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CULTURE, DECISION LATITUDE AND SUPERIOR-SUBORDINATE COMMUNICATION: A SYSTEMIC ANALYSIS OF ORGANIZATIONAL LEARNING BY SENIOR FEDERAL PUBLIC SERVICE EXECUTIVES[1]

For several years, researchers have actively tried to improve their understanding of the concept of organizational learning and the importance of certain factors that influence this learning. One such factor at the level of the organization as a whole (the "macro" level) is the organization's culture, which, according to several authors, is a major determinant in organizational learning. Another factor identified in the literature, this time at the intermediate level, is the degree of control or decision latitude that individual employees have over their work, since this creates opportunities for experience that enhance learning. Finally, at the level of the individual (or the "micro" level), the day-to-day behaviour of superiors towards their subordinates has a major impact on both individual and group learning. However, most current literature on the importance of these factors has been descriptive and prescriptive, and little empirical research has been forthcoming to substantiate the relationship between these variables and organizational learning. As part of the APEX (Association of Professional Executives of the Public Service of Canada) study, the researchers collected data from 1,822 public service executives on the above-mentioned variables. These results show that a culture of learning combined with decision latitude plays an important role in the acquisition of the various organizational learning skills identified by Senge (1990). With respect to the quality of superior-subordinate communication, the findings show that this dimension does not shed any further light on how to forecast organizational learning. In this paper, the findings are discussed in light of certain theoretical models and a number of future avenues of research are proposed.

Over the past ten years, organizational learning has become a staple concept in the field of management research. The reason for this emphasis is the idea that the survival of an organization depends on its capacity to adapt to changes in its environment and that this capacity is intrinsically dependent on individual and collective learning. In other words, since an

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organization is, above all, a social system, its ability to adjust to its environment is only possible when its members become aware of the changes that occur in their fields of activity, understand the consequences of these changes, find appropriate solutions to current and potential problems, and then implement the solutions. Thus, for solutions to be appropriate, individual and group learning is a basic requirement at each stage of the process – As Schein (1996a) points out, organizational learning only occurs when the organization's individual members learn. Individual learning does not always produce positive results for organizations, but it is certain that organizations do not progress without learning by their individual members.

Learning is also considered to be one of the variables that explain individual and organizational health. This viewpoint is endorsed by the LDWHP (Luxembourg Declaration on Workplace Health Promotion), which considers that employee development is one of the major goals in promoting individual employee health in the workplace (Menckel, 1999). This situation has been amply confirmed by many research studies that have identified learning as a determining variable that reduces strain and can predict physical and mental health in the workplace (Bandura, 1997; Holman and Wall, 2002, O'Brien, 1986). In this perspective, health should not be considered simply as the absence of stress symptoms, but rather as a set of positive health indicators, one of which is learning (Parker and Sprigg, 1999). The same parallel can be drawn with respect to the organisation, whereby, along the lines that individual learning can help employees face up to the challenge of their jobs and reduce strain, organizational learning, for its part, can help the organization adapt to its environment and create a healthier work environment (Beckhard, 1997). Organizational learning is considered by several authors as an indicator of the health of organizations (Beer, 2003) as well as individuals. In this connection, Lowe (2004) states that an organization's learning capacity is critical to its organizational health and that employee health promotion programs should go beyond traditional approaches and include activities designed to promote continuous learning.

In the literature, organizational learning is described in many ways - as a cycle or process that facilitates acquisition of knowledge (Hubert 1991 and Dixon 1992) or a process of collective learning through interaction with the environment (Cyert and March 1963 and Hedberg 1981), a theory of identifying anomalies and corrections through a restructuring of the theory of action by actors (Argyris and Schon 1978), an enhanced ability to achieve desired results (Senge 1990a), and an organization's ability to use experience to maintain and improve its performance (DiBella, Nevis and Gould 1996). While most theories of organizational learning have been based on theories of individual learning, the authors argue that, even though all learning, in the final analysis, passes through individuals, organizational learning is not simply the sum of the learning by the individuals who make up the organization. In practice, organizational learning must involve an organizational process whereby the individual's learning is shared, assessed and then integrated with the learning of others (Dixon 1994). For Senge (1990a, 1990b), organizational learning is associated with systems theory – in other words, a set of factors that affect and interact with each other over a period of time in the context of achieving a common objective. This author is one of the very few to have proposed a theory and concrete method to guide organizations in their efforts to improve their learning capacity. And yet, despite the theory's popularity, very little research has been derived from it. Basically, this theory argues that it is crucial in any learning organization that its main actors, especially its senior manager, master five disciplines or competencies – namely, personal mastery, insight into mental models, building shared vision, team learning and systems thinking.

The competency of personal mastery relates to an individual's ability to manage his own learning, i.e., to be able to continually improve his ability to achieve new objectives. This competency covers two aptitudes: the ability to identify what is important for oneself and the ability to analyse everyday reality. The second discipline, insight into mental models, implies the ability to question mental images or representations (e.g., prejudices or stereotypes) that people make of themselves and the world around them. Once these representations become embedded in an individual's

psychology, they tend to limit thinking, action and, by extension, learning. In Senge's view, insight into mental models implies the ability to criticize oneself through a number of essential processes required for developing the ability to identify, test and improve one's own mental images so as to achieve greater learning. The third competency concerns the individual's ability to develop a common vision in his group so as to help others to act on the basis of the organization's goals and values. Shared vision tends to provide both a rationale for learning and the energy to acquire it, thereby becoming a key factor in generative learning or learning that increases creative capacity. Shared vision helps instil a common goal, create an overarching objective and engender a new way of acting by maintaining an active learning process. For its part, the fourth competency, team learning, tends to increase the likelihood that learning will be diffused throughout the entire organization via both individuals and groups. Transfers of knowledge, expertise and experience are likely to take place and increase through individual and group learning. Lastly, the fifth competency, systems thinking, refers to the individual's ability to see phenomena in the context of overall systems, to study cause-and-effect relationships, rather than individual events, and to observe processes of change. Systems thinking rounds out the set of five learning competencies because it conditions and underpins the other four.

By positing development of these five disciplines, Senge essentially made the connection between individual learning and organizational learning: an organization only learns through the learning of its individual members. In theory, individual learning of these five competencies does not guarantee organizational learning; on the other hand, without individual learning, organizational learning is impossible. In this author's view, the extent to which each of these five competencies is evident in an organization indicates the organization's ability to qualify as a learning organization and constitutes a measure of its potential for organizational learning.

Bureaucracy and organizational learning

In general, all these authors share the view that the overall environment plays a vital role in the whole process of organizational learning (Argyris and Schon 1978; Hedberg 1981; Weick 1979, Senge 1990a and Dixon 1992). On the other hand, while the concept of organizational learning is usually studied in organizations that have organic structures, very little research is conducted on bureaucratic organizations. In fact, bureaucracies are often criticized for their inability to manage uncertainty and environmental complexity and maintain the learning activities required to adjust to change. According to some authors, bureaucratic structure creates a definite barrier to learning (Myers 1985). However, such a conclusion is not based on empirical research and the question of understanding how bureaucratic organizations learn has so far received very little attention from researchers. Although it is possible that bureaucratic characteristic, such as specialization and formalization can inhibit learning, it cannot be stated that bureaucratic structure is the only factor that can limit learning in such organizations. Indeed, it cannot be stated either that a bureaucracy is simply a mechanical structure or environment in which everything is already programmed. There are clearly important differences between various bureaucracies in terms of their respective missions, strategies, cultures, climates of communication, and formal or informal systems that foster learning in different departments (Richard and Goh 1995). It is therefore evident from reading the research that very few authors have really taken the time to check to what extent these factors can contribute to organizational learning in such an environment. One of the very few researchers in this field contends that "bureaucracy" and "learning" are not contradictory terms and that in a bureaucracy, learning exists and can be developed (Zayed 1989). To become learning entities, organizations need both flexibility and stability in their management of environmental complexity (Kahn 1982). Stability is not thus in itself a factor that is detrimental to learning. On the other hand, it is legitimate to believe that introducing flexibility into bureaucratic environments would stimulate the learning process in the organizations concerned, while still maintaining relative stability.

In theory, there are many factors at the organizational, structural, behavioural and cognitive levels that can be expected to facilitate or impede individual and collective learning. One factor that is frequently cited as a major determinant of organizational learning is organizational culture (Gephart, Marsick, Van Buren and Spiro 1966, Schein 1993a and 1996, and Yeung, Ulrich, Nason and Van Glinow 1999). With respect to organizational structure, several researchers emphasize the effect that the degree of an individual's latitude, autonomy or involvement in the decision-making process has on individual learning (Daft, 2001; Garvin, 2000; Jay, 2001; Schein, 1992). When the degree of the individual's discretional decision-making over his duties is increased, this apparently creates opportunities for richer and more varied experience that facilitates more advanced learning. In this regard, there is considerable consensus that diversity and quality of experience are critical factors relating to acquisition of the knowledge and tacit skills required to solve work-related problems, especially those in the management area (Barrette and Durivage 1997, McCauley, Ruderman, Ohlott and Morrow 1994, and Wagner and Stenberg 1987). Lastly, at the individual or "micro" level, some authors argue that the quality of superior-subordinate communication has a major impact on individual and collective learning. These three aspects – culture, decision latitude and superior-subordinate communication – are also part of the theoretical model of the learning organization postulated by Daft (2001).

At the organizational level: Organizational culture and organizational learning

The concept of organizational culture has been defined in several ways. For example, it has been defined as a set of attitudes, values, goals and practices that characterize an organization (Yeung et al., 1999), a set of implicit assumptions that are taken for granted by a given group and which determine how the group perceives, thinks and reacts in various environments (Schein, 1992), a set of values, beliefs and ways of thinking that is shared by the organization's members and which is taught to new members (Daft, 2001), and a set of expressive and affective aspects organized into a collective system of symbolic meaning (myths, ideologies and values) (Abravanel et al., 1988). An organization's general culture is also often organized in terms of its primary orientation towards the external environment (flexibility versus stability) and its strategic posture (internal versus external). Thus, depending on the organization's particular positioning in terms of these two polarities, an organization's culture can be characterized as that of a clan, an "adhocracy," a hierarchy or a market-determined entity (Quinn and Rohrbaugh, 1988, Daft, 2001, Yeung et al., 1999). However, regardless of the type of organizational culture that predominates in an organization, the need to learn and to ensure the acquisition, dissemination and interpretation of knowledge remains an essential requirement of the organization's ability to adapt. On the other hand, it is possible that an organization classified in one or other of these categories may or may not value learning as a fundamental component of its culture (Yeung, et al., 1999).

An organization's culture can be grasped in several ways, such as by analysing its artifacts (its structure), its processes (especially its decision-making ones), its basic assumptions (beliefs) and its values (its management ideology and philosophy). One of the various possible approaches and one that is often used in evaluating an organization's culture is to focus on the values that the organization promotes. Generally speaking, an organization's values represent the most concrete expression of organizational ideology and all organizations tend to adopt and maintain their own system of values (Abravanel et al., 1988). These values are expressed in the organization's rites, customs, ceremonies, symbols and range of management practices (e.g., training and team work). As Daft points out (2001), the strength of an organization's culture is based on the degree to which specific values are shared among the organization's employees. According to Kilmann (1985), an organization with a learning culture promotes values like risk-taking and mutual support between employees in the process of identifying problems and solutions. For Miles and Randolph (1980), people in this type of working environment learn proactively and demonstrate this by setting up programs that promote individual and group learning. Furthermore, Popper and Lipshitz (2000) suggest that organizational learning mechanisms have a greater impact on

productive learning if they are embedded in a normative system of shared values. In this respect, these authors articulate five values in particular: continuous learning, valid information, transparency, issue orientation and accountability. Bennett and O'Brien (1994), for their part, state that such organizations introduce values that support and accelerate individual learning and the sharing of learning between subordinates. Along the same lines, Yeung et al. (1999) maintain that a learning culture should promote values, like dialogue, experimentation, knowledge acquisition, collaboration, sharing, reciprocity, acceptance of mistakes and failure, and perception of the opportunities created by change (Yeung et al, 1999). In short, these authors strongly endorse the idea that an organization's values represent both a central construct for understanding its organizational culture and a pillar of its learning culture.

In theory, organizations that promote certain values should see that these affect the learning behaviour of their employees. In this study, it is accepted as a research hypothesis that the values proposed by Yeung et al. (1999) can orient senior managers towards adopting the learning behaviour patterns associated with the five disciplines identified by Senge (1990). Thus, given the importance of culture and its underlying value as one of the factors that affect learning, it should be expected that organizational learning is a direct function of the learning culture of the organization concerned (Hypothesis 1).

At the structural level: Decision latitude and organizational learning

According to the model of organizational design developed by Daft (2001), organizational learning is closely linked to elements of formal structure, especially the degree to which authority is decentralized. Concretely, what decentralization of authority means for senior managers in organizations is more latitude or control over decision-making in relation to their own work and that of their subordinates. Decision latitude is described as the ability of workers to control both their own work and the use of their abilities (Karasek and Theorell, 1990). The idea that decision latitude affects learning is often cited in the literature. For example, Wright (1997) and Daft (2001) affirm that decision-making autonomy is a key component of workplace learning, because it stimulates expression of the strengths and potential of both individuals and work teams For Whetten and Cameron (2001), decision-making autonomy encourages experimentation and risk-taking. For Conger and Kanungo (1988), the ability to act enhances the feeling of personal effectiveness (self-efficacy), a factor that several authors associate with organizational learning. Lastly, Karasek and Theorell (1999) argue that work characterized by a heavy workload and a high degree of control promotes a sense of mastery. On the other hand, despite these various claims, there is still very little empirical research on this subject (Holman and Wall, 2002).

The few studies that have occurred have been based mainly on the model developed by Karasek (1990) and have focused on the combined effect of workload and control over learning. This model postulated that a high workload and a low level of decision latitude (low control) presaged negative learning outcomes by employees; on the other hand, a high level of decision latitude is likely to produce more opportunities for employees to develop their abilities. In this sense, Taris (2003) found that jobs that combine low decision-making latitude (low control) and heavy demands are associated with a deterioration in learning behaviours. This author emphasizes that degree of control is a determining factor in the motivation to learn new skills. However, other recent research suggests that these two factors affect learning separately, rather than reinforcing each other, and that decision latitude has a greater impact on active learning (Jan de Jonge et al., 1999; Demourti et al., 2001). Along the same lines, the research of Parker and Sprigg (1999) showed that the control exercised by employees over their work is a strong predictor of three learning parameters (perceived mastery, role breadth and self-efficacy, and production ownership), whereas a heavy workload is only linked to one of the variables, namely, self-efficacy, a factor that needs to interact with decision latitude so as to become positively significant. Moreover, these authors' findings indicate that enhanced decision latitude promotes

learning even for passive employees with a light workload. These authors conclude that work-organization measures, such as empowerment and autonomous teams, give proactive employees the independence to more effectively manage the stressful challenges that result, and stimulate the development of a sense of ownership and other learning outcomes. Holman and Wall (2002) studied various models of the relationships and interactions between the variables of workload, control, learning and strain. On the basis of three sample groups, two cross-sectional analyses and a longitudinal study, these authors showed that there is consistent evidence supporting the view that greater control enables employees to deploy and develop a broader range of abilities, and that the use of these abilities, in return, helps them meet challenges more effectively and counteract depression.

In a nutshell, decision latitude is considered by several authors as a key component of workplace learning. However, despite the popularity of the concept, no empirical study to date has focused on the connection between decision latitude and organizational learning. In this perspective, the second objective of this study is verify the degree to which decision latitude is linked with organizational learning. It is expected in Hypothesis 2 that level of decision latitude in an organization will be a strong predictor of its level of organizational learning, over and above that provided by its organizational culture.

At the behavioural level: Superior-subordinate communication

Several works on organizational learning suggest that the quality of communication between superiors and their subordinates fosters more advanced learning. In the past, several research projects have focused on assessing the impact of the quality of superior-subordinate communication on subordinates' productivity, satisfaction, motivation or quality of life (Jablin 1979, Latham and Wexley 1994, and Whetten and Cameron 2001). However, very few of these projects have assessed this link in terms of learning. Needless to say, both parties in a superior-subordinate relationship are responsible for creating a positive communication dynamic. However, superiors by virtue of their formal position of influence play the predominant role in creating this dynamic. If they do not foster this climate of openness and exchange between themselves and their subordinates, it becomes very difficult to imagine that subordinates would be the kind of people to question organizational objectives or strategies, propose performance-improving ideas or give their views on the work-related or personal problems affecting the results of their work or that of the organization as a whole.

In the theory of organizational learning developed by Argyris and Schon (1978), the quality of superior-subordinate communication is identified as an important part of the process. For these authors, the quality of communication within an organization is one factor that helps stimulate critical examination of the premises underlying decision-making, thereby creating a non-defensive overall working climate; this process is what they called "double-loop learning." According to this theory, double-loop learning is negatively influenced by the normal tendency of human beings to create defence mechanisms to protect their image and self-respect. Argyris (1993) defines defence mechanisms as action that minimizes trouble or embarrassment for oneself or others. However, this attitude acts as a barrier to learning because it inhibits individual thinking about the organization's basic problems, such as the relative value of either its objectives or the current projects the individual concerned is working on. In theory, this defensive attitude can be alleviated providing that open communication and a climate of trust exists between management and subordinates. When trust exists in a relationship, there is less incidence of defence mechanisms designed to protect ego, such as justification, accusations, excuses and avoiding blame or initiative. To mitigate such defence mechanisms, Argyris (1993) advocates a style of management communication that is direct, honest, supportive and credible so that important problems are raised without fear of reprisal. A positive relationship with their respective superiors encourages subordinates to think for themselves on how relevant their work objectives are, as well as about the quality of their work and the way they perform it. In fact, it

also encourages them to raise basic, unsettling questions that challenge some of the organization's standards, values, policies, practices and procedures without fear of negative personal consequences. Several types of management behaviour that foster this type of trusting relationship have been proposed. These involve allowing subordinates to participate in setting objectives and clarifying what is expected of them; in this way, subordinates understand both the meaning of their efforts and constructive feedback on their performance and conduct (Evered and Selman 1989, Marsh 1992, and Yukl 1994). In addition, Elliger (1997) argues that managers who assume the role of teacher, facilitator and helper will have a greater effect on organizational learning. The types of behaviour underlying these roles are fairly similar to the types of behaviour associated with coaching and supportive communication – encouragement, demonstrated understanding of work by subordinates, objective criticism, empathy, honesty, openness to mistakes and acceptance of disagreement (Whetten and Cameron 2001).

Until now, very little empirical research has been carried out on the relationship between the quality of superior-subordinate communication and organizational learning (Ritchie 1999). The third objective of this research has therefore been to verify the hypothesis that the quality of superior-subordinate communication will improve the predictability of organizational learning over and above that provided by organizational culture and decision latitude (H..3).

In a nutshell, the overall goal of this research is to examine to what extent the culture of learning, decision latitude and superior-subordinate communication are variables that can predict the level of organizational learning in senior executives of the federal public service. It is fully expected in these hypotheses that organizational learning will be positively linked to the culture of learning (H. 1), enhanced decision latitude (H. 2) and the quality of superior-subordinate communication (H.3).

METHODOLOGY

The data used were taken from the APEX (Association of Professional Executives of the Public Service of Canada) national survey and were thus part of a larger study to assess the state of health of senior executives and identify the organizational parameters that would be most conducive to creating a "learning" organization. In this context, the human resources branch of each department and agency was responsible for distributing the questionnaire in February 2002. The overall network of Canadian government organizations constitutes an interesting sample population for the study of these parameters in a bureaucracy. Indeed, the federal public service contains a large number of senior executives (approximately 8,500 senior managers at the EX-1 to EX-5 level who are directly involved in managing information and knowledge). In total, 3,670 senior-management executives in the federal public service received the questionnaire. The complete kits included a questionnaire in French and in English, a bilingual letter of participation and informed consent, a pre-paid return envelope addressed to a non-government post-office box. The replies remained anonymous and the results were compiled by a team of researchers. Nearly 40% of the EX-level managers responded. Table 1 shows the composition of the sample compared with the composition of the EX-level population of the federal public service. Comparative analysis reveals that the sample closely reflects the composition of EX-level population both in terms of gender, hierarchical level (EX-1 to EX-5) and age. In terms of highest educational level, 2.1% of the respondents had a high-school diploma, 10.4% a college diploma, and the rest a university degree of one kind or another.

Table 1

Percentage composition of the sample compared with the overall
composition of EX-level managers in the federal public service

	Sex		Hierarchical level					Age[a]					
	Male	Female	EX1	EX2	EX3	EX4	EX5	1	2	3	4	5	6
Population	68.1%	31.9%	52%	25%	16%	5%	2%	6%	13%	24%	35%	18%	4%
Sample	66.8%	33.2%	51%	26%	15%	6%	2%	5%	13%	23%	35%	19%	4%

a)   1 = under 40; 2 = 40 − 44; 3 = 45 − 49; 4 = 50 − 54; 5 = 55 − 59; and 6 = over 60.

Measurement of independent variables

Culture of learning. The values that an organization promotes are often used as a means of evaluating its organizational culture (Abravanel et al., 1988). This set of values represents one of the most concrete ways of measuring an organization's ideology with respect to learning (Yeung et al., 1999). An analysis of the scale developed by Yeung et al. (1990) suggests that a good sense of the presence of a learning culture can be obtained by measuring five values: proaction (action-orientation), self-criticism, risk-taking, knowledge acquisition, and reciprocity. Thus, this scale of values, as used in this study, reflects a learning-oriented ideology.

Measurement in this construct consists of 12 items (see Table 2) with an internal consistency of 0.92 [mean = 4.42 and std = 1.07]. The design of this scale by Yeung et al. (1999) was mainly based on the detailed analysis of individual case studies of seven large organizations that were well-known for their demonstrated learning excellence (Alcatel, Bell, Samsung, Electronics, Motorola, Hewlett-Packard and 3M). These companies were selected on the basis of their recognized commitment to promoting learning and because they provided a number of multicultural insights into the organizational learning mechanisms used. This measurement thus refers to the extent to which senior managers feel that these values are present in their organization. To measure this construct, we asked participants to respond on a scale of 1 to 7 (from "totally disagree" to "totally agree") to the following instruction: *The following questions deal with learning within your organization, as well as your own learning and development. On the basis of your own experience in your current organization, indicate the extent to which you agree or disagree with the following statements: My organization: 1) tends to encourage action; 2) appreciates self-questioning and self-analysis; 3)encourages experimentation, etc.*

Decision latitude. The measurement of decision latitude was based on the work by Hurrell and McLaney (1998) on this topic. These researchers proposed 10 parameters (see Table 2) to measure the degree of control exercised by respondents over various aspects of their work. The internal consistency of this scale is estimated to be 0.84 (mean = 3.47, std = 0.66). Participants were asked to respond on a scale of 1 to 5 ("very little" to "enormously") to the following instructions: *Indicate the degree of influence you currently exert over each of the various factors below. By "influence," we refer to the degree of control that you exert over what is done by others and the freedom of choice that you have in your own work. What influence do you have: 1) when it is question of obtaining the equipment and other material needed for your work? 2) over the order in which you carry out your professional duties? 3) etc.*

Table 2
Scales for measuring culture of learning, decision latitude, communication and organizational learning, including the correlation of each parameter with organizational learning

Measuring Culture of Learning and Associated Instrumental Values (Yeung, Ulrich, Nason, and Van Glinow, 1999)
These questions relate to how learning occurs in your organization, as well as to your own learning and development experiences. Based on your experience in your current department, indicate the extent to which you agree or disagree with the following statements:

My organization
1. maintains a bias towards action (.06) (proaction)
2. makes learning a part of its cultural values (.20) (knowledge acquisition)
3. welcomes open inquiry and self-analysis (.21) (self-criticism)
4. is playful as well as serious when approaching work endeavours (work is fun) (.22)
5. encourages an experimental attitude (.21) (risk-taking)
6. supports failures that are the product of risk taking (.20) (risk-taking)
7. perceives any change as an opportunity, not a threat (.21) (risk-taking)
8. encourages the capacity to be continually aware of internal processes and the external environment (.21) (knowledge acquisition)
9. anticipates future demands rather than rests on past successes (.19) (proaction)
10. believes that knowledge is more important than job title (.16) (knowledge acquisition)
11. encourages the norm of reciprocity (.22) (sharing and reciprocity)
12. ensures a commitment to sharing ideas is in all formal strategic documents (.20) (sharing and reciprocity)

Measuring decision latitude (Hurrell, Nelson and Simmons 1998)
These questions ask how much influence you now have in each of several areas. By influence we mean the degree to which you control what is done by others at work and the freedom to determine what you do yourself at work.

How much influence do you have over:
1. the availability of supplies and equipment you need to do your work? (.14)
2. the order in which you perform tasks at work? (.17)
3. the amount of work you do? (.13)
4. the pace of your work, that is how fast or slowly you work? (.11)
5. the decisions concerning which individuals in your work unit do which tasks? (.21)
6. the hours or schedule that you work? (.11)
7. the decisions as to when things will be done in your work unit? (.21)
8. the availability of the human resources you need to do your job? (.18)
9. the training of other workers in your unit? (.23)
10. the policies and procedures in your work unit? (.21)

Measuring quality of superior-employee communication (Duxbury and Higgins 2001)

My manager/supervisor:
1. Gives recognition when I do my job well (.09)
2. Makes it clear what is expected of me (i.e. is good at communicating goals, objectives, how to proceed) (.11)
3. Provides constructive feedback when performance standards are not met (.12)
4. Listens to my concerns (.09)
5. Shares information with me (.07)
6. Is available to answer questions (.06)
7. Asks for input before making decisions that affect my work (.10)
8. Provides me with challenging opportunities (.14)
9. Supports my decisions (i.e. with clients, upper management) (.13)

Measuring organizational learning competencies (Senge 1990)

Over the past year, in my role as leader I have:
1. Assessed environmental opportunities and threats that affected my work unit accurately (systems thinking)
2. Addressed set ways of thinking and doing that got in the way of improving my unit's work (systems thinking)
3. Recognized what I needed to do differently to achieve superior results (personal mastery)
4. Uncovered root causes of my performance shortcomings (personal mastery)
5. Addressed my own biases to bring about improvements (insight into mental models)
6. Addressed my improvement opportunities (insight into mental models)
7. Developed a clear vision for my work unit (shared vision)
8. Rallied my work unit around a common vision (shared vision)
9. Promoted teamwork within my work unit (learning in and with a team)
10. Harnessed the strength of my work unit towards getting the results we needed (learning in and with a team)

Superior-subordinate communication. The measurement of "superior-subordinate communication" consisted of a number of selected parameters taken from the work of Duxbury and Higgins (2001). These researchers proposed 9 parameters (Table 2) to measure the quality of superior-subordinate relations and communication. The internal consistency of this scale is estimated to be 0.90 (mean = 3.64, std = 0.81). For this set, respondents were asked to assess 9 statements on a scale of 1 to 5 (from "strongly disagree" to "strongly agree") using the following instruction: *My manager/superior: 1) compliments me when I do good work; 2) clearly explains what he expects of me (i.e., can explain work goals and objectives; 3) etc.*

Measuring the dependent variable: Organizational learning

Despite the popularity of the model formulated by Senge (1990b), the lack of a recognized scale for measuring organizational learning competencies led the authors to develop and validate their own scale. As a first step, the authors developed 18 items to cover Senge's five disciplines. Validation of the scale then proceeded as follows: a) five neutral items (i.e., items not related to Senge's model) were created (e.g., the ability to make presentations before large groups) and added to the 18 basic items; b) a questionnaire presenting the 23 items, as well as a definition of each of Senge's competencies, was administered to 28 senior managers identified by the organization; c) these respondents were required to indicate on a scale of 1 to 6 (from "totally agree" to "totally disagree") the degree to which each item reflected one or other of Senge's definitions of organizational learning. An analysis of the average difference (t = 11.94, p = ≤ 001) indicates that the respondents were clearly able to distinguish the items associated with Senge's model (mean = 5.31, std = 0.109) from the neutral items (mean = 3.53; std = 0.152), thus showing that the measurement used referred to the "organizational learning" construct in Senge's model. In practice, a restriction imposed by the organization where the study took place limited the maximum number of items in the questionnaire to 10. This restriction forced the researchers to choose from the 18 original items the best two for each competency. The ten items chosen were deemed by over 85 per cent of the respondents (a rating of 4 or over on the six-point scale) as reflecting one or other of Senge's learning competencies. As a result, given the limited number of items per competency, the researchers opted for an overall measurement, which made it possible to also cover the five disciplines of Senge's model.

The dependent variable thus illustrates a set of behavioural indicators and these indicators, taken as a whole, provide an overall indication of organizational learning. The estimated internal consistency of the overall scale is 0.83 (mean = 3.92, std = 0.48). To measure these learning competencies, we asked participants to respond on a scale of 1 to 5 (from "strongly agree" to "strongly disagree") to the following scenarios: *In my role as a manager over the past year, I have: 1) correctly assessed organizational opportunities and threats affecting my work team; 2) reassessed certain ways of thinking and doing that have prevented my team's work from improving; 3) acknowledged that I should do things differently to obtain better results; d) etc.*

RESULTS

The aim of the following analysis is to determine to what extent organizational learning can be predicted by a strong culture of learning, increased decision latitude and the quality of superior-subordinate communication. Table 3 shows averages, standard deviations and intercorrelations for the variables. These results indicate that there is limited variance for the three variables of superior-subordinate communication (S.D. = 0.81), decision latitude (S.D. = 0.66) and organizational learning (S.D. = 0.48). However, despite this limited variance, significant correlation (p < 0.001) was found between the independent variables and the measurement of organizational learning. Analysis of this correlation between the predictor variables and

organizational learning indicates that these operate in the direction expected. Hierarchical regression analyses were performed to determine the relative importance of the three main variables of organizational culture, decision latitude and quality of superior-subordinate communication in predicting key organizational learning skills. Control variables (age, gender and educational level) were introduced as a block at stage 1 of the regression. The variables of "organizational culture," "decision latitude" and "quality of superior-subordinate communication" were then entered block by block in that order at stages 2, 3 and 4 of the regression. The variables were entered in this order to be consistent with the initial theoretical model, i.e., the macro variable first (culture), then the intermediate variable (decision latitude) and lastly the micro variable (superior-subordinate communication).

Hypothesis 1 was corroborated, since it was expected that mastery of key organizational learning skills would be in direct proportion to the level of an organizational learning culture. The findings in table 4 show that organizational culture is the reason for a significant increase in variance when measuring organizational learning ($\Delta R^2 = 0.08$, $F = 124.95$, $p < 0.001$).

Table 3

Variable averages, standard deviations and intercorrelations

	Avge.	S.D.	1	2	3	4
1. Culture	4.47	1.07	1.00			
2. Superior-subordinate communication	3.64	0.81	0.36^{***}	1.00		
3. **Decision latitude**	3.47	0.66	0.49^{***}	0.35^{***}	1.00	
4. Learning skill	3.92	0.48	0.27^{***}	0.13^{***}	$.25^{***}$	1.00

Table 4

Regression between measurement of "organizational learning" and the predictor variables of "culture, "decision latitude" and "superior-subordinate communication"

Dependent variable	Block	Independent variable	β	F	ΔR^2
Organizational learning	1	Control (age, educational level, gender)		6.57	0.01***
	2	Organizational culture	0.21	124.95	0.08***
	3	Decision latitude	0.19	56.57	0.03***
	4	Superior-subordinate communication		2.09	n.s.

Note: n = 1,822
* p < 0.05, ** p < 0.01, *** p < 0.001

Hypothesis 2 was also corroborated since it was expected in this hypothesis that decision latitude would contribute an added level of predictability over and above that provided by organizational culture. The results in table 4 show that decision latitude is the reason for a significant increase in variance in the learning measurement ($\Delta R^2 = 0.03$, $F = 56.57$, $p < 0.001$). Hypothesis 3 foresaw that the quality of superior-subordinate communication would help predict organizational learning over and above culture and decision latitude. Although this variable is significantly correlated with the learning measurement ($r = 0.13^{***}$) it is not significant in the regression ($F = 2.09$, $p > 0.05$).

DISCUSSION

There is relatively strong consensus among the authors that organizational learning is a critical factor in any organization's survival. On the other hand, the literature is full of suggestions on predictor variables for this kind of learning. However, until now, there has been very little empirical research on this subject. Three of the predictor variables of organizational learning proposed in the theoretical models are organizational culture, decision latitude and superior-subordinate communication. The thrust of our results validates the important role of two of them — organizational culture and decision latitude — in predicting organizational learning.

Although theoretical links have often been proposed between organizational culture and organizational learning, little empirical research has verified this relationship in organizations in general and even less in bureaucracies. In reality, Senge's "five disciplines" are based on theoretical reflection, rather than on empirical observation, and the current study is, to our knowledge, the first that has attempted to measure these competencies and empirically verify the connection between them and the learning culture in the public service. Our findings show that learning culture is positively linked with the presence of Senge's learning competencies in this sector. These results run counter to the conventional wisdom that bureaucracies cannot become learning organizations. Indeed, bureaucratic culture has often been defined as a hierarchical, homogenous context in which rules, procedures, practices and formal policies dominate and frame behaviour, leaving little latitude to the actors and their learning. Bureaucracies are perceived as organizations with relatively rigid hierarchical structures that adapt poorly to change, given their structural characteristics. However, bureaucracies like other organizations need to adapt to changes if they want to accomplish their respective missions. On the other hand, an organization the size of the federal government is not a single, homogeneous entity facing a similarly single, homogeneous environment. On the contrary, this institution actually consists of many organizations, departments and agencies, each of which has a relatively distinct mission, strategy and culture. Despite the characteristic stability of the overall organization, the component entities need to adapt to the challenges that their environment poses, especially in the areas of technology, sociocultural and international contexts, and human resources, as well as in their respective markets (i.e., the specific population groups they serve).

The results obtained in this study suggest that the learning culture in this organization as a whole is not uniform and that the development of skills linked to organizational learning would be enhanced by an environment that advocates values and behaviours that support individual and collective learning. The challenge for government departments and agencies that face an increasingly complex environment is how to change their traditional culture to a learning culture. In this respect, the task of promoting learning-culture factors is largely the responsibility of senior management whose primary role is to create a strong culture (Schein 1992). The findings in this study represent food for thought on how to orient management action in this direction. In fact, a number of ad hoc analyses indicate that certain organizational characteristics are more likely than others to foster development of key organizational learning skills. Thus, analysis of correlations higher than 0.20 (Table 2) between measured items and the dependent variable indicates that development of key organizational learning skills would be fostered by an environment that: a) considers learning as an important value and officially commits itself in this regard; b) expresses appreciation for the work performed and encourages experimentation, self-questioning and reciprocity; c) maintains an enjoyable working atmosphere; and d) keeps its members informed about both the internal and external environment. It would be interesting in future research to identify what specific action has been taken by departments and agencies with a particularly strong learning culture. It would also be interesting to identify the characteristics that facilitate or impede learning in this environment, thereby making it possible to develop more accurately-targeted responses.

In theory, organizational learning is closely linked to elements of formal structure (Daft, 2001). The results of our analyses show that learning culture is a direct function of decision-making latitude – a finding that supports the theoretical postulate propounded by Schein (1992). The impact of decision latitude on people's ability to learn competencies, over and above the effect of the learning culture, supports the idea that decision latitude is a key variable for stimulating organizational learning.

The concept of decision latitude is closely linked with the concept of empowerment. Indeed, as in the case of decision latitude, empowerment results from increased control over the ability to act in response to new challenges. Both definitions imply a delegation of responsibility and decision-making authority with respect to one's own actions (Ford and Fottler, 1995). As a result, research and theoretical models that deal with the concept of empowerment can contribute to a better understanding of the effect of decision latitude on learning. For example, the models developed by Robbins, Crino and Fredenhall (2002) and by Conger and Kanungo (1988) on the empowerment process clarify the role of contextual, environmental, cognitive and behavioural variables in the authority-delegating process. These authors consider that the control that individual employees have over their duties represents a way to increase learning through the creation of opportunities for more varied experiences, which in itself has a positive effect on employees' feelings of self-efficacy, feelings that naturally generate stronger motivation towards their work. Lastly, interesting links have been discovered between empowerment and the energy that individuals devote to their work (Spreitzer 1995), the level of effort and persistence when faced with a difficult situation (Kanter 1983), and the ability to learn new tasks (Thomas and Velthouse 1990). These formulations about empowerment are consistent with research conclusions on decision latitude. For example, Wall et al. (1996) showed that increased job control favoured the development of more proactive roles and feelings of self-efficacy. In addition, the research by Taris et al. (2003) showed that increased decision latitude is associated with enhanced motivation to learn and to use one's abilities. It may be fairly deduced therefore that, as in the case of empowerment, the introduction of more decision latitude will almost automatically entail the information-sharing required for making intelligent decisions. In theory, information sharing and interpretation are considered as two characteristics of the learning organization (Dixon, 1993; Huber, 1991). Thus, generally speaking, more decision latitude is a factor that should create conditions conducive to more advanced learning.

The change from a hierarchical culture to a learning culture is a long-term process that requires considerable effort towards change in terms of the behaviour of senior management, as well as in terms of management practices in general and human resource management systems in particular. In the shorter term, changes in structural elements, like decision latitude, are easier to implement. In fact, increased decision latitude could very well be the first sign of an organization's willingness to change towards a learning culture. Our results suggest that bureaucratic organizations possess a concrete and relatively fast means of affecting organizational learning for the better. However, senior management's involvement in the decision latitude process appears to be a determining factor in the genuine engagement of individuals in accepting more responsibility and power (Robbins et al. 2002).

With respect to the effect of the quality of superior-subordinate communication, the results show that this dimension does not add any improvement in the ability to predict organizational learning. However, such results are surprising inasmuch as the quality of relationships is a major component of one of the basic theories of organizational learning (Argyris and Schon 1978). In theory, good superior-subordinate communication reduces defence mechanisms and encourages subordinates to examine both their own objectives and those of their organizations. However, although the literature establishes links between quality of communication and less defensive behaviour, the literature also notes a number of exceptions in this regard (Argyris 1994 and Green and Scheimann 1978). In this connection, Green (1978) has shown that positive superior-

subordinate communication does not necessarily lead to openness and a willingness to question both one's own behaviour and objectives and the organization's way of doing things. It is possible that the reason for the absence of meaningful results is an overly narrow definition of the construct when it is strictly limited to just the superior-subordinate relationship. In other words, the single factor of the quality of superior-subordinate communication is probably not strong enough for subordinates to develop sufficient confidence to embark on the process of critically examining their role in the organization and the organization itself. It could be postulated that subordinates will restrain their own questioning if they feel that their direct superiors are not able, in turn, to express their own independently critical views to their own superiors. Indeed, for individuals to question both themselves and the status quo, the relationship of trust has to extend beyond the superior-subordinate dyad and include an overall perception of trust embracing the whole organization.

AVENUES OF RESEARCH AND ASSOCIATED LIMITATIONS

One limitation involves the risk of common variance between the variables, especially between the evaluation of learning competencies in conjunction with culture-related assessments. In practice, the respondents might have unconsciously oriented their responses on learning-related items so as to confirm the value of organizational culture. It would therefore be desirable in future research that researchers check this possibility by obtaining data from other individual respondents in the same organization on both the independent and dependent variables.

Despite the enormous popularity of the theory developed by Senge (1990), it has been subjected to very little empirical validation, possibly due to a lack of measurement tools. At the same time, Senge's theory on organizational learning and on the five disciplines that this learning consists of is much more complex than the aspects that were measured in this study. Nonetheless, despite its limitations, the measurement tool developed by the authors constitutes is a first step in this direction. It would appear to be necesssary in future research to expand this measurement so as to cover Senge's five disciplines more thoroughly and verify their factorial structure. In fact, Senge's theory suggests several factors (attitude, abilities, personality traits, behaviour patterns, personal values and needs) that could contribute to an understanding of these disciplines and serve as possible measurement tools. Although interesting, Senge's model is also limiting in its definition of what constitutes organizational learning. Indeed, there are several other theories and models of organizational learning. Future research should therefore seek to measure the multiple dimensions of this construct by combining several models, such as those of Argyris (1977), Huber (1991) and Dixon (1993), while also including indirect indicators, like learning styles and initiatives taken to update knowledge and abilities.

Analysis of organizational culture can be conducted in various ways, as, for example by observing symbols and artifacts, collecting historical information (about founders, heroes, myths and so on), analysing the discourse contained in systems and documents and analysing human resource management practices (e.g., compensation and reward systems), as well as through participant observation. Although all these approaches are valuable, they represent a challenge of practicability for researchers when the organization under study is spread over many locations in a huge territory like Canada. In these circumstances, the measurement of values through a questionnaire represents a valid alternative and an approach that several researchers prefer as a means of obtaining a portrait of the prevailing culture at a given point in time. Because of this study's overall aim, the concept of the culture of learning was the only factor that was considered, formulated and analysed in this research. However, other values promoted by organizations could have an impact on learning. In future research, it would be interesting to extend this measurement to a set of other basic values (such as accountability and transparency) so as to obtain a more complete portrait of the organizational culture concerned and study the relationship between these other values and organizational learning. Lastly, the concept of the culture of learning is a

construct that is still in process of being developed. In this regard, the dimensions proposed by Schein (1992), such as measuring the degree of confidence in the organization, the balance between a work-centred orientation and interpersonal relations, or even the internal communication network, are subjects that could be added to the model prepared by Yeung et al. (1999) so as to measure this construct more thoroughly. In spite of this limitation, the scale prepared by Yeung et al. (1999) has the advantage of being designed, as Schein (1996) recommended, on the basis of actual working environments. This model provides realistic indicators of learning culture. Thus, hopefully, in the future, researchers could introduce structural variables relating to human resource management systems, such as training, compensation and performance management, in order to verify their relative contribution to organizational learning.

It would be interesting in future research to develop the measurements, especially those relating to the constructs of "superior-subordinate communication" and "key learning skills," where little variance has been discovered, thereby reducing their value as potential predictors. The reason for the absence of significant results with respect to the "superior-subordinate communication" variable may be a less valid scale for the population in question or by a scale that does not completely cover the construct's domain. To obtain a clearer sense of this concept, one would need to add measurement of factors like communication with peers, subordinates, other departments and top management, all of which go beyond the superior-subordinate relationship as such.

Despite the limitations presented, this study provided the researchers with empirical corroboration showing that culture and decision latitude are two dimensions linked to organizational learning. In practical terms, this research makes it possible for federal public service managers to identify an important tool that can be used to increase organizational learning and affect the culture of their respective organizations along these lines.

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