

Collaborative learning processes in the context of a public health professional development program: a case study.

Tremblay, Marie-Claude¹

Richard, Lucie²

Brousselle, Astrid³

Chiocchio, François⁴

Beaudet, Nicole⁵

Affiliations des auteurs:

1Department of Family Medicine and Emergency Medicine, Université Laval, Quebec, Quebec, Canada

2Faculty of Nursing, Université de Montréal, Montreal, Quebec, Canada

3Department of Community Health Sciences, Faculty of Medicine and Health Sciences, Université de Sherbrooke, Longueuil, Quebec, Canada

4TELFER School of Management, University of Ottawa, Ottawa, Ontario, Canada

5Public Health Directorate for Montreal, Montreal Health and Social Services Agency, Montreal, Quebec, Canada

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Abstract

The health promotion laboratory (HPL – Canada) is a public health professional development program building on a collaborative learning approach in order to support long-term practice change in local health services teams. This study aims to analyse the collaborative learning processes of two teams involved in the program during the first year of implementation. Based on a multiple case study design involving observations, interviews, and documentary sources, the study: (1) describes the learning process by which each team built a common understanding of the problem at hand and developed an intervention to address it; (2) identifies factors that facilitated or hindered these processes; and (3) proposes a cross-case explanation of the collaborative learning process in the HPL. The results demonstrate that the two teams learned by expanding their repertoire of actions, albeit experiencing different processes. Results point to the central role of shared mental models and key influencing factors, such as commitment and participation (team cohesion), team climate (psychological safety), and leadership style. Unlike previous studies on team learning that concentrated on existing teams in organisations, the current research studied purposely created teams working at transforming their practices and showed that they can successfully learn if specific conditions are achieved.

Keywords: Professional development; program evaluation; team learning; public health

1. Introduction

Teams are seen as important learning units in today's health organisations (Lemieux-Charles and McGuire [21]; Decuyper, Dochya, and Van den Bossche [6]). The increasing incidence of chronic conditions, increased complexity of health issues, the need to link across practices, as well as the emergence of new models of care and population-level interventions have called for more integrated practice and collaborative work in public health and healthcare settings (Nembhard and Edmondson [23]; Nicolini et al. [24]; Thistlethwaite [32]). From a professional development perspective, it is increasingly recognised that learning is best situated within a context where individuals actively interact and learn with each other (Wenger [39]; Garet et al. [11]; Webster-Wright [38]; Thistlethwaite [32]). This approach to learning, that arises from a sociocultural paradigm (Legendre [20]), has been proposed as a promising way to foster teamwork, enhance knowledge, facilitate practice change among professionals, improve the performance of healthcare organisations in terms of patients safety and patient outcomes, and more generally to promote organisational learning (Nicolini et al. [24]; Braithwaite et al. [3]; Ranmuthugala et al. [29]; Nisbet, Lincoln, and Dunn [26]; Nisbet, Dunn, and Lincoln [25]). Despite the growing popularity of team-based and collaborative learning approaches in public health and healthcare contexts, their implementation still faces important challenges. For instance, Nembhard and Edmondson ([23]) emphasise that collaborative learning does not occur naturally in healthcare settings because of the potentially high cost of team experimentation and brainstorming, the difficulty of integrating the deeply different knowledge bases of professionals, and the well-entrenched status hierarchy in medicine. In addition to these implementation barriers, evaluation of interprofessional education initiatives and team learning remains limited, as it is

often focused exclusively on individual outcomes, and excludes the comprehensive and contingent analysis of the processes and conditions leading to learning outcomes (King and Rowe [16]; van Offenbeek [27]; Langan-Fox, Anglim, and Wilson [19]; Braithwaite et al. [3]; Thistlethwaite [32]).

The subject of this study, the health promotion laboratory (HPL – Québec, Canada), is a public health professional development program targeting health professionals from local health and social services centres (CSSSs)[1] to help them develop and implement new health promotion and prevention practices. The program aims to foster collaborative learning in newly created teams that meet at regular intervals over a long period. Participant teams are charged with exploring a public health issue (a particular aspect of population health or a health determinant), framing a common understanding of the issue, and collectively developing a new intervention to address it.

Using a multiple case study design involving two sites, the aim of this research project was to analyse the learning processes of two teams over the first year of program implementation. More specifically, this research aims to answer the following question: what are the team learning processes involved in the HPL and what factors are influencing them? To do so, the study: (1) describes the learning process by which each team arrived at a common understanding of the issue (problem) at hand and developed a health promotion intervention to address it; (2) identifies factors that facilitated or hindered these two processes; and (3) proposes a cross-case explanation of the team learning process and its influential factors.

1.1. Conceptualising the team learning process

Team learning has been defined both as an outcome and a process. For instance, many authors propose an outcome-focused definition of team learning, where learning is seen as a change in the shared mental model of the group or the range of potential behaviour and action (Huber [13]; Van den Bossche et al. [34]; Wilson, Goodman, and Cronin [40]). For others, team learning is mainly viewed as a process 'in which a team takes action, obtains and reflects on feedback, and makes changes to adapt or improve' (Edmondson [9], 129). The diversity of definitions has not facilitated consensus on the basic activities involved in team learning processes (Wilson, Goodman, and Cronin [40]). For instance, building on a case study of teams in two companies, Kasl and colleagues (Kasl, Marsick, and Dechant [15], 229; Yorks et al. [42]) developed a research-based model that describes team learning as being characterised by a set of interrelated and interdependent activities, namely: framing, reframing, experimenting, crossing boundaries, and integrating perspectives. A literature review in this domain by Wilson, Goodman, and Cronin ([40]), suggests that 'the processes of sharing, storage, and retrieval [of group knowledge, routines and behaviors] are the basic elements or mechanisms of the learning process' (1043). Drawing on an integrative and interdisciplinary review of the literature in this domain, Decuyper, Doehy, and Van den Bossche ([6]) developed an integrative and systemic

model that includes basic processes (sharing, co-construction, and constructive conflict), facilitating processes (team reflexivity, team activity, and boundary crossing), and information storage and retrieval variables. In other words, these models propose that, acquiring, sharing, interpreting, and disseminating knowledge, experience and information are central processes of team learning.

Team learning is categorised in the literature by different levels inputs, processes, emergent states, and outcomes. For instance, Decuyper, Dochya, and Van den Bossche's ([6]) integrative review distinguishes supra-system variables, system variables, and subsystem variables. Inputs of team learning at the subsystem level (team members) include prior knowledge, experience, motivation, and openness (Johnson and Johnson [14]; Argote, McEvily, and Reagans [1]; Ellis et al. [10]; Day, Gronn, and Salas [5]; Sweet and Michaelsen [31]; Decuyper, Dochya, and Van den Bossche [6]), as well as cohesion, team culture, and leadership at the system level (team) (Ellis et al. [10]; Hirst et al. [12]; Decuyper, Dochya, and Van den Bossche [6]). In addition, 'emergent states' (at the system level), which are considered to be evolving and essential side-effects of team processing, such as group potency, psychological safety, and shared mental model, are recognised as playing an important role in team learning (Edmondson [8]; Van den Bossche et al. [34]; Kozlowski and Bell [18]; Decuyper, Dochya, and Van den Bossche [6]). In addition, a whole range of supra-system inputs related to the organisation, such as organisational culture and organisational strategies, has already been shown to influence team learning (Bain [2]; Zellmer-Bruhn and Gibson [43]; Decuyper, Dochya, and Van den Bossche [6]).

In keeping with Decuyper, Dochya, and Van den Bossche's ([6]) approach, in this study we combine a process and outcome perspective on team learning, considered as a multi-level phenomenon. Our initial theoretical propositions are based on a thorough literature review on team and organisational learning theories that informed our definition of team learning, conceived as characterised by different levels of inputs, processes, and emergent states. We define the learning process as one in which information, knowledge, and experience are shared, acquired, interpreted, and actively used to generate a new common understanding of an issue (problem), and a shift in the team's approach to addressing it (e.g. intervention designed by the team).

1.2. The HPL

1.2.1. Context

Industrialised countries are currently undertaking significant transformations of their health systems, which share a common characteristic; 'the gradual integration of public health resources into health-care' (Breton et al. [4]). In 2004, the Quebec (Canada) provincial government implemented a healthcare reform that changed the face of healthcare and public

health. At the local level, the reform culminated in the creation of governance structures called CSSSs. CSSSs are structured into service departments, such as family and early childhood, school-age youth, mental health, occupational health, home-based care, and primary care. Each department is headed by a manager and composed of an interdisciplinary group of various health professionals formed to meet the needs of the service department. CSSS professionals usually have individual clinical tasks, but are often required to coordinate their work with other professionals in their department (e.g. a nurse and a social worker assigned to the same school).

The reform that created CSSSs also mandated a population-based approach to management which involves improving the health and well-being of the local population by focusing on prevention, mobilising community action, and integrating the supply of services, all based on local needs. This responsibility required the CSSSs to link public health to the provision of healthcare across a continuum of services ranging from health promotion all the way to palliative care. The reform raised a number of challenges for public health professionals, who had to incorporate prevention and health promotion activities (which can involve collective interventions leveraging social determinants of health) into their practices, usually focused on individual care and personal risks (Breton et al. [4]). In this context, team learning and teamwork appear particularly relevant because population-based strategies involve the collaborative work of a wide range of health professionals, as well as building partnerships with community level actors and policy-makers (Breton et al. [4]; Richard et al. [30]).

1.2.2. The intervention

In 2009, in order to assist the CSSSs' intervention staff in dealing with these practice changes, the Public Health Directorate for X (PHDX) (hidden for peer review), the regional public health body, designed the HPL professional development program. The goal of the program is to support, in an innovative and flexible manner, purposely created CSSS teams so that they can develop and implement new health promotion practices regarding particular issues (e.g. occupational health and student retention).

Concretely, each newly created team consists of approximately 10 participants from the same CSSS who have voluntarily accepted to enrol in the HPL. In this study, a team is conceptualised as a group of people required to complete a project or task (in this specific case, the HPL program) that operates with a high degree of interdependence, share authority, work towards a common goal, and share rewards. In the HPL, team members are professionals and managers from different backgrounds but who usually work in the same service department. The HPL builds on team learning to support the planning and implementation of a health promotion intervention. The program's operational approach, supported by specific activities, is proposed, adapted, and implemented according to each team's situation and needs (Tremblay et al. [33]). The iterative operational approach and related activities suggested to the teams is structured in seven phases, summarised in Table 1.

Table 1. Phases of the operational process and related activities.

Phase	Purpose
1	Together with the program's designers, the participating CSSS identifies a particular public health problem (designated as the 'issue') and a group of people ready to work on this problem (the HPL team).
2	The HPL team takes ownership of the proposed operational process and discusses actions to overcome constraints and optimise incentives for participating in the laboratory.
3	Team members acquire the basic concepts of public health and health promotion through reading, group discussions, and exercises.
4	The team identifies the specific angle from which they want to address the issue by exploring, analysing, and interpreting data on the population in their territory.
5	The team explores and discusses various options for interventions to address the issue from the chosen angle. They then collectively decide on an intervention project.
6	The team sets up partnerships with community stakeholders to be involved in the health promotion intervention that will be developed.
7	The team plans the implementation of the intervention by developing a logic model, conceptualising intervention tools and instruments, and setting up a coordinating committee.

The HPL program's operational approach involves three-hour team meetings held every two weeks for two to three years. The meetings take place during the participants' normal working hours, and sometimes necessitate preparatory work. A contract between the PHDX and the CSSSs stipulates that the employees must be given time by the organisation to attend the meetings. During the two or three years of the program, the team is guided, supported, and oriented by mentors from the PHDX. However, it is a participant (usually the same), supported by the mentors, who assumes the role of the moderator.

At the individual level, the HPL's expected effects include the acquisition of new professional competencies relating to health promotion, and increased reflexivity about the professional experience. At the team and organisational levels, collaborative learning is expected to culminate in the development and adoption of new health promotion practices.[2]

2. Methods

2.1. Investigation strategy

This research project consists of a process implementation analysis based on a multiple case study design involving two sites (Yin [41]). In this study, the researcher was integrated into the team that designed the program at the PHDX at the start of the implementation process in order to grasp the dynamics of the project in context and to develop a deep, comprehensive understanding of the intervention, the team, and the sites.

2.2. Selection of cases

In this case study, the cases were two HPL teams (system level of analysis) followed over a one-year period, while the analysis also took into account variables at other levels of implementation (subsystem and supra-system). The two teams observed were the first teams to implement the HPL program (team A and team B). Cases were temporally bounded by the first year of HPL implementation. These teams came from two CSSSs in the XX area, each serving a specific territory of the region. Both teams were multidisciplinary and included a combination of physicians, nurses, social workers, specialised educators, community organisers, dental hygienists, occupational hygienists, health promotion advisors, and managers (see Table 2). The teams consisted, on average, of 10 professionals and managers at different managerial levels. While participants shared similar individual profiles with regard to most characteristics (except for seniority in the organisation), the composition of the two teams differed on some points. Points on which the two teams differed prior to the start of the HPL are: average team members' seniority in the organisation (including managers' seniority), team members' service department (occupational health and safety vs. school-age youth), collaboration history of the team members, and issue chosen as the focus of the HPL (occupational health vs. student retention). Each team was guided by a different PHDX mentor.

Table 2. Characteristics of participants and teams.

Characteristics	Site A (n = 9) Occupational health	Site B (n = 11) Student retention
Theme of the laboratory		
Sex		
Women	6	8
Men	3	3
Occupation (dual)		
Managers	4	4
Professionals	5	7
Years of experience in the Health and Social Services Centre (m)	18.3 years	9.4 years
One year or less	2	0
More than one year to five years	0	4
More than 5 and up to 10 years	1	3
More than 10 and up to 20 years	2	3
More than 20 years	4	1

Participants in team A came primarily from the occupational health and safety department of the centre (physicians, nurses, community organisers, occupational hygienists, health promotion advisors, and managers). The department's initial mandate was to visit factories and companies in its service area to monitor health risks and prevent harmful exposure for the workers. This team chose to work on 'occupational health' as their issue.

Team B mostly included participants from the school-age youth department (nurses, social workers, specialised educators, community organisers, dental hygienists, public health advisor, and managers). Professionals in this department are primarily mandated to respond to the needs of the schools of the territory and, as such, distribute their time among the different schools and the CSSS. This team chose 'student retention' as the issue for their laboratory.

2.3. Data collection strategies

Data used to inform this case study were collected using multiple strategies including direct observation, documentary sources, focus groups, and semi-structured interviews with participants (Table 3). Except for the interviews, which were conducted only once and after one year of implementation, all other data were collected continuously over the year, corresponding to 17 meetings in team A and 15 in team B.

Table 3. Information concerning data collection strategies used in this study.

Teams	A	B
Participants		
Regular participants (n)	9	9
Occasional participants (n) ^a	2	2
Total	11	11
HPL sessions in the first implementation year	(January to December 2010)	(March 2010 to February 2011)
Held (n)	17	15
Cancelled (n)	0	1
Average participation rate, regular participants ^b	86.1%	79.4%
Average participation rate, occasional participants	14.2%	13.3%
Focus groups		
N	7	7
Average participation rate, regular participants	88.0%	82.5%
Average participation rate, occasional participants	14.2%	14.2%
Observation sessions		
N	7	7
Average participation rate, regular participants	88.0%	82.5%
Average participation rate, occasional participants	14.2%	14.2%
Qualitative interviews		
N	9	11
Average participation rate, regular participants	88.8%	100.0%
Average participation rate, occasional participants	50.0%	100.0%
Documentary sources		
Intern report (only one for both)	1	1
Minutes of the meetings	17	12

Teams	A	B
Missing	0	3
Mentors' logbook entries	17	15
Missing	0	0

aManagers who supervise the teams, expected to participate occasionally in the meetings.

bAverage participation rate = $(\sum \text{number of participants present} / \sum \text{number of potential participants}) \times 100$.

Documentary sources included the logbooks of PHDX mentors who guided and mentored the HPL through the process (content concerning the first year of the process). Other documents included minutes of the HPL meetings and internal PHDX reports.

Fourteen focus groups were held (seven focus groups with each team) in a 15-minute time slot reserved for exchanges between the researcher and the HPL participants at the conclusion of some of the meetings. The aim of the focus groups was to identify facilitators and constraints to the team learning process and the implementation of the HPL.

Observations (seven sessions with each team) were carried out during HPL meetings using a formatted grid to document context characteristics, team learning process, as well as facilitating and constraining factors of the process. The context of each observation session was also documented.

After one year of HPL implementation, 20 qualitative semi-structured interviews were conducted with regular (9 in each team) and occasional HPL participants (2 in each team). Only one professional declined to participate due to lack of time for the interview (site A). Also, one of the interviews with a senior manager was discarded because the participant (who was an occasional participant and did not take part regularly in the HPL) felt insufficiently knowledgeable about the laboratory to answer the interview questions (site A). Open-ended questions were used to investigate how participants had experienced the whole learning process, what they had learned from the HPL, what they saw as positive and negative elements of the HPL, and how the HPL could have been improved. All interviews were audio recorded and transcribed verbatim.

2.4. Ethics

Written informed consent for participation in the study was obtained from all the participants. Full ethical approvals were sought and obtained from the PHDX and University of XX ethics committees (hidden for peer review).

2.5. Data analysis

The analytic technique used in this study was 'explanation building' over a three-dimension process (Yin [41]): (1) a description of each team's learning process; (2) an analysis of the most important factors that influenced each team's learning process; and (3) a final cross-case interpretation to develop an overall explanation of team learning. The first author carried out the analysis, but all provisional interpretations were discussed by the research team to interpret conflictual data from different sources, explore differential interpretation, and elaborate meaning. Thus, the final modelling of team learning and influencing factors presented in this paper is a result of the meaning co-created between the different members of the team, which includes members of the PHDX. Construct and internal validity of the study were ensured by triangulation of data sources and methods, member checking, and the in-depth involvement of the researcher in the field. This involvement was conceived as facilitating an 'explanation building' analysis and the ruling out of rival explanations (Yin [41]). The analysis of two cases was meant to provide greater explanatory depth and facilitate analytical generalisation. Finally, reliability of the study was improved by the development and use of a case study protocol and the development of database and a chain of evidence (Yin [41]).

To perform the analysis, a database including all sources of data was constructed using QSR International's NVivo 8 software (QSR International [28]). Our first reading of the data from all sources served to describe the settings of the two cases. Subsequent readings were then carried out to extract information relating to the team learning process. Data were extracted on how each team acquired, interpreted, and actively used information about the issue (e.g. student retention and occupational health) to generate a new common understanding of the issue at hand, thus gradually allowing each team to develop a health promotion strategy to act on it. This analysis was drafted into a narration of the different steps the team encountered in this learning process, the choices the teams were confronted with, and their decisions. Then, a thematic analysis allowed us to identify core meanings and strong recurrent patterns, and to aggregate them into themes that categorise potential influencing factors (within-case analysis). The two team learning processes as well as their influencing factors were compared in order to refine and to develop an interpretation that was then depicted in the form of a diagram (cross-case analysis).

3. Results

3.1. The two teams' learning processes and their influencing factors

We should first emphasise that both teams learned by expanding their repertoire of actions and shared representations. However, our analysis suggests that the two teams underwent different learning processes during the first year of implementation.

3.1.1. Team A's learning process

Participants from team A chose to take part in the HPL team mainly because the HPL concept was innovative and allowed for practice change. The broad issue chosen by the CSSS was 'occupational health'. Their original vision of occupational health, which focused on risk control and occupational disease prevention, was at first very far from health promotion, which focuses on upstream determinants of positive health. The initial direction proposed early in the process was to educate young vocational students (from the territory's professional schools) about their rights and the province's Occupational Health and Safety Act. However, after a number of meetings, participants revisited the idea and decided instead to focus on the working environments of young workers, as it seemed a more effective approach. In subsequent discussions on the issue participants questioned the choice of target population, as young workers and students receive training on occupational health at school. At this point, some team members were eager to work more concretely on developing the intervention and thought too much time was being devoted to documentation. In the words of one participant: 'How long will we be setting the stage for the intervention? I am an action person and I can't wait to work on something tangible' (mentor's logbook). Nevertheless, the mentor brought them back to the core of the process. When the team incorporated feedback received from their colleagues from the service department, new areas of focus emerged. Soon, potential issues were summarised within five categories: (1) immigrant workers who did not speak French (the language of the workplace in Quebec); (2) young people who had dropped out of school; (3) unhealthy work environments; (4) students from vocational and technical programs who were about to begin working and were not familiar with their rights; and (5) new factories opening in the territory that could be more sensitised about health promotion. The team agreed on five prioritisation criteria to help them choose which occupational health issue they would address. After applying the criteria, three of the five potential issues were retained: (1) immigrant workers; (4) students; and (5) new factories opening in the territory. Then, through a documentation process in which data were collected in the field, and after frequent consultation with colleagues and managers of the department, the team developed an understanding of each potential issue and described its determinants and consequences. The final issue chosen was (5) new factories opening in the territory. Refining its vision of the intervention, the HPL team proposed to develop a health promotion counselling program to support new factories and companies as they were being established. This intervention was to be aimed at promoting healthy and supportive working environments for workers. Although participants admitted to having been somewhat confused at first by the intangible aspects of the process, after one year, they reported being confident in the HPL approach and proud of what they had accomplished.

During this first year, team members shared their experience and knowledge with each other, they acquired new information through the literature, data collection in the field and consultations with colleagues, and interpreted this information through discussions with each other and with colleagues in the department. After one year, the team had learned to distinguish between health promotion and preventive practice, social determinants of health

and individual risk factors, population intervention and individual care, and more importantly, to translate these new concepts into the context of their work and mandate. This has allowed a new understanding of the potential of their work, and repositioned their practice from one focused on individual primary prevention to one devoted to anticipative promotion of health. While learning how to systematically identify a health priority and design an intervention, team members also shifted their perception of a commonly encountered problem (occupational health) and its determinants, and found out a new way to address it.

Important factors that shaped the learning process of Team A. From the outset, participants in team A were open to questioning their professional practice and to accepting new ideas, as mentioned by one participant in an interview: 'When I agreed to take part in this project, I had the idea that we would end up doing new things. When they talked about revising practice, things like that, it was something that appealed to me' (S1_04). This openness to innovation seemed to have helped participants cope with the relative uncertainty of the approach. Most participants had an experience of teamwork and some already knew each other. Also, the managers were seniors in the organisation. The team climate was characterised by respect, confidence, and complicity. In the interview, one HPL participant observed: 'Generally, in "normal" teams, there are a lot of tensions, things like that. In this team, we feel that discussions are very easy; it is clear that [the participants] are used to working together' (S1_02). This was also reflected in the focus groups, where the discussion climate was easy and convivial.

From the start, team A's designated moderator (an HPL participant with a long leadership experience) was comfortable with the relative uncertainty of the approach. Throughout the process, he was committed and confident in the success of the approach, and relied implicitly on the designers' mentorship. Both the team and the moderator appreciated the support from the mentors, which was perceived as subtle but firm: 'When we take a little detour that [the mentor] feels is going in the wrong direction, [he] tells us why [he] thinks it's important for us to come back to our objective' (S1_01).

From the outset, team A was concerned about integrating other colleagues from the occupational health and safety department into the process. In the interview, one participant mentioned: 'I had the new concern of mobilising the rest of the department (...) when I realised that my [disciplinary] team was not part of the project. The mobilisation aspect preoccupied me as much as the issue [of occupational health]' (S1_04). At each step of the process, decisions were explained and choices were validated with those colleagues. Supported by the designers' mentorship, different strategies were used to inform and engage the rest of the department in the HPL's activities: presentations, standing agenda items at the department meetings, inviting colleagues to HPL meetings, and information to new employees about the HPL. While fostering the exchange of information about the HPL in the organisation, these activities also allowed participants to continuously refine and express what they were doing and why.

Team A's department occupied a distinctive position within the organisation, as one participant noted in the interview: 'We feel that [the department] is somewhat apart; it has its own budget, which has a surplus, whereas usually, in CSSS teams, it is more often the reverse: they go through budget cuts, things like that' (S1_02). Because of this particular set of circumstances, it was easier for the organisation to free up participants to engage in HPL activities by reassigning some of their work to others. As a result, participants were rarely absent and participated fully in the activities, sometimes even giving extra time to the outside work required by the HPL. Managerial support for the HPL came mainly from the lower- and mid-level managers who were directly involved in the HPL activities.

3.1.2. Team B's learning process

Participants in team B were initially motivated to take part in the team because of its 'school dropout' theme, an issue they often encountered in their professional activities and that is particularly prevalent in their territory. The theme was highly specific right from the start, and focused on a social determinant of health rather than a targeted health outcome. At the outset, mentors and participants agreed to use the term 'student retention' – which can be seen as a positive determinant of health from a health promotion perspective – rather than 'school dropout', but, in fact, both terms were used during the process. To begin with, the team decided to examine current practices aimed at reducing school dropout rates and promoting student retention through a documentation process in which data were collected in the field (in schools). This exercise, intended to facilitate the development of a common understanding of the issue and identify potential action pathways, generated a huge amount of information, and making synthesis a challenge. For example, one participant indicated 'I had some difficulties figuring out what we had to compare' (S2_03) (from the interview). Analysis of the data led to the identification of five school dropout determinants: (1) children with learning disabilities; (2) children going on long international leaves with their families during the academic year; (3) family issues; (4) school climate; and (5) students' socio-economic conditions. These findings were shared and validated with other colleagues and managers in the department. In subsequent meetings, the team worked on identifying two corresponding student retention strategies and action pathways for each of the five determinants. This step of the process left some participants confused; for instance, one participant said in the interview: 'It was vague; I was unable to summarise what we were doing ... I found it difficult' (S2_02). Others echoed this feeling in focus groups conducted at that time: 'The theme (student retention) is a challenge in itself. The project is unclear. I feel we're not progressing.' Nonetheless, three potential action pathways to promote student retention were finally identified: (1) promoting of the value of education in families; (2) developing a positive school–family link; and (3) strengthening the skills and competencies of parents. The team agreed on two prioritisation criteria to help them make their final choice. Following discussions among team members and after consultation with other colleagues in the department, promoting the value of education in families – which is seen as a central determinant of student retention – was finally chosen as the most desirable action pathway. At the end of the first year, the specific form of the intervention was still to be

defined. However, many participants felt the project had finally begun to take a more concrete form: 'I'm glad to have the impression that something is taking shape now, because it has taken several months' (S2_07). 'It's still a little nebulous, but now we're heading toward something clearer than when we first started' (S2_03). 'Finally, we have come to a new way to reflect about our work' (S2_05) (from the interviews). Yet, the HPL approach remained vague for some participants, who felt confused by the direction the process had taken: 'For me, the laboratory itself seems to be very loosely organized, and it puts me in an ambiguous situation that I'm not very comfortable with' (S2_02, from the interview).

During this first year, members of team B shared their knowledge and experience about student retention and school dropout, and studied this problem by examining the literature and collecting data in the field. Finally, through discussion and consultation with colleagues they identified a particular angle on which to act to foster student retention (i.e. promoting the value of education in families). Despite the sense of confusion expressed by many participants during the process, after the first year team B had a clearer grasp of health promotion, the social determinants of health, and population interventions. More importantly, the team was able to translate these concepts into the context of their specific project, with team members developing a complex representation of the causes of school dropout and the determinants of student retention. While they had not yet developed a specific intervention at the end of the first year, they had nonetheless learned how to work collaboratively on a health promotion issue and create links with partners on the field.

Important factors that shaped the learning process of Team B. At the outset, some participants in team B found it difficult to question their practice and ways of working and felt destabilised and uncomfortable with reflection, as some confided in the interviews: 'I'm used to working in preventive services with clients; to make the transition to health promotion after looking at things the same way for 20 years, that was a difficult adjustment' (S2_05). Before the HPL, team members were used to working individually in different settings (schools) and barely knew each other. In addition, at the start of the process, the manager (who was a new team leader in the department), was assigned – rather than volunteered – to participate to the HPL. As a result the team had to spend a lot of time creating a climate of confidence and complicity. Participants felt that they needed to 'build something concrete in order to develop a shared identity' (quotation from a focus group).

In team B, it seemed that the moderator's role was not clearly understood at the start. This role was assumed by more than one person, and sometimes by the recently arrived manager. There was a misunderstanding in the team about who, among the moderators and the PHDX mentors, should lead the meetings and the process. One participant wondered in the interview: 'They'd like this to be a real bottom-up project, but sometimes it seems things are not entirely clear: who will speak, who will structure what ... ' (S2_02). As a consequence, the approach taken in the first months varied from one meeting to another and lacked clear direction.

Team B planned a number of mobilisation efforts at the start of the process and discussed a communication strategy. However, these activities were slow to be implemented, and the mobilisation of colleagues from the school-age youth department received little attention. The team, which saw its work around the issue as highly complex, did not feel ready to share their project with colleagues. One participant commented in the interview: 'On our side, we're thinking as a laboratory team, but the other teams aren't involved in this reflection. (...) Maybe when it becomes clearer for us, we'll be able to bring in the others' (S2_08). The integration of input from other people in the department came at the end of the first year, when the department was involved in validating the choices made by the team.

Team B's participants came from a service department that experienced a lot of demand with limited staff. Nonetheless, the organisation strongly supported the HPL, and managerial support came from all levels. The organisation, which was considered progressive, believed in the HPL approach, as stated by the executive director of the CSSS in the interview: 'I think the HPL is an integral part of our mission and I would recommend that other CSSSs adopt such an approach' (S2_11). However, despite this supportive rhetoric, and even if participants were officially 'freed up' to take part in the HPL, the organisation did not always exempt them from their regular duties, and their work accumulated outside the Laboratory. Participants sometimes felt frustrated by this situation and were not always able to fully engage in the process: 'The HPL is worthwhile, but it involves a huge amount of time in a really busy schedule, and it is sometimes frustrating to lack the time to do the extra work needed between the meetings' (S2_03) (from the interview). A meeting was even cancelled due to a high level of absenteeism (mentor's logbook).

3.2. Final interpretation (cross-case analysis)

Even though the two teams built upon the same HPL approach, the emerging learning processes are clearly different. In both cases, there were common factors that played an important role in shaping those processes, whether by promoting or hindering the groups' learning. Table 4 compares these factors for the two teams and shows how the factors were interrelated in each site.

Table 4. Factors that influenced the learning process in the two cases.

Factors	Team A	Team B
Sub-system	Participants were open to innovation and reflection and had a long tradition of working as a team.	At the start, some participants were not ready to question their practice, and team members were used to working individually in different milieus.

Factors	Team A	Team B
System (team climate, activities)	Team climate was characterised by respect, confidence, and complicity. At each step of the process, decisions were explained and validated with other colleagues, allowing the team to continuously refine and express what they were doing and why.	The team had to spend a lot of time creating a climate of confidence and complicity. Mobilisation and knowledge dissemination activities were planned early but were slow to be implemented. The team felt confused and not ready to share its project with others colleagues.
System (moderator and mentorship)	Throughout the process, the moderator of the meetings relied implicitly on the promoters' mentorship and provided a clear direction to the process, as well as an inclusive climate of discussion.	In the beginning, the moderator's role was not clearly understood and there was a need for a more directive support from the mentors. The moderator did not feel confident in the process, and adopted a defensive stance.
Supra-system (organisation)	Because of their sub-regional mandate, the team's department occupied a distinctive position within the organisation. This flexible situation, coupled with managerial support from supervisory and middle-management levels, allowed participants to engage more freely in the HPL activities.	The school department is a regular department of the centre that experiences a lot of demand. Despite the supportive rhetoric of the CSSS, the organisation did not exempt participants from work during the HPL, because service demand was too high. Participants sometimes felt frustrated by this situation, which hindered their engagement in the process.

From these two case descriptions and the analysis, we can draw a final cross-case interpretation of the team learning process and its most important influencing factors. This interpretation is illustrated in a diagram representing the different pathways of interaction between influencing factors and the team learning process (Figure 1).

Graph: Figure 1. The figure represents the different pathways of interaction between influencing factors and team learning. From our findings, team learning in the HPL is a contingent phenomenon, building on subsystem-level inputs (e.g. team members' experiences, interests and motivations), system-level inputs, processes and emergent states (team's history, openness to new ideas and reflection, team climate, engagement and motivation, and collective understanding of the process), as well as supra-system inputs (e.g. program's approach and suggested activities, organisational culture and support).

In the first case (A), team members had a history of collaboration, the innovative and laboratory style approach of the program appealed to them, they were ready to question their practice and supported by a confident moderator; all of this led to an inclusive climate, facilitating discussion and reflection among members and increasing tolerance to uncertainty within the group (team openness to new ideas and reflection). In addition, the leadership provided by an experienced manager and the mentorship of the designers facilitated the ongoing work of the team. This mentorship also influenced the type and the range of activities put in place through the process, and allowed the team not only to acquire information and knowledge but also to share with other people in the department, providing further opportunity for the team to reflect on, and define, their project. At another level, the organisational context and the particularity of the department from which many participants came enabled high levels of participation, and allowing team members to engage deeply and freely in the HPL process. All these factors facilitated the development of a common representation of project and the team learning processes (e.g. acquiring, sharing and interpreting knowledge and experience) during the first year of implementation.

In the second case, the participants were more attracted by the theme addressed in the HPL than by its innovative formula had no previous collaboration history and were not used to teamwork. All these team characteristics made it harder for members to develop an appropriate climate for discussion and reflection. In addition, the fact that the moderator had little experience, did not choose the task but was assigned to it and did not benefit from the close support of the designers, weakened the moderation dynamic. The lack of strong moderation during meetings considerably hindered the development of a common understanding of the process by the team, and the work was perceived as more complex and convoluted. In addition, knowledge diffusion and mobilisation activities were not implemented consistently during the first year, further depriving the team of opportunities to reflect on, and articulate, its collective project. Finally, despite the explicit support of the organisation, the busy schedules of team members hindered their availability and engagement in the process. All of these factors impeded the development of a collective representation of the process, ultimately slowing down team learning itself during the first year of implementation.

4. Discussion

Findings from the study provide insight into the learning processes of two teams involved in Quebec's HPL program, and propose a cross-case explanation for the manner in which factors, at multiple levels, are linked to each other in different pathways to influence team learning. As expected, many of our findings are consistent with existing theories and empirical studies on team learning. First, our cross-case interpretation made it clear that one of the most crucial factors in the team learning process is the team's common understanding of the learning process (the perceived direction of the process). In the literature, this element relates to the concept of a 'shared mental model', an emergent state of team learning that represents 'the team members' shared, organized understandings and mental representations of knowledge about key elements of the team's task environment' (Kozlowski and Bell [18], 27). Shared mental

models have been widely discussed in the literature. Many empirical studies that investigated this concept have shown that teams with higher level of task mental model and better capacities for sense-making are more effective and perform better (Klimoski and Mohammed [17]; Mathieu et al. [22]; Van den Bossche et al. [34]; Van den Bossche et al. [35]). Consistent with these prior studies, our research, which uses a qualitative case study approach, points to the crucial and proximal role that shared mental model plays on the learning outcomes of HPL teams. Indeed, our analysis shows that this factor is the one that has more connections with all the others, and displays a proximal influence on team learning processes and outcomes, being linked to the HPL teams' capacity to engage in each step of the learning process (i.e. gathering, sharing, and interpreting information, choosing a precise target, and developing an action plan).

Our results suggest that the common understanding developed by the team (shared mental model) is a core factor in a recursive loop that facilitates learning processes and creates a sense of commitment and cohesion among team members. Team member participation behaviour and level of commitment to the HPL can be associated with the concept of 'team cohesion', which is an emergent state defined as 'the resultant of all the forces acting on all the members to remain in the group' (Van den Bossche et al. [34], 499). The link between shared mental model and team cohesion or team identification has been demonstrated in other empirical studies on team learning (Vinokur-Kaplan [37]; Deeter-Schmelz, Kennedy, and Ramsey [7]; Van den Bossche et al. [34]). For instance, Van den Bossche et al. ([34]), who built and field-tested a team learning model integrating shared cognition, demonstrated that task cohesion (i.e. a component of team cohesion related to a team's commitment to achieve a goal) plays a role in the development of shared mental model and team learning (Van den Bossche et al. [34]). Surveying 57 multidisciplinary teams in the oil and gas industry, Van Der Vegt, and Bunderson ([36]) have shown that high diversity of expertise in team was negatively related to team learning when there is low collective identification (i.e. 'the emotional significance that members of a given group attach to their membership in that group', 533), but that this relationship was positive for teams with high level of collective identity. This result is also evidenced in our study where team B's diversity of expertise and low level of commitment have played against building a shared representation of the learning process.

In addition, we found that team climate, which can be associated with psychological safety (i.e. a sense of confidence that allows interpersonal risk-taking and experimentation in team (Edmondson [8])) has a clear influence on team processes and learning. In our study, team climate and team's openness to reflection was impacted by the leadership style of the moderator (a manager in both cases), who holds a functional role in the learning process of the team by fostering or hindering psychological safety (Edmondson [8]; Langan-Fox, Anglim, and Wilson [19]; Decuyper, Dochya, and Van den Bossche [6]). Building on a survey of 23 neonatal intensive care units, Nembhard and Edmondson ([23]) arrived at a similar finding by demonstrating that an unsupportive or defensive leadership style, compared to an inclusive and supportive one, can hinder psychological safety in the team and impede free discussion and experimentation behaviour of the group.

Finally, this study is unique in that it examines the learning processes of healthcare teams that were purposely created to bring about practice change in the context of a formal professional development initiative. This specific topic is still under-researched as most of the studies on team learning focus on learning and effectiveness in existing healthcare teams (Lemieux-Charles and McGuire [21]; Nembhard and Edmondson [23]), informal opportunities for team learning in healthcare settings (Nisbet, Lincoln, and Dunn [26]; Nisbet, Dunn, and Lincoln [25]) or team learning in the context of professional education (Thistlethwaite [32]). Findings from the study have practical implications for designers of the HPL, and programs planners in the area of professional development. Mainly, the results highlight the importance of a shared mental model, and point to strategies that can be used to develop this state in a professional development context where learning is intended and directed. Findings point to the need to foster an inclusive and supportive leadership style that creates an enabling environment for the development of shared mental models. In addition, it is important that program designers and participating organisations create conditions that facilitate individual and group participation and engagement in the project, particularly in the context of long-term learning processes such as those involved in the HPL. Moreover, our results highlight the need to incorporate a wide range of activities that involve critical reflection, knowledge sharing, and collective interpretation, because these activities lead to a higher level of common understanding. Finally, designers of professional development interventions might want to add a training component devoted to facilitating mental modelling using strategies suggested in the literature, such as team interaction training, or leader briefings (Langan-Fox, Anglim, and Wilson [19]).

5. Limitations

This study has some limitations and our results must be interpreted in this context. This case study only explored the first year of the teams' learning processes. Each team had its own pace, and their evolution over the first year is not necessarily representative of the entire learning process which took place over two to three years. This case study focuses on the first two teams that took part in the program, and that might be considered early adopters therefore not necessarily representative of other teams. Also, qualitative interviews conducted with participants after the first year may have been affected by memory bias or social desirability bias. Direct observation of HPL meetings may have been influenced by the presence of the researcher in the group, but the fact that the researchers was integrated in the designers' team and was thus familiar to team members, is deemed to lessen this limit. Finally, documentary sources, such as the mentors' logbooks, were not homogeneous and varied from one to another.

6. Conclusion

In a context of rapid change in healthcare and public health, professional development initiatives based on team learning approaches are more relevant than ever. However, the actual

implementation of collaborative learning approaches present several challenges. First, the heterogeneity of professional backgrounds, experiences, and professional statuses of members makes it difficult for interdisciplinary teams to come to a shared representation of a problem and its solution. In addition, high service demands and heavy workloads make it challenging for health professionals to adopt and engage in transformative and collaborative learning processes either on a medium- or long-term basis. Moreover, keeping a sense of direction in this kind of process and sustaining a climate that enables reflection and experimentation can be difficult.

The current study showed that purposely created teams working at transforming their practices in the context of a professional development program can be successful if specific conditions are met. Results highlight the central role of shared mental models and key influencing factors, such as commitment and participation (team cohesion), team climate (psychological safety), and leadership style. Findings point to strategies that can be used to facilitate team learning processes in healthcare and public health professional development programs.

Disclosure statement

The authors of this work declare no competing financial interests.

Notes on contributors

Marie-Claude Tremblay Ph.D., is an Assistant professor in health sciences education at the Department of Family Medicine and Emergency medicine of Université Laval. Her research interests include professional development in health sciences, educational theories and participatory approaches to program evaluation and research.

Lucie Richard Ph.D., is a tenured Full Professor in the Faculty of Nursing at Université de Montréal. She is currently director of the Institut de Recherche en Santé Publique de l'Université de Montréal (IRSPUM).

Astrid Brousselle Ph.D., is an Associate Professor at the department of Community Health Sciences, Université de Sherbrooke, and researcher at the Charles-LeMoyne Hospital Research Center. She is the holder of a Canada Research Chair in 'Evaluation and Health System Improvement (EASY)' co-funded by the Canadian Institutes of Health Research and the Fonds de recherche en Santé du Québec.

François Chiochio Ph.D., is an Associate Professor at the Telfer School of Management of the University of Ottawa. His research interests include project management, teamwork and collaboration, individual and team coaching.

Nicole Beaudet M.Sc., is a project manager for the Health Promotion Laboratory at the Public Health Directorate for Montréal. She is also a clinical professor at the Department of Preventive Medicine of Université de Montréal.

Notes

1 In French: Centres de santé et de services sociaux.

2 The intervention theory (logic model) of the HPL has been evaluated in a previous study for its potential to lead to the expected outcomes. The analysis demonstrated that the program's model has great potential to achieve its intended results (reference hidden for peer review).

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