[Clinical editor A name]  
[Clinical editor B name]  
[Clinical editor C name]  
[Clinical editor D name]  
[Clinical editor E name]  
[Clinical editor F name]  

Email message:

Please give me an update on these comments.  
Thanks,

[Editor name]  

See screen 6 for the clinical editor interface.
Screen 3 – Investigation requested (Interface user: Editor-in-Chief)

This interface shows comments that have not been looked at following requests for investigation (Screen 2). N.B. “Click to open...” is just a feature description in this mock-up prototype; comments are for illustration only.

Investigation requested:

**Respiratory Disorders: Croup**  ⇩ [Click to open the Chapter in another browser window.]

Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress.8,9,10,11 Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

<table>
<thead>
<tr>
<th>Feedback Comments</th>
<th>Last request</th>
<th>Clinical Editor</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas</td>
<td></td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout, that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas</td>
<td></td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. the listed reference 15 said nothing to back up the high-lighted statement(at least in the abstract available on line.)</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas</td>
<td>✓</td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas</td>
<td>✓</td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
<td>8 February 2011</td>
<td>Barbara Jovaisas</td>
<td></td>
</tr>
</tbody>
</table>

Send follow-up request to:  ⇩ [Option to re-direct selected comments to another clinical editor.]

| [Clinical editor A name]           |          |
| [Clinical editor B name]           |          |
| [Clinical editor C name]           |          |
| [Clinical editor D name]           |          |
| [Clinical editor E name]           |          |
| [Clinical editor F name]           |          |

Email message:

Please give me an update on these comments:
Thanks,

[Editor name]

⇨ [A message for the clinical editor to receive in email.]
Screen 4 – Comments under investigation (Interface user: Editor-in-Chief)

This interface shows comments that are under investigation as indicated by the clinical editor.
N.B. “Click to open...” is just a feature description in this mock-up prototype; comments are for illustration only.

Under investigation:

Respiratory Disorders: Croup ⇄ Click to open the full Chapter in another window.

Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress.8,9,10,11 Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

<table>
<thead>
<tr>
<th>Feedback Comments</th>
<th>Put to investigation on</th>
<th>Editor’s Notes</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas: Under investigation</td>
<td>☐</td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout, that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas: Waiting to hear back from the author...</td>
<td>☐</td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. the listed reference15 said nothing to back up the highlighted statement(at least in the abstract available on line.)</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas: Some notes...</td>
<td>☑</td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas: Some notes...</td>
<td>☑</td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
<td>31 January 2011</td>
<td>Barbara Jovaisas: Some notes...</td>
<td>☐</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

Send follow-up request to: ⇄ Option to re-direct selected comments to another clinical editor.

[ Clinical editor A name ]  ☐
[ Clinical editor B name ]  ☑
[ Clinical editor C name ]  ☐
[ Clinical editor D name ]  ☐
[ Clinical editor E name ]  ☐
[ Clinical editor F name ]  ☐

Message:

Please give me an update on these comments. Thanks,

[ Editor name ]

⇔ A message for the clinical editor to receive in email.
Pending changes:

Respiratory Disorders: Croup

Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress.8,9,10,11 Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

<table>
<thead>
<tr>
<th>Feedback Comments</th>
<th>Put to change on</th>
<th>Editor’s Notes</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas: Pending changes.</td>
<td></td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout, that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
<td>21 March 2011</td>
<td>Barbara Jovaisas: Sent for technical fix.</td>
<td></td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. the listed reference15 said nothing to back up the highlighted statement(at least in the abstract available on line.)</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas: Notified author to deal with in next major revision.</td>
<td></td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
<td>11 February 2011</td>
<td>Barbara Jovaisas: Estd. done by 1/31.</td>
<td>✓</td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
<td>31 January 2011</td>
<td>Barbara Jovaisas: Some notes ...</td>
<td></td>
</tr>
</tbody>
</table>

Send follow-up request to: Option to re-direct selected comments to another clinical editor.

<table>
<thead>
<tr>
<th>[Clinical editor A name]</th>
<th>[Clinical editor B name]</th>
<th>[Clinical editor C name]</th>
<th>[Clinical editor D name]</th>
<th>[Clinical editor E name]</th>
<th>[Clinical editor F name]</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Message:

Please give me an update on these comments:

Thanks,

[Editor name]

A message for the clinical editor to receive in email.
Email from [participant name]:  
Message sent through Screen 2, 3, 4, and 5.

From: [participant name]
Sent: Thursday, March 17, 2011 2:53 PM
To: Participant name
Subject: CFB comments

Hi Barb,
Could you please look into these comments, and let me know by Friday?
Thank you,

[participant name]

Logon Feedback Management System  
See screen 7 illustration.

**Respiratory Disorders: Croup**  
Click to open the Chapter in another browser window.

Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress.8,9,10,11 Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

<table>
<thead>
<tr>
<th>Feedback Comments</th>
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<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout, that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. The listed reference15 said nothing to back up the high-lighted statement(at least in the abstract available online.)</td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
</tr>
<tr>
<td>...</td>
</tr>
</tbody>
</table>
Summary of CFB comments by Chapter:

- **Neurologic Disorders: Fever in Children (15 / 10 / 5) See: Screen 8 illustration.**
  There is insufficient evidence to support the practice of alternating acetaminophen and ibuprofen. Moreover, there may be an increased risk of parental confusion and subsequent dosing errors when this strategy is employed.

- **Respiratory Disorders: Croup (18 / 9 / 3)**
  Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress.8,9,10,11 Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

- **Infectious Diseases: Community-acquired Pneumonia (2 / 7 / 5)**
  For patients who are well enough to be treated on an ambulatory basis, a minimum of 5 days of antibiotic therapy is required.2 Patients who are hospitalized and who respond to treatment within 48 hours can be treated with 10 days of antibiotics.1 Specific etiologies may require longer treatment such as 21 days for severe Legionnaires’ disease, 14 days for bacteremic aerobic gram-negative bacilli pneumonia and up to 21 days for pneumonia caused by Pseudomonas aeruginosa.

......
**Respiratory Disorders: Croup**

Evidence suggests that mist (mist wanes, bedside humidifiers, mist tents) is not effective at reducing respiratory distress. Placing children in mist tents, a wet, cold, “caged” environment separated from their parents, may provoke anxiety and agitation and should be avoided.

<table>
<thead>
<tr>
<th>New Comments</th>
<th>Investigate</th>
<th>No change</th>
<th>Notes (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had been advocating alternating the 2 drugs! Is there any evidence that one or the other is more effective?</td>
<td>🗣️</td>
<td>🗣️</td>
<td></td>
</tr>
<tr>
<td>Fever can be daunting, especially for parents unaccustomed to its management. Our local emergency has a handout that outlines the alternating of acetaminophen and ibuprofen. Most times you would not have to resort to this option.</td>
<td>🗣️</td>
<td>🗣️</td>
<td>Type in the reason for making no changes...</td>
</tr>
<tr>
<td>I find there is more dosage confusion from the many formulations of acetaminophen and ibuprofen than confusion between the two. The listed reference 15 said nothing to back up the high-lighted statement (at least in the abstract available on line.)</td>
<td>🗣️</td>
<td>🗣️</td>
<td></td>
</tr>
<tr>
<td>Alternative is overdosing on one medication viewpoint not discussed.</td>
<td>🗣️</td>
<td>🗣️</td>
<td></td>
</tr>
<tr>
<td>The studies quoted showed better fever free times when both agents were given. So I am a little confused about the conclusions.</td>
<td>🗣️</td>
<td>🗣️</td>
<td>Type in the reason for making no changes...</td>
</tr>
<tr>
<td>...</td>
<td>🗣️</td>
<td>🗣️</td>
<td></td>
</tr>
</tbody>
</table>

In this table, the clinical editor decides which comments need to be investigated and which need no change.

Radio buttons:
Selecting “Investigate” will then save the comment to the Under-investigation table on the next page;
Selecting “No change” will then save the comment to the concluded table at the end.

*Continues on next page...*
<table>
<thead>
<tr>
<th>Comments Under Investigation</th>
<th>To Change</th>
<th>No change</th>
<th>Notes (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I still believe that motivated competent parents are able to dose their children without confusion.</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous guidelines I have read report equal efficacy of using either advil or tylenol for fever, and that using both together had an even further increase in efficacy. This highlight has given me some food for thought.</td>
<td>0</td>
<td></td>
<td>Type in the reason for making no changes...</td>
</tr>
<tr>
<td>I have always recommended alternating antipyretics when necessary to provide patient relief; I write down the correct doses to avoid confusion. The headline is misleading and alarmist.</td>
<td>0</td>
<td></td>
<td>Investigation Results...</td>
</tr>
<tr>
<td>Already known, also article should have compared ibuprofen vs Acet.</td>
<td>0</td>
<td></td>
<td>Investigation Results...</td>
</tr>
<tr>
<td>I don’t see any problem alternating use of tylenol with advil in my patients, possibly I see older kids 5-15 years old. I wrote the precise instruction on a sheet of paper and parents found it useful. I agree this may be confusing for certain parents.</td>
<td>0</td>
<td></td>
<td>Type in the reason for making no changes...</td>
</tr>
</tbody>
</table>

When investigation is completed on a comment, the clinical editor decides whether changes should be made or not.

Radio buttons:
Selecting "To Change" will then save the comment to the Pending-changes table on the next page;
Selecting "No change" will then save the comment to the concluded table.

Alarm clock buttons:
Optionally, the clinical editor may set a date for her/himself to receive an email reminding of a comment under investigation. The reminder can be reset to a future date or be unset at any time.

Continues on next page...
<table>
<thead>
<tr>
<th>Comments Pending Changes</th>
<th>Conclude</th>
<th>Notes (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think you underestimate the competence of parents and overestimate the toxic threshold of tylenol-advil. Cheers</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td>Nothing new. Insufficient evidence? want to elaborate. This is at the level of 'don't do this, without support' poor.</td>
<td>☑️</td>
<td>Type in conclusion remarks...</td>
</tr>
<tr>
<td>This highlight has merely stated that acetaminophen should not be alternated with ibuprofen without giving a valid reason why, other than confusion in dosing. That is insufficient reason to change the common practice of alternating the two anti-pyretic.</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td>I did not find any TIPS from this information as to replace the choice of alternating Tylenol and ibuprofen. Is it still harmful if the parents understand clearly how to alternating?</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td>Combination still sometimes extremely effective but recognised that overdose risk potential is higher.</td>
<td>☑️</td>
<td>Type in conclusion remarks...</td>
</tr>
<tr>
<td>...</td>
<td>☑️</td>
<td></td>
</tr>
</tbody>
</table>

In this table, the clinical editor concludes a comment after the change of content has been completed.

Checkbox: Selecting “Conclude” will then save the comment to the concluded table on the next page.

Alarm clock buttons: Optionally, the clinical editor may set a date for her/himself to receive an email reminding of a comment to be concluded. The reminder can be reset to a future date or be unset at any time.

Continues on next page...
<table>
<thead>
<tr>
<th>Concluded Comments</th>
<th>Received</th>
<th>Conclusion</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would have preferred more emphasis on ignoring fever altogether.</td>
<td>21 Feb. 2011</td>
<td>Change</td>
<td>Showing notes for the change...</td>
</tr>
<tr>
<td>Information on alternating Acetaminophen and ibuprofen is author’s opinion and</td>
<td>12 Jan. 2011</td>
<td>-</td>
<td>Showing notes for no changes...</td>
</tr>
<tr>
<td>admittedly not supported by any data.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>there are some studies that recommend the use of alternating acetaminophen with</td>
<td>11 Jan. 2011</td>
<td>-</td>
<td>Showing notes for no changes...</td>
</tr>
<tr>
<td>ibuprofen, however i think more studies are required to agree to to disagree with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the above study.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need more info since i find combo of tylenol and advil helpful.</td>
<td>21 Nov. 2010</td>
<td>Change</td>
<td>Showing notes for the change...</td>
</tr>
<tr>
<td>re: confusion - I think this is highly variable depending on how comfortable/well</td>
<td>18 Oct. 2010</td>
<td>-</td>
<td>Showing notes for no changes...</td>
</tr>
<tr>
<td>informed parents are / age of children, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All concluded comments pertaining to the present chapter are listed in this table.
**Appendix K**

Interview guides for the study of organizational factors

<table>
<thead>
<tr>
<th>INTERVIEW GUIDE (FOR CLINICAL EDITORS)</th>
<th>FIELD NOTES (Related factors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Study of User Feedback Management for Health Information Providers: The Case of the Canadian Pharmacists Association</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td></td>
</tr>
<tr>
<td>To begin, I would like to briefly explain the context of our interview.</td>
<td></td>
</tr>
<tr>
<td>In the past few weeks, you have taken part in the project for developing a user feedback management process.</td>
<td></td>
</tr>
<tr>
<td>The purpose of this interview is (1) to reflect on the experience of developing the feedback management process, and (2) to discuss the factors that may affect the implementation of the process/system.</td>
<td></td>
</tr>
<tr>
<td>I would like our discussion to be as comprehensive as possible, so please don’t feel constrained by the scope of my questions, and any idea that you may think of would be much appreciated.</td>
<td></td>
</tr>
<tr>
<td>Our interview will last 1.5 hours. Before we start, do you have any questions?</td>
<td></td>
</tr>
<tr>
<td>1. First, I would like to ask some questions about your own opinion as a professional involved in this project.</td>
<td></td>
</tr>
<tr>
<td>(1.1) <strong>Before</strong> this project, what did you think about the usefulness of feedback comments from health professionals?</td>
<td>(Personal conception)</td>
</tr>
<tr>
<td>(1.2) Given your feeling about the usefulness of that feedback, did you think there was a need to develop a formal process to manage that feedback?</td>
<td></td>
</tr>
<tr>
<td>(2) Did it ever occur to you that the need for a feedback management process fits with the mission or mandate of CPhA? (Could you explain?)</td>
<td>(Awareness of Organizational Mission)</td>
</tr>
<tr>
<td>(3) Did you feel any pressure from any eT+ subscriber, from your manager, or from any external agency to improve the existing practice of feedback management? If yes, could you explain?</td>
<td>(Pressure for Innovation)</td>
</tr>
<tr>
<td>(4) Prior to this project, have you ever thought that a more formal and systematic feedback management process could help you improve the content you are responsible for? If yes, could you explain?</td>
<td>(Personal Valence) (i.e., Personal job performance)</td>
</tr>
<tr>
<td>(5.1) Did you feel obliged to participate in this project (e.g., interviews)?</td>
<td>(Normative Commitment) (i.e., Job responsibility)</td>
</tr>
<tr>
<td>(5.2) Did you consider participation in this project as part of what you should be doing with your time? OR, were you motivated by something other than a sense of job responsibility?</td>
<td></td>
</tr>
<tr>
<td>(6) Did you spend time on this project beyond what you think you should do? If yes, what did you do?</td>
<td>(Affective Commitment)</td>
</tr>
</tbody>
</table>
(7) In the past few weeks, were you able to spend enough time as needed on this project? (i.e., developing this new feedback process)  

(8) Did you recommend any specific features or changes for the new feedback process or system? If yes, what were the recommendations?  

(9) Are you enthusiastic about implementing this feedback process? Do you think this enthusiasm is shared by other staff (whom)?  

(22) How confident are you about implementing the new feedback process if the project would move ahead and you would be involved?  

(11) Do you think that you will need some training in order to be able to implement the new feedback process?  

(12.1) Do you think everyone will get on board and chip in to make this implementation happen?  

(10.1) Have you tried to convince others that it’s a good idea to develop a systematic feedback management process?  

(10.2) To implement the new process that we’ve just developed, do you feel that you might want to convince some other CPhA staff?  

(12.2) Do you get the feeling that any dept. is not so committed to support the implementation of this new feedback management process?  

2. So far, you have told me about your own thoughts and opinions. Now, I would like to ask some questions about the factors pertaining to CPhA as an organization, which may concern its strategy, operation, and resources.  

(13) Prior to this project, did you think a formal feedback management process may benefit CPhA acting as a health information provider?  

(14.1) Did it ever occur to you that a formal feedback management process will give CPhA some competitive advantage?  

(14.2) Based on your knowledge, have any of CPhA’s partners or competitors worked on a similar feedback process? If yes, was this one of the reasons for which CPhA wanted to improve how feedback had been handled?  

(15.1) Prior to this project, has user feedback been used to support decision-making in CPhA?  

(15.2) Did you request any specific feature for the feedback system, in order to support your work?
(16.1) Here at CPhA, are you encouraged to think creatively and pursue novel ideas? (Tie in with *this project*)

(16.2) Under what conditions, would you be required to consult with higher managers about any functionalities you wish to incorporate into the feedback process and system?

(17.1) Do you think each department can be counted on to perform the needed tasks to implement the feedback process? (a lead question for 2)

(17.2) If some issues arise during the implementation of the new feedback process, how would they be managed? (e.g., inter-departmental issues)

(18) If implemented, will the new feedback process affect your current workload? If yes, in what way?

(21.1) What do you think of the communication process in the past months?

(21.2) How could discussion between staff members help with implementing the new feedback system and process?

(22) Have you thought of any risks that might be associated to implementing the new process?

3. Finally, I have two general questions.

(19) 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 so far?

(20) Could you think of any other factor that may facilitate or inhibit the successful implementation of the new feedback process in CPhA, as well as its sustained operation in the long-term?

Before finish, do you have anything more to add?

**Conclusion**

I thank you very much, and I would ask you if you have any comment about our study or the interview.
INTERVIEW GUIDE (FOR EDITOR IN CHIEF)
A Study of User Feedback Management for Health Information Providers: The Case of the Canadian Pharmacists Association

Introduction
To begin, I would like to briefly explain the context of our interview. In the past few weeks, you have taken part in the project for developing a user feedback management process.

The purpose of this interview is (1) to reflect on the experience of developing the feedback management process, and (2) to discuss the factors that may affect the implementation of the process/system.

I would like our discussion to be as comprehensive as possible, so please don’t feel constrained by the scope of my questions, and any idea that you may think of would be much appreciated.

Our interview will last 1.5 hours. Before we start, do you have any questions?

1. First, I would like to ask some questions about your own opinion as a professional involved in this project.

   (1.1) Before this project, what did you think about the usefulness of feedback comments from health professionals? (Personal conception)

   (1.2) Given your feeling about the usefulness of that feedback, did you think there was a need to develop a formal process to manage that feedback? (Awareness of Organizational Mission)

   (2) Did it ever occur to you that the need for a feedback management process fits with the mission or mandate of CPhA? (Could you explain?) (Pressure for Innovation)

   (3) Did you feel any pressure to improve the existing practice of feedback management (e.g., from any eT+ subscriber, from your manager, or from any external agency)? If yes, could you explain? (Personal Valence)

   (4) Prior to this project, have you ever thought that a more formal and systematic feedback management process could benefit your own job as the Editor-in-Chief? If yes, could you explain? (i.e., Personal job performance)

   (5.1) Did you feel obliged to participate in this project particular (e.g.)? (Normative Commitment)

   (5.2) Did you consider participation in this particular project as part of what you should be doing with your time? OR, were you motivated by something other than a sense of job responsibility? (i.e., Job responsibility)

   (6) Did you spend time on this particular project beyond what you think you should do? If yes, what did you do? (Affective Commitment)

   (7) In the past few weeks, were you able to spend enough time as needed on this particular project? (i.e., developing this new feedback process) (Workload)
(8) Did you recommend any specific features or changes for the new feedback process or system? If yes, what were the recommendations?

(9) Are you enthusiastic about implementing this new feedback process? Do you think this enthusiasm is shared by other staff (whom)?

(22) How confident are you about implementing the new feedback process?

(11) Do you think that you will need some training in order to be able to implement the new feedback process?

(12.1) Do you think everyone will get on board and chip in to make this implementation happen?

(10.1) Have you tried to convince others that it’s a good idea to develop a systematic feedback management process?

(10.2) To implement the new process that we’ve just developed, do you feel that you might want to convince some other CPhA staff?

(12.2) Do you get the feeling that any dept. is not so committed to support the implementation of this new feedback management process?

2. So far, you have told me about your own thoughts and opinions. Now, I would like to ask some questions about the factors pertaining to CPhA as an organization, which may concern its strategy, operation, and resources.

(13) Prior to this project, did you think a formal feedback management process may benefit CPhA acting as a health information provider?

(14.1) Did it ever occur to you that a formal feedback management process will give CPhA some competitive advantage?

(14.2) Based on your knowledge, have any of CPhA’s partners or competitors worked on a similar feedback process? If yes, was this one of the reasons for which CPhA wanted to improve how feedback had been handled?

(15.1) Prior to this project, has user feedback been used to support decision-making in CPhA, particularly, did you make an association between a feedback management process and decision-making at CPhA?

(15.2) Did you request any specific feature for the feedback system, in order to support your work?

(16.1) Here at CPhA, how much autonomy do you feel that you have, with regard to the development of this feedback management process?
(16.2) Under what conditions, would you consult with others about any features you wish to incorporate into the feedback process and system?

(17.1) Do you think each department can be counted on to perform the needed tasks to implement the feedback process? (a lead question for 2) (Governance and Management)

(17.2) If some issues arise during the implementation of the new feedback process, how would they be managed? (e.g., inter-departmental issues) (Workload)

(18) If implemented, will the new feedback process affect your current workload? If yes, in what way? (Communication)

(21.1) What do you think of the communication process in the past months, both within CPhA and with McGill researchers? (Open-ended, and potentially relevant to Organizational Resources)

(21.2) How could discussion and communication help with implementing the new feedback process and system?

(22) Have you thought of any risks that might be associated to implementing the new process?

3. Finally, I have two general questions.

(19) In addition to what you have mentioned, is there anything we haven’t talked about that you think is interesting or relevant to this project so far? (Open-ended, retrospective)

(20) Could you think of any other factor that may facilitate or inhibit the successful implementation of the new feedback process in CPhA, as well as its sustained operation in the long-term? (Open-ended, and potentially relevant to Organizational Resources)

Before finish, do you have anything more to add?

Conclusion
I thank you very much, and I would ask you if you have any comment about our study or the interview.
INTERVIEW GUIDE (FOR IT STAFF) – A Study of User Feedback Management for Health Information Providers: The Case of the Canadian Pharmacists Association

Introduction
To begin, I would like to briefly explain the context of our interview. In the past few weeks,

The purpose of this interview is to discuss the factors that may affect the implementation of the process/system.

I would like our discussion to be as comprehensive as possible, so please don’t feel to be constrained by the scope of my questions, and any idea that you may think of would be much appreciated.

**Strictly CONFIDENTIAL!**

Our interview will take about 1 (1.5) hour. Before we start, do you have any questions?

1. You have contributed to developing a feedback management process. First, I would like to ask some questions about your own opinion as a professional about this project.

(1.1) Have you thought about the usefulness of feedback comments from health professionals?

(1.2) Given your feeling about the usefulness of that feedback, did you think there was a need to develop a formal process to manage that feedback?

(2) Did it ever occur to you that the need for a feedback management process fits with the mission or mandate of CPhA? (Could you explain?)?

(3) Did you feel any pressure from any eT+ subscriber, from your manager, or from any external agency to improve the existing practice of feedback management? If yes, could you explain?

(4) Did you feel that the feedback system is related to or can benefit your own job performance?

(5.1) Did you feel obliged to participate in this project (e.g., interviews)?

(5.2) Did you consider participation in this project as part of what you should be doing with your time? OR, were you motivated by something other than a sense of job responsibility?

(6) Did you spend time on this project beyond what you were obliged to do? If yes, what did you do?

(7) In the past few weeks, were you able to spend enough time as needed on this project? (i.e., developing this new feedback process)?

(Personal conception) (Awareness of Organizational Mission) (Pressure for Innovation) (Personal Valence) (Normative Commitment) (Affective Commitment) (Workload)
(8) Did you recommend any specific features or changes for the new feedback process or system? If yes, what were the recommendations?  

(9) Are you enthusiastic about implementing this feedback process? Do you think this enthusiasm is shared by other staff (whom)?

(22) How confident are you about implementing the new feedback process if the project would move ahead and you would be involved?

(11) Do you think that you will need some training in order to implement the new feedback process?

(10) Do you think that you can influence the decision on whether or not the process should be implemented, and how it should be implemented?

(12) How do you anticipate the cooperation among staff members, if the new feedback process is to be implemented? (In other words: Do you think everyone will get on board and chip in to make this implementation happen)

2. So far, you have told me about your own thoughts and opinions. Now, I would like to ask some questions about the factors pertaining to CPhA as an organization, which may concern its operation, and resources.

(13) Prior to this project, did you think a formal feedback management process may benefit CPhA as an organization, which may concern its operation, and resources?

(new) Did it ever occur to you that a formal feedback management process will give CPhA some competitive advantage?

(14) Does CPhA have an adequate IT infrastructure to deploy the system for implementing the new feedback process? If not yet, do you think CPhA has the financial resource to acquire the required IT resource?

(15) Not relevant to this informant.

(16.1) If the feedback management system would be implemented, would you be required to consult with higher managers about any judgements and decisions you would make for deploying the system?

(17) If some issues arise during the deployment and future operation of the new system, how would they be managed?

(18) If implemented, will the new system affect your current workload? If yes, in what way?

(19) If the system is implemented, do you think the IT department of CPhA has the ability to maintain the system and support its long-term operation?
3. Finally, I have two **general questions**.

(20) In addition to what you have mentioned, do you think there was any other reason that may have led to or affected the development of this feedback management process particularly the support system? (Open-ended)

(21) Based on your knowledge about CPhA, could you think of any other factor that may facilitate or inhibit the successful implementation of this new process and system, as well as its sustained operation in the long-term? Or, what do you think about the adequacy of necessary conditions for implementing the feedback system and sustaining its long-term operation? (Open-ended, and potentially relevant to Organizational Resources)

Before finish, do you have anything more to add?

**Conclusion**
I thank you very much, and I would ask you if you have any comment about our study or the interview.
**Interview Guide (For IT Director) – A Study of User Feedback Management for Health Information Providers: The Case of the Canadian Pharmacists Association**

**Introduction**
To begin, I would like to briefly explain the context of our interview. In the past few weeks, you have taken part in the project for developing a user feedback management process.

The purpose of this interview is (1) to reflect on the experience of developing the feedback management process, and (2) to discuss the factors that may affect the implementation of the process/system.

I would like our discussion to be as comprehensive as possible, so please don’t feel to be constrained by the scope of my questions, and any idea that you may think of would be much appreciated.

Our interview will take about 1 (1.5) hour. Before we start, do you have any questions?

1. You have contributed to developing a feedback management process. First, I would like to ask some questions about your own opinion as a professional about this project.

   1.1) **Before** this project, what did you think about the *usefulness* of feedback comments from health professionals?

   1.2) Given your feeling about the usefulness of that feedback, did you think there was a *need to develop* a formal process to manage that feedback?

   2) Did it *ever* occur to you that the need for a feedback management process fits with the *mission or mandate* of CPhA? (Could you explain?)

   3) Did you feel any *pressure* from any eT+ subscriber, from your manager, or from any external agency to improve the existing practice of feedback management? If yes, could you explain?

   4) Did you feel that the feedback system is related to or can benefit your *own job performance*?

   5.1) Did you feel obliged to participate in this project (e.g., interviews)?

   5.2) Did you consider participation in this project as part of what you should be doing with your time? **OR**, were you motivated by something other than a sense of *job responsibility*?

   6) Did you spend time on this project beyond what you were obliged to do? If yes, what did you do?

   7) In the past few weeks, were you able to spend enough *time* as needed on this project? (i.e., developing this new feedback process)?
(8) Did you recommend any specific features or changes for the new feedback process or system? If yes, what were the recommendations? (Functional Appropriateness)

(9) Are you enthusiastic about implementing this feedback process? Do you think this enthusiasm is shared by other staff (whom)? (Momentum)

(22) How confident are you about implementing the new feedback process if the project would move ahead and you would be involved? (Efficacy)

(11) Do you think that you will need some training in order to implement the new feedback process? (Training Needs)

(10) Do you think that you can influence the decision on whether or not the process should be implemented, and how it should be implemented? (Mutual Influence)

(12) How do you anticipate the cooperation among staff members, if the new feedback process is to be implemented? (Mutual Trust, Support, and Cooperation)

(In other words: Do you think everyone will get on board and chip in to make this implementation happen)

2. So far, you have told me about your own thoughts and opinions. Now, I would like to ask some questions about the factors pertaining to CPhA as an organization, which may concern its strategy, operation, and resources.

(13) Prior to this project, did you think a formal feedback management process may benefit CPhA acting as a health information provider? (Organizational Needs)

(new) Did it ever occur to you that a formal feedback management process will give CPhA some competitive advantage? (Competitive Advantage)

(14) Does CPhA have an adequate IT infrastructure to deploy the system for implementing the new feedback process? If not yet, do you think CPhA has the financial resource to acquire the required IT resource? (Resources)

(15) Not relevant to this informant.

(16.1) If the feedback management system would be implemented, would you be required to consult with higher managers about the judgements and decisions you would make for deploying the system? (Autonomy)

(17) If some issues arise during the deployment and future operation of the new system, how would they be managed? (Governance and Management)

(18) If implemented, will the new system affect your current workload? If yes, in what way? (Workload)

(19) If the system is implemented, do you think the IT department of CPhA has the ability to maintain the system and support its long-term operation? (Staff Support)
3. Finally, I have two **general questions**.

(20) In addition to what you have mentioned, do you think there was any other reason that may have led to or affected the development of this feedback management process particularly the support system?

(21) Based on your knowledge about CPhA, could you think of any other factor that may facilitate or inhibit the successful implementation of this new process and system, as well as its sustained operation in the long-term?

Before finish, do you have anything more to add?

**Conclusion**

I thank you very much, and I would ask you if you have any comment about our study or the interview.
**INTerview Guide (For Senior Director)**

A Study of User Feedback Management for Health Information Providers: The Case of the Canadian Pharmacists Association

**Introduction**

To begin, I would like to briefly explain the context of our interview. In the past few weeks, I worked with Carol, the editors and Dino on developing a process for managing the feedback from health information users. To support that process, a system was also developed—its prototype you saw on the May 16th meeting.

The purpose of this interview is to understand (a) some factors related to the development of this feedback management process as well as (b) the factors that may affect its feasibility in implementation.

Our interview will last about 1.5 hour. Before we start, do you have any questions?

I. First, I would like to ask some questions about your own opinion, as a senior director, about this project.

(1.1) Before this particular project, what did you think about the usefulness of feedback comments from health professionals?  

(1.2) Given your feeling about the usefulness of that feedback, did you think of the need for a formal and systematic process to be developed?

(2) Did it occur to you that there is a link between the need for a feedback management process and the mission or mandate of CPhA? If yes, could you explain?

(3) Did you feel any pressure from any subscriber, or from any external agency to improve CPhA’s practice of feedback management? If yes, could you explain?

(4) Do you think that a formal process would possibly benefit your own job as a senior director? If yes, could you explain?

(5) Did you encourage the development of a formal feedback process? If yes, did you consider it part of your job responsibility to do so?

(6) Did you spend any particular effort or resource to facilitate the development of this feedback process? If yes, what was the effort or resource?

(7) Not relevant to this informant.

(8) Did you recommend any specific function for the new feedback process? If yes, what were the functions?

(9) Are you enthusiastic about having this new process implemented at CPhA? Do you think this enthusiasm is shared by the staff? (whom?)

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**FIELD NOTES**

(Related factors)

1. **(Personal conception)**
   - (1.1) Before this particular project, what did you think about the usefulness of feedback comments from health professionals?

2. **(Awareness of Organizational Mission)**
   - (2) Did it occur to you that there is a link between the need for a feedback management process and the mission or mandate of CPhA? If yes, could you explain?

3. **(Pressure for Innovation)**
   - (3) Did you feel any pressure from any subscriber, or from any external agency to improve CPhA’s practice of feedback management? If yes, could you explain?

4. **(Personal Valence)**
   - (4) Do you think that a formal process would possibly benefit your own job as a senior director? If yes, could you explain?

5. **(Normative Commitment)**
   - (5) Did you encourage the development of a formal feedback process? If yes, did you consider it part of your job responsibility to do so?

6. **(Affective Commitment)**
   - (6) Did you spend any particular effort or resource to facilitate the development of this feedback process? If yes, what was the effort or resource?

7. **(Workload)**
   - (7) Not relevant to this informant.

8. **(Functional Appropriateness)**
   - (8) Did you recommend any specific function for the new feedback process? If yes, what were the functions?

9. **(Momentum)**
   - (9) Are you enthusiastic about having this new process implemented at CPhA? Do you think this enthusiasm is shared by the staff? (whom?)
(10.1) Have you tried to convince others that it’s a good idea to develop a systematic feedback management process? (Mutual Influence)

(10.2) Do you think that you can influence the staff or other managers with regard to whether or not the new process/system should be implemented, and how it should be implemented?

(10.3) To implement the new process, do you feel that you might want to convince some other CPhA staff?

(11.1) Have you stated your support for developing a formal feedback management process in CPhA? What was the response of the staff? (Manager Support)

(11.2) Would you commit to, and if yes how would you support its implementation in CPhA?

(12.1) How do you anticipate the cooperation among staff members, if the new feedback process is to be implemented? (Trust and Cooperation)

(12.2) Do you get the feeling that any dept. is not so committed to support the implementation of this new feedback management process?

2. So far, you have told me about your own thoughts and opinions. Now, I would like to ask some questions about the factors pertaining to CPhA as an organization, which may concern its strategy, operation, and resources.

(13) Prior to this project, did you think a formal feedback management process may benefit CPhA acting as a health information provider? (Organizational Needs)

(14.1) Prior to this project, did it ever occur to you that a formal feedback management process would give CPhA some competitive advantage? (Competitive Advantage)

(14.2) To your knowledge, has any of CPhA’s partner or competitor worked on a similar feedback process? If yes, was this one of the reasons for which CPhA wanted to improve how feedback had been handled?

(15.1) Prior to this project, was end-users’ feedback consulted to support decision-making in CPhA? (Decision-making Culture)

(15.2) Prior to this project, did you make an association between a feedback management process and decision-making at CPhA (e.g., in relation to the eT+ product)?

(16.1) Do you require your staff to consult with you about the functionality they wish to incorporate into the feedback process? (Autonomy)

(16.2) How would you value their judgements and decisions?
(17.1) Do you think the individual staff of each functional department can be counted on to perform the needed tasks if the feedback system is to be deployed and implemented? (Governance and Management)

(17.2) If some issues arise during the implementation of the new feedback process, how would they be managed? (Workload)

(18) If implemented, do you think the new feedback process will affect the workload of your staff? If yes, in what way? (Workload)

3. Finally, I have two general questions.

(19) In addition to what you have mentioned, is there any other reason that may have led to the development of this new feedback handling process? (Open-ended)

(20) Based on your knowledge about CPhA, could you think of any other factor that may facilitate or inhibit the successful implementation of this new process in CPhA, as well as its sustained operation in the long-term? (Open-ended, and potentially relevant to Organizational Resources)

Before finish, do you have anything more to add?

Conclusion
I thank you very much, and I would ask you if you have any comment about our study or the interview.
Appendix L
Development and validation of interview questions

This appendix explains (a) the development of the interview questions, and (b) steps taken for content validation of those questions. Both were based on Haynes, Richard and Kubany (1995) and Vogt, King and King (2004).

1. Interview Questions
In Table 1, items to be inquired about are grouped under four dimensions, namely (1) motivators to initiate the feedback process innovation, (2) factors involved in designing the functionality of the feedback process and supporting system, and (3) factors that may affect the implement-ability as well as (4) those potentially relevant to the sustainability of the feedback process. Around 170 items gathered from the literature (Section 4 of the Proposal) are reduced to 26 elements which can be managed within a 1-hour interview session. Table 2 details the rationale of deduction by grouping, combining, and dropping terms (keywords and phrases) from the original items. The link between the interview questions and the relevant factors are shown in the interview guides (Appendix K). Although subjective deduction would have resulted in some loss of details (i.e., specific items used for representing each factor), open-ended questions are designed to compensate the loss, hence a semi-structured interview instrument.

2. Content Validation
Content validation concerns the representativeness of interview questions. For this study, when potential factors in the above four dimensions are
adequately represented by elements covered by the interview questions, representativeness is considered to be attained.

Content validation on representativeness has been conducted in three steps. First, my supervisors reviewed the development of interview questions. Second, the conversion of items was critically reviewed by two other doctoral students in order to ensure targeted factors are adequately translated in the adaptation process. Third, the wording of questions has been reviewed by a native English speaker with a PhD in Education in Curriculum and Literacy Studies and a researcher at the Information Technology Primary Care Research Group, McGill. Fourth, open-ended questions were incorporated in the interview guide to allow participants to suggest factors not thought about in designing the interview instrument.

For future research, that is after the feedback process has been implemented, I may interview the participants to collect empirical evidence for confirming factors identified by anticipation in this study. The actual circumstance and performance of factors in play may lead to some interview questions being amended and/or some others being added.


<table>
<thead>
<tr>
<th>Purpose</th>
<th>Dimension</th>
<th>Factor (level)</th>
<th>Elements to Inquire about (Interview Question #)</th>
</tr>
</thead>
</table>
| To confirm Factors involved in developing the feedback process         | Motivation      | Commitment (individual)      | The staff has spent effort and resources on developing the feedback management process. (Question 6 for editors)  
The staff was obliged to participate. (Question 5.1 for editors)  
It was the staff’s job responsibility to participate in developing the feedback process (would have felt guilty not to have participated). (Question 5 for editors) |
| Personal Valence (individual)                                          |                 |                              | Prior to the development of a new feedback management process, the staff thought that a new process would benefit her job performance.  
(Question 4 for editors)                                                                                                                                                                      |
| Personal Conception (individual)                                       |                 |                              | The staff has thought that a formal feedback management process is useful for producing medical information products.  
(Question 1 for editors)                                                                                                                                                                      |
| Pressure for Innovation (individual)                                   |                 |                              | The staff felt there was pressure from the information user, from other staff or managers, or from an external funding agency to improve the way user feedback has been processed.  
(Question 3 for editors)                                                                                                                                                                      |
| Awareness of Organization Mission (individual)                        |                 |                              | Prior to the development of a new feedback management process, the staff thought that a systematic process for managing user feedback was required to facilitate the mission of CPhA (associated organizational mission with the need for a feedback management process).  
(Question 2 for editors)                                                                                                                                                                         |
| Fact-based decision-making (organization)                             |                 |                              | User feedback has always been considered by CPhA staff as evidence to support decision-making in creating eT+ guidelines.  
(Question 15.1 for editors)                                                                                                                                                                     |
| Competitive Advantage (organization)                                  |                 |                              | There may be a competitive advantage to pursue a formal feedback management process.  
The fact that any competitor or partner has worked on a similar feedback process was one of the reasons for which the organization wanted to improve its practice of user feedback management.  
(Question 14 for editors)                                                                                                                                                                         |
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<tr>
<th>Purpose</th>
<th>Dimension</th>
<th>Factor (level)</th>
<th>Elements to Inquire about (Interview Question #)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To confirm Factors involved in developing the feedback process</td>
<td>Motivation</td>
<td>Organizational Needs (organization)</td>
<td>CPhA’s need for a formal feedback management process. More specifically, the benefits for the information provider. (Question 13 for editors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functional Appropriateness (individual)</td>
<td>The functions that are recommended for the feedback process. (Question 8 for editors)</td>
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<td></td>
<td></td>
<td>Workload (individual)</td>
<td>The staff was able to spend enough time on developing the feedback process. (Question 7 for editors)</td>
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<td></td>
<td></td>
<td>Fact-based decision-making (organization)</td>
<td>Any specific system feature requested for facilitating decision-making in editing process of e-Therapeutics+. (Question 15.2 for editors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Autonomy (organization)</td>
<td>Staff members are always required to consult with higher managers regarding their own judgments and decisions. (Question 16 for editors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication (organization)</td>
<td>The communication process has effectively contributed to the development of a new feedback management process. The way in which discussion between staff members can help with implementing the feedback process. (Question 21 for editors)</td>
</tr>
<tr>
<td>To explore factors that may affect the implementation of the feedback process</td>
<td>Deployment</td>
<td>Efficacy (individual)</td>
<td>The staff is confident about his/her capacity to carry out any specific task related to implementing the new feedback process. (Question 22, relevant to editorial and IT staff)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager Support (individual)</td>
<td>Senior managers provide support to implement the feedback process. (Question 11 for senior director)</td>
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<td></td>
<td></td>
<td>Momentum (individual)</td>
<td>Staff’s energy and enthusiasm about implementing the feedback process. (Question 9 for editors)</td>
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<tr>
<td></td>
<td></td>
<td>Personal Conception (individual)</td>
<td>Perceived adequacy of necessary conditions that are related to the implementation of the feedback process. (Question relevant to Dino, based on his proposal comments)</td>
</tr>
<tr>
<td>Purpose</td>
<td>Dimension</td>
<td>Factor (level)</td>
<td>Elements to Inquire about (Interview Question #)</td>
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</tr>
<tr>
<td>To explore factors that may affect the implementation of the feedback process</td>
<td>Deployment</td>
<td>Training Needs (individual)</td>
<td>The training that is needed to successfully implement the new feedback process. (Question 11 for editors)</td>
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<td></td>
<td></td>
<td>Mutual Influence (individual)</td>
<td>The staff member’s ability to influence others with regard to whether or not, or how the feedback process should be implemented. (Question 10 for editors)</td>
</tr>
<tr>
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<td></td>
<td>Trust and Cooperation (individual)</td>
<td>Mutual trust and cooperation among staff members will play a role in implementing the feedback process. (Question 12 for editors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitude to Innovation (individual)</td>
<td>The staff's attitude to innovation, and whether, and if yes how, that attitude contributes to implementing the feedback process. (To be determined by analyzing the overall interview conversation.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resources (organization)</td>
<td>The IT infrastructure for deploying a support system for implementing the new feedback process. Or, the financial resource to acquire the required IT resource. (Question 20 for editors, Question 14 for IT person)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Governance and Management (organization)</td>
<td>The accountability of individual staff of each functional department for performing specific tasks needed to implement the feedback process. The ability to manage any issues arising from implementing a new feedback process in the organization. (Question 17 for editors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Autonomy (organization)</td>
<td>Higher managers respect and value staff members’ judgment about and their interest in implementing the feedback process. (Question 16 for editors)</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Workload (individual)</td>
<td></td>
<td>The new feedback process may change staff’s current workload. (Question 18 for editors)</td>
</tr>
<tr>
<td></td>
<td>Staff Support (organization)</td>
<td></td>
<td>The ability to maintain a computer system that is necessary in support of the long-term operation of the feedback process. (Question 21 for IT person)</td>
</tr>
<tr>
<td></td>
<td>Resources, financial and facilities (organization)</td>
<td></td>
<td>The financial, facility or equipment resources that CPhA would need for sustained operation of the feedback process. (Question 20 for editors)</td>
</tr>
</tbody>
</table>
Table L-2.

_Deduction of Factor Items_

**INDIVIDUAL-LEVEL FACTORS**

<table>
<thead>
<tr>
<th>Factor Items (<strong>bold</strong> terms are adapted for interview design)</th>
<th>Rationale of Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affective commitment</strong></td>
<td>Retain as Commitment</td>
</tr>
<tr>
<td>(1) It is necessary to introduce new mechanisms for processing feedback comments.</td>
<td></td>
</tr>
<tr>
<td>(2) New feedback mechanisms will serve an important purpose.</td>
<td>Relevant as Motivators</td>
</tr>
<tr>
<td>(3) It is a good decision to <strong>spend time, effort, and resources</strong> on building new feedback mechanisms.</td>
<td></td>
</tr>
<tr>
<td>(4) This project will contribute to the strategy of this organization.</td>
<td></td>
</tr>
<tr>
<td>(5) To promote the value of this project to others inside the organization.</td>
<td></td>
</tr>
<tr>
<td><strong>Normative commitment</strong></td>
<td>Retain as Commitment</td>
</tr>
<tr>
<td>(1) It is part of my <strong>job responsibility</strong> to participate in this project.</td>
<td></td>
</tr>
<tr>
<td>(2) It would be not right to oppose this project.</td>
<td>Relevant as Motivators</td>
</tr>
<tr>
<td>(3) It would make me feel guilty to oppose this project even I do not agree with the idea of this project.</td>
<td></td>
</tr>
<tr>
<td>(4) It is irresponsible to not participate in this project.</td>
<td></td>
</tr>
<tr>
<td>(5) I am obliged to support and participate in this project.</td>
<td></td>
</tr>
<tr>
<td><strong>Continuance commitment</strong></td>
<td>Passive Commitment,</td>
</tr>
<tr>
<td>(1) The organization left you with no choice but to go alone with this project.</td>
<td>To merge with Pressure for Innovation</td>
</tr>
<tr>
<td>(2) There is pressure from the organization to take part in this project.</td>
<td></td>
</tr>
<tr>
<td>(3) I have too much at stake to not participate in this project.</td>
<td></td>
</tr>
<tr>
<td>(4) It would be costly to not participate in this project.</td>
<td></td>
</tr>
<tr>
<td>(5) It is unwise or risky to speak out against this project.</td>
<td></td>
</tr>
</tbody>
</table>
Factor Items **(bold terms are adapted for interview design)**

<table>
<thead>
<tr>
<th>Rationale of Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self efficacy related to the innovation</strong></td>
</tr>
<tr>
<td>(1) There is an anticipation of problems adjusting to the work I will have when the new feedback mechanisms are implemented.</td>
</tr>
<tr>
<td>(2) I do (or do not) have the <strong>capability</strong> in performing some of the tasks related to the new feedback procedure.</td>
</tr>
<tr>
<td>(3) I do (or do not) have the capability in using the new feedback system with ease.</td>
</tr>
<tr>
<td>(4) I do (or do not) possess the skills for making this project successful.</td>
</tr>
<tr>
<td>(5) I do (or do not) have the learning ability in adapting to the new feedback mechanisms.</td>
</tr>
<tr>
<td>(6) My past experiences do (or do not) make me feel confident that I will be able to cope well with the new feedback mechanisms once implemented.</td>
</tr>
<tr>
<td>(7) I do (or do not) have the skills needed to process feedback comments.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>General work efficacy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) I am (or am not) effective and <strong>confident</strong> in doing my job.</td>
</tr>
<tr>
<td>(2) I do (or do not) usually accomplish whatever I set my mind on.</td>
</tr>
<tr>
<td>(3) I do (or do not) have the skills needed to do editorial work on medical information.</td>
</tr>
<tr>
<td>(4) I do (or do not) always plan ahead and carry out my plans.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Appropriateness</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The <strong>organization will</strong> (or will not) <strong>benefit</strong> from this feedback management process.</td>
</tr>
<tr>
<td>(2) This project will (or will not) improve the organization’s overall efficiency.</td>
</tr>
<tr>
<td>(3) This project will (or will not) make my job easier.</td>
</tr>
<tr>
<td>(4) In the long run, this project will (or will not) be worthwhile.</td>
</tr>
<tr>
<td>(5) There is (or is not) something to gain when the new feedback mechanisms are implemented.</td>
</tr>
<tr>
<td>(6) Time spent on this project should have been spent on something else.</td>
</tr>
<tr>
<td>(7) This project does (or does not) match the priorities of our organization.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Management support</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Senior management has <strong>stressed the importance</strong> of this feedback process innovation</td>
</tr>
<tr>
<td>(2) Senior management has stated their <strong>support for</strong> the new feedback process</td>
</tr>
<tr>
<td>(3) Senior management has <strong>encouraged</strong> us to embrace this project</td>
</tr>
<tr>
<td>(4) Senior management is committed to this project</td>
</tr>
<tr>
<td>(5) Senior management does not want new feedback mechanisms to be implemented</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Retain as Efficacy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retain as Functional Appropriateness</strong></td>
</tr>
<tr>
<td><strong>Merge with Commitment (by manager) and Organizational needs</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Merge with Efficacy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item (3) to merge with Persona Valence</strong></td>
</tr>
<tr>
<td><strong>Item (7) to merge with Need of the Organization</strong></td>
</tr>
<tr>
<td>Factor Items (<strong>bold</strong> terms are adapted for interview design)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Personal valence</strong></td>
</tr>
<tr>
<td>(1) This job limits or <strong>benefits my future performance in this job</strong></td>
</tr>
<tr>
<td>(2) This project will affect my status in the organization</td>
</tr>
<tr>
<td>(3) This project will affect some of the personal relationships I have developed</td>
</tr>
<tr>
<td><strong>Changed-related momentum</strong></td>
</tr>
<tr>
<td>(1) This project represents a very new and different direction which is more than just to continue or extend what is currently being done.</td>
</tr>
<tr>
<td>(2) In the organization, I felt <strong>there is much energy and enthusiasm</strong> about this new process.</td>
</tr>
<tr>
<td>(3) Some significant events have drawn or shifted away my attention from this new process.</td>
</tr>
<tr>
<td>(4) As the project was unfolding, I had the feeling that we were or were not moving well towards the implementation goal.</td>
</tr>
<tr>
<td><strong>Personal awareness of the innovation</strong></td>
</tr>
<tr>
<td>(1) There are <strong>opportunities and threats</strong> associated to implementing the new feedback process.</td>
</tr>
<tr>
<td>(2) There is a meaningful theoretical model behind the new feedback mechanisms</td>
</tr>
<tr>
<td>(3) Use of feedback comments <strong>can impact the way medical information is generated</strong></td>
</tr>
<tr>
<td>(4) There is a <strong>competitive disadvantage</strong> if the organization fails to pursue new feedback mechanisms.</td>
</tr>
<tr>
<td><strong>Personal training needs</strong></td>
</tr>
<tr>
<td>(1) I do (or do not) need training on basic computer skills/programs.</td>
</tr>
<tr>
<td>(2) I do (or do not) need training on specialized computer applications (e.g., feedback system).</td>
</tr>
<tr>
<td>(3) I do (or do not) need training on new methods/developments in my area of responsibility.</td>
</tr>
<tr>
<td>(4) I do (or do not) need training on using new procedures being established (or implemented)</td>
</tr>
<tr>
<td><strong>Pressure for change/innovation</strong></td>
</tr>
<tr>
<td>(1) There is <strong>pressure from the user</strong> of our information products to apply improved or new feedback mechanisms.</td>
</tr>
<tr>
<td>(2) There is pressure <strong>from other staff</strong> members to apply improved or new feedback mechanisms.</td>
</tr>
<tr>
<td>(3) There is pressure <strong>from higher managers</strong> to apply improved or new feedback mechanisms.</td>
</tr>
<tr>
<td>(4) There is pressure from the healthcare community to apply improved or new feedback mechanisms.</td>
</tr>
<tr>
<td>(5) There is pressure <strong>from funding agencies</strong> to apply improved or new feedback mechanisms.</td>
</tr>
<tr>
<td>(6) There is pressure from accreditation or licensing authorities to apply improved or new feedback mechanisms.</td>
</tr>
</tbody>
</table>
Factor Items (**bold** terms are adapted for interview design) | Rationale of Deduction
---|---
**Growth**
(1) I am (or am not) satisfied with the present job.
(2) This project does (or does not) encourage and support **professional growth**.
(3) It is (or is not) a priority to keep up-to-date my knowledge and skills in editing medical information.
(4) I do (or do not) give high value to the work I do.
(5) I am (or am not) good at regularly updating and improving my work-related skills.
(6) I am (or am not) proud to tell others where I work.
(7) I would like to find a job somewhere else.
| **Merge with Personal valence**

**Influence**
(1) Other staff members do (or do not) ask me about dealing with feedback comments.
(2) I am (or am not) considered a good source of advice about user inputs.
(3) I do (or do not) feel appreciated for the job I do at work.
(4) I do (or do not) regularly influence the decisions of other staff I work with.
(5) Other staff members do (or do not) **ask for my opinions** about editorial issues.
(6) I do (or do not) frequently share knowledge and work ideas with others.
(7) I am (or am not) viewed as a leader by the staff I work with.
(8) I do (or do not) like the people I work with.
| **Retain as Mutual Influence**
| **Relevant to Implement-ability**

**Adaptability**
(1) Learning and using new procedures are (or are not) easy for me.
(2) I am (or am not) able to adapt quickly when I have to make changes.
(3) I am (or am not) willing to try new ideas even if some staff members are reluctant.
(4) I am (or am not) sometimes too cautious or slow to make changes.
| **Merge with Efficacy**

**Staff awareness of agency mission and clarity of goals**
(1) Some staff members seem confused about the goal of this project.
(2) My duties are (or are not) clearly related to the goals of this project.
(3) This project does (or does not) operate with clear goals and objectives.
(4) Staff members involved in this project do (or do not) understand how **project goals fit as part of the organizational system**.
(5) There is (or is not) a clear plan for the future of this project.
| **Retain as Awareness of Organization Mission**
| **Relevant as Motivators**
<table>
<thead>
<tr>
<th>Factor Items (<strong>bold</strong> terms are adapted for interview design)</th>
<th>Rationale of Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trust and cooperation</strong></td>
<td>Retain as Trust and Cooperation</td>
</tr>
<tr>
<td>(1) There is (or is not) a sense of team of staff members working on the project.</td>
<td>Relevant to Implementation</td>
</tr>
<tr>
<td>(2) Mutual <strong>trust and cooperation among staff members</strong> are (or are not) strong.</td>
<td></td>
</tr>
<tr>
<td>(3) Staff members on this project do (or do not) get along very well.</td>
<td></td>
</tr>
<tr>
<td>(4) Staff members on this project are (or are not) quick to help one another when needed.</td>
<td></td>
</tr>
<tr>
<td>(5) There is much friction among staff members I work with.</td>
<td></td>
</tr>
<tr>
<td>(6) Some staff members on the project do not do their fare share of work.</td>
<td></td>
</tr>
<tr>
<td>(7) Management does (or does not) fully trust our judgments in this project.</td>
<td></td>
</tr>
<tr>
<td><strong>Stress and work overload</strong></td>
<td>Retain as Workload</td>
</tr>
<tr>
<td>(1) My heavy workload reduces the effectiveness of participating in this initiative.</td>
<td></td>
</tr>
<tr>
<td>(2) I am under too many pressures to do my job effectively on an on-going basis.</td>
<td></td>
</tr>
<tr>
<td>(3) Staff members on this project do often show signs of high stress and strain.</td>
<td></td>
</tr>
<tr>
<td>(4) Staff frustration is common where I work.</td>
<td></td>
</tr>
<tr>
<td><strong>Attitude about the organization (in relation to the innovation)</strong></td>
<td>Retain as Attitude to Innovation</td>
</tr>
<tr>
<td>(1) The general attitude here is to improve things that are not perfect.</td>
<td>Relevant to Implement-ability</td>
</tr>
<tr>
<td>(2) The general attitude is to <strong>accept new and changing things</strong>.</td>
<td></td>
</tr>
<tr>
<td>(3) Failure are (or are not) tolerated in this organization.</td>
<td></td>
</tr>
</tbody>
</table>
**ORGANIZATION-LEVEL FACTORS**

<table>
<thead>
<tr>
<th>Factor Items (bold terms are adapted for interview design)</th>
<th>Rationale of Deduction</th>
</tr>
</thead>
</table>
| Governance
  (1) Roles, responsibilities and **accountability** are (or are not) clearly defined within the project initiative  
  (2) Individual’s accountability has (or has not) been developed based on responsibility  
  (3) Decision-making authority has (or has not) been clearly determined  
  (4) There has (or has not) been thorough analysis of changes to be caused in our organization as a result of this project  
  (5) There is (or is not) a systematic process for **managing issues arising** from implementing the new feedback process. | Retain as Governance and Management Relevant to Implement-ability Item (5) to merge with those of Management |
| Project Management Process
  (1) In this organization, there is (or is not) a process for dealing with (political) resistance that occurs during this project.  
  (2) In this organization, there is (or is not) a process for managing this project initiation.  
  (3) There is (or is not) systematic support from throughout the firm for the project.  
  (4) The various technical and interpersonal challenges that occur during this project can (or cannot) be effectively and satisfactorily resolved.  
  (5) | Merge with Governance and Management |
| Fact-based analytic decision-making culture
  (1) In this organization, people do (or do not) rely on facts, figures and charts in making decisions.  
  (2) There is (or is no) openness in sharing information throughout the organization for decision-making.  
  (3) This organization does (or does not) encourage and reward **fact-based decision-making**.  
  (4) In this organization, it is (or is not) common to require information, for the purpose of decision-making, in customized formats and in varying levels of detail.  
  (5) In this organization, people do (or do not) always use information that is current for decision-making. | Convert to a specific organizational need: Fact-based decision-making Relevant as Motivators and Function Design (This factor may drive the need for tools and organizational processes and shape their functionalities.) |
| Project awareness (organizational-level)
  (1) Our organization is aware that our **partners** have (if any) similar project  
  (2) Our organization is aware that our **competitors have worked on similar project.** | Retain as Competitive Advantage Relevant as Motivators |
<table>
<thead>
<tr>
<th>Factor Items (<strong>bold</strong> terms are adapted for interview design)</th>
<th>Rationale of Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational needs</strong></td>
<td>Retain as Organizational Needs Relevant as Motivators</td>
</tr>
<tr>
<td>(1) The organization does (or does not) need guidance in defining its mission.</td>
<td></td>
</tr>
<tr>
<td>(2) The organization does (or does not) need guidance in <strong>setting specific objectives and means for improving medical information resources</strong>.</td>
<td></td>
</tr>
<tr>
<td>(3) The organization does (or does not) need guidance in assigning or clarifying staff roles in the project and in general</td>
<td></td>
</tr>
<tr>
<td>(4) The organization does (or does not) need guidance in establishing accurate job descriptions for staff.</td>
<td></td>
</tr>
<tr>
<td>(5) The organization does (or does not) need guidance in evaluating staff performance.</td>
<td></td>
</tr>
<tr>
<td>(6) The organization does (or does not) need guidance in improving relations among staff.</td>
<td></td>
</tr>
<tr>
<td>(7) The organization does (or does not) need guidance in improving communications among staff.</td>
<td></td>
</tr>
<tr>
<td>(8) The organization does (or does not) need guidance in <strong>improving feedback record keeping with information systems</strong>.</td>
<td></td>
</tr>
<tr>
<td>(9) The organization does (or does not) need guidance in improving billing/financial/accounting procedures.</td>
<td></td>
</tr>
<tr>
<td><strong>Staff training needs (project-related)</strong></td>
<td>Merge with Training Needs</td>
</tr>
<tr>
<td>(1) The staff in this organization does (or does not) need training on interpreting medical information users’ feedback comments.</td>
<td></td>
</tr>
<tr>
<td>(2) The staff in this organization does (or does not) need training on using feedback comments to guide editorial work.</td>
<td></td>
</tr>
<tr>
<td>(3) The staff in this organization does (or does not) need training on matching medical information users’ needs with our products.</td>
<td></td>
</tr>
<tr>
<td>(4) The staff in this organization does (or does not) need training on using feedback comments to track potential problems with the information resource.</td>
<td></td>
</tr>
<tr>
<td>(5) The staff in this organization does (or does not) need training on thinking for the user and solving problems they encounter in using the information resource/product.</td>
<td></td>
</tr>
<tr>
<td><strong>Training resources</strong></td>
<td>Merge with Training Needs</td>
</tr>
<tr>
<td>(1) Staff training is (or is not) a priority in the organization.</td>
<td></td>
</tr>
<tr>
<td>(2) Job-related training is (or is not) supported by the organization.</td>
<td></td>
</tr>
<tr>
<td>(3) The organization does (or does not) provide regular in-house training.</td>
<td></td>
</tr>
<tr>
<td>(4) There are frequent meetings with higher managers to discuss about users’ information needs and how to meet them.</td>
<td></td>
</tr>
<tr>
<td>(5) The organization does (or does not) provide budgetary support for staff to attend job-related training.</td>
<td></td>
</tr>
<tr>
<td><strong>Financial resources</strong></td>
<td>Retain as Resources Relevant to Implement-ability</td>
</tr>
<tr>
<td>(1) The organization does (or does not) have adequate <strong>financial resources</strong> to develop and maintain innovative feedback management systems.</td>
<td></td>
</tr>
<tr>
<td>Factor Items (<strong>bold</strong> terms are adapted for interview design)</td>
<td>Rationale of Deduction</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td><strong>Equipment and facilities</strong></td>
<td>Merge with Resources</td>
</tr>
<tr>
<td>(1) Facilities are (or are not) adequate for this project.</td>
<td>Adding relevance to Sustainability</td>
</tr>
<tr>
<td>(2) Computer problems are (or are not) usually repaired promptly.</td>
<td></td>
</tr>
<tr>
<td>(3) More computers are (or are not) needed for this project.</td>
<td></td>
</tr>
<tr>
<td>(4) Equipment available for this project is (or is not) old and outdated.</td>
<td></td>
</tr>
<tr>
<td>(5) Current feedback procedures are (or are not) computerized.</td>
<td></td>
</tr>
<tr>
<td>(6) Offices and equipment are (or are not) adequate for the need of this project.</td>
<td></td>
</tr>
<tr>
<td><strong>Staffing</strong></td>
<td>Merge with Governance and Management</td>
</tr>
<tr>
<td>(1) There is (or is not) a good project manager in this project setting.</td>
<td>Retain as Staff Support</td>
</tr>
<tr>
<td>(2) There is (or is not) a problem of frequent staff turnover in the organization that may affect this project.</td>
<td>Adding relevance to Sustainability</td>
</tr>
<tr>
<td>(3) Higher managers are (or are not) capable.</td>
<td></td>
</tr>
<tr>
<td>(4) Higher management does (or does not) give much time and attention when needed.</td>
<td></td>
</tr>
<tr>
<td>(5) Staff in the organization are (or are not) able to spend the time needed on dealing with issues from medical information users.</td>
<td></td>
</tr>
<tr>
<td>(6) Management decisions are (or are not) generally well planned.</td>
<td></td>
</tr>
<tr>
<td>(7) Support staff (e.g., IT personnel) in the organization does (or does not) have the skills they need to do their jobs.</td>
<td></td>
</tr>
<tr>
<td>(8) The organization is (or is not) short-staffed.</td>
<td></td>
</tr>
<tr>
<td>(9) The editorial staff are (or are not) well trained.</td>
<td></td>
</tr>
<tr>
<td>(10) <strong>A larger support staff is (or is not) required</strong> to help meet the needs of implementing the new process.</td>
<td></td>
</tr>
<tr>
<td>(11) Staff members in the organization are (or are not) comfortable using computers.</td>
<td></td>
</tr>
<tr>
<td>(12) Staff members are (or are not) ignored in most decisions made in the organization.</td>
<td></td>
</tr>
<tr>
<td><strong>Internet and technology use</strong></td>
<td>Merge with Resources</td>
</tr>
<tr>
<td>(1) There is (or is not) convenient access to e-mail at work.</td>
<td></td>
</tr>
<tr>
<td>(2) We do (or do not) have high bandwidth connectivity to the Internet.</td>
<td></td>
</tr>
<tr>
<td>(3) There is (or is not) easy access for using the Internet at work.</td>
<td></td>
</tr>
<tr>
<td>(4) Policies do (or do not) limit use of the Internet for work-related needs.</td>
<td></td>
</tr>
<tr>
<td>(5) We do (or do not) have sufficient experience with computer-based systems.</td>
<td></td>
</tr>
<tr>
<td>(6) Our organization is (or is not) well equipped with computer networks.</td>
<td></td>
</tr>
<tr>
<td>(7) Our computer systems are flexible and customizable to our specialized needs.</td>
<td></td>
</tr>
<tr>
<td>(8) We do (or do not) have adequate in-house IT capability.</td>
<td></td>
</tr>
<tr>
<td>Factor Items (bold terms are adapted for interview design)</td>
<td>Rationale of Deduction</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Alignment of technological architecture</strong></td>
<td>Merge with Resources</td>
</tr>
<tr>
<td>(1) There is (or is not) a robust IT infrastructure (e.g., hardware, telecom, networks, operating systems, databases, etc.) within the organization.</td>
<td></td>
</tr>
<tr>
<td>(2) There are (or are not) IT systems within the organization that can make use of or benefit from this project.</td>
<td></td>
</tr>
<tr>
<td>(3) Our organization does (or does not) collect feedbacks as readily useable electronic data.</td>
<td></td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td>Retained as Autonomy</td>
</tr>
<tr>
<td>(1) Higher management does (or does not) tend to <strong>override</strong> us on our decisions made in the project.</td>
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<tr>
<td>(2) We do (or do not) have <strong>authority</strong> in treating and responding to any specific feedback comments.</td>
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<tr>
<td>(3) Novel ideas about making use of feedback comments are (or are not) discouraged in this organization.</td>
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<tr>
<td>(4) It is (or is not) easy to <strong>change procedures</strong> of feedback processing to meet new conditions arising from within the organization or from external users.</td>
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<tr>
<td>(5) Staff members on this project can (or cannot) <strong>try out</strong> different ways of feedback processing to improve effectiveness.</td>
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<tr>
<td>(6) Staff members are given <strong>too many rules</strong> to participate in this project.</td>
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<tr>
<td><strong>Communication</strong></td>
<td>Dropped. (Added back – see Editor’s interview guide)</td>
</tr>
<tr>
<td>(1) Good ideas are (or are not) frequently and adequately communicated for improving the medical information we generate.</td>
<td>Reason: according to its definition in Section 4.2, this factor is relevant only when an information network is needed to keep staff informed and to facilitate the their relationship with leadership, which is not the case in this study where the participants are leaders themselves.</td>
</tr>
<tr>
<td>(2) More open discussions about feedback management issues are needed in this organization.</td>
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<tr>
<td>(3) Ideas and suggestions for feedback management do (or do not) get fair consideration by senior management.</td>
<td></td>
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<tr>
<td>(4) Staff members on the project are (or are not) always kept well informed.</td>
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<tr>
<td>(5) The formal and informal communication channels in this project do (or do not) work very well.</td>
<td></td>
</tr>
<tr>
<td>(6) Staff members on the project do (or do not) always feel free to ask questions and express concerns.</td>
<td></td>
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</tbody>
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