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The Impact of an Online Learning Resource Designed to Enhance Interprofessional Collaborative Practice in Palliative Care: Findings from the Caring Together Pilot Project

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Abstract

Background: This study assessed the effectiveness of an online learning resource for staff in long-term care (LTC) homes. The resource was designed to increase palliative care and interprofessional patient-centred care (IPC) skills and knowledge and stimulate the transfer of knowledge to the workplace.

Methods and Findings: A mixed methods approach was used. The Staged Innovation Design, which uses an experimental group and a control–replication group, was adopted. The resource was piloted in two not-for-profit LTC homes with 55 staff. Data were collected from four surveys. Individual interviews were conducted with 15 participants. Participants stated the resource exposed them to relevant, practical information regarding caring for residents at the end of life; the material was presented in an engaging, interactive manner; and e-learning was a convenient way to learn. The resource allowed learners to learn with, from, and about each other and increased palliative care and IPC skills and knowledge. Evidence regarding changes in learners' attitudes toward IPC and transfer of knowledge was weak. Given the short time-frame from completion of the training to evaluation, this is not surprising.

Conclusions: Suggestions for improving the resource emerged from the evaluation, and these have been implemented.

Keywords: E-learning; Palliative care; Interprofessional practice

Introduction

Residents in long-term care (LTC) settings are an elderly, frail, and vulnerable population. When these individuals need palliative care, they require an interprofessional healthcare team to work collaboratively to offer the resident and his or her family the best possible end-of-life experience. Many feel that teamwork or interprofessional patient-centred care (IPC) is a prerequisite for enhanced communication among caregivers, improved case management, and efficient resident care [1,2]. Changing healthcare processes to foster greater IPC is at the heart of many reform recommendations [3-5]. However, changing the way healthcare services are delivered requires changing the way healthcare workers are educated. In LTC, for example, the susceptible state of the resident, staff shortages, and financial constraints often make it difficult for staff to justify time away from caring for residents to participate in continuing professional development [6]. New approaches to educating this workforce need to be explored.

For the past two decades, educational theorists have described how technology has transformed, and will continue to transform, education [7-11]. Technology

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offers viable alternatives to the traditional teaching-learning process as ongoing advancements continue to offer new avenues for learning. The benefits of online learning are well documented in the literature [12,13]. However, the effectiveness and viability of online resources and tools as a means of creating engaging and effective learning, particularly within the healthcare sector, remains relatively unexplored and, therefore, warrants further research.

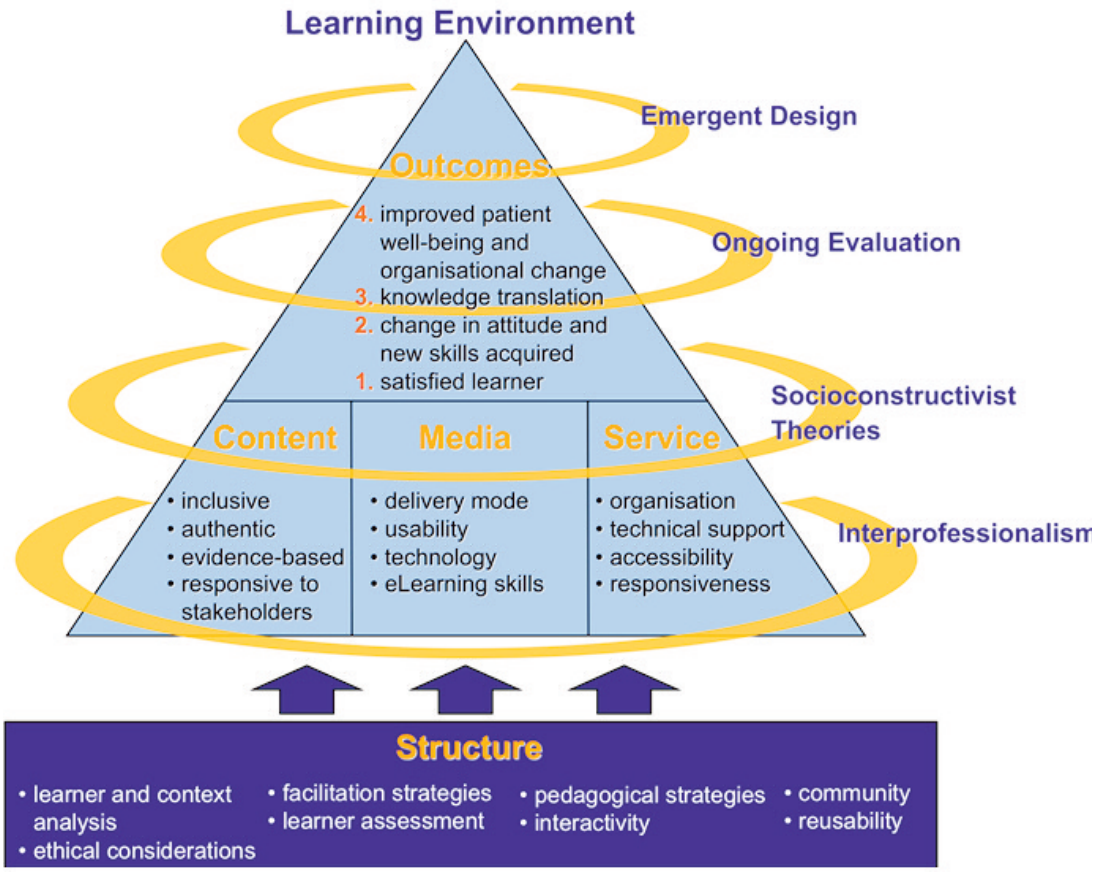
E-learning technologies may provide a solution that promotes an interprofessional model of care while addressing the challenges that face educators teaching healthcare teams. E-learning offers methods for delivering convenient and flexible education that fit within the constraints of the healthcare workplace. Indeed, positive outcomes, such as satisfaction with learning and increased knowledge and skills, have been seen with the use of e-learning to deliver education to busy caregivers [12,14-16]. However, like any learning, e-learning must be grounded in sound pedagogical or andragogical principles [17,18]. Although the literature reveals a number of key elements that define effective online learning [19-22], often these recommendations and frameworks do not inform program design specifically [23], and there is a distressing incongruence between the use of sound learning models and online learning technologies [22,24]. Researchers have demonstrated that when a theoretical framework is used to guide program design, the quality of online learning is improved [21,25].

Consequently, the purpose of this pilot study was to assess the effectiveness of using an online learning resource to increase palliative care and IPC skills and knowledge and to stimulate the transfer of this knowledge to the workplace. W(e)Learn [26] (Figure 1), a framework for interprofessional education, was used to guide the design, development, delivery, and evaluation of the resource.

W(e)Learn draws on the knowledge and experience of healthcare professionals, educators, academics, and industry; considers key elements outlined in D'Amour and Oandasan's framework [27]; incorporates best practices for interprofessional education (IPE) from the literature; and reflects expertise in curriculum design, psychopedagogy, e-learning, and evaluation methods. W(e)Learn outlines four critical dimensions of online IPE—structure, content, media, and service—and is grounded in socioconstructivist theories and interprofessionalism. W(e)Learn is intended to elicit four levels of outcome, the pinnacle of which is organizational change toward IPC and the resulting improvement in care delivery that promotes patient well-being. For an interactive explanation of the framework, visit http://www.ennovativesolution.com/WeLearn/.

The online learning resource piloted in this project was called *Caring Together in the Last Hours of Life*. It was designed to facilitate the development of palliative care and IPC skills and knowledge. The resource is intended for those who are involved in the care of residents at the end of life, including physicians, pharmacists, nurses, frontline care providers, housekeeping, administration, and recreational therapy. The resource uses case-based learning activities to permit the integration of clinical theory and practice, which situates learning in the workplace and fosters the development and application of work-related skills. The resource presents evidence-based discipline-specific knowledge essential to resident care so learners can identify with

Figure 1
W(e)Learn [26]



their own field while also learning about other disciplines and perspectives.

A multimedia-rich resource was designed to facilitate the immersion of the learners into the learning environment through interaction with the content and an engaging design. The resource employs: digital storytelling (see Figure 2), interactive online activities and tools learners can share and print, an interactive resource library animations to show learners how to use the resource and highlight concepts (see Figure 3), 3-D objects that can be manipulated by the learners to obtain the information they need and want, videos to illustrate practice points and encourage reflection, audio clips from experts in the field, an artificial intelligence "expert" who responds to learners' questions about grief and mourning, and interactive game-based activities to help learners test their knowledge and monitor their learning. For a summary of the learning resource content, see Table 1.

Methodology

The project evaluated the use of an online learning resource as an intervention to improve palliative care and IPC knowledge and skills and to stimulate transfer of knowledge to the workplace. The following research questions guided the evaluation of *Caring Together in the Last Hours of Life*:

- How did learners react to the learning resource?

Figure 2
The digital story using Rose's photo album

Figure 3
The interactive bookshelf

Table 1
Summary of learning resource

Section	Content
Section 1: What is a good end-of-life journey?	Through a digital story in the form of a photo album (see Figure 2), learners are introduced to "Rose," the main character in the case study used in this resource. Rose is presented as a resident who is nearing the end of her life. An online interactive activity guides learners to think about the end-of-life process and the different needs and wants of residents. Learners then complete the activity using Rose as the case.
Section 2: What does it mean to care together?	Collaborative practice and the skills needed to collaborate together effectively are introduced. The Structured Model of Collaborative Practice and Seven Essential Elements of Collaborative Practice provide the framework for this section. Examples of collaboration are provided and learners are given the opportunity to assess their collaborative practice skills through an online interactive performance-profiling activity based on Kelly's personal construct theory [28]. Privacy issues are also highlighted in this section.
Section 3: Providing palliative care through effective teamwork	Learners reconnect with Rose on her end-of-life journey through a video and use what they learned in Section 2 to identify how they can provide better care and support to Rose and her family. Learners are asked to identify questions they may have when caring for a resident who is dying. Learners can find the answers to these questions by perusing an interactive bookshelf (see Figure 3). As learners move their mouse over each book on the bookshelf, a description of that resource appears. Learners can then access these resources by clicking on the book. A second tool—the web of collaboration—is introduced and an interactive activity guides learners through the process of developing their own interprofessional web that illustrates with whom they should be collaborating and why. Learners are then taught *how* to collaborate with these team members and the collaborative practice skills presented in Section 2 are reviewed. Learners are introduced to a checklist for the seven elements of collaborative practice as a means of assessing their collaborative skills.
Section 4: Reflecting on and evaluating the provision of palliative care	Learners are required to apply what they have learned in the module using the tools presented to a real case in their LTC home. The activity involves an individual reflection, a group discussion with two of their team members, and a reflection on the process. At the end of the resource learners learn that Rose passed away peacefully. Learners are directed back to the bookshelf for additional resources that will help them understand grief, bereavement, and the mourning process, including an artificial intelligence "avatar expert" who will answer their questions. Opportunities for further professional development activities are presented.

- What new knowledge and skills regarding palliative care and collaborative practice did the learners acquire?
- How did the learners' attitudes toward the value and use of team approaches to care change?
- How was learning transferred to the workplace?
- How did interprofessional collaboration change?

Participants

Participants were recruited from two not-for-profit LTC homes located in a mid-sized city in Ontario, Canada. The homes were of similar size: Home A had 128 residents and 189 staff and Home B had 100 residents and 88 staff. Fifty-five caregivers from 19 disciplines volunteered to participate in the project (47 female, 7 male) (see Table 2). Seventeen (31%) were from Home A and 38 (69%) were from Home B. One-third (31%) were between 45 and 54 years old.

Table 2

Demographic information for the learners

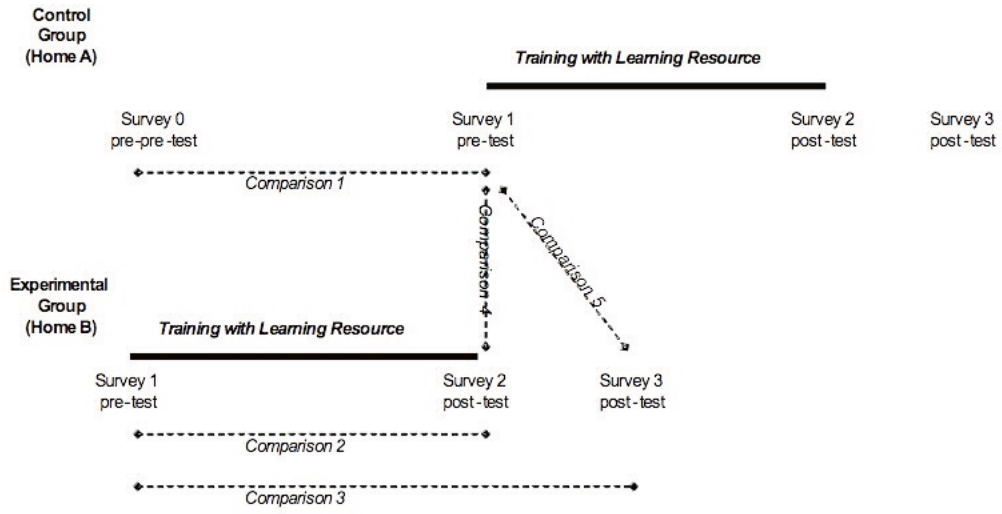
		Home A		Home B		Total	
		Freq	%	Freq	%	Freq	%
Sex	Male	3	18	4	11	7	13
	Female	14	82	33	89	47	87
Occupation	Registered Nurse/ Registered Practical Nurse	6	35	8	22	14	26
	Personal Support Worker/ Health Care Aide	2	12	7	19	9	17
	Recreational Therapist/ Assistant	2	12	3	8	5	9
	Physician	0	0	3	8	3	5
	Restorative Care Worker	1	6	2	5	3	5
	Social Work (Social Worker, coordinator, student)	1	6	2	5	3	5
	Administrative Assistant	0	0	3	8	3	5
	Food Services	1	6	2	5	3	5
	Pharmacist	0	0	1	3	1	2
	Dietician	0	0	1	3	1	2
	Occupational Therapist	0	0	1	3	1	2
	Director of Care	1	6	0	0	1	2
	Spiritual Leader	1	6	0	0	1	2
	Hairdresser	0	0	1	3	1	2
	Housekeeper	1	6	0	0	1	2
	Volunteer Coordinator	0	0	1	3	1	2
	Coordinator of Quality Management	0	0	1	3	1	2
	Administration Manager	0	0	1	3	1	2
	Finance	1	6	0	0	1	2
Age	18-24	2	12	6	16	8	15
	25-34	8	47	4	11	12	22
	35-44	4	23	5	14	9	17
	45-54	2	12	15	40	17	31
	55-64	1	6	6	16	7	13
	65+	0	0	1	3	1	2

Research design

A mixed methods approach was used in this project to evaluate the effectiveness of the learning resource, as both quantitative and qualitative methods were required to answer the research questions. The triangulation design, the most common approach for mixed methods, was used to validate the quantitative results with the qualitative data [29]. Triangulation is an efficient design because both types of data are collected concurrently. Although analysis of both types of data can be time consuming, the team approach allowed us to be more efficient and increase the trustworthiness of the results. The Staged Innovation Design [30,31] (Figure 4), involving the use of an experimental group and a control–replication group, was adopted. The program was first introduced to the experimental group (Home B), while Home A served as a control. Then, the program was introduced to the control–replication group (Home A). The results from the control–replication group (Home A) were then compared to those of the experimental group (Home B); as well, Home A served as a replication. This research design allowed the research to be conducted in a natural setting, thereby strengthening external validity while also maximizing internal validity [32].

Figure 4

The staged innovation design



Data collection tools

Data were collected from four surveys, as well as individual interviews with participants.

Surveys

Four surveys were compiled that included demographic questions, questions related to the learning objectives of the resource, an adaptation of the Demand-Driven Learning Model (DDLM) evaluation tool [33], the Quality of Care/Process subscale from the Attitudes Toward Healthcare Teams Scale [34], and Jones and Way's Collaborative Practice Survey [35]. Table 3 summarizes the composition and purpose of each survey, as well as when and to whom each survey was delivered (see also Figure 4).

Survey 0 (see Table 3) was administered as a paper and pencil questionnaire to the learners in Home A; at the same time, the learners in Home B were granted access to the learning resource and completed Survey 1 (see Figure 4). Survey 0 was used as a pre-pre-test to control for threats to internal validity. Survey 1 was administered online to all learners before they started using the learning resource. Learners were required to complete Survey 2 as soon as they completed all the activities in the learning resource. One to two months after learners had completed the learning resource they were required to complete Survey 3.

Table 3

Summary of Evaluation Surveys

Survey	What	When	Who
Survey 0 (pre-pre-test)	**Section A**: Demographic information **Section B**: Tool to assess skills and knowledge of collaborative practice that aligned with the learning objectives **Section C**: 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale [34] to assess attitudes toward collaborative practice. **Section D**: Jones and Way's Collaborative Practice Survey [35] to assess collaborative practice behaviour	When the learners in Home B were granted access to the learning resource	Home A
Survey 1 (pre-test)	**Section A**: Demographic information **Section B**: Tool to assess skills and knowledge of collaborative practice that aligned with the learning objectives **Section C**: 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale [34] to assess attitudes toward collaborative practice. **Section D**: Jones and Way's Collaborative Practice Survey [35] to assess collaborative practice behaviour	When the learners were granted access to the learning resource	Home A Home B
Survey 2 (post-test)	**Section A**: DDLM evaluation tool (adapted from [33]) **Section B**: Tool to assess skills and knowledge of collaborative practice that aligned with the learning objectives **Section C**: 14-item Quality of Care/Process subscale from the Attitudes Toward Health Care Teams Scale [34] to assess attitudes toward collaborative practice	Once the learners had completed the learning resource	Home A Home B
Survey 3 (post-test)	**Section A**: Jones and Way's Collaborative Practice Survey [35] to assess collaborative practice behaviour **Section B**: DDLM evaluation tool (adapted from [33])	1—2 months after the learners had completed the learning resource	Home A Home B

Demographic questionnaire

The purpose of the demographic questionnaire was to obtain relevant information about the learners and solicit information regarding their computer skills and experience, attitudes toward computers and e-learning, and their experience with e-learning and working in a team. The questionnaire was incorporated into Survey 1. The demographic information collected from the learners was used to help put the findings in context.

Learning objectives questionnaire

This questionnaire aligned with the learning objectives of the resource. Learners were asked to rate how confident they were in each of the aspects of palliative care and IPC that the resource addressed and also to indicate whether they feel the learning resource improved their knowledge and skills in these areas (see Table 4).

Table 4

Percentage of learners who felt the learning resource contributed to their improved knowledge and skills relating to collaborative practice

Do you feel the learning resource helped you improve your ability to:		
Learning objectives	**Yes (%)**	**No (%)**
Accurately define what is meant by collaborative practice	88.2	11.8
Use common language related to collaborative practice	92.2	7.8
Define the elements needed to collaborate (work together) effectively	88.2	11.8
Explain the benefits of collaborating (working together) with my colleagues	84.3	15.7
Identify who I should collaborate (work) with when providing end-of-life care	80.4	19.6
Define the roles and responsibilities of caregivers from different disciplines	84.3	15.7
Recognize the result of a team that is collaborating (working together) effectively	80.4	19.6
Recognize the processes that facilitate collaboration (working together)	78.4	21.6
Access tools that will help me resolve any conflicts that may occur with my colleagues	82.4	17.6
Explain the signs that someone is dying	82.4	17.6
Explain what to expect in the last couple of days prior to death	74.5	23.5
Comprehensively assess residents' needs at the end-of-life	86.3	13.7
Explain my own views of dying	72.5	27.5
Recognize that everyone has different needs and ideas about what a good end-of-life journey is	82.4	17.6
Provide support to the family members of residents who are at the end of their life journey	84.3	15.7

DDLM evaluation tool

The DDLM is the e-learning framework upon which W(e)Learn was based. The DDLM and W(e)Learn share many similar constructs, but W(e)Learn has evolved to be specific to IPE. The DDLM evaluation tool [33] aligns with the DDLM and is

designed to evaluate e-learning in terms of the following constructs—content, delivery, service, structure, and outcomes. These reflect the W(e)Learn constructs—content, media, service, structure, and outcomes. The DDLM tool was chosen for this project as it aligns closely with the W(e)Learn framework that was used in the design, development, and delivery phases of the project. The DDLM evaluation tool has 59 items. Questions in the content, delivery, service, and structure sections are accompanied by five response options: never, rarely, sometimes, often, or always. Questions on the program outcomes have four response options: strongly disagree, disagree, agree, or strongly agree. Twenty-six closed-item questions and three open-ended questions were selected from this tool and adapted as necessary for this project and incorporated into Surveys 2 and 3.

Attitudes toward health care teams scale

The purpose of the Attitudes Toward Healthcare Teams Scale [34] is to determine learners' attitudes toward the value and efficiency of teamwork. The scale was psychometrically tested with a sample of 973 individuals from interdisciplinary geriatric healthcare teams [34]. Factor analysis was conducted to determine construct validity and reliability. Two factors emerged: Quality of Care/Process, which included 14 items (eigenvalue = 4.64; variance explained = 22.1%; Cronbach's alpha = .83), and Physician Centrality, which contained 5 items (eigenvalue = 2.27; variance explained = 10.8%; Cronbach's alpha = .68). The two subscales were not correlated. Correlations with other related measures supported construct validity for the Quality of Care/Process subscale but not for the Physician Centrality subscale. Only the 14-item Quality of Care/Process subscale was used in this project. It was incorporated into Surveys 0, 1, and 2 as an indicator of team members' perceptions of the quality of care delivered by healthcare teams and the quality of teamwork to accomplish this. Participants were required to respond to the questions using a six-choice answer format, ranging from strongly agree (5) to strongly disagree (0).

Collaborative practice survey

Jones and Way's Collaborative Practice Survey [35] asks respondents about the extent to which collaboration (i.e., IPC) with different team members takes place, as well as how satisfied they are with the process of this collaboration. There are seven response options for each question: strongly agree = 1 to strongly disagree = 7 or very satisfied = 1 to very dissatisfied = 7. Jones and Way's Collaborative Practice Survey was chosen to assess collaborative practice in this project because it aligns with the definition of collaborative practice that was adopted in the learning resource. In this project, the 9-item scale for assessing the extent of collaboration was used in Surveys 0, 1, and 3.

Interviews

Fifteen individuals were purposefully selected to participate in individual interviews after they had completed the learning resource. Attempts were made to select a cross-section of participants from different disciplines with different experiences with the

learning resource. The site coordinators from each home were asked to select the interview participants as they knew the struggles and successes of the participants.

The purpose of the interviews was to discover the participants' experiences with the learning resource, specifically in terms of the W(e)Learn constructs (i.e., content, media, service, structure, and outcomes) and in relation to the research questions. The interviews were designed to identify the strengths of the learning resource and provide recommendations for where the resource could be further refined and improved. The interview schedule is presented in Appendix A.

Data analysis

Quantitative and qualitative analyses were conducted with the data collected from the surveys and interviews.

Quantitative data analysis

Paired-samples t-tests were conducted on the participants' scores from Home A for the Learning Objectives Questionnaire, the Attitudes Toward Healthcare Teams Scale, and the Collaborative Practice Survey in Surveys 0 and 1 (Comparison 1, Figure 4). The purpose of these comparisons was to determine whether the collaborative practice knowledge, skills, attitudes, and behaviours of participants not exposed to the learning resource (i.e., the control–replication group, Home A) changed over time without any intervention. Paired-samples t-tests were then conducted on the participants' scores from Home B for each of the questionnaires in Survey 1 and Surveys 2 and 3 (Comparisons 2 and 3, Figure 4). The purpose of these comparisons was to determine whether the knowledge, skills, attitudes, and behaviours of participants in the experimental group (Home B) changed as a result of completing the learning resource. These tests provided a preliminary estimate of the effectiveness of the learning resource. Next, if changes were found as a result of these tests, independent-samples t-tests were conducted with Home B participants' post-test scores and Home A participants' pre-test scores (Comparisons 4 and 5, Figure 4). The purpose of these comparisons was to confirm findings from Comparisons 2 and 3 regarding the effectiveness of the learning resource. Lastly, 2 HOME × 2 TESTTIME mixed factorial ANOVAs with repeated measures on the second factor were conducted on the pre- and post-test data to compare the pre- and post-test scores of both groups. A mixed factorial ANOVA was used in order to evaluate the interaction among the independent variables (i.e., home and test time) and the effects of this on the dependent variable (i.e., survey score).

Qualitative data analysis

Qualitative data analysis involved searching the interview transcripts for information that addressed learners' reactions to the learning resource, evidence of learners' acquisition of new knowledge and skills and their implementation in the workplace, examples of changes in attitude, and the use of a collaborative approach. In the initial step of the analysis, the transcripts were read and re-read and a preliminary list

of relevant emergent categories was developed. The researchers read the data until no additional themes or categories emerged. A finding had to be identified by at least two participants to be identified as a theme. Once the categories reflected "the recurring regularities or patterns in the study" [36] and the researchers were satisfied the themes reflected the views of the participants, the data were assigned to the categories and the findings compiled into a report. Direct quotations were used to preserve the voice of the participants.

Findings

Of the 55 caregivers who signed up to participate in this project, 51 (94%) completed the learning resource and evaluation. The findings from the evaluation are presented as answers to the research questions.

How did learners react to the learning resource?

Overall, learners expressed excitement over the variety of activities and effectiveness of the resource. The praise came not only at the learner level but also at the organizational level. The findings related to the learners' reactions are organized according to the constructs in W(e)Learn—content, media, service, and structure.

Content

Independent-samples *t*-tests conducted on the learners' responses on the DDLM evaluation survey items showed no significant differences between groups ($p > .05$);

Table 5

Learners' responses to the content items in the DDLM evaluation tool (*N* = 51)

	Min[a]	Max	Mean	SD[b]
The material in the learning resource was boring.	1.00	5.00	2.20	1.02
In this learning resource, there was an appropriate amount of team activities.	1.00	5.00	3.47	1.01
There were enough offline activities in the learning resource.	1.00	5.00	3.88	0.86
The content included information that I will be able to use to deal with new situations at work.	1.00	5.00	4.06	0.76
The content included learning tasks that were similar to those I face at work.	1.00	5.00	3.90	0.76
The content included information that I need in my work.	1.00	5.00	3.96	0.80
The content included enough online resources.	1.00	5.00	3.98	0.76
The content was well organized.	1.00	5.00	3.92	1.00
The content used words I did not understand.	1.00	4.00	1.71	0.86
The content was too difficult.	1.00	4.00	1.75	0.82

Note: [a] Response options: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree; [b] Standard deviation

therefore, the findings from this tool are presented together for Home A and Home B. Learners' responses to the content items on the DDLM evaluation tool all hovered around the neutral mark, leaning toward the positive end of the scale (see Table 5). Learners agreed most strongly that the resource included learning tasks that were similar to those they face at work, information that they need at work, and information they would be able to use to deal with new situations at work. In addition, learners tended to agree that there was an appropriate amount of online resources and offline activities. They also felt the content was well organized. Lastly, the learners tended to disagree that the content was too difficult and that words were used that they did not understand. Learners were more neutral regarding the material in the resource being boring and the resource having an appropriate amount of team activities.

Qualitative analysis of the interview transcripts revealed seven themes related to content: authenticity of content, connecting with the content, breadth and depth of content, sensitivity of content, modelling reality, team activity, and length of the resource. These are presented below and triangulated with the quantitative data where possible.

Authenticity of content

Learners indicated they found the resource to be relevant, authentic, practical, and, consequently, valuable to their work situations. The Director of Care from one of the homes commented on how the authenticity of the content affected the learners: "It was so real and it touched our lives. A lot of people here who went through the program dropped some tears. It was sad. People believed that Rose was real!" (Director of Care).

Connecting with the content

Several learners commented on how they connected with Rose. They enjoyed "meeting" her and were curious to see what was going to happen to her. A few learners talked about Rose as if she were an actual person and not a case-study: "Rose was fascinating. . . . Her story is a lesson to all of us. She was a fighter and a winner. She was brave and strong" (Personal Support Worker).

Breadth and depth of content

When asked in the DDLM evaluation survey to state what they liked most about the resource, four learners responded that it was easy to understand. However, a couple felt the language was at too high a level for frontline care providers, particularly those for whom English is not their first language (which includes a large proportion of today's LTC staff). Two participants suggested there should be two levels of content.

Sensitivity of content

Although it is recognized that personal reactions to death and dying can affect the care provided, two learners reported feeling uncomfortable with content on this

topic. At one point in the resource, learners are asked to reflect on their own views of dying and to think about what their wants and needs might be at the end of life. Two learners felt this exercise was too personal.

Modelling reality

Four learners believed that the care providers portrayed in the videos were insensitive to Rose and suggested that they should have acknowledged her in some way when they entered the room. A Director of Care indicated she used this video as a teaching moment with her staff. An Executive Director pointed out that Rose and her family were a stereotypical white family and suggested that different cultures be represented.

Team activity

Although several learners said they appreciated the benefits of completing the training in teams, they also said they thought this expectation needed to be made clear upfront. Several reported they were working on the resource alone at home when they discovered the expectation to work in a group. They stated they found it difficult to co-ordinate meetings with other learners.

Length of resource

Most learners felt the resource took an appropriate amount of time to complete. However, two indicated it was too long. One learner noted, "You want things that people could do in 10–15 minutes. This is really the time they have. When people need more information about palliative care, they can come back to the library as needed" (Physician).

Media

Learners' responses to the items about delivery (media) on the DDLM evaluation tool were all positive. They thought the resource was well organized, uncluttered, functional, and easy to navigate. They also indicated they could easily access a computer when they needed to. There was only one significant difference between the two groups: those in the experimental group were more likely than those in the control–replication group to agree that the navigation buttons did what they were supposed to do ($p < .05$). Three themes related to media emerged from the interview data: learning online, activities and resources, and usability.

Learning online

In the interviews, learners said they enjoyed the online format of the training. They appreciated the flexibility and convenience of learning online. Indeed, when asked in the DDLM evaluation tool what they enjoyed most about the learning resource, four learners indicated they liked the convenience of learning online, and another five mentioned they enjoyed being able to learn at their own pace. A number of learners had little or no computer experience, but, with the support of the site co-ordinators, successfully completed the training.

Activities and resources

In the interviews, learners commented on how impressed they were with the variety of resources presented. However, in the DDLM evaluation tool, one learner indicated he/she would have liked more activities and less reading, and another stated he/she would have liked more videos as he/she found them helpful. The interactivity afforded through the resource led one learner to comment: "I found it energizing. It really made you think. . . . It gives you a notion of the dynamics of each family . . . and how they take [interpret] things" (Executive Director).

When learners were asked in the DDLM evaluation tool what they liked most about the resource, many ($N = 9$) indicated the bookshelf (Figure 3). Learners indicated it had "great reading material," "great information and guidelines," "great links to additional resources," "information to help me within my own practice," and "opportunities to learn more about palliative care." Six learners indicated the videos were what they liked best, stating they were beneficial, relevant, and interesting. An Executive Director reported, "I really liked the video portion. . . . When you started to see things, you started to feel things. That was the closest you could get to experiencing something without actually experiencing something." Learners also appreciated the audio clips. The digital story of Rose was also a powerful learning tool. One learner attested how this approach was effective in getting caregivers to think of those they are caring for as whole people: "Sometimes you get desensitized in long-term care. By seeing [Rose's] regression, the pictures from when she was younger to the end, it really reaffirmed her as a person" (Life Enrichment Coordinator).

Usability

When asked what they liked most about the resource, eight learners mentioned that it was easy to use. There were, however, a few technical glitches that were a source of frustration for some learners. These included problems completing surveys, seeing and/or hearing the videos, accessing resources on the bookshelf, and downloading software.

Service

In the DDLM evaluation tool, learners were asked to comment on their level of agreement with the following statement: While using the learning resource, I received support from my organization. Overall, learners agreed that they received support from their organization while using the resource (M = 3.96, SD = 0.85 [response options: 1 = strongly disagree, 5 = strongly agree]).

Structure

Based on their responses on the DDLM evaluation tool, learners tended to agree that there were opportunities for self-evaluation and for practicing what they had learned. In addition, they felt that the content and learning activities supported the learning objectives. To a lesser extent, they agreed that the resource kept their interest, met their learning needs, and respected their current knowledge and experience.

Learners were only slightly more positive than neutral regarding whether the online format of the training made learning more convenient than learning face-to-face. They indicated that they were not replaced when they left their work duties to engage in learning (see Table 6).

Table 6

Learners' responses to the structure items in the DDLM evaluation tool (*N* = 51)

	Min[a]	Max	Mean	SD[b]
In the learning resource, I was replaced when I left my work duties to do this learning.	1.00	5.00	2.49	1.29
In the learning resource, there were opportunities for me to practice what I learned.	1.00	5.00	3.82	0.87
In the learning resource, there were opportunities for self-evaluation.	1.00	5.00	4.00	0.66
In the learning resource, the content and learning activities supported the learning objectives.	1.00	5.00	3.96	0.63
The learning resource kept my interest.	1.00	5.00	3.69	0.79
The learning resource met my learning needs.	1.00	5.00	3.76	0.71
The learning resource respected my current knowledge.	1.00	5.00	3.73	0.67
The learning resource respected my experience.	1.00	5.00	3.71	0.70
Having this learning resource online made learning more convenient than learning face-to-face.	1.00	5.00	3.53	0.92

Note: [a]Response options: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; [b]Standard deviation

What new knowledge and skills regarding palliative care and collaborative practice did the learners acquire?

Scores on the Learning Objectives Questionnaire in the experimental group were significantly higher after the training (M = 61.89, SD = 7.50) than before the training, (M = 53.94, SD = 12.26), $t(34) = -4.059$, $p < .05$. These findings provide preliminary evidence that the training was effective in meeting the learning objectives. Further, scores in the experimental group after the training, (M = 61.89, SD = 7.50) were significantly higher than those in the control–replication group before the training, (M = 48.81, SD = 11.10), $t(49) = -4.944$, $p < .05$. These findings provide further confirmation regarding the effectiveness of the learning resource in meeting the learning objectives.

A 2 HOME × 2 TESTTIME mixed factorial ANOVA with repeated measures on the second factor conducted on the scores from the pre- and post-test of the learning objectives questionnaire showed no TESTTIME by HOME interaction, F(1,

49) = 2.417, p = .126 (MSE = 65.50) or significant main effect for group, $F(1, 49)$ = 0.957, p = .333, (MSE = 137.26). The latter finding indicates there were no between-group differences in scores. However, there was a significant main effect for test time $F(1, 49)$ = 37.87, p = 0.000 (MSE = 65.50), indicating that knowledge and skills improved after training. In the post-test, learners were asked whether they felt it was the training that contributed to their improved knowledge and skills. The vast majority replied in the affirmative (see Table 4). Lastly, paired-samples t-tests conducted on the control–replication group's scores for the learning objectives questionnaires in Survey 0 and Survey 1 showed no significant differences between the scores, $t(15)$ = 0.912, $p > .05$, providing further indication that the change in scores in the experimental group was due to the training.

The interview data supported these findings. Learners reported that they acquired new information related to both palliative care and IPC. For example, one learner discussed how the resource helped her learn to identify the symptoms when someone is dying: "I didn't know the symptoms, but now when I walk into a room I would notice who is palliative or not. I found that really helpful" (Recreation Assistant). Not only did learners obtain new knowledge about providing palliative care but also about collaborative practice. A few learners interviewed mentioned that participating in the learning resource helped them understand the role of the different team members and how everyone on the team has an important part to play. For example:

> It's been helpful for me. . . . This resource helped me to understand the right people to go to, such as the housekeeping, nursing, or social worker. It would be helpful to me if I walk into a palliative care resident's room. I would understand what is going on, what kind of example I could use in this circumstance, and who to go to. The thing that helped me the most was to realize how much everybody's role in the team is important, especially spiritual care that sometimes has been put on the back burner. It made me more alert that my role is important—it is part of the total care that the residents need in the last stage of their life. It [has] been a good learning tool for me. (Chaplin)

How did the learners' attitudes toward the value and use of team approaches to care change?

No significant differences were found between the experimental group's scores on the Attitudes Toward Healthcare Teams Scale before and after the training, $t(34)$ = –0.670, $p > .05$. These preliminary findings suggest that the resource was not effective in changing participants' attitudes. A 2 HOME × 2 TESTTIME mixed factorial ANOVA with repeated measures on the second factor conducted on the participants' scores from the pre- and post-test of the Attitudes Toward Healthcare Teams Scale showed no TESTTIME by HOME interaction, $F(1, 49)$ = 0.197, p = .659 (MSE = 101.73), or significant main effects for group, $F(1, 49)$ = 1.112, p = .297 (MSE = 179.77), or test time, $F(1, 49)$ = 0.089, p = .766 (MSE = 101.73). These findings indi-

cate that there were no between-group differences in scores and no changes in scores on the Attitudes Toward Healthcare Teams Scale following completion of the training.

When asked during the interviews whether their attitude toward collaborative practice had changed, most learners indicated that they felt they already had a positive attitude toward working as a team before their learning. One Director of Care discussed how the staff in her home valued a team approach to care and emphasized that all team members have a valuable role to play: "We call our housekeepers the 'secret keepers'. . . . The housekeepers are the ones who hear things first, as they have that kind of relationship with the residents. It is very important to include these people in the team" (Director of Care). However, some stated they came to better understand and value the roles and responsibilities of those in other disciplines as a result of completing the training. One learner discussed how, as a result of the learning resource, she was making an effort to change her attitude and practices: "I am trying to be a little more sensitive of other people's disciplines and where other people are coming from" (Social Worker).

How was learning transferred to the workplace?

On the DDLM evaluation tool following the training, 85% of learners agreed or strongly agreed they had applied new knowledge and skills in the workplace, and 79% agreed or strongly agreed they had applied new skills. However, there was little evidence to support the transfer of learning to the workplace in the qualitative data: many learners responded "Not yet," "It is too soon to tell," or "No, but I think I will in the future." However, there were indications that what participants learned will impact how they deliver care in the future. One learner, a chaplain, noted, "The [pie] [Appendix B] is something I can take with me [and use] for any resident." Another learner, who was responsible for her home's palliative care manual, said she had already incorporated much of what she had learned into the manual: "What I learned in this project is going to help me educate and help other staff" (Nurse).

How did interprofessional collaboration change?

A paired-samples t-test was conducted with the experimental group's pre- and post-scores on the Collaborative Practice Survey to determine whether they had changed their collaborative practice behaviours as a result of completing the training. No significant difference in scores was observed, $t(33) = -0.045$, $p > .05$. These preliminary findings suggest that the learning resource was not effective in changing the participants' collaborative practice behaviours. However, when asked in the DDLM evaluation survey, 79% of the respondents agreed or strongly agreed with the statement that they worked more effectively as a team as a result of their participation.

A 2 HOME × 2 TESTTIME mixed factorial ANOVA with repeated measures on the second factor was conducted on the participants' scores from the pre- and post-test of the Collaborative Practice Survey. The results showed no TESTTIME by

HOME interaction, $F(1, 45) = 0.962$, $p = .332$ ($MSE = 89.15$), or significant main effects for group, $F(1, 45) = 0.506$, $p = .481$ ($MSE = 115.57$), or test time, $F(1, 45) = 0.859$, $p = .359$ (MSE = 89.15). These findings indicate that there were no between-group differences in scores and no changes in scores following completion of the training.

The qualitative data supported these findings. Most learners reported that they felt they already worked well as a team and, therefore, the training did not have a big impact on their practice in this regard. However, a few suggested they were working better as a team as a result of completing the training because they felt they better understood the importance of teamwork. A few administrators discussed how, after completing the training, they made more of an effort to include all team members and make them feel valued. For example, a Director of Care stated, "I think it made me make a more conscious effort to include them more. Just to make them more aware of collaboration: 'maybe you could do this, she could do that' . . . making them feel more valuable."

Discussion

The effectiveness of the resource

The use of the Staged Innovation Design [30,31] controlled for some threats to internal validity and provided some support for the effectiveness of the resource in achieving the learning objectives. However, the results do not provide conclusive answers as to whether the learners' attitudes toward IPC changed and whether learning was transferred to the point of care.

Quantitative analyses revealed that learners' attitudes did not change as a result of completing the resource. Perhaps there was no change owing to a ceiling effect, as learners who were interviewed indicated they already had positive attitudes toward IPC. Alternatively, the lack of change in learners' attitudes may have been due to the fact that the sample was too small to detect a difference.

Although the quantitative data indicated that learners believed they had applied their new knowledge and skills in the workplace, there was little qualitative evidence to support this. Preliminary findings regarding whether collaborative practice had improved as a result of the training were not positive. Given the short time-frame from completion of the training to evaluation, this is not surprising. It is reasonable to expect that behavioural changes would require time. Follow-up data need to be collected before any firm conclusions can be made in this regard. Such research should collect data that objectively explore transfer of knowledge, organizational change, and the impact of staff learning on resident care.

The sample size of the two participant groups in this study was relatively small (17 and 38) due to the pilot nature of this study. Therefore, some of the findings need to be interpreted with caution. Moreover, as two groups of staff in two unique settings were studied, the generalizability of these findings is somewhat limited [37]. Nevertheless, Merriam [38] advised that by providing detail, readers can determine themselves "whether the research setting sufficiently resembles their own situation to warrant adopting the same practices."

The learner population

Frontline care providers and housekeeping staff spend the most time with residents and yet have the least amount of education. Thus, this group of care providers would likely benefit the most from engaging in the type of learning described in this article. Despite encouragement by the site co-ordinators, many such staff chose not to participate in the project because they felt intimidated by the training and did not want to "look stupid." Many of those reluctant to participate were immigrants who did not speak English as their first language and who had little or no computer experience.

Of the 55 participants, only 4 (one registered nurse, one nurse practitioner, and two personal support workers) dropped out. They were of varying age, but all worked on the floor, directly caring for residents, and none had strong computer skills. Although it might be assumed that their lack of computer skills was a factor in dropping out, 24 other learners with similar skill levels successfully completed the training. Five (9%) of the participants had never used a computer before, yet four of them (80%) completed the learning. The appropriateness of online training for those who work on the floor, directly caring for residents, and the factors that will make such training successful, warrant further investigation.

Areas for improvement

The participants reacted positively not only to the content of the resource but also to the approaches and media used to deliver the content. However, the learners did not like it when they were blocked from moving forward in the resource until they had completed the activities; these learning activities have since been made optional. Another challenge was the activity in which learners were asked to share what they had learned in the resource with two members of their interprofessional healthcare team. Since participants were not forewarned that they would need to get together to complete this exercise, they found it hard to find people with whom they could do the activity and a time when they were all available to meet. The resource has since been modified to introduce the group activity at the start of the training.

The fact that learners from one home were more likely than those from the other home to agree that the navigation buttons did what they were supposed to do may be related to how successful the homes were at setting up computers with the appropriate software and whether the learners used these computers for the training. Indeed, learners complained about a number of technical glitches. Although many were related to how the computers were set up rather than the design of the resource, they were still a source of annoyance and frustration.

Two participants commented about cultural and religious references in the resource. The family used in the case study represented a "homogenized white family" and, as such, depicted a narrow view of dying from one specific culture. The use of multiple case-studies and stories may alleviate this concern. Moreover, although we made efforts to demonstrate exemplary care in the videos, learners still had suggestions as to how care could be improved. The feedback has since been used to develop further learning activities that build on the videos and address this issue.

Conclusion

To conclude, this online learning resource met the learners' need of accessing educational materials at their convenience and the organizations' need for educating staff in palliative care. Many of the partner organizations will continue to benefit from having a learning resource they can integrate into their academic programs or clinical practices to enhance palliative care and collaborative practice. Other partners have benefited from gaining a deeper understanding of the complexities of using e-learning in healthcare. Suggestions to improve the resource that emerged from the evaluation have been addressed in a newer version, and plans will be made to disseminate it to other LTC facilities for their palliative care education efforts.

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Competing Interests

The authors have no competing interests.

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APPENDIX A
Interview Schedule for Learners

- Can you describe your experience using the **Caring Together** learning resource? (probe with regard to content, media, service, and structure). Did you like it? Did you benefit from it? Was it is easy to use?
- 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?
- 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?
- 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?
- What motivated you to engage in this learning?
- What motivated you to complete the learning?
- Did you face any barriers to learning online?

If time permits:

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

APPENDIX B
"The Pie"