



Systems school leadership: exploring an emerging construct

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Abstract

Purpose – The purpose of this paper is to explore how effective school principals use systems thinking, aiming to present the systems school leadership (SSL) approach – an approach where principals lead schools through the systems thinking concept and procedures.

Design/methodology/approach – Participants were 28 Israeli school principals, selected as outstanding leaders by recommendations from their superintendents and according to their schools' achievements. The study employed semi-structured interviews as well as focus groups. Generating themes was an inductive process, grounded in the various perspectives articulated by participants.

Findings – Data analysis generated four main characteristics of SSL: leading wholes; adopting a multidimensional view; influencing indirectly; and evaluating significance.

Research limitations/implications – Further research that will explore to what extent and how often principals use systems thinking is required. In addition, replication in various educational contexts is important in order to substantiate the validity of the SSL's characteristics. Beyond principals' perceptions, more objective measures like direct observations are needed to evaluate actual implementation of SSL in diverse school settings.

Practical implications – Identifying the SSL characteristics facilitates the development of practical processes for nurturing SSL in various stages of school leaders' educational career.

Originality/value – This paper provides a useful conceptual and empirical framework to evaluate SSL as a managerial approach.

Keywords Principals, Systems theory, Leadership development, School leaders, SSL approach

Paper type Research paper

Introduction

Systems thinking can be explained succinctly as a holistic approach, which puts the study of wholes before that of the parts; it does not try to break down systems into parts in order to understand them; it concentrates its attention instead at how the parts act together in networks of interaction (e.g. Checkland and Poulter, 2006; Richmond, 1994; Senge, 2006). The literature implies that systems thinking is an effective approach, recommended for managers dealing with complex organizational challenges (e.g. Ackoff, 1999; Checkland and Poulter, 2006; Sterman, 2000).

Systems thinking was recently proposed for school leaders, with specific guidance given on how to use it in particular topics. Thus, a growing number of guidebooks have suggested ways to implement the concept of systems thinking in educational leadership, offering practical advice on the use of systems thinking for facing the demands and challenges of today's educational systems (e.g. Hoban, 2002; Matier, 2007; Senge *et al.*, 2012). Researchers also described the use of systems thinking in key parts of school life, such as educational reforms (King and Frick, 2000; Miller-Williams and Kritsonis, 2009), parent-school relationships (Price-Mitchell, 2009), and teachers' collective learning (Cheng, 2011). The contribution of systems thinking to the effectiveness of educational leadership has also recently begun to be investigated (e.g. Pang and Pisapia's, 2012 study of school leaders in Hong Kong).

This study intended to explore how effective school principals use systems thinking, exploring the characteristics of school leadership where principals lead schools through



the systems thinking concept and procedures, which we have termed systems school leadership (SSL) – referring to school leadership that applies the systems view and performs at the systems level.

Conceptual framework

The conceptual framework for this study is grounded in the literatures on systems thinking and on its implementation in school leadership.

Systems thinking

Systems thinking was first mentioned nearly 60 years ago, by Bertalanffy (1949, 1968) and others, as a method of scientific investigation that contrasted with the scientific reductionism of René Descartes, which was developed about 400 years ago. To put it simply, scientific reductionism is a scientific approach whereby complex phenomena are understood by reducing them to their simpler basic parts (Jones, 2000; Rosenberg, 2006). In contrast to this approach, systems thinking claims that the only way to fully understand why a phenomenon arises and persists is to understand its parts in relation to the whole (Hammond, 2005).

Systems thinking is not a discipline, but rather is an interdisciplinary conceptual framework used in a wide range of areas, as explained by Cabrera (2006, p. 93): “Systems thinking is a conceptual framework, an orientation to the world, and a model for thinking about and learning about systems of all kinds – scientific, organizational, personal, and public.” Thus, the literature on systems thinking is scattered in disparate fields and journals, as one of the pioneers in systems thinking noted decades ago: “If someone were to analyze current notions and fashionable catchwords, he would find ‘systems’ high on the list. The concept has pervaded all fields of science and penetrated into popular thinking, jargon, and mass media” (Bertalanffy, 2003, p. 1). Due to this lack of a unified, central, ongoing discussion about systems thinking, it is difficult to define the construct accurately; therefore, no single, accepted definition exists. The range of systems thinking definitions includes the following:

- The art and science of making reliable inferences about behavior by developing an increasingly deep understanding of underlying structure (Richmond, 1994, p. 141).
- The art of simplifying complexity. It is about seeing through chaos, managing interdependency, and understanding choice. We see the world as increasingly more complex and chaotic because we use inadequate concepts to explain it. When we understand something, we no longer see it as chaotic or complex (Gharajedaghi, 2011, p. 335).
- The ability to see the world as a complex system, in which we understand that “you can’t just do one thing,” that “everything is connected to everything else” (Sterman, 2000, p. 4).
- An epistemology which, when applied to human activity, is based upon the four basic ideas: emergence, hierarchy, communication and control as characteristics of systems. When applied to natural or designed systems the crucial characteristic is the emergent properties of the whole (Checkland, 1999, p. 318).
- A discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static “snapshots.” It is a set of general principles [...]. It is also a set of specific tools and techniques (Senge, 2006, p. 68).

Despite the absence of a common and agreeable definition for systems thinking, it is quite clear that systems thinking has two main complementary meanings: rising above the separate components to see the whole system, and thinking about each separate component as a part of the whole system. These two meanings of systems thinking – seeing the whole beyond the parts and seeing the parts in the context of the whole – will be used in this paper to explore whether the statements given by principals fall under systems thinking.

As mentioned above, systems thinking was first suggested as a scientific method of investigation, but it soon became a means for tackling real-world problems too, under the assumption that scientific expertise may uncover a deeper understanding of reality and help deal effectively with various challenges. In public health, for example, systems thinking was recently used to prevent a global pandemic of the highly communicable H5N1 Avian influenza (bird flu) disease (Leischow *et al.*, 2008). Another example was the application of systems thinking in developing a Vietnamese tourism system that was threatened by overuse of underground water, lack of skilled workers, and poor infrastructure (Van Mai and Bosch, 2010). Managers today are expected to tackle a great diversity of challenges, which often present as richly interconnected problem situations. Systems thinking as a way of coping with real-world problems has been recommended for managers dealing with complex organizational challenges (e.g. Ackoff, 1999; Checkland and Poulter, 2006; Sterman, 2000).

Systems thinking and school leadership

Systems thinking can be used in key elements of school life. In the context of schools' educational reforms, systems thinking may provide a frame of reference for comprehensive school reform, enabling strategic planning that focusses on predetermined measurable outcomes; encompassing the organization's total resources and purpose; and defining how goals will be accomplished (Miller-Williams and Kritsonis, 2009). King and Frick (2000) claimed that schools cannot be effectively redesigned without the employment of systems thinking skills, which enable those concerned to analyze existing schools and to design alternative systems by exploring how people and elements in the school environment interact. Thus, the answer to the question of how schools may become places of transformation lies in systems thinking (Zmuda *et al.*, 2004).

Regarding parent-school relationships, systems thinking may help reframe parent-school partnerships as learning communities that aim to create new knowledge and innovation by enabling the experiences and capabilities of teachers and parents to interact in order to make tacit knowledge explicit (Price-Mitchell, 2009). In the context of the No Child Left Behind federal legislation in the USA, Chance (2005) proposed the use of a systems approach to, claiming that systems thinking helps educational leaders see public relations as a continual, systematic process that is essential to engage school community support for improving students' learning.

Systems thinking may also foster teachers' collective learning (Cheng, 2011), because work using this approach emphasizes the interrelatedness of goals. Teachers thereby review the system to identify its interconnections and then form solutions based on this deeper understanding (Wells and Keane, 2008). Systems thinking may also be significant in evaluating curricula and educational programs. Curriculum evaluation via systems thinking can ensure district-wide uniformity and consistency in evaluation (Jasparro, 1998). Dyehouse *et al.* (2009) compared linear and systems thinking approaches for evaluating educational programs, and they demonstrated how

systems thinking provides added value by modeling the participant groups, instruments, outcomes, and other factors in ways that enhance the interpretation of quantitative and qualitative data.

Several guidebooks for using systems thinking in educational leadership are also available; most of them engage in educational reform, offering recipes for successful educational transformation. Such a guide usually concentrates on implementing systems thinking regarding a particular issue that is claimed to be essential for effective educational change, while proposing clear instructions for treating this issue. For example, focussing on the sustainability of educational reform, Fullan (2005) asserted that sustained improvement of schools requires “system thinkers” who address the entire system comprising three levels: school and community, district or local education authority, and state or national policy. These system thinkers, no matter their own level in the system, know that all three levels influence one another. Similarly, Higham *et al.* (2009) advocated “system leadership” – leadership that goes beyond a single school, where leaders work directly for the success and welfare of students in other institutions as well as their own. Hoban (2002) concentrated on systems thinking and teachers’ learning, claiming that one of the reasons for the disappointing results seen for many efforts toward educational change is an overly simplistic view of teachers’ own learning, which is incompatible with its complex nature. Zmuda *et al.* (2004) claimed that systems thinking is the “door” leading to school staff members’ continuous improvement, focussing on making schools a place where all staff can constantly improve their teaching, learn, and work to increase students’ achievements.

A recent study by Pang and Pisapia (2012) substantiated the argument that systems thinking can be an important conceptual framework for school principals who wish to develop well-performing schools, which produce satisfactory results in terms of students’ achievements. In a previous study, Pisapia *et al.* (2005) defined the three strategic thinking skills with apparent links to leader success: reframing, reflection, and systems thinking. Based on related literature, Pisapia and Reyes-Guerra (2007) presented the Strategic Thinking Questionnaire, which was designed to provide an assessment of these skills. Sample items included: “I seek different perceptions,” “I review the outcomes of past decisions,” “I try to extract patterns in the information available,” and “I track trends by asking others if they notice changes in our context, or environment.” Using this questionnaire, Pang and Pisapia (2012) found that for Hong Kong school leaders, the strategic thinking skills profile was formed around systems thinking, which was the strongest predictor of leader effectiveness. This important albeit limited empirical research calls for further exploration of how effective school principals use systems thinking, intending to identify the characteristics of SSL.

Research context

This research study presents findings from Israeli principals. The Israeli educational system has been traditionally highly centralized both structurally and procedurally. The Ministry of Education has controlled schools in areas such as, writing and distribution of curriculum materials, standards, testing, and hiring and firing of school staff (Gibton *et al.*, 2000). Schools have followed a basic national curriculum although allowed to conduct “experiments” under administrative direction from the Ministry (Oplatka, 2006). However, in recent years, the tendency toward neo-liberal ideas of competition and privatization has resulted in more open and flexible registration opportunities for urban schools (with weaker links between residential location and

school attendance zones). These processes (open enrollment zones, school choices, increased strength of local education authorities in municipalities) have transpired much more in the urban schools, which operate in a competitive environment, whereas suburban and rural schools operate in a less competitive environment. This tendency toward flexible registration opportunities has been coupled with attempts (since late 1980s) to decentralize the school system through efforts such as school-based management, autonomous schools, and so forth (Nir, 2006). Although enabling school autonomy is a declared policy of the Ministry of Education, principals are still hesitant to undertake professional autonomy due to the Ministry's attempt to retain a strong centralized control system in operation, generally perceived by principals as bounded autonomy (Inbar, 2009).

According to the Gini coefficient for measuring a nation's distributive inequality, Israel is among the four countries with the broadest gap between rich and poor, alongside the USA, the UK, and Mexico (Organisation for Economic Co-operation and Development, 2011). Mindful of the great diversity among school populations, recent educational policy in Israel has been directed toward achieving high levels of equality in educational outcomes across the board. Nevertheless, Israeli students' academic achievements remain among the lowest in the industrialized countries, and students' educational gaps (achievement distributions) remain the widest (Ben-David-Hadar and Ziderman, 2011). The similarities between Israel and other countries, such as the USA, the UK, and Mexico, provide a unique opportunity to identify the characteristics of SSL.

Method

Research design

This study aims to explore systems thinking characteristics among school principals. Like most research engaging in this field (e.g. Frank, 2002; Frank and Elata, 2005; Hung, 2008; Larsson, 2009; Taber, 2007; Zulauf, 2007), this study is also qualitative in nature, to provide complex textual descriptions of how people experience a given issue or situation. More specifically, this is a qualitative topic-oriented study (Guba and Lincoln, 1994) of principals' mindscapes (Sergiovanni, 1995) concerning school systems thinking. Mindscapes function as personal theories that help practitioners navigate in an uncertain and complex educational context. Exploring principals' mindscapes can provide a broader view of systems thinking characteristics in the context of the educational system.

Participants

To select the research participants, 15 superintendents were asked to recommend "outstanding" school principals. To ensure diversity, the superintendents were from three different districts (Center, Haifa, and North), five superintendents from each district. They recommended 42 principals. These principals were then examined regarding their schools' achievements and climate, based on data collected and published by the Ministry of Education. Only school principals whose schools' achievements and climate were in the upper tier of national scores were included in the research population. This step reduced the list to 30 school principals. All these principals, except two, agreed to participate when approached; thus, the current sample consisted of 28 school principals. This procedure was based on the assumption that it is more likely to find systems thinking characteristics among principals who are considered successful and achieve high results, although lower functioning principals may also demonstrate these characteristics.

The 28 school principals included 12 males and 16 females, 24 Jews and four Arabs, from three of Israel's six school districts (Center, Haifa, and North). Participants worked in the state educational system ($n = 18$), the religious state educational system

($n = 8$), and the state special educational system ($n = 2$). They worked in elementary schools ($n = 20$), middle schools ($n = 2$), and high schools ($n = 6$). On average, participants had 19 years of teaching experience (range = 15-28), and nine years of experience as principals (range = 5-18).

Data collection

Data were collected through semi-structured interviews designed to explore participants' personal perspectives (Marshall and Rossman, 2006; Patton, 2002) and focus groups – round-table discussion forums of five participants each – which enabled a more dialogic setting than that of a one-on-one interview. Group discussion produces data and insights that cannot be obtained in other settings because listening to others' verbalized experiences stimulates participants' memories, ideas, and experiences (Lindlof and Taylor, 2010; Litosseliti, 2003). All the participants were given the option to participate in a focus group. Those whose schedules allowed them to participate in the focus groups did so: ten principals participated in two focus groups. The remaining 18 principals who could not participate in the focus groups were then interviewed.

The goal of the focus groups and individual interviews was to listen for utterances that reflected interviewees' points of view about school management. Without saying so explicitly, the interviewer (first author) tried to elicit interviewees' views regarding school management, through questions such as: "Please tell me about a conflict that arose at your school. What do you see as the causes of this conflict? What were its implications? How do you think this conflict should have been treated?;" "Which important processes are currently occurring at your school? Why do you think they are important? What are their consequences? Could anything compromise them, and what should be done to prevent this?;" and "What is the issue that your school needs to improve the most? Why? What might happen if this issue is not improved? What can increase the chances of this issue being improved?"

Individual interviews with principals generally lasted 40 minutes, and focus groups generally lasted one hour. They were conducted in places chosen by interviewees: their schools, coffee shops, and other locations. All those school principals whose schedules allowed them to participate in the focus groups did so. All interviews were audio-taped and transcribed verbatim. Transcriptions were translated from Hebrew to English by a specialist in both languages. All participants were fully informed of the aims of the study and were promised complete confidentiality as well as full retreat options. Pseudo names were assigned to all interviewees.

Data analysis

The analysis process exposed, expanded, and verified the phenomenon under study through systematic data collection and analysis (Charmaz, 2003). That is, data collection and analysis occurred simultaneously in an ongoing process throughout the inquiry (Strauss and Corbin, 1994). In particular, the data analysis included a data reduction process in which the already available data were reduced into briefer and more succinct formulations (Huberman and Miles, 1994). Thus, a conceptual framework constructed according to the study's goal served to reduce the data collected from the interviewees' utterances into shorter formulations. This data reduction enabled meaning to be drawn from the data after processing and interpretation.

To reveal how systems thinking manifested itself in educational leaders, study participants' utterances on school leadership were examined, to uncover clues indicating systems thinking. More specifically, the analysis was performed in two

phases: first, principals' voices were each analyzed separately; second, principals' voices were analyzed to generate common themes and elucidate the differences between the voices (Cohen *et al.*, 2000; Merriam, 2009). In this way, generating themes was an inductive process, grounded in the various perspectives articulated by participants (Flick, 2009; Marshall and Rossman, 2006; Rossman and Rallis, 2003). The dimensions of categories were explored, identifying relationships between categories and testing categories against the full range of data. This facilitates the reaching of a conclusion about transferability and provides the reader with an opportunity to engage in reasonable speculation as to whether the themes that emerged are applicable to other cases with similar circumstances (Schwandt, 1997). Moreover, a member check was conducted with all the participants to evaluate the soundness of the data, in order to improve the study's accuracy, credibility, validity, and transferability (Holloway and Wheeler, 2010). Transcripts were sent back to participants, requesting that they evaluate their responses to the interview questions and, if needed, add or refine their responses. Five of the interviewees changed their answers, clarifying their remarks and adding things they forgot to say.

Findings

Data analysis yielded four main characteristics of SSL: leading wholes; adopting a multidimensional view; influencing indirectly; and evaluating significance. See Table I for a summary of each.

Leading wholes

Principals' voice revealed that the first and primary characteristic of SSL is a holistic point of view, oriented toward seeing the big picture and not only its separate parts. As mentioned above, rising above the separate components to see the entire system is one of the two main complementary meanings of systems thinking. When it comes to understanding an entire school, those school principals who espouse SSL understand it as a whole system, above and beyond its subsystems and components, and recognize how each of them functions as part of the entire system. They view all the parts of the

Leading wholes	Seeing the entire school, including all its aspects, as one large system Seeing pupils' parents as partners Having tolerance for ambiguity Believing that teachers should be committed to the entire school Understanding that a group is more than the sum of its parts
Adopting a multi-dimensional view	Conceptualizing many aspects of a given issue simultaneously Switching between perspectives
Influencing indirectly	Using an indirect approach when dealing with tasks and challenges Willing to assume responsibility rather than blame others
Evaluating significance	Recognizing important issues and prioritizing them Balancing and bridging between internal needs and external demands; buffering against external guidelines Identifying patterns

Table I.
Characteristics of systems school leadership

school in the context of and in relation to the other parts, and recognize that the whole emerges from the relationships between the parts. For example, Naomi, an elementary school principal with nine years of experience as principal, considered her school as one large entity thriving to achieve its mission:

The leading concept of my school is that of multiple intelligences, which – in a nutshell – means that human beings have a variety of intellectual capacities: in addition to the linguistic and logical-mathematical intelligences there are also some additional intelligences, such as musical, bodily-kinesthetic, and social intelligences. I believe that to assimilate this concept successfully, we must implement it not only in a single area of school life, but rather in many, maybe in all areas of school life. Implementing the concept of multiple intelligences only in the context of learning is not enough. It must be a part of our peak events – ceremonies, parties, joint parent-pupil activities etc. of our evaluation method, of our teamwork as teachers, of our connection with parents and so on. So twice a year we hold an event for the parents which is prepared according to the multiple intelligences concept. The teachers are assigned roles according to the multiple intelligences concept, and our report cards are designed according to the multiple intelligences concept, and so on.

Naomi claimed that in order for the multiple intelligence concept to become truly ingrained in her school, it could not be implemented merely in one aspect of school life; it had to influence the school's entire educational practice, including all actions in all areas. This position represents a holistic viewpoint, seeing all the diverse parts of the school as one large entity that must be managed according to a consistent educational principle.

Similarly, principals who revealed a holistic point of view saw any given issue from any sort of school-life area – be it a program, event, or pupil – as a whole system, not only as a collection of details. In the following example, David, a religious elementary school principal with ten years of experience as principal, described his holistic understanding of an educational plan:

When I plan a project I initially have a vision of it complete, and this vision guides me all the way through, up until the implementation of the idea. The vision shows me the whole picture of the project, including its details. I'll give you an example: When there was a war going on in southern Israel I had an innovative idea – to adopt a school from there. The meaning of this adoption was that I, as the school principal, contacted the principal of the adopted school, and each teacher in my school contacted one teacher from the adopted school, and each student in my school contacted one student of the same age from the adopted school, and my school's secretary contacted the adopted school's secretary, etc. Of course the contents of these contacts developed accordingly: The principal of the adopted school and I discussed principals' issues, the teachers spoke about the subjects that interested them, and the pupils talked about their own issues, etc. When thinking about this unique idea, I first had the overall concept, alongside its details.

David asserted that when he planned an educational program related to a national situation (fighting in southern Israel), he did not compile a list of separate activities; rather, he saw the whole. Right from the first moment, David imagined an overall concept, from which he derived various activities.

The holistic view sometimes results in considering pupils' parents as an integral part of the school system, rather than an external factor possibly posing a threat. Deborah, an elementary school principal with 12 years of experience as principal, explained this point of view during a focus group meeting:

I agree with you that sometimes parents want us to make a decision regarding their child that we think is wrong and not in the child's best interests. But I don't expect parents to always back us up automatically either; I aspire for the school and parents to work together for the

benefit of the child. We have to meet the parents, listen to them carefully, learn from them, and also explain our positions to them. Then we can try to reach a joint decision. We can explain to them why we think we're right, but we mustn't be arrogant. We have to cooperate with the parents; there's no other way to succeed.

Instead of seeing parents as an external factor and even as potential opponents, Deborah recommended to see them as potential partners and advocated thinking and working together with them.

In addition, the holistic view may enable school leaders to tolerate ambiguity and be able to work under circumstances of uncertainty, so that lack of knowledge about all the details of a particular situation does not hinder their efforts to solve a system's problem. By viewing seemingly separate details as parts of one big picture, they may become able to deal with tasks based on currently available information, even if it is only partial. A case in point was given by Michael, a religious high school principal with six years of experience as principal, who described a dispute he had with senior staff members in his school about planning a new school year under conditions of uncertainty:

Some position holders in my school can't start planning the next school year until they get all the needed information. You have to understand, during the planning of a new school year, there is a lot of uncertainty. Only very late do you have all the information you actually need for the new school year. Actually, you have it after the new school year has begun; as a matter of fact, maybe a month or two later [...] And based on this lack of information you're supposed to plan the new school year: to determine how many classes there will be in your school; to determine the role of each teacher and how many hours he will work; to accept new teachers, etc. As I said, some position holders in my school can't plan a new school year until they get all the information about it. They think that we shouldn't make a plan, because there's a risk that we'll have to change it later. They want to wait until we have all – or almost all – the information, and just then start planning. But I don't think so. I see the next year as a big picture, parts of which are covered, slowly unfolding and revealing themselves. You can see how such a picture would look, more or less, even when part of it is still hidden, so it's possible to plan the next year despite the uncertainty. We should use the available information, and start planning based on it, and as time goes on and we know more and more, we can continuously improve our plans.

Some of Michael's team members found it difficult to work without knowing all of the system's minutiae; they showed low tolerance for uncertainty and felt they had to thoroughly understand all the details involved in a given problem in order to be able to reach a decision and come up with a solution. According to Michael's point of view, on the other hand, the ability to skip over the lack of information and function under uncertain conditions resulted from the ability to see the whole, or as he said, "the big picture."

The current data indicated that school leaders who possessed a holistic point of view were inclined to believe that their teachers must consider not only their own jobs, but rather the entire school. These principals believed that teachers should feel a sense of responsibility not only toward their pupils or the specific subject-matter they teach, but also to the vision and purpose of the whole school. For example, during a focus group session, Eric, an elementary school principal with six years of experience as principal, claimed that when the school staff considers itself to be one large team, it strengthens each teacher. Layla, an Arabic elementary school principal with 18 years of experience as principal, added that teamwork may be justified for a deeper reason as well:

Many times I tell my teachers that when they see a pupil misbehaving, they should reprimand him even if he is not their own pupil. If a student resorts to violence or vandalism, or even just throws trash on the floor – a teacher who's just passing by should reproach him even if the

teacher doesn't know his name. I believe that a teacher at a school is not only the teacher of his own pupils; he is part of the school team, which is responsible for educating all the children. As a staff member he is an educator of each and every student at the school.

Layla regarded teachers as members of one large organization, which operates as a whole, meaning that all teachers should promote the entire school together. A single teacher must not focus only on his or her position, but rather must feel responsible for the whole school's output, and therefore should discipline other teachers' students as well.

In her discussion of the effects of group dynamics in the classroom, Sarah, a religious elementary school principal with 12 years of experience as principal, revealed her view that a group of students or faculty members may present characteristics that differ from the sum of the individuals' traits:

In our school we divide the pupils into new classes for their third year at school. We invest a lot of time and thought in this division, because it's very important to us that the classes be equal as far as size, pupils' level of behavior and learning ability, proportion of boys and girls, etc. In order to create balanced classes we collect a lot of information about the pupils from the teachers who taught them during their first two years at school. But many times, despite our efforts to make things even, eventually the classes turn out to be very different. This inequality is a result of many surprising changes: Pupils who were quiet suddenly become boisterous, pupils who were marginal suddenly become leaders, etc. And then someone always suggests, after a period of time, that we should mix the classes and re-divide them, because now we already know the pupils well and can create equal classes. I explain to my staff again and again that even if you know each student's personality very well, you can never foresee exactly what sort of characteristics the whole class will take on. A class as a group is not just the sum of the students comprising it; when you put them together they have all sorts of interactions, and they influence each other in so many ways that all of them are transformed. This is a very important principle, which is true in other contexts too.

Sarah's claim about classrooms – that a class's features are determined by more than the sum of its individual pupils' previously known personalities – and her generalization of this claim to other contexts coincide with the first SSL characteristic – an orientation toward seeing the big picture and not only its separate parts.

In essence, this SSL characteristic of seeing the whole picture is very important with regard to the entire school as well as to various issues transpiring within it. This knowledge about how numerous separate details combine to create the entire school may result on the one hand in tolerance for ambiguity and on the other hand in the important belief that teachers should be held accountable beyond their own specific teaching jobs and should learn to understand that a whole system may present emerging properties that are not explicitly apparent in the properties of its components.

Adopting a multidimensional view

An additional characteristic of SSL is adopting a multidimensional view rather than a unidimensional view, thus understanding that because each element is a part of the large and complex school system it necessarily has more than one reason, one explanation, one implication, or one answer, and therefore principals must take various aspects into consideration simultaneously. This multidimensional view falls under system thinking because it is a result of seeing the whole beyond the parts, which is one of the two major meanings of systems thinking. Aaron, a high school principal

with eight years of experience as principal, for instance, described how he led a multidimensional process of pedagogical improvement in his school:

Now I'm leading a comprehensive pedagogic improvement process. This is a long and complex process that concerns not only our teaching. It includes an occupational aspect when it comes to a change in our team composition; an emotional aspect, because the teachers have to change their work methods; it changes our connection with the middle school and has many additional repercussions. Seeing the whole process, with all of its components and all of its stages, I drive the entire school to its destination.

Aaron understood that a process of pedagogical improvement is multidimensional, lying not only in the instruction area but rather in several areas simultaneously.

Principals revealed a multidimensional view when they considered a single occurrence at school to have several causes and therefore viewed a single explanation for a specific occurrence as unsatisfactory. Joshua, a religious high school principal with five years of experience as principal, illustrated this view:

I'll give you an example. At the meeting we just held we discussed our results on the national examinations. The results were not as good as we believe they could have been, and during the discussion some of the staff pointed to "the sole and exclusive explanation" for this: One teacher said that the reason for our poor achievements is the lack of an instructional coordinator; another teacher claimed that we simply do not allocate a sufficient number of hours to language classes; and still another teacher claimed that our teachers are not professional enough and do not know how to teach. This phenomenon, of pointing to the supposedly-exact cause for anything that happens, reappears in many of our discussions. There's always somebody, or a few somebodies, who know the exact cause for the problem at hand. I believe there's never one single reason for anything that happens in a school, or anywhere, for that matter. A school is such a complicated entity, consisting of so many components that influence each other, that there are always quite a few reasons for anything that occurs in it. Of course, some of the reasons are primary and some are secondary, but you can't point to one single reason for anything, and if you do look for such a reason without considering all the various factors influencing the situation – you won't get a full explanation of reality. Whenever you want to solve a problem at school, or to improve a particular area, you must take into account the variety of factors affecting it.

Joshua was capable of juggling several notions at once regarding explanations for his school's disappointing results on the national examinations, believing that no single reason exists for anything that happens in a school, and no single opinion represents the sole truth.

Rebecca, a special education school principal with 11 years of experience as principal, suggested a structured method for thinking about a given issue from a variety of perspectives:

For my thinking to be effective I usually use a method that I've adopted from De Bono's bestseller "Six Thinking Hats." This method separates thinking into six functions, each of which is identified with a symbolic thinking hat of a certain color. According to this method I mentally wear and switch hats, so that I can easily focus and redirect my thoughts. The white hat, for example, calls for facts and for information known or needed; the yellow hat calls for optimism and positivity; the black hat calls for judgment and pessimism, and so on. I like this method because it enables me to take into account all the considerations that relate to the subject at hand.

In sum, this characteristic of SSL considers various issues from multiple relevant perspectives and viewpoints, as well as cognitively switching among perspectives in order to overcome problematic issues.

Influencing indirectly

Another characteristic of SSL that emerged from the principals' qualitative data is the use of an indirect approach when dealing with tasks and challenges, thereby understanding that each issue at hand is part of a large system and therefore principals do not have to deal directly with every issue but rather can influence it circuitously. Addressing the school's separate components and subsystems as parts of one whole system characterized by mutual, reciprocal effects is a view that falls under one of the two major meanings of system thinking, that of seeing the parts in the context of the whole. Daniel, a middle school principal with 11 years of experience, described during a focus group how he radically increased his school's achievements based on this circuitous influence:

I understood that in order to increase student achievement, I must improve teachers' instruction. So I began to provide the teachers with guidance regarding curriculum, strategies, and so on. But I understood also that directly improving instruction is not the whole answer for improving achievements. So I also tried to increase teachers' self-efficacy, persuading them consistently that they possess the ability to lead students to great success. But the most important step was the less direct step: I invested a lot of effort in fostering the teachers' emotional satisfaction from each other and with our school, and got them excited about our work, telling them over and over again that teaching is a job and a career, but also a calling. This is what made the difference.

Eva, an elementary school principal with 12 years of experience as a principal, advocated using the indirect approach regarding school violence:

To stop school violence from occurring in my school, I first made rules and procedures very clear to students and parents alike, but I also took indirect actions: I made conflict resolution part of my school's curricula, and mainly tried to make classroom and school environments more welcoming by integrating lively and interesting activities. School life doesn't have to be limited to textbooks and blackboards; science activities, art activities and math activities build students' confidence and unlock their imaginations, and most importantly – create a positive school climate, without violence.

More broadly, Rafael, a religious high school principal with six years of experience as principal, explained that because of the interconnections at school, each school's area affects other areas, for better or worse:

When there are some problems at school, I don't have to solve each problem separately; it is enough to properly solve one problem or two, so that other problems will disappear. The things at school are so connected to each other that you don't have to address them separately; one thing influences another. Because of the strong connections between things at school you almost never have just one problem alone, but some problems arise together, and for the same reason you also don't have to deal with each problem alone.

Rafael added that because of the possibility of dealing indirectly with challenges principals do not need to address every issue. It is sufficient to deal with some issues, and other issues will be handled by mutual influence. Similarly, Sharon, a high school principal with five years of experience as principal, saw the school's interconnections, giving an example from her field – the natural sciences:

As a science teacher, I know that when something happens in a system we should explore the entire system to find out the exact reason for that particular happening. If, for example, our garden suffers from destructive aphids – we try to find out what cause the proliferation of that aphid. We may find that the emergence of the aphids is a result of the disappearance of seven-spot ladybugs, which eat the aphids. And why did the seven-spot ladybugs disappear?

Because of the arrival of a new breed of birds that feeds on the seven-spot ladybugs. And what brought these birds? Resection of the forest that was their natural habitat, due to construction. So the resection of the forest there caused the aphids' destruction here. The same thing at school: When you have a problem, you have to look for the reason very carefully; the direct and immediate solution is not always the effective solution.

Utterances by school leaders who often influence indirectly showed that these principals did not tend to blame their teachers for deficiencies in their conduct; instead, they sought to motivate the teachers to improve their performance. These principals did not direct their energy toward brooding on their teachers' mistakes or faults even discreetly; they focussed mainly on what they could do to promote teachers' functionality because they realized the influence of their own actions on the staff's level of functioning. Joseph, a religious elementary school principal with eight years of experience as principal, described the disagreements he and his vice principal had on this matter:

When I became the principal of my current school I also began to work with my present vice principal. In the beginning, she often explained to me that the teachers were wrong: This teacher is irresponsible, this teacher is a slacker, these teachers don't invest enough effort, and so on. She did it all the time, out of the belief that these were the real causes of our school's problems. However, I felt very uncomfortable with her approach; I felt that according to her the teachers were our enemy, and the cause of our problems. Over time I shared my viewpoint with her, explaining to her that our teachers are our responsibility, and that our role is not to blame them for their mistakes but to prevent these mistakes in the first place by motivating them to work more professionally. Blaming is a dead end; it leads nowhere. You must understand that you are the one who needs to improve and should help them improve.

Joseph's statements about avoiding blame and taking responsibility for teachers' mistakes suggest his grasp of distinct connections between his own actions and teachers' functioning. Viewing himself and his teachers as interconnected parts of the same system, he explained his goal of working with his senior staff to ensure the quality of the teachers' work.

To summarize, this SSL characteristic comprises a realization that each element in the school functions as an interconnected part of an entire system, with implications for the system's other parts. School leaders who revealed this point of view chose to affect things indirectly, and rarely found fault with someone or something outside themselves when things went wrong; instead, they examined how their own actions could contribute to improving the situation.

Evaluating significance

The fourth characteristic of SSL that emerged from the current principals' qualitative data is the ability to figure out the significance of school life's elements to the whole system – identifying the role, the importance, and the relevance of each element. This characteristic is consistent with one of the two major meanings of systems thinking, that is, thinking about each separate component as a part of the whole system. Edna, an elementary school principal with seven years of experience as principal, described this ability:

Life at school is composed of a huge amount of tiny events. At any given moment there are a lot of occurrences at school, of many kinds, which together constitute the school routine. As a principal, I'm exposed to a lot of those occurrences; every day I see or hear a vast amount of items of information, and the most important thing I should do is to identify those that are significant. The significant ones are not necessarily noticeable at first sight, but due to my experience and my good knowledge of the school I am able to identify the small events that have great importance: those which are a warning sign of a problem, a clue suggesting the

right way or an answer to a question that bothers me. Today, for example, parents came to me to complain about one of the teachers. Complaints of parents about teachers is not unusual, but this complaint is a particularly important warning signal for me, because I suspect that it implies a serious problem in that class, which may worsen much further. So I plan to examine this specific complaint in depth, to solve the problem immediately.

Edna said she knows how to identify the small occurrences that are of great significance. Similarly, Tammy, a religious elementary school principal with seven years of experience as principal, said she is able to “filter out” the nonessential elements of the school’s complex and dynamic reality and to analyze the most important issues that need addressing:

I think that over the years I have learned how to point to the most important issues in my school, and to discern the more important from the less important ones. Maybe it sounds simple, but in actual fact it isn’t at all. The school is a very complex entity, which consists of many parts and components, and many issues requiring my attention. My job is to highlight and deal with the essential ones. I have to address all of my school’s needs, even those that are less pressing, but I must distinguish between the more significant and the less significant, in order to give the more significant ones priority, invest more efforts in dealing with them, and avoid putting them off.

Tammy verbalized her feeling that she is able to prioritize the most important actions and foci out of all of the incoming stimuli. When asked to give an example, she said:

Now, toward the end of the school year, for example, I pay attention to every student who says he plans to leave the school, so I won’t be surprised by a wave of departures. During the summer, I pay attention to messages on new educational initiatives, and so on.

During a focus group discussing decentralization, Eleanor, an elementary school principal with seven years of experience as principal, also addressed the ability to put her finger on the main issues pertaining to the school:

I advocate decentralization, dispersing functions and powers, because I think that the principal does not have to handle every trifle himself or herself. But regarding the important matters – the principal can’t rely on anyone else; he must be involved. The trick is to detect the school’s important matters. It is a complex challenge, but it is indispensable. For this purpose you must be a very skilled principal, because in many cases the crucial matters are not conspicuous. You have to put your finger on the crucial things in time, although they are elusive and misleading.

Nur, an Arabic elementary school principal with six years of experience as principal, who also participated that focus group, linked the ability to evaluate the significance of school life’s elements to the ability to effectively balance the school’s needs, mission, and interests with the external requirements imposed by district and/or national guidelines, shifting or bridging between the two and buffering the school from the external guidelines. She described this complexity and potential conflict:

Ministry of Education expects you, as a school principal, to do exactly what it determines: to implement its policy, to adhere to its guidelines, to attend all its conferences, etc. For me it is a constant dilemma: to what extent to adhere to their requirements and to what extent to do what I think is good for the school. On the one hand, the Ministry of Education is my employer and my boss, and its instructions are generally reasonable and beneficial, but on the other hand I was chosen to be a school principal not only to follow instructions but because I have my own educational judgment and I know what’s right for my school. I think that today, after I gained experience, I know how to balance between the guidelines that were dictated to us and my own opinions, because I understand which dictated instructions are important, and those are the ones I accept, and I also know which ones it is better to ignore or get around. Sometimes I don’t even tell my teachers what the Ministry of Education directed me to do.

Another implication of this leadership characteristic is the ability to discern repeating patterns in school life, and to link separate elements in order to derive their meaning. Leah, an elementary school principal with nine years of experience as principal, described her ability to discover valuable management information hidden among the many details of everyday school life, paying attention to elusive hints and seeing them together “like a detective story or a puzzle that has to be solved”:

Recently I have realized that the teachers in our school think there’s nothing they can do better than they’re already doing. It seems to them that the way they’re working is the best under the given circumstances, and that there’s no room for improvement. The interesting thing is how I came to notice that. No teacher ever said explicitly that this is his or her opinion; they were not even aware of it. I understood it after collecting a lot of clues. I saw something here and something there, and suddenly I had this insight that connected various points together. Each clue was very small and elusive, but all the clues together gave me a whole new picture, that I was blind to beforehand. And what happened next was no less fascinating: I started to speak about this insight with position holders in our school, and then I had a new, deeper insight: I understood my own part in creating this point of view by the teachers.

Although Leah knew her school very well, she still discovered something very essential about it that she had not realized beforehand: she knew the facts all along but did not notice that they were interrelated, pointing to a single conclusion. She figured out the pattern, learning the full meaning of elements of school life.

In short, this SSL characteristic includes the capability to evaluate elements of school life according to their significance for the entire system. Thus, it consists of the ability to “filter” information and prioritize requirements and tasks, distinguishing between important and unimportant issues to be resolved, understanding underlying structures, and identifying major patterns in the data.

Discussion and implications

This paper presents four characteristics of SSL. The first characteristic is leading wholes – the conceptualization of all aspects of school life as one large system, so that when there is a need to change or improve it, the principal will not isolate small parts and attempt to repair them but rather will consider a large number of interactions as they mutually influence each other. The second characteristic is adopting a multidimensional view – the ability to “juggle” between several aspects of a given issue simultaneously; noticing a wide range of reasons for its emergence and existence, taking into account a variety of its consequences and predicting various options for its future development. The third characteristic is influencing indirectly – using an indirect approach when dealing with tasks and challenges, based on the awareness that countless mutual influences are at play among various elements within the school, each of which is connected to others, affecting them and being affected by them. The fourth characteristic is evaluating significance – the ability to evaluate elements of school life according to their significance for the entire system, distinguishing between important and unimportant issues to be resolved and identifying patterns. In line with systems thinking, this list of four main characteristics of SSL should be seen as overlapping, interconnected, and interrelated. School leaders who perform at the SSL level should be considered as such not merely because they demonstrate several of these characteristics, but rather because they reveal an overall ability to apply the conceptual framework of SSL in the reality of schools. Thus, the characteristics of SSL should be seen as reflections of a comprehensive approach.

The findings above explained how these characteristics are related to the two major meanings of systems thinking. As illustrated in the following figure, each of the four

characteristics is related mainly to one of the two meanings. On the one hand, both the leading wholes and the using a multidimensional view characteristics reflect seeing the whole beyond the parts. On the other hand, the influencing indirectly and evaluating significance characteristics are both related to seeing the parts in the context of the whole. Thus, each of these two meanings of SSL includes two characteristics (Figure 1).

The existing literature on systems thinking in educational leadership, reviewed above, has considered systems thinking to be a tool for improving a particular field at school, such as parent-school relationships (Price-Mitchell, 2009), teachers' collective learning (Cheng, 2011), and evaluation of educational programs (Dyehouse *et al.*, 2009); or as a method for school improvement programs (King and Frick, 2000; Miller-Williams and Kritsonis, 2009; Zmuda *et al.*, 2004), which by its nature is a time-limited process. This perception in the literature thus far probably results from considering the application of systems thinking in school leadership as a complicated procedure, which involves a series of steps and requires special attention or effort. According to the findings of the current study, systems thinking can be useful in almost all school arenas. Thus, school leaders can incorporate the SSL's conceptual framework as a means for analyzing and evaluating the school as a whole as well as its everyday occurrences.

According to the literature, systems thinking is recommended as an effective approach for managers in general (e.g. Ackoff, 1999; Checkland and Poulter, 2006; Serman, 2000), and in particular for school leaders (e.g. Fullan, 2005; Hoban, 2002; Zmuda *et al.*, 2004). Thus, it seems advisable to nurture prospective and currently performing school principals with the conceptual framework of SSL, in various stages of their educational career, such as preparatory programs, mentoring programs provided to beginning principals and school principals' lifelong learning.

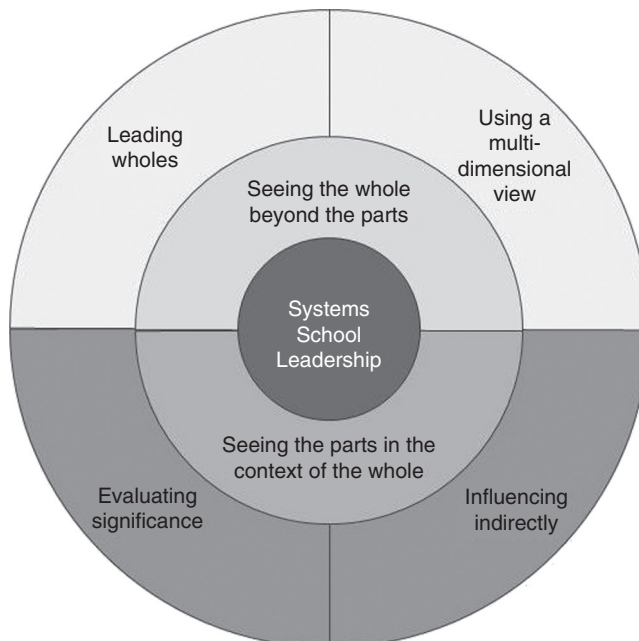


Figure 1.
Characteristics of systems school leadership

This study provides unique data compared to prior research; however, it has several limitations, such as the focus on findings from Israeli principals, the relatively small sample size, and the fact that only “outstanding” principals were studied. Thus, it requires replication elsewhere in the world, in various ethnic, socioeconomic, and cultural contexts in order to substantiate the validity of the SSL characteristics, evaluating the interrelations between school context, leadership, and systems thinking. It also requires replication among low functioning principals, examining to what extent there is a mutual influence between the principals’ systems thinking capacity and their success in schools. Further research should complement principals’ verbally expressed perceptions with more objective measures like direct observations to evaluate actual implementation of SSL in diverse school settings. Further research should also explore to what extent and how often principals use systems thinking. In addition, future research should look for the sources of SSL, and for the stages in its development. Such research should also seek ways to teach the SSL perspective, examining how and to what extent it can be taught in principal preparatory programs and through the induction process with a principal mentor. This would enable the evaluation of school principals’ SSL development over time, and more importantly, would help identify ways to support, enhance, and accelerate SSL.

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