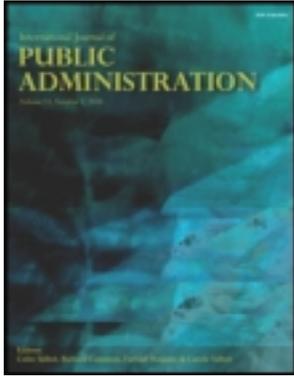


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Organizational Learning Facilitators in the Canadian Public Sector

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Organizational learning (OL) is considered to be a central element in the renewal of Canada's federal public service. What factors facilitate OL in this sector? How can these factors be measured? This study aims to answer these questions by describing the development of an instrument designed to produce a valid measure of the organizational learning facilitators (OLFs) relevant to public sector organizations. The confirmatory analysis indicated a 6-factor solution with 5 first-order factors ("knowledge acquisition and transformation," "learning support," "learning culture," "learning leadership, and "strategic management") and one second-order factor ("learning environment"). Results indicate that the OLF measure is a significant predictor of organizational outcomes.

Keywords: organizational learning, facilitators, executives, public sector, Canada, confirmatory factor analysis

INTRODUCTION

Organizational learning (OL) is a key concept in management research. Its importance is justified because an organization's survival depends on its ability to adapt to changes in both its external and internal environments, and this ability necessarily involves individual and collective learning. In the public sector, OL has the potential to become a key driver for improving policy-making capacity and public policy implementation (Common, 2004). In Canada, OL is considered a central element in the renewal of the federal public service and its ability to deliver on its mission (Government of Canada, 2001a). Like many other organizations, Canada's

public service is facing the challenge of accelerated change and is endeavouring to become a learning organization.

It is acknowledged that implementation of OL in the public service is relatively more difficult than in the private sector. Some of the factors accounting for this difficulty are organizational fragmentation, a fixation on learning outcomes assessment, the artificial separation of policies and services, and the difficulty in measuring the link between organizational learning and policy outcomes (Vince, 2000, Common, 2004). Despite these limitations, implementation of OL in the public service still requires a better understanding of the factors fostering such learning. Various theories provide us with tools for understanding these factors. However, when shifting from theory to practice, it is necessary to identify and adequately measure these facilitators in order to act on the main levers fostering organizational learning. This research report specifically focuses on this objective.

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Theories and research in public policy and organizational learning have developed separately. This separate development is illustrated in the literature review conducted by Rashman et al., (2009) by the virtual absence of references to OL in the public sector. Nevertheless, several researchers have underscored the importance of the organizational dimensions affecting policy learning in this context (Boyne et al., 2004; Common, 2004; Sabel, 2006). Much research on organizational learning stems from research conducted in the private sector (Rashman et al., 2009).

However, the two sectors differ in terms of goals, structures, activities, and stakeholders. Unlike their private sector counterparts, public sector organizations do not strive for profits but rather the production of public value for a citizenry with multiple interests. Public sector organizations operate in a complex political environment subject to a high degree of supervision, accountability, and formal political control (Hartley & Skelcher, 2008). These variants mean that the results of research carried out in a private sector context are not automatically applicable to the public sector.

Despite significant interest in OL and recognition of its importance in creating an effective public service in Canada, the Government of Canada in a recent report referred to the fact that a lack of research on OL in the public sector limits understanding of the phenomenon and the ability to act on the main lever points (Government of Canada, 2007). In 2000 and 2001, the Government of Canada set up several focus groups to obtain a better understanding of the various challenges and issues of organizational learning and develop a policy in this area. These working groups led to the formulation of a learning policy by the Treasury Board as well as several practical guides for creating a learning organization. Two key questions emerged from these groups (Government of Canada, 2001a, 2001b, 2002a, 2002b):

- a. What factors facilitate OL in the public sector?
- b. How can these factors be measured?

By identifying the main OL facilitators (OLFs) and developing a valid measure of these in the public sector, it would be possible to determine and measure the main lever points on which to act more effectively in order to create a learning organization in this environment. Such a compact but valid instrument could also be used as a research and diagnostic tool for quickly assessing how well OL activities are progressing and what effect the main OLFs are having on the public sector's organizational performance. This study accordingly aims to develop a measure of the most important OLFs for public sector-specific OL, and to evaluate its psychometric characteristics.

ORGANIZATIONAL LEARNING THEORIES

Organizational learning is based on several disciplines and schools of theoretical thought (Argyris & Schön, 1978;

Fiol & Lyles, 1985; Miller, 1996; Nonaka, 1994, 1996). As a result, OL as a conceptual construct is not subject to any universal definition, nor can it be considered a single, integrated theory. However, several authors agree that OL is a dynamic, multilevel process incorporating cognitive, behavioural, and social elements (DeFillipi & Ornstein, 2003; Rashman et al., 2009; Zollo & Winter, 2002), which affect the evolution of organizational knowledge and practices. In the public sector, OL is defined as the ability to demonstrate that the organization can learn collectively by applying new knowledge to policy and innovation processes as well as their implementation (Common, 2004).

Three dominant theoretical schools have emerged from the literature on OL. The first underscores its cognitive dimension, with OL viewed as the changes produced as a result of the reflections of individuals. This first view originates from Argyris (1957), who defined OL as the ability of individuals and, by extension, organizations to question the underlying premises of their functioning in order to address a problem through the process of double-loop learning. In contrast, single-loop learning is confined to an examination of the gaps between specific objectives and actual results. This theory makes a distinction between the espoused theory of action and the theory in use and is very applicable to the public sector policy development field.

According to Visser et al., (2010), developing a policy begins in the same way as the development of an espoused theory (e.g., a law is passed) and is then transformed into a theory in use, i.e., concrete action suited to the situations at hand when the policy in question is being implemented. Among the OL-conductive dimensions relating to this theory are: a culture of openness to experimentation, the ability of the actors concerned to challenge their frame of reference, and compatibility of the leader's values with the organizational changes (Argyris & Schon, 1978; Schein, 1996).

A second theoretical perspective emphasizes a coherent rational process that follows specific phases. This approach is based on knowledge management theories, particularly information technology models (Alavi & Tiwana, 2003). Knowledge management and OL models overlap in terms of common fundamental concepts related to learning (i.e., creation, retention, and transfer), as well as to its cognitive and behavioural expressions and how learning can be fostered at each of these stages (Alavi & Tiwana, 2003; Vera & Crossman, 2003). Knowledge management adopts a prescriptive approach by offering managers technological facilitators to foster learning at the various stages of the process.

Huber (1991) provides an operational definition of OL in terms of an underlying four-phase process:

- a. knowledge-sharing, which implies knowledge acquisition;
- b. information dissemination;
- c. information interpretation; and
- d. organizational memory.

Several authors have subsequently adopted and enriched this conception of OL (Garvin, 1993; Dixon, 2000; López Peón, J., & Ordas, 2005). In practice, each stage represents a potential area of intervention for facilitating OL (Dixon, 2000).

More specifically for the public sector, Common (2004) also suggests four phases for choosing, adopting, and implementing policies from other countries: scanning (exploring outside policy innovations); selecting (choosing policy innovations relevant to the organization); understanding (analyzing and interpreting programs and policies), and making assessments and recommendations (experience-based evaluation). Access to reliable information and policy innovation dissemination are two similar phases that combine organizational learning and policy learning (Wyatt & Grimmeisen, 2002). Among the facilitators connected to this body of theory about the public sector are: active research on how outside programs are operated; the role of boundary workers as environmental scanners; the use of experts; and the internal circulation of information on innovations (Common, 2004; Rose, 1993).

Another major school of thought that has influenced OL and policy learning thinkers deals with social learning theory (Elkjaer, 1999). The social perspective is also included in the theoretical model of knowledge creation developed by Nonaka and Takuchi (1995). In this view, OL is considered a relational activity, and not an individual thinking process. The emphasis is on how people interact and develop as members in the organization, as well as on the facilitating organizational and contextual factors of the collective learning. This constructivist perspective of OL views learning as the results of individuals participating in concrete situations that lead them to develop and share their knowledge through social exchanges. From this perspective, interaction is essential for people to interpret and give meaning to learning.

The concept of social learning is also a key element in contemporary theories of public policy-making (Hall, 1993). In this regard, Braun and Benninghoff (2003) mention that the power of the actors concerned and their interactions with both internal and external members are central to the learning involved in the various levels of change: first-order (budget adjustment), second-order (instrumentation change), and third-order (changes in economic philosophy). For his part, Rose (1993) argues that common experience is the starting point for the reflexive process leading to knowledge-sharing and collective learning. He provides a methodology for taking advantage of lessons learned and suggests seven specific stages representing sources of obstacles or facilitators in the process of transferring a program coming from the outside.

In short, adopting a social perspective of OL requires exploring the context of the social activities (e.g., dialogue and collective action) in which learning takes place and the conditions and actions supporting it (e.g., management practices). According to this model, all organizational activities

that support tacit or explicit knowledge-sharing among individuals (e.g., teamwork) foster organizational learning.

In view of the preceding discussion, each body of theory clearly suggests conditions that facilitate the emergence and support of organizational learning. These conditions relate, respectively, to individual dimensions (e.g., values, actor capacities and leader behaviours), process dimensions (e.g., information acquisition and innovation dissemination), collective dimensions (e.g., sharing lessons learned) and organizational dimensions (e.g., information systems and management practices).

Organizational Learning Facilitators

Like any organization, the public service needs to identify the most effective means of creating, sharing, and interpreting knowledge, as well as of coordinating and conserving the knowledge that individuals possess (Jensen, 2005). Although the outside environment exerts pressure on organizations to become learning organizations (e.g., policy innovations), these outside contingencies do not create organizational adaptation. It is the actors concerned, (e.g., leaders, teams, and communities of practice) and the internal interventions (e.g., processes, programs, practices, and systems), which act on the organization's capacity to adapt and innovate (Yeung et al., 1999; DiBella, 2001). It is up to the organization to adapt to the external contingencies and not the other way round. In other words, it is primarily the organization's internal conditions that need to be considered.

Some researchers have focused on the conditions or internal facilitators of learning. Depending on organizational type, these authors consider strategic positioning and the choice of innovative strategies and technologies as learning antecedents, whereas Finger and Brand (1999) suggest that structural arrangements (e.g., small work units or a centralized hierarchy) are essential requirements for increasing learning capacity in individuals and groups. Several authors also underscore the importance of learning facilitators that are more closely associated with the immediate work environment, such as teamwork, supportive behaviour, the supervisor's leadership, the work atmosphere, horizontal communication, participatory decision-making processes, mechanisms to take advantage of lessons learned, and the existence of a formal learning support policy (Pisano, Bhomer, & Edmondson, 2001; Fiol & Lyles, 1985; Rose, 1993; Bierly & Chakrabarti, 1996; Mikkelsen, Saksvid, & Ursin, 1998; Spencer, 2003;).

In some cases, OLFs are management practices designed to stimulate thinking, such as those associated with individual or organizational performance evaluations or even skill acquisition through staff selection and training (DiBella, 2001). Lastly, some experts are interested in the actions involved in information and knowledge processing (Jensen, 2005). However, many of these OLFs are based on the theoretical analyses by the authors concerned and not on

empirical research or validated measures. That is why there is a whole area of psychometric research to be pursued.

Furthermore, given that some of these facilitators have been identified in private sector organizations, it needs to be verified whether they are appropriate for supporting OL in public sector organizations. As DiBella (2001) points out, while it is illusory to think that OL-conducive practices are universal, it is essential to take into account the differences between organizations in terms of their constraints, limitations, and other circumstances.

The Canadian Federal Public Service as a Context for Organizational Learning

In 2002, the Canadian federal public service adopted the *Policy for Continuous Learning in the Public Service of Canada*. This policy sought to restructure development and training activities around the specific objective of facilitating OL within the organizational context of the Canadian federal public service (Government of Canada, 2002a). This policy emerged as the result a thorough reflection process on the relevance of integrating and translating principles of organizational learning research its daily operations (Canadian Centre for Management Development, 2000, 2002). Executives from this organization were targeted as the main organizational actors in charge of the implementation of the policy. Executives represent a distinctive occupational group encompassing positions from regional directors (EX1) to assistant deputy ministers (EX4-5) defined by the exercise of executive managerial, advisory, or policy roles and responsibilities in the direction of departments or organizations (Government of Canada, 1999). Data from the most recent census specific to the executives as an occupational group indicated that nearly 8,500 executives were part of the core public administration out of 192,000 employees in 2007 (Treasury Board, 2007, 2011).

Hence, the case of the Canadian federal public service constitutes a unique and highly valuable organizational setting to investigate OLFs where organizational learning as a codified phenomenon may have influentially contributed to shape executives' daily routines and tasks for the past decade. Based on qualitative and quantitative data from executives from the Canadian federal public service, this study's objective is to identify the main OLFs in the public sector and develop a corresponding measurement instrument that can be used for diagnosis and research in public sector organizations.

METHODOLOGY

Study 1. Content Validity Study: Generating Items

Because there is virtually no empirical research on measuring OLFs in the public sector, we opted to develop items

based on the public sector itself, using complementary qualitative and quantitative methods. In the first stage of this process, a qualitative approach based on the grounded theory paradigm was used to define what OL constitutes in the public service environment, as conceived by the organization's actors, and then to explore from their perspective the conditions facilitating OL in this environment.¹ The rationale for adopting an exploratory qualitative approach was motivated by the paucity of knowledge about the specific nature of the public service organizational environment in terms of how it possibly shapes the organizational learning process in a distinctive way (Creswell, 2003).

Participants

A purposeful sample of 37 senior executives from a wide variety of grade levels², departments, and geographic locations was constituted in 2003 as part of a qualitative follow-up of volunteering respondents from a previously conducted epidemiological survey of executives from the Canadian federal public service (APEX, 2002). Executives had on average 25 years of experience in management positions with responsibilities that entailed developing OL capabilities in the federal public service in Canada.

Procedure

Semi-structured interviews were conducted among executives asking them about their definition of OL in their environment, and on the OLFs involved and their impacts in their environment.³ These interviews, administered either face-to-face or by telephone, lasted approximately 60 minutes each. These were also recorded and transcribed into verbatims and validated for their bilingual content. Interview content was analyzed using NVivo 2.0 software for data analysis and retrieval (QSR International, 2002).⁴ The

¹The qualitative approach is phenomenological in the sense that emphasis must be placed on the actors' experience in order to prevent researchers from imposing their own *a priori* scheme of reference in the emergence of information (Glaser & Strauss, 1967).

²The EX occupational classification represents to the highest levels of management in the Canadian public service.

³The following questions were asked:

- a. Describe in your own words what OL consists of?
- b. Could you illustrate this point with a specific example?
- c. What are the prerequisites for OL in your organization?
- d. In your opinion, what are the main facilitators of OL in your organization?
- e. From an individual and organizational standpoint, what are the factors confirming that OL has taken place in your organization?

⁴NVivo is a qualitative data analysis (QDA) computer software package produced by QSR International. It has been designed for qualitative researchers working with very rich text-based and/or multimedia information, where deep levels of analysis on small or large volumes of data are required.

content analysis followed the principles of grounded theory (Glaser & Strauss, 1967) with a multiple coding procedures (i.e., open and axial coding). To assess the validity of the coding procedure, two researchers independently classified interview content on the basis of the dimensions that emerged (Cohen's kappa = .81).

Results

From these semi-structured interviews, a preliminary bank of items for the OLF instrument was generated. Overall, 180 items from this analysis were developed and grouped into ten categories covering key environmental and process situations acting as OLFs. These categories are:

- a. organizational culture;
- b. management and leadership;
- c. the context and job design;
- d. interactions at work (both between co-workers and between employees and their supervisors);
- e. control systems;
- f. human resource management (HRM) systems (e.g., the staffing system);
- g. organizational support for learning;
- h. learning acquisition processes;
- i. information dissemination processes; and
- j. reflection processes.

Study 2. Item Analysis Study

In order to initiate a reduction and validation of the OLF instrument that comprised 180 items in Study 1, an expert panel was constituted in Study 2. The constitution of an expert panel was retained as an independent validation strategy to further ensure that the OLF instrument adequately reflected the specificity of the organizational learning process as taken from the public sector's organizational setting.

Procedure

In the first stage, experts analyzed the content to reduce the number of items and select only the most relevant and observable items.⁵ Nine experts familiar with OL evaluated the extent to which each action (item) has the potential to facilitate OL in the public sector (0 = not necessary for developing OL; 1 = useful for developing OL; and 2 = essential for developing OL). The development of a scale on which the items are clear, concrete and easily observable, contributes to the accuracy and the validity of the measurement (Converse & Presser, 1986). In the second

⁵The experts familiar with the OL concept consisted of 5 professors in an OL research project, one consultant involved in introducing OL into a public organization, and 3 senior managers familiar with the public service.

stage, the same panel of experts indicated the extent to which each item could be observed in the workplace (0 = very difficult for a manager to evaluate or observe; 1 = sometimes possible for a manager to evaluate or observe; and 2 = easy for a manager to evaluate or observe). The content validity ratio (CVR) (Lawshe, 1975) was calculated for each item with respect to its content validity dimension (relevance and observability).⁶

Finally, in the third stage, the questionnaire was administered to $N = 752$ managers and executives working in the Canadian public service. Of these, 53 percent were executives (EX level) and the remainder middle management; 77 percent had more than 5 years seniority in the federal public service; 57 percent were male; and 95 percent had a post-secondary degree or diploma.

Results

In total, 61 items were selected with each item having a CVR equal to or higher than .78. No item concerning control systems or HRM systems (e.g., the staffing system) obtained a sufficiently high CVR to be selected. Analysis reveals that these items are mainly related to hiring, compensation and performance evaluation practices. Since these practices have an individual rather than a collective character, it would be fair to say that these practices do not involve much exchange of knowledge at the collective level, which is a central element of the OL concept. The number of items selected at this stage for the OLF content dimensions were 7 for organizational culture, 8 for management and leadership, 4 for work context and job design, 11 for workplace interactions, 8 for organizational support to learning, 15 for information acquisition and dissemination processes, and 8 for reflection processes. From the managers and executives surveyed using internal consistency analysis, the only items selected were those that contributed the most to the scale's internal consistency in the EFA (explanatory factor analysis). In all, 29 items dealing with OLF were retained yielding excellent reliability (Cronbach's alpha = .96).

Study 3. The National APEX Survey

Study 3 sought to offer an exhaustive psychometric validation (i.e., EFA, CFA, construct and nomological validity) of the final, 29-item OLF scale through a large epidemiological survey made up exclusively of executives.⁷

⁶ $CVR = (n - N/2)/N/2$ where n = the number of panellists who rated the item as 1 or 2 and N the total number of respondents. This procedure uses a majority vote to validate a given item's content. The CVR coefficient is interpreted as a correlation index.

⁷EFA is a statistical technique to achieve data reduction through a series of statistical parameters in order to achieve a sound representation of a given latent construct either through a simple (unidimensionality) or more complex (multidimensionality) configuration of its constitutive items.

TABLE 1
Percentage of the sample compared with the Canadian federal public service's population

	Gender		Hierarchical level					Age categories					
	Male	Female	EX1	EX2	EX3	EX4	EX5	≤40	40-44	45-49	50-54	55-59	≤60
Population	58%	42%	53%	24%	17%	4%	2%	8%	13%	22%	28%	20%	6%
Sample	55%	45%	55%	22%	17%	4%	2%	5%	13%	26%	33%	18%	5%

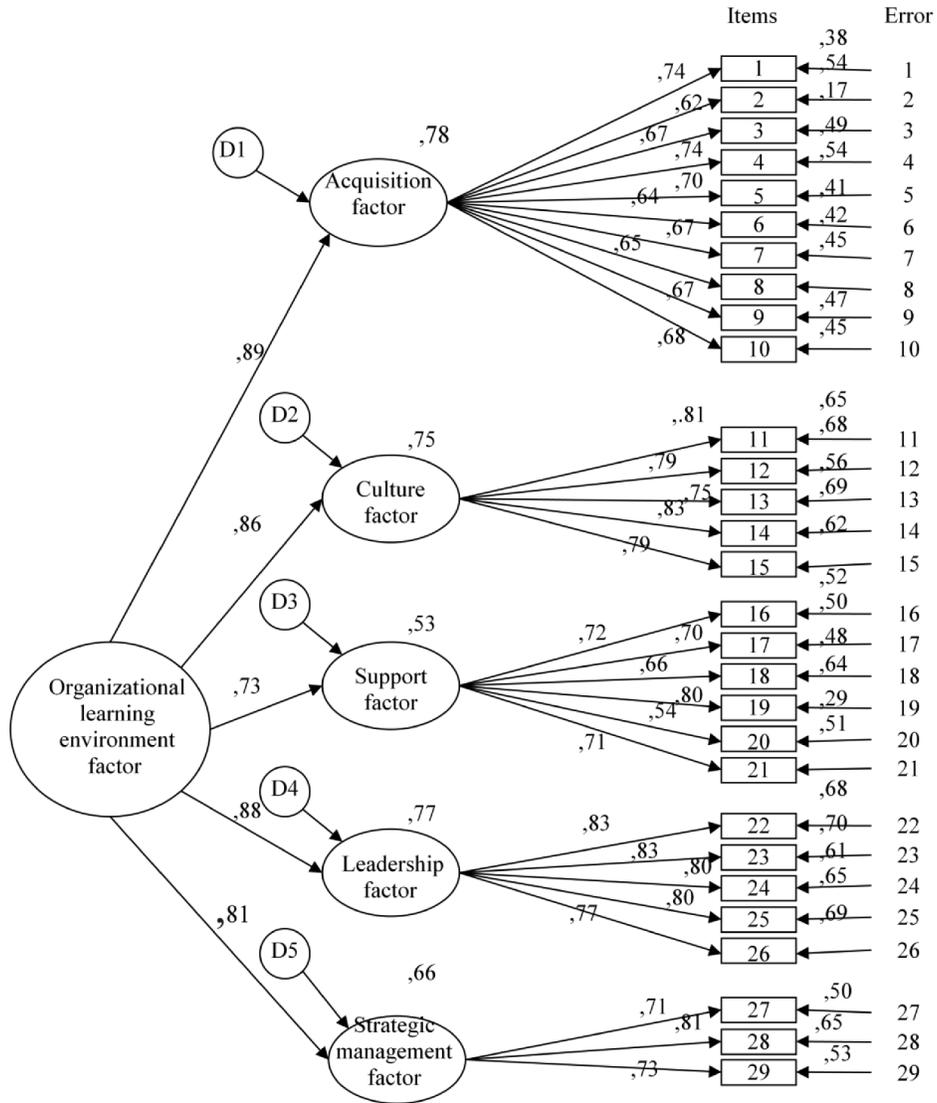


FIGURE 1 Final model of factorial structure of Organizational learning facilitators factors.

Participants and procedure

The 29-item scale was included in APEX's national survey in 2007. In total, $N = 5,202$ executives working in the Canadian federal public service received a self-administered anonymous questionnaire for a response rate of 40.0 percent ($N = 2,081$). Table 1 shows the percentage composition

of the sample compared with the federal public service's overall proportion of executives. The respondent profile was representative of the EX population in the core public service for all major factors: age, gender and grade level. All comparisons are based on Canada Public Service Agency data for executives.

Results

Exploratory factor analysis (EFA). As generally recommended by Brown (2006), an exploratory factor analysis (EFA) with varimax rotation (ML) was performed on the 29 items for one half of the sample (n = 1,040). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy showed adequate fit (KMO = .96). Two criteria were used to determine the factor structure:

- a. selection of items with a factor loading equal to or greater than .40, and;
- b. exclusion of items with double loadings.

No item was excluded. The 5-factor solution explained 56.13 percent of the total variance. The first factor, Knowledge Acquisition and Transformation, consisted of 10 items explaining 15.76 percent of the total variance. The second factor, Organizational Learning Culture, accounted for 11.76 percent of the variance. The third (Organization Learning Support), fourth (Learning leadership) and fifth (Strategic Management) factors explained 11.23 percent, 11.09 percent and 6.32 percent, respectively, of the total variance. Factor loadings ranged from .42 to .73. The reliability, means, standard deviations, factor loadings for the 29 items loading significantly on these 10 factors are shown in Table 2.

TABLE 2
Organizational learning facilitator factors

<i>Variables</i>	<i>M</i>	<i>S.D.</i>	<i>Loading</i>	<i>Alpha</i>	<i>Explained variance</i>
KNOWLEDGE ACQUISITION AND TRANSFORMATION				.909	15.76 %
1. Horizontal structures encourage sharing between units or the entire department/agency	2.97	1.09	.504		
2. New ideas are quickly disseminated throughout the entire department/agency	2.54	.95	.622		
3. There are systems for distributing information in an easy-to-understand, accessible format	3.00	1.01	.607		
4. Useful work practices are shared between employees	2.95	.94	.621		
5. Managers ensure that information is disseminated throughout the entire department/agency	3.02	.98	.606		
6. There is examination and reflection to analyze why a project succeeded or failed	2.74	1.02	.599		
7. There is a regular assessment process of objectives, activities, methods and resources	2.96	1.03	.572		
8. We inform others of lessons learned from past actions	2.87	.97	.637		
9. My organization makes key information available through our information system	3.14	.96	.502		
10. My organization makes review reports available in anticipation of change	3.03	.93	.510		
ORGANIZATIONAL LEARNING SUPPORT				.862	11.76 %
11. There is concrete support (time, resources, budget and tools) for learning or professional development	3.15	1.11	.751		
12. Employees are given training if they have learning needs	3.62	.93	.815		
13. The training methods available are flexible (e-learning, distance education, etc.)	3.62	.97	.675		
14. Emphasis is placed on long-term professional development	3.04	1.06	.628		
15. We have access to internal and external coaching	3.04	1.15	.427		
16. We are able to apply at our work what we have learned in training			.527		
ORGANIZATIONAL LEARNING CULTURE				.895	11.23 %
17. My organization is generally open to change and innovation	3.33	1.01	.649		
18. My organization encourages sharing and mutual assistance (sharing of information and ideas)	3.40	.94	.545		
19. My organization accepts that formal rules may be questioned as to their utility and value	3.07	1.02	.646		
20. My organization encourages an experimental attitude	2.86	1.02	.731		
21. My organization perceives any changes as an opportunity, not a threat	3.08	.97	.691		
LEADERSHIP OF LEARNING				.913	11.09 %
22. Senior managers encourage subordinates to try new ways of working	3.31	1.05	.593		
23. Senior managers are open to different ideas and dialogue	3.24	1.05	.614		
24. Senior managers expose us to ideas that help me question the way I do things	3.15	1.01	.733		
25. Senior managers encourage us to look at situations from different angles	3.33	1.00	.722		
26. We are able to find new ways of doing things, new values or new structures that enrich our learning	3.16	.97	.530		
STRATEGIC MANAGEMENT				.786	6.23 %
27. There is consistency between senior management's objectives and the way work is implemented at lower levels	3.28	1.07	.456		
28. Management decisions are effectively communicated to employees	3.21	.99	.738		
29. Strategic objectives are clear	3.37	1.04	.509		
TOTAL VARIANCE EXPLAINED					56.07 %

Confirmatory factor analysis (CFA). A confirmatory factor analysis was run on the second half of the sample. Using AMOS 18 (Arbuckle & Wothke, 2010), multivariate normality (skewness, kurtosis) was examined, and using the benchmark ± 2.0 , no items exhibited significant skewness. The multivariate kurtosis critical values were all below 8.00 which indicates acceptable non-normality, supporting the normality assumption for all variables (West, Finch, & Curran, 1995).⁸ Outliers were examined with the Mahalanobis distance statistic. No cases were deleted. Based on the EFA, three models were specified in which 10 items loaded on the latent variable Factor 1, 5 on Factor 2, 7 on Factor 3, 5 on Factor 4, and 3 on Factor 5. The fit indices for the three models are shown in Table 3.

The fit indices for Model 1 indicated a poor fit (χ^2 (366) = 7129, GFI = .76, CFI = .81). Results indicated that Model 2 (χ^2 (356) = 1095.61; GFI = .93, CFI = .96) and Model 3 (χ^2 (361) = 1197.54; GFI = .94, CFI = .96) showed comparatively good fits. We can conclude that Models 2 and 3 show two valid ways of representing the data. Figure 1 shows the specifications for Model 3. All the path coefficients were statistically significant and positive in direction.

Construct validation: Gender and hierarchical level analysis. Executives' gender and grade levels might be relevant variables *vis-à-vis* organizational learning. In the

TABLE 3
Fit indices for competing models of the organizational learning facilitator structure

Fit Index	First-order CFA model			Second-order CFA model
	Null Model	Model	Model	Model
		1 Five-Factor non-correlated	2 Five-Factor correlated	
χ^2	18,328.85	3845.60	1095.61	1197.54
df	406	366	356	361
χ^2 /df	45.14	10.57	3.07	3.31
RMSEA	.20	.10	.03	.04
SRMR	.40	.34	.04	.04
GFI	.16	.76	.93	.94
AGFI	.10	.71	.91	.91
TLI	.00	.79	.95	.96
AIC	18,386.85	7267.57	1723.42	1725.46
CFI	.00	.81	.96	.96

Note: RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; GFI = goodness-fit-index; AGFI = adjusted GFI; TLI = Tucker-Lewis Coefficient; AIC = Akaike Information Criterion; and CFI = comparative fit index.

⁸For practical purposes, very small multivariate kurtosis values (e.g., less than 1.00) are considered negligible, while values ranging from 1 to 10 often indicate moderate non-normality. Values that exceed 10 indicate severe non-normality.

psychometric literature, construct measurement bias means that a test measures something different in one group than in another (Costello & Osborne, 2005). If so, then group membership moderates the relations between the indicators and the latent variables specified in the measurement model. To verify the stability of the model analysis between groups, as recommended by Brown (2006), we first created balanced groups based on gender and grade level, and then verified the stability of the factor structure.

In general, indicators (Table 4) are comparable between male and female respondents, as well as between the two hierarchical levels, thus suggesting that the model's structure is stable between the two group categories. Although there is a decline in some fit indicators, the fact of having substantially reduced the sample in order to obtain balanced groups could explain this result.

Nomological validity. According to Cronbach and Meehl (1955), the development and verification of a chain of conceptual inference is required to validate a given scale's constructs. Linear regression analyses were performed to verify the relationship between the five OLFs and the three outcome variables, i.e., a measurement of individual learning composed of 5 items (e.g., "In my organization, I regularly learn information useful for my work"), a measure of 4 group learning items (e.g., "In my organization, the quality of the team's results is continuously improving") and lastly, a measure of 3 organizational impact items (e.g., "my organization adapts to change when faced with external pressure").⁹ These scales were developed on the basis of the

TABLE 4
Fit indices for competing models of organizational learning facilitator structure in terms of gender (n = 933) and hierarchical level (n = 279)

Fit Index	Six-Factor CFA model		Six-Factor CFA model	
	Female	Male	Middle management	Senior management
RMSEA	.046	.048	.059	.044
SRMR	.042	.043	.056	.050
GFI	.924	.922	.852	.878
AGFI	.908	.906	.821	.853
TLI	.951	.946	.914	.953
AIC	1233.01	1273.17	857.30	706,660
CFI	.956	.956	.923	.958

⁹Although this study does not specifically validate this scale of measurement, it is important to note that we have taken care of prior assessment parameters to measure of this instrument's psychometric properties. As such, the results observed following the confirmatory factor analysis indicate a good fit to the data (GFI = 0.95, CFI = 0.95, TLI = 0.94; RMSEA = 0.06). For these measurement scales, coefficients of internal consistency (Cronbach's alphas) obtained are 0.83 (individual learning), 0.80 (group learning), 0.85 (organizational impacts).

responses provided in the interviewees from Study 1 who responded to the question asking about the visible impacts of OL in their organization. The research team grouped these items under three dimensions on the basis of their content proximity. The reliability of each of these scales is superior to .80. It was expected that the OLF factors would be significantly and positively related to the various forms of organizational learning outcomes. Table 5 shows the results of these analyses.

The standardized regression coefficients were all statistically significant and in a positive direction. Results show that the OLF factors were associated with the outcomes in distinctive ways. The magnitude of the variance explained (R^2) suggests that individual learning is mainly predicted by “knowledge acquisition and transformation” ($F(1, 2079) = 126.01$), “learning leadership” ($F(2, 2078) = 85.58$) and “organizational learning support” ($F(3, 2077) = 64.94$). These results suggest that the organizational learning process (acquisition, dissemination, and evaluation) is mainly responsible for learning at the individual level. In terms of group learning, it is mainly “organizational learning culture” ($F(1, 2079) = 137.87$) and “organizational learning support” ($F(2, 2078) = 115.84$) that encourage employees to seek community learning opportunities and generate new ideas or approaches. Finally, the most important result concerns the effect of all factors on the

“organizational learning outcome” variable. Indeed, 53 percent of the variance on this last dimension is explained by the 5 factors. These results suggest that OLF measurements have significant effects on a given organization’s outcomes, i.e., its ability to anticipate and solve problems, incorporate its decisions in systems and processes, and eventually adapt to its environment.

DISCUSSION

This research constitutes one of the few studies to combine qualitative and quantitative approaches in analyzing the OL phenomenon. To our knowledge, it is also the first that focuses on systematically identifying OLFs in the public service community on the basis of a qualitative approach that draws on the actual experience of the organization’s executives.¹⁰ The use of a substantial sampling of senior public service executives is particularly valuable, given these actors’ special vantage point in identifying these facilitators. In addition to confirmatory analyses, nomological analyses can also be used for further support in validating the construct concerned.

This research was designed to develop a sound instrument for measuring OLFs in the public sector. The study followed a systematic process designed to develop a valid OLF measurement scale. Initially, 180 organizational learning-related items were developed on the basis of qualitative semi-structured interviews conducted with 37 executives. Nine experts then reduced this number to 61 items. The psychometric characteristics of these items were then studied in 752 Canadian public service executives to reduce them to 29. These items were then subjected to factorial (EFA) and confirmatory (CFA) analysis with two other samples of senior managers in order to identify and confirm the existence of 6 organizational learning factors, i.e., 5 first-order factors: “knowledge acquisition and transformation,” “organizational learning support,” “organizational learning culture,” “learning leadership” and “strategic management,” plus one overall factor: “learning environment.”

The study findings show that the instrument developed to measure OLFs has a high construct validity level and that the factors show a high internal consistency level. The results confirm that OLF is a multi-factor construct. The factorial structure is stable between subsamples regardless of whether randomly selected or composed of groups of men and women or even middle and senior managers. This attests

TABLE 5
Regression of organizational learning factors on organizational learning outcomes

Dependent variables OL outcomes	Independent variables (stepwise) OLF factors	B	F***	$\Delta R^2_{adjusted}$
Individual learning	Knowledge acquisition and transformation	0.21	126.01	.057
	Learning leadership	0.12	85.58	.075
	Organizational learning support	0.12	69.94	0.09
	Strategic management	0.08	56.89	0.10
	Organizational learning culture	0.08	48.60	0.11
Group learning	Organizational learning culture	0.22	137.87	.062
	Organizational learning support	0.19	115.84	0.10
	Learning leadership	0.13	92.90	0.11
	Knowledge acquisition and transformation	0.11	77.79	0.13
Organizational impact	Organizational learning culture	0.42	779.31	0.42
	Knowledge acquisition and transformation	0.40	625.80	0.23
	Strategic management	0.19	606.23	0.47
	Organizational learning support	0.19	531.29	0.50
	Leadership of learning	0.17	473.78	0.53

*** $p \leq .001$.

¹⁰Bapuji and Crossman (2004) emphasize the need for more qualitative studies on OL in order to produce theories based on the reality of the environments involved. Only two empirical studies out of the 55 listed by these authors combined both qualitative and quantitative approaches in researching the OL phenomenon.

to robust measurement. Also the measure's construct validity was convincingly demonstrated with the three impact measures (individual, group and organizational) and the nomological path.

The first conclusion from our results is that the factors identified cover both process and environment, thus supporting the view that OLFs cannot be dissociated from the context in which the process takes place. A complete measurement of OLF must therefore include both elements.

Five first-order dimensions emerged. The first concerns "Knowledge Acquisition and Transformation," which is a process factor. Compared with the other factors, it is the most important in terms of explaining not only variance but also nomological validity. It is the factor that most convincingly explains two of the three dependent variables: "individual learning" and "organizational impact." The content of this factor combines the process elements proposed in the models of Huber (1991) and Dixon (2000), and covers the five stages of organizational learning: information and new knowledge acquisition; sharing, interpreting, and discussing this information among employees; reflecting to evaluate decisions and outcomes; and, storing and extracting information from organizational memory.

The four other factors are environmental elements conducive to individual and collective learning. Three of these factors — "organizational support for learning," "organizational learning culture," and "learning leadership" — are equally important in terms of explaining variance.

The "Organizational Support for Learning" factor represents a concrete effort by the organization in terms of means being deployed (e.g., budgets, resources, training, coaching, etc.) to support its employees' learning and professional development in various forms (e.g., training, coaching and e-learning). For the public service organization, this entails a genuine investment of time and both financial and human resources in order to give employees an environment that motivates and supports them in their continuous learning. Indeed, it is difficult to imagine that any organization can become a learning entity, if it does not invest in learning, given that more training and coaching are not sufficient in themselves to achieve organizational learning. The knowledge and skills acquired by employees during training or coaching sessions should be shared with their co-workers. Knowledge sharing and its corollary, the emergence of collective meaning, is a fundamental element of the organizational learning process (Dixon, 2000; Kang, Kim, & Chang, 2008).

Furthermore, organizational support creates internal motivation for learning and increases the likelihood that new knowledge will be shared between employee groups. The nomological validation results show that this factor helps to stimulate learning, particularly at the working group level. This factor also involves creating conducive conditions for learning transfer. Any investment in learning will be ineffective if no transfer of the acquired learning takes place.

Without transfer of acquired learning, both individual and group learning will quickly be lost due to lack of use. Transfer of acquired learning represents a prerequisite, albeit insufficient, to obtaining OL. It is insufficient because it does not guarantee that learning will go to the collective level. However, everything that is conducive to learning transfer increases the likelihood that this new knowledge will extend to the rest of the organization.

The third factor concerns "organizational learning culture." The importance of creating a "learning culture" has been emphasized by several authors who have studied organizational learning in the private sector (Daft, 2001; Schein, 1996; Yeung, Ulrich, Nason, & Van Glinow, 1999). For Dixon (1994), learning culture consists of a set of meaningful collective structures that an organization's members use to interpret the nature of their world and their relationship to it.

Organizational culture is also associated with a form of implicit information storage — the organizational memory that guides the behaviour of an organization's members (Huber, 1991). The knowledge contained in this organizational memory affects how new knowledge and information is acquired and processed (Walsh & Ungson, 1991). In our study, this factor concerns a set of conditions or actions such as tolerating mistakes, questioning established rules, and being open to experience and change. This factor also entails encouraging mutual aid and multiple ways of sharing ideas, which can be expressed through encouragement for the development of "citizenship behaviour," defined as employees' willingness to go beyond their assigned roles, particularly in terms of social mutual aid (Podsakoff, Mackenzie, Paine, & Bachrach, 2000). A learning culture has a powerful impact on organizational learning by facilitating the creation of a workplace conducive to exploration, experimentation, constructive feedback, open communication, and tolerance of ambiguity. As Senge (1990) points out, such a culture encourages innovation through generative learning by enabling the organization's members to expand their capacities, anticipate the community's needs, and improve the ways in which operational and organizational problems are solved. The importance of this factor in the public sector is confirmed by the nomological validity obtained that identifies this factor as the one most closely linked to group learning.

The fourth factor concerns leadership. Many researchers recognize the effect of leadership on organizational learning (Dixon, 2000; Garvin et al., 2008; Goh & Richard, 1997). Based on our results, leadership plays a crucial role in organizational learning insofar as it is the manager's responsibility to create and maintain a learning-conducive environment. Whereas the concept of culture is situated at the macro level, the leadership measured here becomes meaningful in an operational context. Leaders' day-to-day behaviour sets the example and gives concrete form to organizational values. Leadership and team work are thus very

closely linked and play a crucial role in establishing the connection between individual and organizational learning (Akdere, 2006; Ellinger, 1999; Yeo, 2006).

In our study, this factor consists of a set of leadership behaviours that creates a context of willingness to take risks and openness to dialogue and debate and sharing viewpoints. This factor also includes the leaders' capacity to empower their employees with ideas. Moreover, the leaders' expertise in nurturing reflection, their cognitive aptitude for analyzing situations, and their creative capacities for exploring situations are all apparently underlying dimensions of this factor. Learning leadership is thus linked not only to interpersonal skills but also to cognitive abilities to stimulate thinking and question established procedures, while giving employees the basic security to experiment and take risks. This factor also suggests that leaders possess a level of personal security, flexibility, or self-confidence to remain open to ideas that differ from their own. As can be expected, because of the unique role that leaders play in their employees' development, the nomological analyses show that this factor is the one most closely linked to individual learning.

The fifth factor, "strategic management," refers to exchanging key information with employees about the organization's direction (mission, vision, and objectives). The importance of this factor is based on the fact that employees need to understand how their work contributes towards achieving the organization's mission and receive help in identifying the gap between the prevailing situation and the targeted one in order to make the corrections necessary.

However, this understanding is supposed to be more than a simple awareness of the gap. In fact, when this understanding permeates the organization and is genuinely discussed and interpreted by both individuals and working groups, it becomes transformed into knowledge that helps the organization's members direct their actions and evaluation procedures and assess their results together. But a simple message from senior management is not sufficient to produce this outcome. To create collective learning, this exchange must take place regularly and be supported by internal integration mechanisms at all levels of the organization. In the public sector environment, frequent political changes, decision-making uncertainty, and many hierarchical levels make it more difficult to install OLFs linked to this factor. It was surprising to discover in our nomological analyses that this factor did not predict group learning in any way. One possible reason for this is that the relatively few items chosen for measuring this factor were not sufficient to adequately identify the degree of this factor's real significance. By enriching this factor in a subsequent version, we will be able to verify this hypothesis.

The development of any measurement instrument entails limitations and is an iterative process. Wishing to develop a short, convenient and inexpensive instrument, we reduced the number of items as much as possible, thereby inherently increasing the possibility of specification errors, i.e.,

eliminating items that could have made an additional contribution towards predicting or extracting other factors. This limitation is inherent in all measuring instruments, but has been minimized in this research project by the identification of specific items in the environment and by a systematic evaluation of each item in terms of its theoretical connection to the level of analysis targeted: the organization.

Another limitation concerned the common variance resulting from the collection of data from the same participants in order to verify the nomological network. Further, despite evidence of the instrument's construct and convergent validity, the discriminating nature of the five factors needs to be explored further by conducting additional studies to cross-validate the instrument's validity in various organizations. Additional studies are also needed to verify in the public sector the relationship of OL factors to individual and collective organizational performance measures, such as quality of service to the public or speed of adaptation to new legislation. Lastly, it is recommended that the measure be used to predict a series of organizational performance indicators that are both objective and systemic.

CONCLUSION

In the past, public policy researchers have underscored the need to take into consideration the combination of rational and non-rational processes for a better understanding of organizational learning in the public sector (Braun & Benninghoff, 2003). The facilitators identified in the research described in this report belong to both these types of process and are reflected in the Organizational Learning Facilitator (OLF) instrument developed in the research. On the one hand, the factors of knowledge acquisition, knowledge transformation, learning support, and strategic management reflect a more rational dimension of the learning process with the theoretical perspective of information management and processing being specifically illustrated in the instrument's items; on the other, two other factors — learning culture and learning leadership, in both of which the concept of power is implied— involve less rational (more subjective) elements that act on organizational learning. The most predominant of these factors is the theoretical conception of social learning. Lastly, several items involving knowledge acquisition and transformation as well as learning leadership can be associated with the cognitive-behavioral standpoint. In short, this research shows that all three major theoretical perspectives are reflected in the OLF instrument to varying degrees.

Henceforth, numerous advantages can be associated with the expansion of the OLF instrument to better refine our understanding of the organizational learning process and its relative facilitators within the context of the public service organizations. At a practical level, this tool can be used by public sector organizations to identify areas of potential

intervention in their processes and environments. By using this instrument to make regular evaluations, they can monitor the action taken to produce organizational change and assess how the organization's learning capacities are evolving, while also identifying areas requiring improvement. The instrument can thus be of relevance to verify how deeply the process has penetrated the workplace and constructively intervene at appropriate stages, becoming part of an integrated strategy for benchmarking the sustainable development of public service organizations. It is noteworthy that this instrument provides researchers a conceptually valid tool, specifically designed for the public sector, that can be used to verify a number of hypotheses concerning the relationship between OLF factors and the various direct measures of collective learning and organizational performance.

Overall, both the public and private sectors face the challenge of creating learning organizations. However, some major differences between the public sector and its private counterpart— notably pertaining to the degree of control, centralized decision-making, and the decision-making limitations imposed on managers, the high turnover of managers between departments with differing missions, the internal public audit process, and the many changes in political direction— have justified the need to question the foundations of the quality of the organizational learning process encountered in such organizational settings.

The current research has sought to shed additional light on the context-specific dynamics of the public sector by investigating the specific nature of the facilitators conducive of its organizational learning process. In the future, one fruitful avenue for knowledge advancement will be to explore the nature of the contingencies placed on these facilitators, and whether and how these may restrain the full implementation of the organizational learning process in that matter. This study, accordingly, provides strong theoretical and empirical rationales for further exploration of this avenue of research.

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