

RESEARCH

An Online Knowledge Resource and Questionnaires as a Continuing Pharmacy Education Tool to Document Reflective Learning

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Objective. To assess the use of an electronic knowledge resource to document continuing education activities and reveal educational needs of practicing pharmacists.

Methods. Over a 38-week period, 67 e-mails were sent to 6,500 Canadian Pharmacists Association (CPhA) members. Each e-mail contained a link to an e-Therapeutics+ *Highlight*, a factual excerpt of selected content from an online drug and therapeutic knowledge resource. Participants were then prompted to complete a pop-up questionnaire.

Results. Members completed 4,140 questionnaires. Participants attributed the information they learned in the *Highlights* to practice improvements (50.4%), learning (57.0%), and motivation to learn more (57.4%).

Conclusions. Reading *Highlight* excerpts and completing Web-based questionnaires is an effective method of continuing education that could be easily documented and tracked, making it an effective tool for use with e-portfolios.

Keywords: continuing pharmacy education; electronic knowledge resource; e-portfolio; information assessment method; reflective learning

INTRODUCTION

Electronic knowledge resources are increasingly available to pharmacists. Providing useful excerpts of information via e-mail may promote learning and have direct application for improving patient care. Reflective activities such as concurrently completing online questionnaires about the usefulness of the information also may be beneficial. Linking such questionnaires to an electronic knowledge resource can automatically document pharmacists' brief, reflective e-learning activities, which then could be compiled into a personal e-portfolio (electronic portfolio) or summarized and ranked for use in identifying the educational needs of different groups of pharmacists.

Portfolios are widely used by healthcare professionals as a tool to document continuing education (CE) activities, support individual reflective practice, provide feedback on educational activities, and deliver summative assessment.^{1,2} In pharmacy, over the last decade, licensing bodies in Canada and internationally have moved from requiring pharmacists to maintain continuing education logbooks (lists of learning activities attended) to requiring them to maintain a written portfolio that includes personal reflection on learning activities.²⁻⁵ Portfolio use among pharmacists is generally thought to foster positive, self-directed continuing education activities. For example, 2 studies examining the value of written reflective-learning portfolios by pharmacists enrolled in supplementary prescribing courses in the United Kingdom found that the process encouraged self-awareness and self-reflection.^{6,7} Similarly, pharmacists participating in a Canadian survey reported that maintaining a learning portfolio could be valuable to their professional practice but were not sure how the process might encourage reflection about learning.⁸ This attitude is not

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surprising considering that many traditional learning portfolios may simply list recently attended continuing education events.

In the last 10 years, portfolio development and maintenance has migrated to the electronic format. The extent and scope of portfolio use continues to evolve as portfolios are integrated with electronic learning platforms that enable rapid analysis of data and provide supportive learning.¹ E-portfolios are similar to traditional portfolios in that personalized information can be stored in a unique location (eg, a computer versus a binder common for traditional printed portfolios). However, e-portfolios offer several advantages in that content is easily customizable, compact, accessible via the Internet, and may include videos, digital images, audio files, documents, presentation slides, and embedded hypertext links to Web sites of interest, allowing the e-portfolio to be more interactive than a traditional portfolio.⁹ E-portfolios can be private and accessible by a single user, or shared with broad audiences including educators, employers, administrators, and/or accrediting agencies.⁹ In academia, e-portfolios are emerging as standard curricular components for health professions students in many undergraduate, graduate, and postgraduate programs, including pharmacy.¹⁰⁻¹⁵

The objective of this study was to explore the feasibility of using a Web-based assessment of information derived from an electronic drug and therapeutic knowledge resource to systematically document continuing education activities and reveal educational needs among practicing pharmacists, with the potential for this information to be captured as part of an e-portfolio for pharmacy professional development. e-Therapeutics+ is an online electronic knowledge resource intended to provide Canadian health care practitioners with evidence-based, reliable drug and therapeutic information. e-Therapeutics+ combines information from 2 Canadian Pharmacists Association publications, *Therapeutic Choices* and *Compendium of Pharmaceuticals and Specialties*, with external references and resources. Although predominantly used by pharmacists and physicians (mainly family physicians and physician residents), this resource is also used by pharmacy students and other health care professionals. *Highlights* are excerpts from eTherapeutics+ content that have been summarized for quick reading. Users click on a link embedded in an e-mail notification to read a *Highlight* online and access the questionnaire.

The objective/purpose of this study was to answer the following questions: (1) Will busy pharmacists use the questionnaire to document their reflective learning from the *Highlights*? (2) How does use of *Highlights* and completion

of questionnaires reveal and address the educational needs of pharmacists and pharmacy students?

METHODS

Ethical approval for this study was obtained from the McGill Institutional Review Board. CPhA member recipients who self-identified as a hospital pharmacist, community pharmacist (including family health team pharmacists), or pharmacy student on the questionnaire were included in this study. The latter category comprised undergraduate students, pharmacy residents, pharmacy interns, and international pharmacy graduates enrolled in a training program in Canada at the time of the study.

From August 19, 2008, to May 12, 2009, 67 *Highlights* were e-mailed (approximately twice weekly) to over 6,500 CPhA members. Each e-mail provided members with a link to access the *Highlights* text. The featured text was highlighted in green within the related chapter of e-Therapeutics+ and was followed by a button labeled "Useful Info?" Clicking on the button opened a questionnaire that was developed using the Information Assessment Method (IAM).¹⁶ The questionnaire assessed the relevance (one "yes-no" item), cognitive impact (11 items), use (4 items), and expected health benefits (5 items) of the *Highlights* information retrieved. For all but the first item, the questionnaire allowed the user to provide multiple responses. For example, after reading a *Highlight*, a respondent could check "I learned something new" with respect to information such as pharmacologic choices, and also check "This information confirmed I did (am doing) the right thing" with respect to dosage information. As an incentive, respondents were entered into a contest to win a portable digital music player.

All readers' responses were automatically documented and completed questionnaires were submitted electronically to the CPhA for analysis. The practice site of participants was collected, but other demographic information and unique identifiers were not.

IAM questionnaire responses were analyzed using descriptive statistics (SPSS, v. 16, SPSS Inc., Chicago, IL). A yes response to the cognitive impact item "I am motivated to learn more" was interpreted as the participant having an educational need revealed by the *Highlight*, while a yes response to the cognitive impact items "My practice is (will be) changed and improved" and "I learned something new" were interpreted as the participant having an educational need addressed by the *Highlight*.

RESULTS

Of 27,824 *Highlights* opened by CPhA members, questionnaires were submitted 4,140 times (14.9% response rate; average of 61.8 responses per *Highlight*).

Questionnaire responses are presented in Table 1. Of the 4,140 questionnaires completed, the majority (2,775) were submitted by community pharmacists, while hospital pharmacists submitted 675 and pharmacy students submitted 690.

Of 4,140 completed questionnaires, 2,086 (50.4%) respondents reported practice improvement as a result of reading the *Highlights* excerpt, 2,359 (57%) reported learning from the *Highlight*, and 2,378 (57.4%) reported having motivation to learn more as a result of reading the *Highlight*. Approximately three fourths (75.7%) of respondents reported that *Highlights* were relevant in the treatment of a patient, two thirds (62.4%) reported that *Highlights* were used in a clinical context, and half (52.5%) reported expected health benefits from *Highlights* information. Information from *Highlights* that respondents rated as most helpful and motivating are listed in Table 2.

DISCUSSION

By asking pharmacists in this study to answer questions about clinical information and its impact on their

practice, they were encouraged to reflect on their learning needs and how they felt about them. This type of reflection is important in the maintenance of lifelong learning and could add a new dimension to learning portfolios, rather than limiting them to a list of continuing education events attended.

In a similar approach to continuing education, Canadian physicians use IAM questionnaires to rate daily InfoPOEMs (tailored synopses of research-based clinical information) as well as *Highlights*, both of which are delivered as e-mail. These physicians earn continuing education credits for this brief individual reflective e-learning activity.^{17,18} Because the maintenance of competency is a significant issue for pharmacists, pharmacy educators, regulators, and managers are stressing the importance of maintaining a portfolio as an integral component of professional practice.¹⁹

In this study, unique identifiers were not used so individualized reports could not be produced nor could significant comparisons be made among different respondent groups. The introduction of a unique identifier would have allowed automatic population of a linked

Table 1. Responses to a Questionnaire Self-Administered After Reading a *Highlight* Excerpt (N = 4,140)^a

Questionnaire Item	“Yes” Responses, No. (%)
What is the impact of this <i>Highlight</i> on you or your practice?	n/a
My practice is (will be) changed and improved?	2086 (50.4)
I learned something new?	2359 (57.0)
I am motivated to learn more?	2378 (57.4)
This information confirmed I did (am doing) the right thing?	2476 (59.8)
I am reassured?	2810 (67.9)
I am reminded of something I already knew?	1988 (48.0)
I am dissatisfied?	90 (2.2)
There is a problem with this information?	93 (2.2)
I disagree with the content of this information?	77 (1.9)
This information is potentially harmful?	35 (0.8)
This <i>Highlight</i> has no impact at all on my practice?	535 (12.9)
Is this <i>Highlight</i> relevant for at least one of your patients?	n/a
Totally or partially relevant?	3133 (75.7)
Not relevant?	1007 (24.3)
Will you apply this <i>Highlight</i> to at least one patient?	2584 (62.4)
To better understand a particular issue related to this patient?	181 (43.7)
To justify or maintain the management of this patient?	2135 (51.6)
To modify the management of this patient?	1787 (43.2)
To persuade other health professionals or patients to make changes?	1824 (44.1)
Do you expect any health benefits from applying this <i>Highlight</i> to a particular patient?	2175 (52.5)
Increasing patient knowledge about health or healthcare?	1841 (44.5)
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention?	1748 (42.2)
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention?	1772 (42.8)
Preventing disease or health deterioration (including acute episode of chronic disease)?	1666 (40.2)
Improving patient health or functioning or resilience (ie, how well the patient faces difficulties)?	1652 (39.9)

^a Hospital pharmacists, n = 675; community pharmacists, n = 2775; and pharmacy students, n = 690.

Table 2. *Highlights* Topics That Most Frequently Revealed or Addressed Educational Needs^a

Question and Topics	Yes Responses, No. (%)
“I am motivated to learn more.”	
After reading the following <i>Highlights</i> topic:	
Venous Thromboembolism: Warfarin-herbal combinations to avoid	105 (4.4)
Restless Legs Syndrome: Look for iron deficiency as possible cause	101 (4.3)
Anxiety Disorders: Drugs of choice in panic disorder	76 (3.2)
Gastroesophageal Reflux Disease: Proton pump inhibitors first choice for GERD	69 (2.9)
Drug Withdrawal Syndromes: Psychosis following crystal meth withdrawal	57 (2.4)
“I learned something new.”	
After reading the following <i>Highlights</i> topic:	
Restless Legs Syndrome: Look for iron deficiency as possible cause	107 (4.5)
Acne: Benzoyl peroxide 5% gel as effective as 10%	70 (3.0)
Drug Withdrawal Syndromes: Psychosis following crystal meth withdrawal	66 (2.8)
Muscle Cramps: Trial of quinine reasonable for nocturnal leg cramps	65 (2.8)
Eating Disorders: Zinc promotes weight gain in anorexia nervosa	64 (2.7)
“My practice is (will be) changed and improved.”	
After reading the following <i>Highlights</i> topic:	
Restless Legs Syndrome: Look for iron deficiency as possible cause	101 (4.8)
Venous Thromboembolism: Warfarin-herbal combinations to avoid	79 (3.8)
Muscle Cramps: Trial of quinine reasonable for nocturnal leg cramps	66 (3.2)
Gastroesophageal Reflux Disease: Proton pump inhibitors first choice for GERD	63 (3.0)
Acne: Benzoyl peroxide 5% gel as effective as 10%	58 (2.8)

^a Only the 5 topics receiving the most yes responses for each question are listed. Of 4,140 completed questionnaires spanning 67 *Highlight* excerpt topics, 2,378 (57.4%) reported having motivation to learn more as a result of reading a *Highlight*; 2,359 (57%) reported learning from a *Highlight*; and 2,086 (50.4%) respondents reported practice improvement as a result of reading a *Highlight*.

e-portfolio, as well as more detailed statistical analyses of the 3 groups. Our data also have limitations in terms of outcomes associated with the *Highlights*. The relevance, cognitive impact, information use, and expected benefits were self-reported by participants. As a subjective evaluation of continuing education outcomes (documentation of reflective learning), the questionnaire data may overestimate expected benefits, because clinicians often overestimate their professional competence.²⁰ More research is needed that examines objectively documented outcomes associated with *Highlights*.

This study used the IAM questionnaire to rate e-Therapeutics+ *Highlights*. Linking to other electronic resources (eg, e-mail alerts, databases, other electronic products, and computerized decision support systems) and documenting use over a longer time with a larger population would improve the generalizability of the ranked list of learning needs for educators to consider for different groups of pharmacists.

The implications of the findings from this study are twofold. First, for pharmacy licensing organizations, information providers, and educators, compiled information could identify needs for continuing education programs, as well as specific target audiences. Collated population-level responses portrayed in a ranked format

will assist this process. Second, for individual pharmacists, a Web-based assessment method could be used for systematically documenting reflective learning activities as part of a personal continuing education e-portfolio (for example, when education credits or learning portfolios are required for ongoing maintenance of licensure). Ranked data can also be presented individually allowing pharmacists to view summaries of how clinical information impacted their own knowledge and patient outcomes, as well as to identify their personal learning needs and priorities for their continuing education activities.

We searched the literature for studies on e-portfolio use in continuing pharmacy education, and found that our exploratory study is unique. Many pharmacists initially perceive the maintenance of a written learning portfolio to be onerous, time-consuming, and not a particularly meaningful or productive activity. They may not actually perceive a portfolio to be a serious or important tool for practice; many pharmacists have not made a connection between self-reflection, documentation, and practice improvement.⁸ One possible reason for this finding is that many traditional learning portfolios merely list recently attended continuing education events, rather than facilitating reflection. In this regard, IAM questionnaires

encourages reflection on the recent learning event (eg, reading the *Highlights* excerpt) by asking about the activity's impact on patient outcomes and motivation to learn more (ie, completing the IAM questionnaire guides reflection whereas simply keeping a list does not).

In a study by Swallow and colleagues, pharmacist respondents identified 3 main concerns regarding continuous professional development (CPD): (1) a high workload demand and insufficient support staff were obstacles for pursuing CPD opportunities; (2) the changing role of pharmacists in healthcare over the last decade has increased their training needs; and (3) increased access to electronic information resources and computers could facilitate maintenance of an ongoing record of CPD activities.²¹ All 3 points favor adoption of an e-portfolio for documenting CE activities. Additionally, e-portfolios may be more effective for providing feedback and encouraging reflection than paper portfolios. Users tend to spend more time with e-portfolios vs. traditional portfolios, and e-portfolios have benefits over paper-based portfolios such as ease of access and content, portability of data, and the potential to electronically link to external content.¹ E-portfolio content can easily be shared among colleagues, employers, faculty members, administrators, and regulatory bodies. Furthermore, while creating or editing their e-portfolios, users have the opportunity to develop or broaden various computer skills.⁹ This supports the e-portfolio as a dynamic and powerful learning and documentation tool.

Data from the questionnaires that were automatically incorporated into an individual e-portfolio could facilitate and verify pharmacists' claims for continuing education units. With that goal in mind, in March 2012, the CPhA implemented a new continuing education program for pharmacists, based on the creation of individual e-portfolios. *Highlights* are e-mailed weekly to CPhA members, inviting them to participate in the program. Using IAM, program participants rate *Highlights* and the corresponding chapter of *e-Therapeutics+*. For each rated *Highlight*, participants receive 0.25 continuing education units. Participants have online access to their e-portfolio, and e-portfolios include rated *Highlights* and IAM ratings. This program has been accredited by the Canadian Council on Continuing Education in Pharmacy.

In the future, mixed-methods research is planned using IAM questionnaire data in accordance with the participants' clinical context. Specifically, we plan to follow-up with practitioners in situations where expected patient health benefits were associated with the use of information from *Highlights*. This will facilitate correlation between *Highlights* information and various levels of outcomes of information seeking.

CONCLUSION

This exploratory study suggests new ways for documenting educational needs and outcomes related to electronic knowledge resources in a lifelong learning context. Responses from a larger sample of pharmacists could reveal educational needs that could shape continuing education programs. Furthermore, IAM questionnaire responses linked to a specific electronic knowledge resource could be compiled into a pharmacist's personal or reflective e-portfolio as proof of continuing professional development activities when such a portfolio is required for continuing licensure.

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