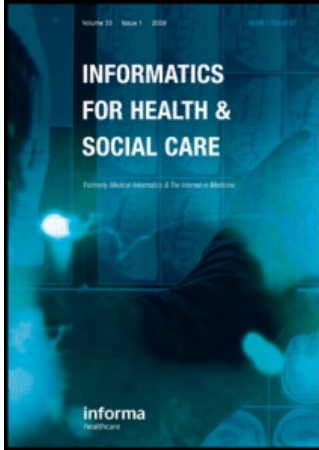


This article was downloaded by:[University of Newcastle upon Tyne]  
On: 10 April 2008  
Access Details: [subscription number 773564496]  
Publisher: Informa Healthcare  
Informa Ltd Registered in England and Wales Registered Number: 1072954  
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Informatics for Health and Social Care

Publication details, including instructions for authors and subscription information:  
<http://www.informaworld.com/smpp/title~content=t713736879>

An online interprofessional learning resource for physicians, pharmacists, nurse practitioners, and nurses in long-term care: Benefits, barriers, and lessons learned

Colla J. Macdonald <sup>a</sup>, Emma J. Stodel <sup>b</sup>, Larry W. Chambers <sup>c</sup>

<sup>a</sup> University of Ottawa,

<sup>b</sup> Learning 4 Excellence,

<sup>c</sup> Élisabeth Bruyère Research Institute, an SCO Health Service and University of Ottawa Partnership, Ottawa, Canada

Online Publication Date: 01 March 2008

To cite this Article: Macdonald, Colla J., Stodel, Emma J. and Chambers, Larry W. (2008) 'An online interprofessional learning resource for physicians, pharmacists, nurse practitioners, and nurses in long-term care: Benefits, barriers, and lessons learned', *Informatics for Health and Social Care*, 33:1, 21 - 38

To link to this article: DOI: 10.1080/14639230801886824

URL: <http://dx.doi.org/10.1080/14639230801886824>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article maybe used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## **An online interprofessional learning resource for physicians, pharmacists, nurse practitioners, and nurses in long-term care: Benefits, barriers, and lessons learned**

COLLA J. MACDONALD<sup>1</sup>, EMMA J. STODEL<sup>2</sup> & LARRY W. CHAMBERS<sup>3</sup>

<sup>1</sup>*University of Ottawa, <sup>2</sup>Learning 4 Excellence and <sup>3</sup>Élisabeth Bruyère Research Institute, an SCO Health Service and University of Ottawa Partnership, Ottawa, Canada*

### **Abstract**

The importance of collaborative practice in health care has been emphasized.[1,2] There is a critical need for convenient and flexible education opportunities that support the development of collaborative practice skills among the health care workforce. Consequently, the purpose of this project was to create and evaluate an online learning resource for physicians, nurses, nurse practitioners, and pharmacists working in long-term care that provided practitioners with the skills, knowledge, and motivation necessary to enhance their ability to act as an interprofessional team while providing clinical care. The Demand-Driven Learning Model [3] was used to guide the project. Findings revealed learners enjoyed the programme and acquired new skills and knowledge relating to collaborative practice that they transferred to their workplace resulting in higher levels of collaborative practice. The data did not reveal significant changes in the learners' attitudes towards collaborative practice; perhaps because the participants were early adopters and already had positive attitudes. Requests to change organizational structure to enhance collaborative practice were minimal, as was the impact of the resource on resident care. Given the short time frame from completion of the learning resource to the evaluation, this is perhaps not surprising as it is reasonable to expect that these types of changes will take time to take effect within the organization. Follow-ups at a later date are suggested.

**Keywords:** *Interprofessional learning resource, physicians, pharmacists, nurse practitioners, nurses, long-term care, eLearning*

### **1. Introduction**

The importance of teamwork in health care is well documented [1,2,4]. Some feel that teamwork is a prerequisite for enhanced communication among health care professionals and caregivers, improved case management, and efficient patient care [5–7]. Others go so far as to suggest that interprofessional health care teams working well together will be able to improve the quality of health care and provide cost savings [8].

Moving towards a collaborative model of healthcare service delivery requires that healthcare providers are trained in this way. Getting professionals to learn together to work together is

---

Correspondence: Colla MacDonald, Faculty of Education, University of Ottawa, 145 Jean Jacques Lussiers, Ottawa, Ontario, K1N 6N5, Canada. Tel: +1-613-562-5800 (ext. 4110). Fax: +1-613-562-5146. E-mail: cjmacdon@uottawa.ca

often challenging due to increased workloads, shift work, assorted professional backgrounds, and differing levels of educational aptitude, literacy, experience, and seniority [9]. New approaches to education and training are needed both by healthcare providers struggling to be efficient and effective in their present jobs and by employers who want to offer the best service to patients by having highly qualified staff but who have limited resources to support the time away from work required by many traditional face-to-face training programmes. The tension between improving employee skills and maintaining talented staff has led employers in many industries to endorse, fund, design, or deliver alternative training programmes. One option that is rapidly gaining support is eLearning.

eLearning involves the use of technologies to deliver learning solutions that enhance knowledge and skills via the Internet. eLearning affords the high levels of interactivity, flexibility, information access, and communication needed for busy adults to learn [10,11]. eLearning holds special appeal for busy adults working in understaffed organizations, such as long-term care (LTC) homes, who want to advance their learning and/or credentials without prolonged interruptions in their work [12]. eLearning initiatives could prove to be an appropriate and useful method to deliver accessible and convenient education designed to enhance collaborative practice that fits within the constraints of the health care setting. Indeed, eLearning has been shown to be a successful medium to facilitate learning for healthcare providers in LTC homes [13,14].

A number of researchers have stressed the need for quality standards to ensure and protect the academic integrity of eLearning [15–18]. In 2001, in response to the call for quality standards and sound pedagogical models for eLearning, MacDonald, Stodel, Farres, Breithaupt, and Gabriel published the Demand-Driven Learning Model (DDL) as a quality standard to guide the design, development, delivery, and evaluation of eLearning. The DDL is grounded within a constructivist framework and defined by five inter-related dimensions (structure, content, delivery, service, and outcomes) that, in concert, create a high-quality eLearning experience. An evaluation tool that aligns with the model was also developed to assess the quality of eLearning against this standard [19,20]. These products have been used to guide eLearning initiatives across Canada and the United States, including an online dementia care programme for caregivers in LTC.

The purpose of this project was to develop and evaluate an online learning resource designed to enhance collaborative practice among healthcare teams of family physicians, nurses, nurse practitioners, and pharmacists who work in LTC. This paper presents the findings of the DDL-based evaluation.

## 2. Methods

### 2.1. Research questions

The following research questions guided the evaluation of the learning resource:

1. Did the learners have a positive reaction to the learning experience?
2. Did the learners acquire new knowledge and skills regarding collaborative practice?
3. Was there a change in the learners' attitudes towards the value and use of team approaches to care?
4.
  - a. Was learning transferred to the workplace?
  - b. Did this result in an increase in interprofessional collaboration?
5. Was there organizational change regarding how care is delivered?
6. Did the residents' well-being improve?

## 2.2. Context and participants

Seventeen not-for-profit/charitable ( $n=10$ ), for profit ( $n=5$ ), and municipal ( $n=2$ ) LTC homes across Ontario, Canada, participated in this project. The evaluation involved 59 professionals from three- or four-member teams comprising pharmacists, physicians, nurses, and/or nurse practitioners who worked in these homes. These participants had been healthcare practitioners for between 1 and 38 years (mean = 18.90 years, SD = 9.83). The demographic information of the learners is presented in Table I. Fifty-one (86.4%) learners completed the learning and its evaluation within the project timelines, and it is their data that are presented in this paper. The healthcare practitioners selected to participate were considered 'early adopters' of both interprofessional collaboration and eLearning. Many participants had already identified a need for such a resource. These four professions were chosen because these professionals have the most 'explicit' or formal knowledge base in LTC;

Table I. Demographic information of the learners.

	Frequency	Per cent
Sex		
Male	24	40.7
Female	35	59.3
Occupation		
Pharmacist	17	28.8
Family physician	15	25.4
Registered nurse	14	23.7
Nurse practitioner	6	10.2
Director of care	2	3.4
Gerontological nurse specialist	1	1.7
Clinical nurse specialist	1	1.7
Advanced practice nurse	1	1.7
Registered practical nurse	1	1.7
Internist	1	1.7
Age		
25–34	10	16.9
35–44	20	33.9
45–54	20	33.9
55–64	7	11.9
65+	2	3.4
Mother tongue		
French	7	11.9
English	48	81.4
Other	4	6.8
Language at work		
French	3	5.1
English	47	79.7
Community		
Urban	41	69.5
Rural	18	30.5
Type of facility		
For profit	31	52.5
Not for profit/charitable	20	33.9
Municipal	8	13.6
Had previous eLearning experience	19	32.2

their professions are represented in virtually all LTC homes; and they are often responsible for educating and empowering staff, residents, and families. Further, if the new learning resource was effective for this group, it would justify future work with other potentially less receptive groups.

2.3. Learning resource

The online learning resource was designed to provide primary health care professionals with the skills, knowledge, and motivation necessary to enhance their ability to act as a collaborative interprofessional team while providing clinical care to elderly people in primary, community, and/or LTC facilities. The learning resource comprises four sections that are split into a total of eight modules and is delivered totally online without the need for a facilitator (Figure 1). The four sections teach the learners to prepare for collaborative practice, share information, process information, and measure their collaborative practice. In each module learners are required to read text-based content (see Figure 2 for an example), complete online activities and worksheets (see Figure 3 for an example), listen to audio-clips, and view video-clips (see Figure 4 for an example). At the end of each section, they are asked to meet face-to-face with their team to complete a group assignment, which involves discussion and application of the material taught in the preceding modules.

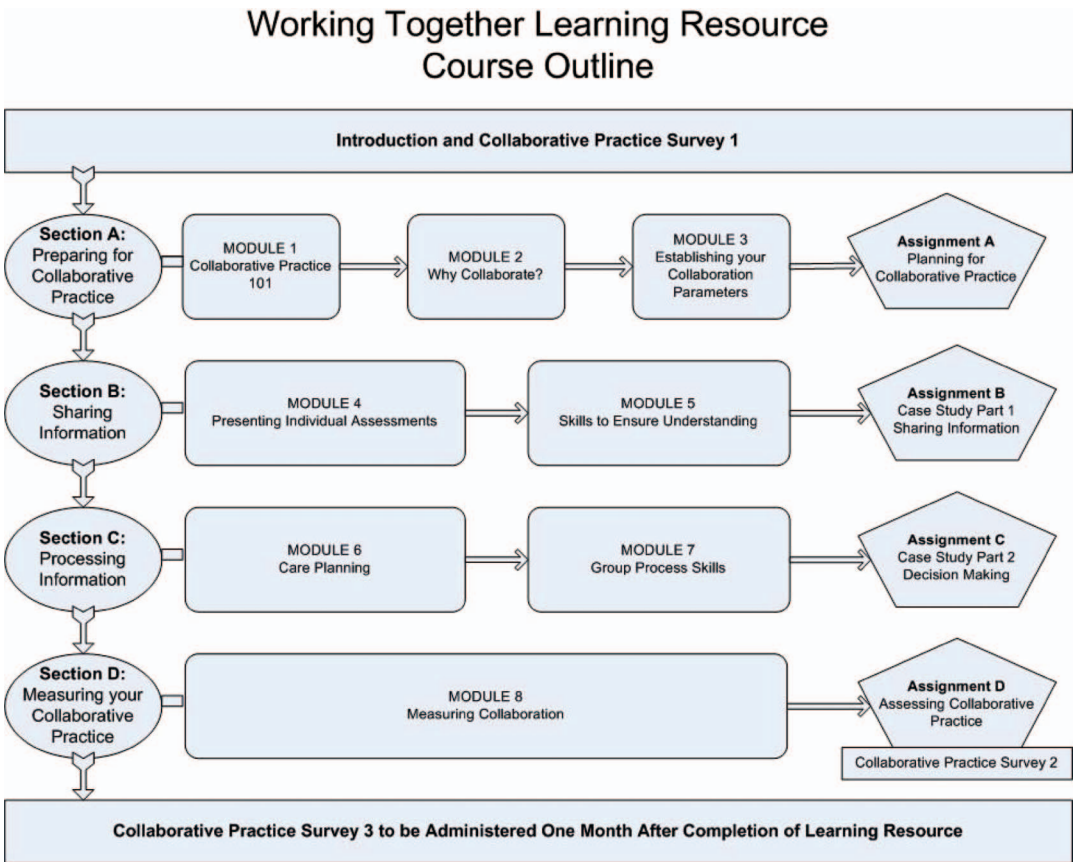


Figure 1. Course outline.

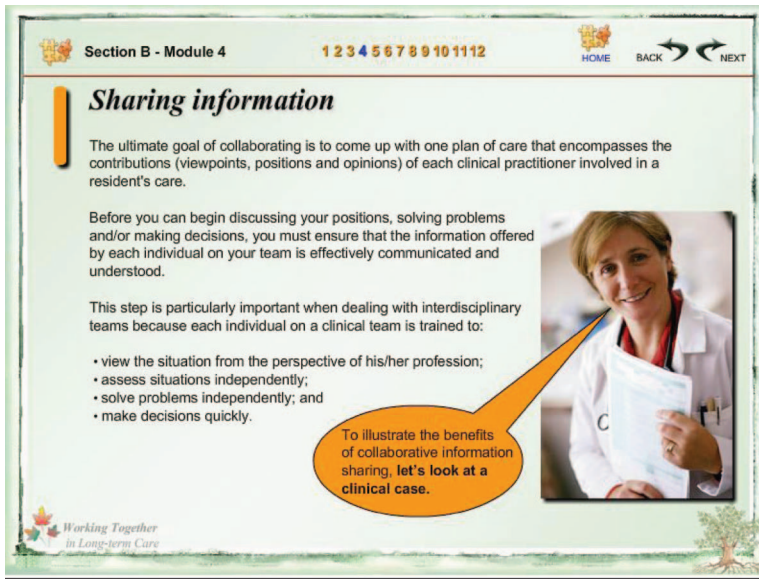


Figure 2. Screenshot of an example of text-based content.

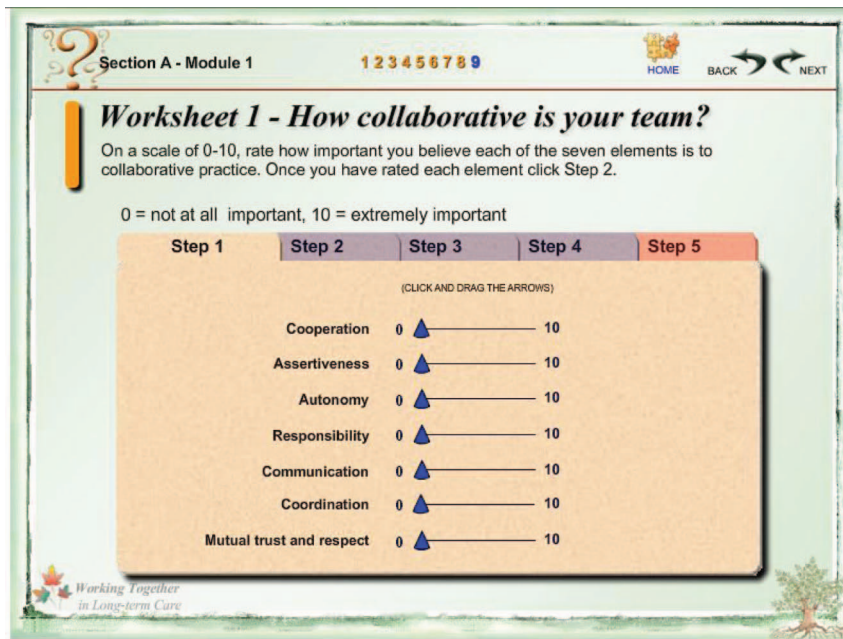


Figure 3. Screenshot of an example of an online activity.

### 2.4. Evaluation procedures

Data-collection tools were developed to facilitate the collection of qualitative and quantitative data that allowed the research questions to be answered.

2.4.1. *Surveys.* Learners completed three online surveys. (A copy of the surveys can be obtained from the lead author.) The surveys comprised existing survey tools (Table II). Survey 1 was administered as learners logged onto the resource for the first time, and surveys 2 and 3 were administered after the completion of all the learning activities. Survey 1 collected demographic information and assessed learners' collaborative practice knowledge, skills, behaviour, and attitudes. Survey 2 obtained feedback on the resource, assessed whether the

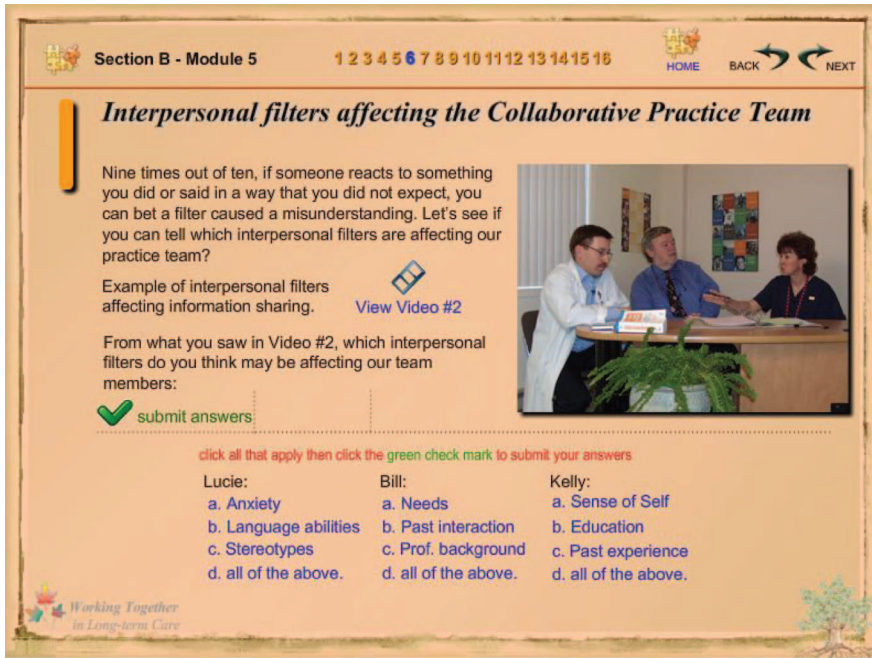


Figure 4. Screenshot of an example of a video-based activity.

Table II. Summary of evaluation surveys.

Survey	Content	Research questions answered
Survey 1 (Pre-learning)	<ul style="list-style-type: none"> <li>• Demographic Survey</li> <li>• Tool to assess knowledge of collaborative practice that aligned with the learning objectives</li> <li>• 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale [21]</li> <li>• Jones and Way's Collaborative Practice Survey [22]</li> </ul>	2, 3, and 4b
Survey 2 (Post-learning)	<ul style="list-style-type: none"> <li>• DDLM evaluation tool (adapted from MacDonald <i>et al.</i> [20])</li> <li>• Tool to assess knowledge of collaborative practice that aligned with the learning objectives</li> <li>• 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale [21]</li> </ul>	1, 2, and 3
Survey 3 (Post-learning)	<ul style="list-style-type: none"> <li>• Jones and Way's Collaborative Practice Survey [22]</li> <li>• DDLM evaluation tool (adapted from MacDonald <i>et al.</i> [20])</li> </ul>	4, 5, and 6

learning objectives had been met, and examined the learners' attitudes towards collaborative practice. Survey 3 assessed the learners' collaborative practice and the impact of the learning resource in terms of organizational change and resident well-being.

*2.4.2. Interviews.* Semi-structured focus-group interviews were conducted with eight teams of learners at the end of the project (Appendix 1). The interviews were designed to identify the strengths and outcomes of the learning resource and provide recommendations for how the resource could be improved. Teams were chosen based on their availability and willingness to participate in an interview and with consideration for the type of home in which they worked and degree of team functioning. In addition, semi-structured individual interviews were planned with one administrator from each of the eight LTC homes where a team of learners was interviewed in order to obtain the LTC home administrators' (e.g. Director of Care, Manager of Operations) perspectives on the learning resource (Appendix 2). The interviews were audio-taped and transcribed verbatim. Transcripts were returned to the participants for member checks.

### *2.5. Data analysis*

Qualitative data analysis involved searching the transcripts for information that answered the research questions. The constant comparative method was used to identify categories of data. Once the categories were created satisfactorily, the data were assigned to the categories. Categories were then linked and a report written to highlight the findings. Direct quotations were used throughout to preserve the voice of the participants. Quantitative data analysis involved calculating frequency and descriptive statistics for the learners' responses on the closed-answer survey items. In addition, repeated-measures t-tests and ANOVAs were used to determine whether the participants' scores relating to collaborative practice knowledge, attitudes, and behaviour changed over time and whether there were any differences between professions.

## **3. Findings**

The research questions and the DDLM guide the presentation of the findings.

### *3.1. Did the learners have a positive reaction to the learning experience?*

Data from the interviews and the DDLM survey revealed that, overall, the learners felt the learning resource was beneficial. However, the participants had some concerns regarding aspects of the resource and provided recommendations for how the learning resource could be improved. The findings in this section are presented within the DDLM constructs.

*3.1.1. Content.* The learners varied in their opinions of the content. For the majority of the questions in the DDLM tool that related to content, learners' responses spanned the full spectrum of possible response options, though on average the responses were positive (Table III).

The interview data regarding the content of the learning resource generally supported the survey data. Some felt the content was comprehensive and entertaining, and they gained new information from it. Others found the material too basic, but felt the resource served as a good review of what they already knew and confirmed their current practices. Generally, though, learners deemed the level of difficulty of the material appropriate.

A couple of learners interviewed did not feel that the content always reflected the reality of LTC. For example, they noted that because healthcare providers in LTC are so busy and team members often have different schedules (many pharmacists and physicians only came to the homes for half a day once a week, or less) they are not able to conduct face-to-face case conferences to discuss residents as depicted in the learning resource. One pharmacist explained it this way:

I think that the way collaborative practice was portrayed [in the learning resource] only happens in an ideal world; that you actually get to sit down at a table and discuss patients like that. It certainly doesn't happen in our world here. However, we are able to still practice collaborative practice in our own modified ways.

Further, the project was criticized by some participants as it did not include care providers. At least one person from each of the eight teams interviewed emphasized that care providers are a critical part of the health care team in LTC and that they should be included in this type of learning.

*3.1.2. Delivery.* Learners' opinions regarding the delivery of the resource were diverse, and the full spectrum of response options in the DDLM tool was used by the learners. On average, the responses were neutral leaning towards positive (Table IV).

Table III. Learners' responses to the content items in the DDLM evaluation tool ( $N=51$ ).

	Min*	Max	Mean	SD
The material in the learning resource was boring	1.00	5.00	2.35	.98
In this learning resource there was an appropriate amount of team activities	1.00	5.00	3.90	.92
There were enough offline activities in the learning resource	1.00	5.00	3.55	.78
The content included information that I will be able to use to deal with new situations at work	1.00	5.00	3.80	.83
The content included learning tasks that were similar to those I face at work	1.00	5.00	3.69	.93
The content included information that I need in my work	1.00	5.00	3.82	.97
The content included enough online resources	1.00	5.00	3.57	.92
The content was well organized	2.00	5.00	3.65	.74
The content used words I did not understand	1.00	4.00	1.65	.74
The content was too difficult	1.00	4.00	1.80	.66

\*Response options: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

Table IV. Learners' responses to the delivery items in the DDLM evaluation tool ( $N=51$ ).

	Min*	Max	Mean	SD
The material in the learning resource was organized so it was easy to find things	1.00	5.00	3.31	.93
The material in the learning resource was uncluttered	2.00	5.00	3.67	.77
It was easy to access a computer when I needed to	1.00	5.00	3.86	1.20
In this learning resource it was easy to "navigate" through the content	1.00	5.00	3.10	1.17
In this learning resource the buttons on the screens did what they were supposed to do (e.g. links to others pages)	1.00	5.00	3.37	1.23

\*Response options: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

The vast majority of learners interviewed reported that they did not have any problems with navigation; nor did they have trouble accessing the resource online. However, a few did face roadblocks accessing the resource, or aspects of it (e.g. audio, video), and these related to security settings, filters, pop-up blockers, firewalls, and the screen resolution on their computers. Several learners reported that they needed the technical support at their organization to download Flash Player (software necessary to view the resource) onto their computers as they did not have network permission to do so themselves. There were a couple of programming oversights that were a source of frustration for the learners. They included not being able to save their responses in activities if they wanted to go back in the resource to review something and not being able to print the content.

*3.1.3. Service.* Data from the DDLM evaluation tool revealed that learners tended to receive support from their organization while involved in this project (mean = 3.71, SD = 1.10; response options: 1 = strongly disagree, 5 = strongly agree). Most learners indicated that if they wanted to work on the learning resource during work, they were supported in doing so. However, most of the learners chose to complete the resource at home in their own time.

The learning experience was not facilitated. Interview data revealed that for the most part, learners did not have problems learning without an instructor or facilitator. In fact, many mentioned they preferred to work independently, and therefore this was a strength of the resource. The fact that the learners in this project volunteered to participate and were professionals with at least one university degree could explain why there was no need for a course facilitator.

When questioned regarding organizational barriers that may have impacted the learners' ability to participate in the resource, the main issue that emerged was time. Related to this, it was a huge challenge for many of the teams to get together to complete the team meetings. Scheduling of these meetings was complicated by the fact that not all of the team members worked at the homes full-time. One physician suggested that in order to reflect the reality of LTC, the learning resource should teach how to collaborate effectively when the team is not in the same room.

For the pharmacists, taking time to meet face-to-face is a particular challenge, as they are not financially compensated for providing patient care. Instead, their priority is to generate revenue through dispensing medications. A number of participants indicated the current situation is unsatisfactory and that a review of the current model of practice in Canada is necessary if collaborative practice is going to be supported in LTC homes.

*3.1.4. Structure.* Learners' opinions regarding the structure of the resource as assessed by the DDLM evaluation tool were once again diverse, and the full spectrum of response options was used by the learners. However, on average, the learners' responses were favourable (Table V). Learners liked the convenience that learning online provided. They appreciated being able to learn where and when they wanted and at their own pace, not having to go out to school in the evenings, nor having to arrange transportation to get there. Even the majority of learners who reported preferring face-to-face learning realized that due to their busy lives, the conflicting schedules of the team members, and not all the professionals being employed full-time on-site, the reality of face-to-face collaborative practice training is a challenging one.

A number of factors impacted the learners' motivation to engage in the programme. Positive motivators included wanting to improve resident care, wanting to learn, the novelty of learning on a computer, the expectation that it was going to be a fun experience, learning about computers, wanting to change LTC policy, and being paid. Conversely, technical

Table V. Learners' responses to the structure items in the DDLM evaluation tool ( $N=51$ ).

	Min*	Max	Mean	SD
In the learning resource I was replaced when I left my work duties to do this learning	1.00	5.00	1.94	1.01
In the learning resource there were opportunities for me to practice what I learned	1.00	5.00	3.69	.93
In the learning resource there were opportunities for self-evaluation	2.00	5.00	3.94	.70
In the learning resource the content and learning activities supported the learning objectives	2.00	5.00	3.86	.69
The learning resource kept my interest	1.00	5.00	3.59	1.04
The learning resource met my learning needs	1.00	5.00	3.49	1.01
The learning resource respected my current knowledge	1.00	5.00	3.49	1.01
The learning resource respected my experience	1.00	5.00	3.45	.99
Having this learning resource online made learning more convenient than learning face to face	1.00	5.00	3.76	1.21

\*Response options: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

glitches and the lack of time the learners had, especially for getting together for group meetings, negatively impacted the learners' motivation.

*3.1.5. Overall.* In order to explore differences in learners' responses on the DDLM survey, a composite score for the DDLM questionnaire was calculated for each learner by adding the learner's scores for each question together (NB: three items were reverse-coded). Repeated-measures *t*-tests and one-way ANOVAs were conducted to determine whether differences in learners' responses were due to differences in demographics. Analyses revealed that women rated the learning resource more favourably than men ( $t = -2.231$ ,  $p < 0.05$ ). Further, Scheffe's post-hoc tests revealed that learners who had a high-speed Internet connection on the computer they used most frequently rated the learning resource more positively than those that had no Internet connection on the computer they used most frequently ( $p < 0.05$ ). However, no significant differences were found between learners with dial-up and high-speed nor dial-up and no Internet ( $p > .05$ ). Neither age ( $F(4, 46) = 0.536$ ,  $p > .05$ ), profession ( $F(7, 43) = 0.913$ ,  $p > .05$ ), mother tongue ( $t = 2.063$ ,  $p > 0.05$ ), computer ability ( $F(4, 46) = 0.604$ ,  $p > .05$ ), attitude towards computers ( $F(4, 46) = 2.013$ ,  $p > .05$ ), prior eLearning experience ( $t = -0.615$ ,  $p > 0.05$ ), nor concerns about learning online revealed differences in learners' scores on the DDLM.

### *3.2. Did the learners acquire new knowledge and skills regarding collaborative practice?*

Several learners reported in the interviews that they acquired new and relevant knowledge and learned new skills. Learners developed a better understanding of collaborative practice and of the roles of practitioners from other professions. An added benefit for some of the learners was improving their computer skills. The survey data supported these findings and indicated that the learning objectives had been met. Repeated measures *t*-tests revealed learners were significantly ( $t$  values ranged from  $-2.22$  to  $-7.09$ ,  $p < .05$ ) more confident that they could do each of the skills that related to the learning objectives of the resource except for one: communicating their individual position on a clinical topic in a clear, concise, and relevant manner ( $t = -1.993$ ,  $p = 0.052$ ). The majority of the learners (86%) attributed the improvements in their knowledge and skills to the learning resource. For each of the

learners, a composite score that reflected their confidence in their collaborative practice skills and knowledge was calculated by adding together their scores from all of the questions relating to the learning objectives. Using these composite scores, one-way ANOVAs were conducted to determine whether there were any differences between the professions. No significant differences were found ( $p > .05$ ).

### 3.3. Was there a change in the learners' attitudes towards the value and use of team approaches to care?

The Attitudes Toward Health Care Teams Scale [21] was used to examine whether there were any changes in learners' attitudes towards the value and efficiency of teamwork after they had completed the learning resource. A composite score for the complete questionnaire was calculated for each learner by adding the learner's scores for each question together (NB: three items were reverse-coded). Repeated-measures  $t$ -tests were conducted to determine whether there was any significant change in learners' attitudes after they had completed the resource. No significant changes were found in either the composite score ( $t = -1.209$ ,  $p > .05$ ) nor in the learners' responses to each of the questions ( $t$  values ranged from 0 to  $-1.61$ ,  $p > .05$ ) except one: the team approach permits health professionals to meet the needs of family caregivers as well as residents ( $t = -0.219$ ,  $p < .05$ ). One-way ANOVAs were conducted using the composite score to determine whether there were any differences in learners' attitudes towards collaborative practice between professions. No significant differences were found between the professions either before ( $F(3, 43) = 2.58$ ,  $p > .05$ ) or after ( $F(3, 43) = 2.30$ ,  $p > .05$ ) participation in the learning resource.

Despite the fact that the quantitative survey data revealed no changes in the learners' attitudes, in the interviews at least one learner, a physician, provided an example of how he had changed his attitude towards collaborative practice:

I had a fear that this was going to be a matter of 'We, the team, are going to make decisions but I, [the doctor,] am going to be on the hook for any bad things that happen'. It was this whole sense of the doctor has to make the medical decisions. . . . So, I think this project, and working through it with these guys, relieved a lot of my anxiety about this whole approach. . . . So, personally, that's been a big change for me.

### 3.4. Was learning transferred to the workplace?

Responses on the DDLM evaluation tool revealed that 82% of the learners either agreed or strongly agreed that as a result of their participation in the learning resource they applied new skills in the workplace, 75% agreed or strongly agreed that they applied new knowledge in the workplace, and 69% agreed or strongly agreed that they had initiated new ideas and projects. The interview data provided further support that the learners had transferred knowledge to the workplace and shared what they had learned with other colleagues. One nurse stated: 'I've already tried some of the things, like [using] positive feedback and trying to get everybody on board with the team; because everybody contributes but if they don't feel recognized they stop [contributing]'.

Another reported that her participation in the learning resource had changed how she runs her weekly team conferences:

I usually have multi-team conferences every week and I've noticed improvement in my listening skills. I used to cut people off all the time. . . . I would let people just talk on and on

and sometimes I'd lose control and people would start talking about their own trip or something like that. I found I'm better at pulling people back in or I'll say, 'OK, we'll discuss this later' . . . I would not have noticed these things about myself until I had taken the course.

Several learners reported that they had improved their communication skills. One nurse reported: 'You might find yourself stopping and listening more and trying to say, "OK, now is this exactly what you said?"' A physician indicated that his team was now communicating differently with each other:

We kind of dreamed about this [but] we had no way of making [it] happen until this [project] came along. . . . We have this common bond [in] that [now] we've gone through this process we probably talk differently to each other, we work differently, . . .

### 3.5. *Did this result in an increase in interprofessional collaboration?*

When the learners were asked in the interviews if they felt that the learning resource resulted in an increase in interprofessional collaboration between team members, most learners indicated that they felt that team functioning had improved. Sometimes they noted this was due to an increased understanding of each others' roles, and other times it was a result of better communication among team members. A pharmacist explained how, as a result of using the resource with her team, she feels more comfortable communicating with the physician, which resulted in a more efficient and effective practice:

Before, my collaboration with the physician was primarily in the form of a written medication assessment and I was very tentative or reluctant to recommend some things. Whereas now [that the physician] and I have spoken, I am more willing to share knowledge and collaborate.

One nurse explained how having used the learning resource she now makes a conscious effort to communicate and collaborate with her staff:

I make sure that I include the RPNs who are in charge of each of my units . . . And a lot of times they have insight that I don't have because they're doing the bedside, they're doing the medication. I think to some degree I did it before but I'm more conscious of it now and it really improves the care.

The project also cultivated a sense of camaraderie among the individuals who took the learning resource and strengthened team cohesion. One nurse reported how her team was collaborating to develop more effective procedures in their workplace.

Data from Jones and Way's Collaborative Practice Survey [22] supported the learners' verbal reports that their collaborative practice had improved following participation in the learning resource. Repeated-measures *t*-tests were conducted to determine whether there were any significant changes in learners' collaborative practice. Following completion of the learning resource, learners were significantly (*t* values ranged from 3.92 to 6.40,  $p < .001$ ) more likely to engage in the different aspects of collaborative practice as assessed by each question in the survey than they were before they engaged in the learning resource.

For each of the learners, a composite score that reflected the overall degree of collaborative practice was calculated by adding together the nine scores from the questions in the

Collaborative Practice Survey. Using this score, one-way ANOVAs were conducted to determine whether there were differences in learners' collaborative practice between the professions. No significant differences were found between the professions either before ( $F(3, 43) = 2.69, p > .05$ ) or after ( $F(3, 43) = 2.09, p > .05$ ) participation in the learning resource.

### 3.6. Was there any organizational change regarding how care is delivered?

Almost half the learners (49%) either agreed or strongly agreed that they had requested that changes be made in their organization as a result of participating in the learning resource, 16% disagreed with the statement, and 35% were neutral. Several teams provided examples of how they had made small organizational changes in how care is delivered as a result of the learning resource. One pharmacist explained that his team had come up with a more efficient and effective approach for handling medication orders and questions to the pharmacist:

I'm not here on staff, and quite often I will get phone calls in the middle of a busy, hectic day with a complicated question from [the Advanced Practical Nurse] and she can't see what's happening in the pharmacy where all hell is breaking loose. . . . For me to be able to answer just off the top of my head, at times doesn't give the best care for the patient. So we've talked about faxes or e-mails or things like this so that they can send me all the information, I can look at it appropriately, find the time to assess it appropriately, and then respond.

Another team explained how the nurse and physician had collaborated to develop a treatment plan for wounds. The physician explained that writing down such procedures can improve the efficiency of care:

It's overwhelming sometimes communicating expectations with the floor nurses regarding wound care. So this was another way of saying let's try to simplify things: 'I'm sure that we can work together to simplify things and put down on paper, This is what I expect. This is what you expect. This is what you need to assess wounds well'.

### 3.7. Did the residents' well-being improve?

In the interviews, when the participants were asked if they had recognized any improvements in the residents' care as a result of their team's involvement in the project, the most common reply was that it was too early to tell. However, some indicated that they were sure that there would be with time. In the surveys, however, learners' responses were more positive. Seventy-three per cent agreed or strongly agreed that they felt they delivered a better service to the residents they care for as a result of participating in the learning resource. Further, in the interviews, learners provided concrete examples of how participating in the learning resource had impacted the residents' quality of care. Two examples will be shared here. The first example involved a young resident who had suffered a stroke. This individual was frightened, did not want to be among large groups of people, was unable to communicate effectively, and was experiencing severe pain. The resident's family wanted her to have higher doses of pain medication; however, this level of medication would likely make the resident too sleepy to eat and cause dietary complications. Obviously, this was a source of concern to the health care team. The team collaborated, shared different perspectives and opinions, and came up

with a safer and more effective solution for the resident. The physician involved explained the case:

[This individual] has really complicated pain issues, anxiety issues, communication issues, and nutritional issues that all feed into each other. And it was really great to see everybody coming at it with, 'This is the issue I have [in my] discipline'. Then hearing [other people tell me] what I'm doing isn't working. And then we were talking about adjusting pain medications and the dietician spoke up a[s she] was really worried.

One of the nurses involved went on to explain that rather than just listening to the resident's family's concerns and addressing them, as a team they were able to discuss the situation and then present a definite plan to the family in a professional manner. The Director of Care noticed an improvement in the resident after the team had collaborated and implemented their care plan:

The resident . . . happens to be two doors from my office. I'm hearing less crying, I'm hearing less stress, I'm getting less complaints from the family. I have the family saying they're thrilled with care now, whereas three weeks ago they were going to walk out the door and leave.

The second example related to a situation where the resident needed an unusual procedure. The physician wanted to give a resident an iron infusion, but he and the pharmacist knew that because this is an unusual procedure, they were likely to get resistance from the nurse. Due to their collaboration, they were able to unite and present their case to the nurse to show it would be in the best interest of the resident to conduct this procedure. The pharmacist and physician recounted the situation and explained how their collaboration allowed them to effectively deliver the procedure:

Dr Carson<sup>1</sup> wanted to start an iron infusion . . . so we're trying to figure out what's the best way to do it. I'm also a hospital pharmacist so I know what the guidelines are and the policies and procedures that were in place, so I was able to facilitate that a bit. (pharmacist)

It was very much a give and take kind of dialogue: 'What do you think about this? Is this safe, can we do that?' (physician)

And then [the nurse] is trying to schedule it, but she needs documentation and information from me on how to run it. . . . I authorise it. . . . I can do all that for her so that she's covered and supported. (pharmacist)

The physician explained how the trust and respect that their team has developed over the years has resulted in a better utilization of each healthcare professional's skills and abilities. He further suggested that the efforts they have made to collaborate as a team, stimulated by the learning resource, have resulted in more efficient practices and more effective patient care.

#### 4. Discussion

A number of benefits and barriers to using eLearning as a means of developing collaborative practice skills and knowledge emerged from this research. Overall, the learning resource was a success, and it became apparent that there is a demand for collaborative practice training in LTC; not only for physicians, nurses, nurse practitioners, and pharmacists, but also for other

healthcare providers. The learners in this project enjoyed the programme and acquired new skills and knowledge relating to collaborative practice that they transferred to their workplace and which resulted in higher levels of collaborative practice. Specifically, learners reported instances of improved communication and a better understanding of other professionals' roles. An oft cited barrier to collaboration in LTC is that, frequently, the pharmacist and physician are neither on staff nor on site at the LTC home. Therefore, to reflect the reality of LTC, teams need to learn how to collaborate when they are not face-to-face in the same room.

The results from this project demonstrated that the learning resource was successful in helping the learners achieve the learning objectives the resource was designed to meet. However, the data did not reveal any significant changes in the learners' attitudes towards collaborative practice and requests to change organizational structure to enhance collaborative practice were minimal, as was the impact of the resource on resident care. Given the short time frame from when the learners completed the learning resource to when the evaluation was conducted, this is perhaps not surprising. A follow-up 6 months later may reveal different results. Indeed, some teams could already provide concrete examples of how resident care had improved as a result of their participation. Also, due to the fact that the learners volunteered to participate in this project, it could be that these individuals already had a positive attitude towards collaborative practice leaving less room for change to occur.

Learners had mixed feelings about learning online, but the majority recognized and appreciated the flexibility and convenience it afforded them. These diverse views towards eLearning suggest that learning through this medium is still in its infancy in the healthcare field. However, many learners reported that eLearning is a great concept and something they need to get familiar with in order to keep up to date. Moreover, online communication technologies may be a viable way to collaborate when it is not possible for team members to meet face-to-face and therefore help deal with the reality of working as a team in LTC. Furthermore, this resource negated the need for an instructor or facilitator. Learners were able to learn independently whenever they chose without the need for any learning support.

## 5. Lessons learned

As a result of this project, a number of lessons were learned and recommendations proposed regarding the development of eLearning for this and similar populations.

### 5.1. Introductory information for learners

- As soon as learners go to access the learning resource, they should be provided with introductory information on how to use the resource and the facility to test their computer settings to ensure they will be able to view and use the learning resource as intended. Learners can be directed to the relevant webpage to download the most recent version of Flash Player as soon as they go to access the resource if they do not have it on the computer they are using. Further, by building audio and video into Flash, there is no need for the user to download additional media players. Learners should be required to open the different file types included in the resource to ensure they have any relevant software (e.g. Acrobat Reader) before they engage in the learning. The introductory message should include audio with a text-based message telling learners they should hear audio and provide troubleshooting tips if they cannot. There should also be an activity to ensure learners have the correct screen resolution and are able to view the whole screen.

- Learners should be provided with step-by-step instructions highlighting how security settings can be changed on their computer, popup blockers turned off, firewalls disabled, etc. The use of screen-recording software (e.g. CamStudio, Adobe Captivate) will provide novice computer users a visual demonstration of the steps.

### 5.2. Programming

- Learners must be able to save their work in the online assignments so if they leave that screen, their work is not lost.
- Computer-mediated communication tools should be included so learners can communicate with each other online. In this way, the resource is providing alternative solutions for communication when it is not possible for the learners to meet face to face.

### 5.3. Organization and Navigation

- Learners should be informed how long each module is expected to take at the beginning of each module, and the modules should be consistent in length.
- Learners must be able to easily print the text-based content included in the learning resource. The content should be made available in pdf files in a printer-friendly format.

### 5.4. Content

- Learning resources designed to improve collaborative practice should be developed for the whole team, not just a subset of the team as was done in this project.
- Content must reflect the reality of the workplace, in this case LTC homes. For example, as well as modelling face-to-face case conferences, model strategies for collaborating when it is not possible for the team members to be in the same physical location.
- Include activities where learners are required to apply what they have learned to a real case from their workplace.
- Use a theme or an acronym throughout the resource to facilitate learning and the recall of information learned.
- Include clinical content to motivate healthcare professionals to use the learning resource.

## Acknowledgements

This project was funded with a grant from the Ontario Ministry of Health and Long Term Care.

## Note

1. A pseudonym has been used to maintain the anonymity of the participant.

## References

1. Health Canada. Interprofessional education for collaborative, patient-centred practice. Available from: <http://www.hc-sc.gc.ca/english/hhr/interprofessional/index.html>. (accessed 3 November 2004). Ottawa: Health Canada; 2004.

2. Health Council of Canada. Health care renewal in Canada: Clearing the road to quality. Available from: [http://www.healthcouncilcanada.ca/en/index.php?option=com\\_content&task=view&id=70&Itemid=72](http://www.healthcouncilcanada.ca/en/index.php?option=com_content&task=view&id=70&Itemid=72) (accessed 3 November 2006). Toronto: Health Council of Canada; 2006.
3. MacDonald CJ, Stodel EJ, Farres LG, Breithaupt K, Gabriel MA. The demand-driven learning model: a framework for web-based learning. *Internet and Higher Education*. 2001;1:9–30.
4. Poulton B, West MA. The determinants of effectiveness in primary health care teams. *Journal of Interprofessional Care* 1999;13:7–13.
5. Atwal A, Caldwell K. Do multidisciplinary integrated care pathways improve interprofessional collaboration? *Scandinavian Journal of Caring Sciences* 2002;16:360–367.
6. McNair R, Brown R, Stone N, Slims J. Rural interprofessional education: Promoting teamwork in primary care education and practice. *Australian Journal of Rural Health* 2001;9(1 Suppl):S19–S26.
7. Sierchio GP. A multidisciplinary approach for improving outcomes. *Journal of Infusion Nursing* 2003;26:34–43.
8. Headrick L, Wilcock M, Batalden B. Interprofessional working and continuing medical education. *British Medical Journal* 1998;316:771–774.
9. Hall N, Harvey P, Meerabeau L, Muggleston D. An evaluation of online training in the NHS workplace, A report submitted to the LTSN Centre for Health Sciences and Practice. London: LTSN Centre for Health Sciences and Practice; 2004.
10. Rossett A, editor. *The ASTD eLearning handbook: Best practices, strategies, and case studies for an emerging field*. New York: McGraw-Hill; 2002.
11. Mann BL. Perspectives in web course management. Toronto: Canadian Scholar's Press; 2000.
12. MacDonald CJ, Gabriel MA. Toward a partnership model for web-based learning. *Internet and Higher Education* 1998;1:203–216.
13. MacDonald CJ, Stodel EJ, Casimiro L. Online dementia care training for health care teams in continuing and long-term care homes: A viable solution for improving quality of care and quality of life for residents. *International Journal on E-learning* 2006;5:373–399.
14. Skorga P. Interdisciplinary and distance education in Delta: The Delta Health Education Partnership. *Journal of Interprofessional Care* 2002;16:149–157.
15. Carstens RW, Worsfold VL. Epilogue: A cautionary note about online classrooms. In: Weiss RE, Knowlton DS, Speck BW, editors. *Principles of effective teaching in the online classroom*, San Francisco: Jossey-Bass; 2000. pp 83–87.
16. DeBard R, Guidera S. Adapting asynchronous communication to meet the seven principles of effective teaching. *Journal of Educational Technology Systems* 2000;28:219–230.
17. Salmon G. *E-moderating: The key to teaching and learning online*. London: Kogan Page; 2000.
18. Speck BW. The academy, online classes, and the breach in ethics. In: Weiss RE, Knowlton DS, Speck BW, editors. *Principles of effective teaching in the online classroom*. San Francisco: Jossey-Bass; 2000.
19. Breithaupt K, MacDonald CJ. Quality standards for e-learning: Cross validation study of the Demand-Driven Learning Model (DDLML). *Testing International* 2003;13:8–12.
20. MacDonald CJ, Breithaupt K, Stodel EJ, Farres LG, Gabriel MA. Evaluation of web-based educational programs via the Demand-Driven Learning Model: A measure of web-based learning. *International Journal of Testing* 2002;2:35–61.
21. Heinemann G, Schmitt M, Farrell M, Brallier S. Development of an attitudes toward health care teams scale. *Education and the Health Profession* 1999;22:123–142.
22. Way D, Jones L, Baskerville NB. Improving the effectiveness of primary health care delivery through nurse practitioner/family physician structured collaborative practice, Final report to the Health Transitions Fund. Ottawa: Health Transitions Fund; 2001.

## Appendix 1. Interview schedule for learners

1. Can you describe your experience using the *Working Together* learning resource? (probe with regards to content, delivery, service, and structure). Did you like it? Did you benefit from it? Was it easy to use?
2. Have you used the new knowledge and skills that you learned at work? If so, can you give me an example of this? Was there anything that you learned in the learning resource that you would like to put into practice but are unable to? If so, why?
3. Do you feel that you are working better as a team because of this learning resource? If so, in what ways? What parts of it helped you work better as a team?

4. Do you feel you are able to care for the residents you work with better because of this learning resource? If so, in what ways?

If time permits:

5. What was the most rewarding or satisfying aspect of the learning resource?
6. What was the least rewarding or satisfying aspect of the learning resource? How could it be improved?

## **Appendix 2. Interview schedule for administrators**

1. What was your role in the project?
2. Describe your impressions of the *Working Together Learning Resource*.
3. In what ways, if any, do you feel the learners benefited from the program?
  - a. What did they learn, and what did they apply?
  - b. Did you notice a change in their attitude towards collaborative practice? If so, in what ways?
  - c. Have you noticed differences in the way they function as a team? Did team cohesion increase?
  - d. Has there been a change in the quality of care provided to the residents as a result of the learners engaging in this learning resource? If so, in what ways?
4. What aspects of the program do you feel facilitated the learners' learning?
5. What aspects of the program do you feel hindered the learners' learning?
6. Has the program benefited your organization? If so, in what ways? Did the learners suggest/request changes in the structure of your organization?
7. What are the advantages and disadvantages of providing your employees with online learning opportunities, compared to face-to-face programs?
8. What was the most rewarding or satisfying aspect of the program for you?
9. What was the least rewarding or satisfying aspect of the program for you? How could it be improved? If you could change one thing about the program, what would it be?
10. What was the most challenging aspect of the program for you?
11. Would you offer this, or another, online learning resource again?
12. What would it take to get other learners to participate in this learning resource?
13. Do you have any suggestions for how the learning resource might be improved?
14. What are the differences in cost (time, money, support) associated with offering a learning program online versus face to face?
15. Do you have any other comments relating to the learning resource, IECPCP, eLearning, and/or teamwork that you would like to share?