The Structure of Knowledge Building for Promising Ideas in the Palliative Care eLearning Program

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Abstract: The Palliative Care eLearning Program is a continuing professional development program for family physicians and nurse practitioners. This program builds on the 10-year success of the End-of-Life Care Distance Education program that employed previous versions of Knowledge Forum. The current, non-linear, graphic display of KF6 notes is innovative and reflects the theory of Knowledge Building putting ideas-at-the-centre; however, it can become challenging for participants in an extremely active KF view. This is the design problem discussed in this paper. In response to high levels of discourse, i.e. note creation (n=577) and build-on activity, the design researcher created *views-within-a-view* that organized discourse according to case-based content. This solution was functional but created unwanted organizational structures segregating ideas, as opposed to integrating them in the same problem space and keeping them fluid and available for creative knowledge work. The inherent limitations of structuring space for Knowledge Building is contrary to its theoretical underpinnings. From this design researcher's experience with knowledge visualization, an expandable, easily navigable, 3D problem space is suggested for future KF design, beyond pages and views. KF as a 3D problem space could impact collaborative interactions and possibilities for work with promising ideas to further scaffold creative Knowledge Building.

Introduction

The Palliative Care eLearning (PCeL) Program, is an online continuing professional development program, for family physicians and nurse practitioners sponsored by the Ontario Ministry of Health and Long-Term Care (Figure 1), <u>https://pcelprogram.ca</u>. It was designed, developed, and is co-ordinated by Prof. Leila Lax and Dr. Anita Singh. It is supported by the University of Toronto, Faculty of Medicine, Office of Continuing Professional Development and certified by the College of Family Physicians of Canada for 211.5 Mainpro+ credits.



Figure 1. The Palliative Care eLearning Program homepage.

The PCeL Program 2019-2020 opened on Nov. 17, 2019 and was scheduled to run to May 6, 2020 but due to the current pandemic was extended until Aug. 26, 2020. There were 2 in-person sessions; the opening session, on Nov. 17, provided an overview of the PCeL Website, KF, Knowledge Building and an introductory lecture on palliative care and the March 7 session provided a lecture on palliative symptoms and small group case-based discussion. All 6 modules were conducted online with participants working seamlessly between the Website, individual, knowledge translation (KT) assessment components and Knowledge Forum (KF) for collaborative, case-based discussion to support Knowledge Building for new knowledge and improvements in practice. Participants' 12-week post-program KT to practice journals are due online on Nov. 18, 2020.

The pedagogic model is a novel blended design, created with a competency-based architecture, combining individual, asynchronous elearning focussed on KT formative feedback assessments (Lax, Singh, Scardamalia, et al., 2006, 2015; Lax, Scardamalia, Watt-Watson, et al., 2010) with collaborative Knowledge Building in KF (Bereiter & Scardamalia, 2003, 2014; Scardamalia, 2002; Scardamalia & Bereiter, 2014; Lax, Philip, Singh, et al., 2016), as well as, 2 synchronous, in-person sessions. The formative feedback assessments, called KT Exercises, are based on 10 palliative care core competencies, defined by detailed milestones and associated with CanMEDS roles and family medicine principles (Fig. 2).

The KT Exercise pre/posttest knowledge scorecards are structured by these competencies/milestones to inform self-assessment, guide individual KT Plans, and elevate collaborative Knowledge Building discourse. Each module begins with a list of case related competencies/milestones. At the conclusion of each module, after 4-weeks of KF discourse and review of eLibrary resources, participants are asked to rate their level of proficiency with each module milestone, reflect, and create a KT Plan of action for continued improvement. All authoritative resources in the eLibrary are also linked to competencies/milestones. The cumulative KT Plan leading to the PCeL Journal requires 12-week follow-up through action, evidence, and reflection on 2 self-selected practice priorities.



Figure 2. Core competencies and module milestones related to CanMEDS roles and family medicine principles.

Access to KF is embedded in the PCeL Program graphic index on the top menu bar and within each module (Figs. 3 & 4). The design of the PCeL Program graphic index is reflected in KF; all 6 modules are designated as separate views based on the case-based content of each module/view (Fig. 5). A detailed schedule is provided in each module for participants' asynchronous individual and collaborative work over the course of 4-5 weeks per module (Fig. 6). Collaborative Knowledge Building in KF is scheduled for 27 weeks, followed by the 12-week post-program KT Journal that prompts participants to take action on new knowledge to elevate personal practice, provide evidence of change, and reflect on the impact; the Journal is the final component submitted online for calculation of individual Mainpro+ continuing professional development credits. All components of the PCeL Program are aimed at scaffolding participants to go beyond elearning – to do Knowledge Building work not just to obtain additional knowledge but potentially to create new knowledge and translate knowledge to practice, to evoke change, and improving one's care of their palliative patients and their families.



Figure 3. Knowledge Forum is embedded in the PCeL Program graphic index & all modules.

	eLearning Program	aphic Throwledge fex Forum	eLibrary	KT Portfolio	Log Out			
T	KNOWLEDGE FORUM							
	Knowledge Forum (KF) is the online collaborative learni the KF icon 🗑 found at the top of all PCeL Webpages a with the KF Login Button. All online case-based knowled by a facilitator/palliative care expert.	ng environment used in t ind in the Graphic Index; t dge building (KB) discussio	he PCeL Program. hese icons will tak on in the PCeL Pro	To access KF click on to you to this page gram is moderated				
	For direct access to KF please bookmark https://kf6.ik	it.org/login						
	Information & How To Register							
Login to Knowledge Forum								
	rio EALTH AND LONG-TERM CARE		ITY OF TORO MEDICINE	ONTO	Honora Later Conte			

Figure 4. Access to Knowledge Forum login is seamlessly integrated.



Figure 5. The 6 module design of the PCeL Website is reflected in Knowledge Forum.



Figure 6. A sample module schedule, across 5 weeks, detailing participant responsibilities.

Participants & Methods

The educational research component of the PCeL Program was approved by the University of Toronto Social Sciences Research Ethics Board. The PCeL Program 2019-2020 was fully registered with 22 family medicine participants. In April 2020, during COVID-19, participants were asked if they would like to end early and receive partial Mainpro credits. Thirteen participants completed the 2019-2020 program. Two facilitators, experts in palliative care, guided the discourse in KF – one for modules 1, 2, and 3 and the other for modules 4, 5, and 6. KF analytic tools were employed for activity statistics and an online survey was conducted for formative feedback and program evaluation.

Results

<u>Knowledge Building activity</u>: Number of notes read and number of notes created for each participant were tabulated in KF. Total online activity across 6 modules showed 11,052 notes read minus 811 (by the design researcher) for a subtotal of 10,241 and a total of 641 notes created minus 64 (created by the design researcher) for a subtotal of 577 (Table 1). The KF ideas building tool was employed to provide an image based on data from build-on notes in Module 2, embedded view for ideas-at-the-centre of pain assessment and management; it shows a high level of interaction, not only by the facilitator (largest circle) but by numerous participants (medium size circles) (Fig. 7).

	Number of Notes Read	Number of Notes Created
Participants (n=22)	9289	499
Facilitator 1	452	44
Facilitator 2	500	34
Subtotal (Ps & Fs)	10241	577
KF Views (DR)	811	64
Total	11052	641

Table 1. Knowledge Forum participant activity summary



Figure 7. Ideas building (build-on contributions) from module 2, pain assessment & management view.

<u>Program evaluation survey</u>: An online survey in Survey Monkey was conducted at the conclusion of the program for formative feedback and program evaluation as required by Continuing Professional Development, Faculty of Medicine, University of Toronto. Eight responses were received (from a possible 13 participants that completed the program). The survey was composed of 3 demographic questions, 10 Likert-scale (strongly disagree to strongly agree) program feedback questions, a series of Likert-scale (novice to expert) outcomes self-assessment questions, 4 KT feedback questions and 3 final feedback qualitative response questions. Overall the PCeL Program was very highly rated across different aspects (Table 2), as were the palliative care cases, discussion in KF, and Knowledge Building components (Table 3). Quantitative and qualitative responses to KT impact on practice are notable (Tables 4 & 5). All CanMEDs roles were well represented, except "Leader" (Table 6).

📕 Strongly Disagree 📕 Disagree 🦰 Neutral 📕 Agree 📕 Strongly Agree								
	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE	
The face-to-face session facilities were satisfactory.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50	
The PCeL Program Website was satisfactory.	0.00% 0	0.00% 0	12.50% 1	37.50% 3	50.00% 4	8	4.38	
The Knowledge Forum discussion environment was satisfactory.	0.00% 0	0.00% 0	12.50% 1	50.00% 4	37.50% 3	8	4.25	
Overall, the program content enhanced my knowledge.	0.00% 0	0.00% 0	12.50% 1	50.00% 4	37.50% 3	8	4.25	
Overall, I would rate the face-to- face sessions as excellent.	0.00% 0	0.00% 0	0.00% 0	62.50% 5	37.50% 3	8	4.38	
Overall, I would rate the PCeL Program as excellent.	0.00%	0.00% 0	12.50% 1	25.00% 2	62.50% 5	8	4.50	

Table 2. PCeL Program ratings of face-to-face sessions, eLearning website & Knowledge Forum.

Table 3. PCeL Program feedback on cases, Knowledge Building & authoritative resources.

📕 Strongly Disagree 📕 Disagree 🦰 Neutral 📒 Agree 📕 Strongly Agree								
	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE	
The cases used in the in-person seminars were interesting.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50	
The online cases were interesting.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50	
The online cases promoted discussion in KF.	0.00% 0	0.00% 0	0.00% 0	57.14% 4	42.86% 3	7	4.43	
The ideas-at-the-centre helped to promote KF discussion.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50	
I gained new knowledge from the online discussions.	0.00% 0	12.50% 1	0.00% 0	37.50% 3	50.00% 4	8	4.25	
I had the opportunity to ask questions about my personal practice in the online forum.	0.00% 0	0.00% 0	0.00% 0	62.50% 5	37.50% 3	8	4.38	
The eLibrary references were easy to access.	0.00% 0	0.00% 0	0.00% 0	37.50% 3	62.50% 5	8	4.63	

Table 4. PCeL Program rating of knowledge translation to practice.

Strongly Di	sagree 📕 Dis	sagree 📒 N	eutral 📃	Agree 🧧	Strongly Agree		
The KT Exercises/Pretests & Post- tests were challenging.	0.00%	0.00%	0.00% 0	50.00% 4	50.00% 4	8	4.50
The KT Pre-tests & Post-tests Scorecards were helpful to me.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50
Scorecards provided helpful self- assessment feedback by milestone/competency.	0.00% 0	0.00% 0	0.00% 0	50.00% 4	50.00% 4	8	4.50
Developing KT Plans were helpful to me.	14.29% 1	0.00% 0	14.29% 1	42.86% 3	28.57% 2	7	3.71
Creating a Cumulative KT Plan, identifying 2 Practice Priorities, was helpful to me.	12.50% 1	0.00% 0	25.00% 2	50.00% 4	12.50% 1	8	3.50
I am looking forward to working on my 2 Practice Priorities and documenting this in the 12-Week Knowledge Translation to Practice (KTP) Journal.	12.50% 1	12.50% 1	25.00% 2	50.00% 4	0.00% 0	8	3.13
Having an online assessment Portfolio was helpful to me.	0.00% 0	0.00% 0	25.00% 2	75.00% 6	0.00% 0	8	3.75

Table 5. PCeL Program feedback on knowledge translation to practice.

#	RESPONSES	DATE
1	approach to symptom management grew	9/3/2020 12:02 PM
2	Use ESAS for describing symptoms. Better manage non-cancer palliative patients	9/2/2020 9:33 PM
3	Knowing community tools that are available in the community	9/2/2020 8:55 PM
4	Continue applying strategies in practice	9/2/2020 8:49 PM
5	mentally screen patients for palliative support/needs talk about ACP more take on more symx management	8/25/2020 2:34 PM
6	Better assessments, more collaboration, earlier discussion re patient preferences	8/21/2020 6:04 PM

Q14. What will you do differently in your practice as a result of this program?

Table 6. PCeL Program rating of applied CanMEDs roles.

ANSWER CHOICES	RESPONSES	
Family Medicine Expert	75.00%	6
Communicator	87.50%	7
Collaborator	75.00%	6
Leader	25.00%	2
Health Advocate	75.00%	6
Scholar	50.00%	4
Professional	62.50%	5
Total Respondents: 8		

Discussion

Strong Knowledge Building activity and survey results from the Palliative Care eLearning Program 2019-2020 provide initial, overall positive feedback on design. Feedback on the post-program Journal was conducted in advance and it is recommended that in the future feedback should be obtained after Journal completion to gage impact on practice. A notable design issue in KF persists related to very high levels of note creation and build-on notes.

Design problem: The PCeL Program employs KF6 and builds on the 10-year success of the End-of-Life Care Distance Education Program using previous versions of KF. The non-linear, graphic display of KF6 notes is innovative and reflects the theory of Knowledge Building putting ideas-at-the-centre; however, it can become challenging for participants in an extremely active KF view (Fig. 8). This design problem is an issue that we continue to address in this program. In response to high levels of KF discourse, i.e. note creation and build-on activity, in PCeL 2018-2019, the facilitator created "rise aboves" and then the design researcher created *views-within-a-view* to organize discourse according to case-based content and ideas-at-the-centre in the PCeL Program 2019-2020 (Fig. 9-13). The *views-within-a-view* solution was functional but created unwanted organizational structures segregating ideas, as opposed to integrating them in the same problem space and keeping them fluid and available for creative knowledge work. The inherent limitations of structuring space for Knowledge Building is contrary to its theoretical underpinnings.

Design possibilities: Inspired by other work in 3D knowledge visualization and interactivity design (Miller, Lax, Wooldridge, et al., 2018; Gautier & Jenkinson, 2018) the design researcher envisions an expandable, easily navigable, 3D problem space, that goes beyond the current design of 2D pages and KF views. Re-designing the KF problem space could impact collaborative knowledge work, interactions with ideas, and possibilities for identification and work with promising ideas (Chen, 2017) to better facilitate "rise-above" progressive discourse and scaffold higher-levels of creative Knowledge Building (Scardamalia, 2002; Scardamalia & Bereiter, 2014; Bereiter & Scardamalia, 2014). Promisingness and idea improvement may be better supported by a 3D, interactive, landscape design of notes within a KF view.



Figure 8. PCeL Program 2018-2019, module 2, KF view.



Figure 9. PCeL Program 2019-2020, module 2, KF view.



Figure 10. PCeL Program 2019-2020, module 2, Pain Assessment & Management, KF view (number of notes read=1483; number of notes created=68).



Figure 11. PCeL Program 2019-2020, module 2, Symptoms Other Than Pain, KF view (number of notes read=430; number of notes created=21).



Figure 12. PCeL Program 2019-2020, module 2, Communication & Culture, KF view (number of notes read=438; number of notes created=24).



Figure 13. PCeL Program 2019-2020, Module 2, Community Resources & Billing KF view (number of notes read=344; number of notes created=18).

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