

Holistic School Leadership: Development of Systems Thinking in School Leaders

HAIM SHAKED

Bar-Ilan University

CHEN SCHECHTER

Bar-Ilan University

Background: *Systems thinking is a holistic approach that puts the study of wholes before that of parts. It does not try to break systems down into parts in order to understand them; instead, it focuses attention on how the parts act together in networks of interactions.*

Purpose: *This study explored the development of holistic school leadership—an approach where principals lead schools through the systems thinking concept and procedures—over principals’ different career stages, a topic that has received little research attention.*

Research Design: *Qualitative data were collected via 82 semistructured interviews, six focus groups, and 27 observations of three groups of principals: (a) prospective principals—24 students attending three principal preparation programs; (b) novice principals—follow-up on 11 prospective principals during their first year after appointment; and (c) experienced principals—eight principals holding that position for 5+ years. Data analysis was conducted by generating themes through an inductive process of condensing, coding, categorizing, and theorizing.*

Findings: *Data analysis indicated that the development of systems thinking in school leaders consists of five stages: (a) preservice stage, typified by an expansion of view; (b) survival stage, typified by a slowdown in the development of systems thinking; (c) consolidation stage, typified by a gradual development of systems thinking; (d) role maturity stage, typified by a systemic view; and (e) possible decline stage, typified by some degree of difficulty to think systemically.*

Conclusions: *Systems thinking is not equally applicable to aspiring, novice, midcareer, and veteran school principals. This study’s findings may help identify ways to enhance and accelerate the development of systems thinking in prospective and currently performing principals in a way that is compatible with the unique features and context of their specific stage.*

Leading a school has never been an easy job; however, current-day school principals face particularly complex challenges (Fullan, 2014). The present era of accountability in education systems is characterized by high expectations from school leaders, alongside frequent changes in a variety of arenas. School principals are expected to demonstrate positive results in terms of their students' achievements, and align all aspects of schooling to support the goal of improving instruction in order to ensure all students' success (Datnow & Park, 2014; Hess & McShane, 2014). Several scholars claim that school principals, who face today's educational leadership complexities, may benefit from the holistic perspective of systems thinking (Fullan, 2005; Senge et al., 2012), which focuses on how parts work together in networks of interaction, rather than on breaking down systems into parts in order to understand them (Gharajedaghi, 2011; Kasser, 2013). Systems thinking was found an effective management approach in a variety of areas, such as organizational resilience (Jaaron & Backhouse, 2014), vehicle design (O'Kane, 2015) and information systems (Bentley, Cao, & Lehaney, 2013); however, its effectiveness in the realm of school leadership has hardly been researched (Pang & Pisapia, 2012a, 2012b).

In prior research, we explored the *holistic school leadership* approach, identifying the characteristics of systems thinking in school leadership (Shaked & Schechter, 2014). The current study aimed to take our investigation a step further by exploring the development of holistic school leadership over principals' different career stages, a topic that has received little research attention. An examination of any theoretical perspective specific to educational leadership, such as that of systems thinking, should attempt to identify the variations, dynamics, and modifications that may occur in that construct's manifestations over school principals' career trajectory because leadership approaches and practices may be linked to one particular career stage and not others (Parylo, Zepeda, & Bengtson, 2012).

The developmental dimensions of educational leadership are gaining an important foothold, because building the internal capabilities enables school leaders to become more effective in supporting others (Drago-Severson, 2009; Drago-Severson, Maslin-Ostrowski, Hoffman, & Barbaro, 2014; Kegan & Lahey, 2009). Deeper understanding of the nature of school leaders' developmental trajectory with regard to holistic school leadership may expand on existing knowledge about school leaders' systems thinking and may assist in finding ways to support the development of systems thinking in school principals. To establish the theoretical background for the current study, we next review systems thinking in general, systems thinking in school leadership, and school leaders' career stages.

THEORETICAL BACKGROUND

SYSTEMS THINKING

Systems thinking was first mentioned toward the end of the first half of the 20th century, as a method that contrasted with Descartes' scientific reductionism (Von Bertalanffy, 1933, 1960). In scientific reductionism, complex phenomena are understood by reducing them to their simpler basic parts (Rosenberg, 2006). In contrast, according to systems thinking, 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 an interdisciplinary conceptual framework used in a wide range of areas; it is a type of orientation towards the world, a model for thinking and learning about systems of all kinds—scientific, organizational, personal, and public (Cabrera & Cabrera, 2015). Thus, the literature on systems thinking encompasses a broad range of fields (and therefore a broad range of journals), yielding a variety of definitions. These definitions primarily represent the interdisciplinary area of systems science, which covers complex systems, cybernetics and dynamical systems theory, and applications in the natural and social sciences and engineering (Hieronymi, 2013). Among the proposed definitions:

- “[The capacity of] simplifying complexity, while seeing through chaos, managing interdependency, and understanding choice” (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’ and 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 of 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, or a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static ‘snapshots’” (Senge, 2006, p. 68).
- “A set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviors, and devising modifications to them in order to produce desired effects” (Arnold & Wade, 2015, p. 675).

It is important to note that there is an ongoing argument in the literature about whether systems-thinking capacity is inherited (innate) or learned (acquired) (Zonnenshain, 2012). Some argue that the only source of systems thinking is natural talent (e.g., Hitchins, 2003), while others claim that systems thinking can be developed as can any other skill (e.g., Frank, 2006). Moreover, despite the absence of a commonly accepted definition for systems thinking, these diverse definitions clearly yield two main complementary meanings for systems thinking: 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, respectively, *seeing the parts in the context of the whole*—were used in the current study to explore the data provided by prospective, novice, and experienced principals.

From the systems thinking perspective, the multitude of variables existing in any system are causally related in feedback loops, which consist of outputs of the system that are routed back as inputs as part of a circuit of causation. The feedback loops themselves interact, and these interactions constitute the structure of the system and determine its behavior (Ford, 2009). Feedback loops challenge the relation between cause and effect, where the first event is considered responsible for the second one. From the feedback loops perspective, understanding the system as a whole is necessary since the first event influences the second, but the second event also influences the first, leading to a circular series of events (Åström & Murray, 2008). Thus, causation in systems is less obvious and tends not to be direct (Pryor, 2008).

Several researchers have demonstrated how the applications of systems thinking allowed managers to cope successfully with complexity, in a wide range of areas. Systems thinking was found to be an effective way for dealing with heterogeneity of stakeholders (Tejeda & Ferreira, 2014); for explaining complexities of a system to all concerned (Holmes, Finegood, Riley, & Best, 2012); for facilitating group learning and shared decision making (Van Mai & Bosch, 2010); for taking into account a variety of influencing factors (Andrew & Petkov, 2003); and for increasing coordination and cooperation between authorities and agencies (Leischow et al., 2008). Moreover, researchers have found strong statistical relationships between systems thinking and project performance (e.g., Elm & Goldenson, 2012). Thus, in the context of business management, systems thinking was described as an effective approach (Brown, 2012; Jolly, 2015; Wilson & Van Haperen, 2015).

SYSTEMS THINKING IN SCHOOL LEADERSHIP

Systems thinking in the context of school leadership has not received sufficient empirical attention. Only a few researchers have examined the uses of systems thinking by school leaders, but these mainly pinpointed the benefit of systems thinking for specifically handling a limited area within the school. Wells and Keane (2008), for example, demonstrated how Senge's (2006) "laws" of systems thinking may be implemented to develop professional learning communities in school systems. Kensler, Reames, Murray, and Patrick (2011) asserted that because educational leaders have access to large volumes of data but lack the skills to use them effectively for continuous school improvement, systems thinking may help facilitate the development of evidence-based practice. Dyehouse, Bennett, Harbor, Childress, and Dark (2009) argued that systems thinking can provide a framework for representing many of the components in a complex curricular program and may serve as a more precise and explicit method of interpreting and assessing program results. Within the context of the No Child Left Behind federal legislation in the United States, systems thinking was proposed as useful for improving public relations (Chance, 2005). Systems thinking was claimed as helping educational leaders see public relations as a continual, systematic process that is essential for engaging the school community's support to improve students' learning. In addition, several educational guidebooks have suggested ways to implement systems thinking in the school context, offering practical advice on using such thinking to confront today's educational demands and challenges, including structured models for successful educational reforms (e.g., Fullan, 2005; Hoban, 2002; Senge et al., 2012; Zmuda, Kuklis, & Kline, 2004).

One of the rare studies specifically focusing on systems thinking's application in educational leadership found that systems thinking was the strongest predictor of Hong Kong school leaders' effectiveness. Thus, a holistic school leadership approach based on systems thinking produced positive results regarding school performance, distinguishing between more and less effective leaders (Pang & Pisapia, 2012a). In addition, school leaders who demonstrated more extensive use of systems thinking also reported higher use of actions taken to accomplish the school's goals, to develop learning organization that continuously transforms itself, and to ensure trust and emotional commitment to the school's aspirations and values (Pang & Pisapia, 2012b).

In our previous study (Shaked & Schechter, 2014) we explored the ways in which school principals led their schools while specifically employing systems thinking concepts and procedures. Based on the characteristics that emerged from that study, we coined the holistic school leadership approach to describe the four major ways in which school leaders apply

the systems view and perform at the systems level. (1) The first characteristic of systems thinking leaders is the capacity for *leading wholes*—a holistic point of view oriented toward seeing the big picture and not only its separate parts. Principals conceptualize all aspects of school life as one large system. (2) The second characteristic—*influencing indirectly*—refers to leaders' ability to address the school's tasks and challenges circuitously. This strategy is based on the principals' awareness that countless reciprocal influences are at play among various elements within the school, each of which is connected to others, affecting them and being affected by them. (3) The third characteristic, *using a multidimensional view*, refers to seeing several aspects of a given issue simultaneously. Effective principals simultaneously notice a wide range of reasons for an issue's emergence and existence, take into account a variety of its consequences, and predict various options for its future development. (4) The fourth characteristic—*evaluating significance*—considers elements of school life according to their significance for the entire system. Principals distinguish between important and less important issues to be resolved, identifying patterns.

In line with the holistic essence of the systems thinking perspective, these four characteristics of holistic school leadership should not be viewed as a linear series but as overlapping, interconnected, and interrelated capacities. Two of these characteristics, leading wholes and using a multidimensional view, coincide with one of the aforementioned two major meanings of systems thinking—seeing the whole beyond the parts. The other two characteristics, influencing indirectly and evaluating significance, coincide with the second major meaning of systems thinking, that of seeing the parts in the context of the whole.

Given the broad role of systems thinking in the context of school leadership, we also explored the sources of holistic school leadership ability, identifying four sets of experiences or people that school principals reported as the major facilitators of their systems thinking development (Shaked & Schechter, 2016). (1) The first source, *management experience*, refers to the experience that school leaders gain prior to and during their principalship role. Such experiences might include holding a managerial position like grade-level coordinator while working in the school, or management experience on the job as an acting school principal, or even a managerial position beyond the school system. (2) The second source of systems thinking that principals identified was that of a *role model*, referring to the impact of working alongside someone who possesses a well-developed level of systems thinking. Usually this role model is a prior principal who led the school through systems thinking and thereby imparted this view to the school's management team and created an atmosphere that promoted systems thinking development. (3) The third source of systems thinking in school

leadership is *academic study*, mainly in principal preparation programs. (4) Last, principals pinpointed the importance of a *natural tendency* or aptitude that facilitates one's acquisition of high levels of systems thinking. Each school principal reveals this natural ability to a different extent. Like for the characteristics, in line with the holistic essence of the systems thinking perspective, these sources promoting systems thinking in school leaders can be conceptualized as interacting with and feeding into each other.

The current study aimed to expand on these previously identified characteristics and sources of systems thinking in school leadership, by exploring the development path of systems thinking in school leaders. To date, the process of developing systems thinking has received little research attention in any professional discipline, leaving fundamental questions unanswered about how it develops in different professionals (Davidz, 2006). As this systems thinking developmental process is presumably related to milestones in professionals' careers, it should be examined in light of the distinctive trajectory for school principals.

GENERAL STAGES OF SCHOOL PRINCIPALS' DEVELOPMENT

Researchers have explored the career stages through which people pass during the course of their working lives in organizations in general (e.g., D. T. Hall, 2002) and in school leadership in particular (e.g., Earley, 2007; Oplatka, 2004; Petzko, 2004). The studies on school leaders' careers reported progress through a series of distinct occupational stages, with each stage characterized by changes in aims, needs, dilemmas, attitudes, relationships and behaviors.

Several models have been suggested in the literature to describe the stages of school leaders' development. For example, Berry (2014) identified four career development stages among secondary school principals: (1) the induction stage—when principals are placed into their new job; (2) the stabilization and establishment stage—when principals feel as though they have established who they are and what they wish to accomplish; (3) the professional stage—when principals want to give something back to the profession; and (4) the distinguished stage—when principals have had numerous experiences as instructional leaders, and are the leaders in their fields.

The National College for School Leadership (2001) in England identified a "leadership development framework" that includes five stages on the path from teacher to head teacher (principal). At first, in the *emergent leadership* stage, the teacher begins to take on management and leadership responsibilities and perhaps aspires to become head. *Established leadership* comprises the stage of assistant heads and deputy heads, who are experienced leaders but who do not intend to pursue headship. The *entry to headship* stage

includes a teacher's preparation for and induction into the senior post in a school. In the *advanced leadership* stage, school leaders reach maturity in their role and look to widen their experience, refresh themselves, and update their skills. The *consultant leadership* stage is when an able and experienced leader is ready to put something back into the profession by taking on training, mentoring, inspection, or other responsibilities.

Developing an integrated model for principals' career stages, Earley and Weindling (2004) divided the development process into seven stages: Stage 0—*preparation prior to headship*—when future principals prepare themselves, including training for headship; Stage 1—*entry and encounter* (first months)—when the new head's notions of headship meet reality; Stage 2—*taking hold* (3–12 months)—when the new head strives to gain control over the new role; Stage 3—*reshaping* (second year)—when the head feels more confident; Stage 4—*refinement* (years 3–4)—when structural changes are in place; Stage 5—*consolidation* (years 5–7)—after the head introduces most of the planned changes; and Stage 6—*plateau* (years 8 and onwards)—when the head has initiated most of the changes.

School principals' training should provide development frameworks that are consistent with the stages of school leaders' career (Darling-Hammond, LaPointe, Meyerson, Orr, & Cohen, 2007). In this regard, many countries offer preservice leadership-preparation programs, which often lead to a university degree or specialized qualification. In addition, many countries provide leadership training programs for newly appointed school leaders. By targeting new school leaders, these programs seek to integrate theoretical and practical knowledge and build networks through which these leaders can share their concerns (Schleicher, 2012). However, in-service programs for school leaders should also provide what Peterson (2002) terms "career-staged" professional development, i.e. development frameworks that are consistent with the stages of school leaders' careers (Darling-Hammond et al., 2007).

The process that school principals undergo, from adapting to their new role through stabilization and establishment, and up to high proficiency levels, may be seen as a lengthy process of sense-making. Sense-making is an active process by which people structure the unknown so as to be able to act within it, turning the ongoing complexity of the world into a "situation that is comprehended explicitly in words and that serves as a springboard into action" (Weick, Sutcliffe, & Obstfeld, 2005, p. 409). Sense-making is more than comprehension, explanation, and situational awareness; it is "a motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively" (Klein, Moon, & Hoffman, 2006, p. 71). Thus, principals' careers continually develop through sense-making processes, in order to integrate experiences into their understanding of their environment (Kolko, 2010).

According to Kegan and Lahey (2009), the process of making sense of one's experience is a lifelong activity, which establishes a balance between self and other (in psychological terms), or subject and object (in philosophical terms). Our psychological development results from this process, which we use in order to solve problems. Kegan (1994, p. 9) stresses the "evolution of consciousness, the personal unfolding of ways of organizing experience that are not simply replaced as we grow but subsumed into more complex systems of mind." Leaders' growth, in this sense, involves movement through progressively more complex ways of knowing, referred to as orders of consciousness (Drago-Severson, 2009).

The current study aims to expand the existing literature, by exploring the development path of systems thinking in school leaders. To date, this process has received no academic attention. Filling this gap could be useful to researchers and practitioners alike.

RESEARCH CONTEXT

According to the Gini coefficient for measuring a nation's distributive inequality, Israel is among the countries with the broadest gap between rich and poor, alongside the United States and Mexico (Organisation for Economic Co-operation and Development, 2011, 2016). 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, thus aiming to narrow the achievement gap upward through growing performance pressure. In practice, however, the Israeli student achievement distribution is characterized by a low level of achievement combined with a growing achievement gap, as evidenced in various international comparative examination studies (BenDavid-Hadar, 2016). This evolving educational context—with national Ministry policies focusing on narrowing students' achievement gaps through standardization and accountability—provides a unique opportunity to explore principals' systems-thinking development.

Specifically, the primary role of Israeli school principals as articulated by Capstones, the institute that spearheads school principals' development in Israel, is to serve as an instructional leader in order to improve the education and learning of all students (Capstones, 2008). Four additional areas of management support this function: designing the school's future image—developing vision and bringing about change; leading the staff and nurturing its professional development; focusing on the individual; and managing the relationship between the school and the community. Thus, as a school leader, the principal need to capture a variety of dimensions and aspects of the school and creating close links between these

factors to ensure the success of all students (Capstones, 2008). This instructional leadership approach, with the four additional areas of management to support it, has been the overall framework for all principal preparation programs in the country (all public). Moreover, the core element of all principal preparation programs is applied experiential learning, aiming to develop professional identity and management orientation. Internship takes place in host schools over the course of one year, during which prospective principals receive guidance from experienced school principals. The internship aims to provide interns with a clear picture of all the principal's duties and responsibilities, as well as with the knowledge and skills enabling effective principalship. Newly appointed principals are provided with an induction program for the first two years of service. This program includes learning in small groups seeking to shape initial school-leadership practices. In addition, during their first two years in the role, school principals are guided by experienced principal mentors to help them develop from novices to self-assured leaders.

METHOD

The goal of the current study is to explore principals' career development in the specific context of systems thinking, which is an area that has not yet been studied empirically. Like most research on systems thinking (e.g., Frank, 2012; Hung, 2008; Taber, 2007; Zulauf, 2007), the present study was qualitative in nature in order to provide rich textual descriptions of the complexities of how people experience a given issue or situation. This qualitative study tapped a diverse sample of school principals spanning three different stages of professional development—prospective, novice, and experienced principals – in order to trace developmental trajectories in systems thinking.

PARTICIPANTS

Participants were school principals at three different stages of professional development: (1) The 24 prospective principals (18 females, 6 males) attended principal preparation programs at three different academic institutions, all of which were public, operating under the guidelines of Capstones, the institute that spearheads school principals' development in Israel. They had 8–26 years of teaching experience ($M = 17$) and worked in elementary schools ($n = 18$), middle schools ($n = 3$), and high schools ($n = 3$) located in five of Israel's six school districts. (2) The novice principals were 11 of the prior group of 24 prospective principals (8 females, 3 males) in a follow-up during their first year after appointment as principals. They had 11–27 years of teaching experience ($M = 18$) and worked in elementary schools ($n = 8$), middle schools ($n = 1$), and high

schools ($n = 2$) located in four of Israel's six school districts. (3) The 28 experienced principals (24 females, 4 males) were selected based on their superintendents' recommendations and their schools' achievements. The experienced principals had 16–39 years of teaching experience ($M = 26$) and 5–18 years of experience as principals ($M = 9$). They worked in elementary schools ($n = 20$), middle schools ($n = 2$), and high schools ($n = 6$) in three of Israel's six school districts. For ethical reasons, all participants were informed that their participation was voluntary and that they could exit the study at any point in time. They were assured of anonymity and confidentiality (pseudo-names were assigned) and were asked to provide written consent based on understanding of the research purpose.

MEASURES

Data were collected through three methods: interviews, focus groups, and observations. The semistructured method was found to be most appropriate to this study's goals. Thus, both interviews and focus groups were semistructured, which "allows the researcher to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (Merriam, 2009, p. 90). The key questions were preplanned, but the interviews and focus groups were also conversational, with questions flowing from previous responses when possible. Interviews and focus groups were audiotaped for later transcription and analysis, with the participants' consent. Interviews with principals generally lasted one hour, and focus groups generally lasted two hours. Focus group participants did not know each other.

During the first part of interviews and focus groups, we intentionally avoided mentioning the term "systems thinking" to prevent priming interviewees to frame their discussions in this light. Instead, we used two types of questions. First, we tried to bring interviewees to talk about their development of systems thinking by asking questions pertaining to general professional development, such as: "What will enable you to succeed as a school principal?" (prospective principals), "Please tell me about your work as a beginning school principal. What helps you in your work?" (novice principals), or "How did you learn to run a school?" (experienced principals). In addition, we used inexplicit questions that in our previous research were found to facilitate effective exploration of systems thinking among future and present school principals (Shaked & Schechter, 2014, 2016). Sample inexplicit questions are presented in Table 1, divided according to the characteristics of holistic school leadership. Only the last part of each interview and focus group used the term "systems thinking," including questions such as: "Do you think you possess systems thinking? What is the meaning of this concept for you? How is it expressed?" and

“How did your systems thinking develop? What contributed to its development? What slowed its development?”

The prospective principals were interviewed twice during their one-year principal preparation program, at the beginning of their studies and toward the end. In addition, three focus groups were held mid-program, attended by 16 out of the 24 participants whose schedule allowed them to participate. Following completion of their preservice program and their appointment as first-year school principals, the subgroup of 11 novice principals was again invited to two interviews: three months and again one year after beginning their new positions. A focus group was also held mid-year with the six novice principals whose schedules allowed them to participate. In the group of experienced principals, all 28 participants were offered the option of participating in a focus group. Those 10 principals whose schedules allowed them to participate did so, forming two focus groups of five principals each. The remaining 18 principals who could not participate in the focus groups were then interviewed.

Observations were conducted as a secondary source, used to confirm or weaken insights obtained via the interviews and focus groups. Four observations of prospective principals were conducted during university workshops. These workshops, which dealt with shared leadership issues (e.g., distributive leadership, collaborative decision-making), required prospective principals’ active participation and involvement. They all ended with a collective reflective inquiry on both the content and process of the workshop. The average duration of these observations was 1.5 hours. Twelve observations of novice principals as well as 11 observations of experienced principals were conducted at their schools. These observations focused on the principals’ participation in meetings and discussions, handling student discipline, writing letters and messages, visiting classrooms, and managing the everyday operations of the entire campus. The average duration of these observations was 2 hours. In total, 82 interviews, 6 focus groups, and 27 observations were conducted (146 hours of data collection).

DATA ANALYSIS

Data analysis was a four-stage process—condensing, coding, categorizing, and theorizing. Once data were collected, we found that not all the material collected could serve the purpose of the study, and a sorting process was necessary (Miles, Huberman, & Saldaña, 2014). Thus, in the first stage of analysis (condensing), we looked for the portions of data that in any way related to the topic of this study. To examine what falls under systems thinking, we used the two main meanings of systems thinking mentioned above: *seeing the whole beyond the parts* and *seeing the parts in the context of the*

Table 1. Sample Inexplicit Questions Used During Interviews and Focus Groups to Explore Systems Thinking Among Present and Future School Principals, Divided According to the Characteristics of Holistic School Leadership

The characteristic of holistic school leadership	Sample inexplicit questions
Leading wholes	<ul style="list-style-type: none"> • 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?
Adopting a multidimensional view	<ul style="list-style-type: none"> • Does your school have a cohesive vision? What is it? Which areas does it affect? • How do you analyze the causes of events at your school? Please provide an example.
Influencing indirectly	<ul style="list-style-type: none"> • 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 handled? • Please complete the following—If I want to change something at school, I...
Evaluating significance	<ul style="list-style-type: none"> • How, in your opinion, should a principal solve a problem that arises at school? Please provide an example. • Among all the occurrences of the last week at school, which are of great significance? Why? • How do you identify the importance and relevance of each element in school life? How do you operate, as a result?

whole. Specifically, we identified which utterances of principals reflect the characteristics of systems thinking found in our previous study (Shaked & Schechter, 2014), as presented in Table 2. In the second stage (coding), each segment of relevant data (utterance) was coded by the aspect of systems thinking it expressed (Gibbs, 2007). In contrast to the previous stage, this stage was data-driven and not theory-driven because we did not use a priori codes but rather inductive ones, developed by direct examination of the perspectives articulated by participants (Flick, 2009; Marshall & Rossman, 2011; Rossman & Rallis, 2012). After capturing the essence of utterances in the second stage, in the third stage (categorizing), we clustered similar utterances to generalize their meanings and derive categories. At this point, we reworked categories to reconcile disconfirming data with the emerging analysis. Finally, in the theorizing stage, we aimed

to reach a conceptual construct of the categories derived in the previous stage, and to see how they were interconnected and influenced each other as parts of one abstract construct (Richards & Morse, 2013).

Several measures were taken at different stages of the study to ensure trustworthiness. First, the diversity of study participants was maintained, in terms of gender, school level (elementary, middle, and high), school types and sectors within the Israeli educational system (state schools in both the Jewish and Arab sectors, state-religious schools, and special education schools), and geographical districts. Second, triangulation was employed “to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint” (Cohen, Manion, & Morison, 2007, p. 141). To triangulate data, we used three different qualitative methods to study the research topic—interviews, focus groups, and observations. It should be noted that the goal of triangulation was not to arrive at consistency across data but to uncover deeper meaning in the data (Patton, 2002). Third, a member check was held, giving the data, transcription, and tentative themes to participants and asking for their feedback (Schwartz-Shea, 2006).

In a qualitative exploration, the researchers should pay attention to how their backgrounds and personal experiences inform the theoretical and methodological perceptions concerning the inquiry. As the researchers of this study, we come from different backgrounds: One of us was a school principal for 17 years and currently is an educational leadership researcher, and the second gained extensive experience in educational leadership research. Our joint work, which includes ongoing mutual reflection, allowed us to become more aware of the conceptual and methodological issues pertaining to the current research. Specifically, as reflective journals have been recognized as an important aspect of qualitative research (Etherington, 2004; Ortlipp, 2008), we wrote and shared our reflective journals throughout the study to ensure critical thinking.

RESULTS

Findings emerging from the data analysis indicated that the process of developing systems thinking in school leaders occurs over five stages, as presented next: (1) the preservice stage, typified by an expansion of view; (2) the survival stage, typified by a slowdown in the development of systems thinking; (3) the consolidation stage, typified by a gradual development of systems thinking; (4) the role maturity stage, typified by a systemic view; and (5) the possible decline stage, typified by some degree of difficulty to think systemically.

Table 2. Utterances of Study Participants Reflecting the Characteristics of Holistic School Leadership

The characteristic of holistic school leadership	Utterances of study participants reflecting this characteristic
Leading wholes	<ul style="list-style-type: none"> • <i>When I became an assistant school principal I began to see the whole school rather than only a single class.</i>
Adopting a multidimensional view	<ul style="list-style-type: none"> • <i>I began to see a somewhat broader picture of the range of students and teaching staff. Later I was appointed to be a pedagogical coordinator, and then my view of the system became much broader.</i> • <i>I learned how to think as a school principal, who takes a lot of considerations into account and combines them all to reach the optimal decision.</i>
Influencing indirectly	<ul style="list-style-type: none"> • <i>I tried several times to open her eyes to see that there are additional teachers at school and also other subjects worthy of our attention.</i> • <i>I began to be exposed to interactions between different coordinators, different tests, internal and external tests, and more.</i>
Evaluating significance	<ul style="list-style-type: none"> • <i>I believe that I don't have to respond directly to teachers' complaints. Teachers' complaints and requests are very important to me, and I'm very attentive to them; but sometimes the correct answer is not to deal with them directly.</i> • <i>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>

STAGE 1: THE PRESERVICE STAGE—EXPANSION OF VIEW

According to the findings based on qualitative analysis of the current study participants' data, the first stage in the development of systems thinking in school leadership seems to occur during the years before appointment as school principal and is therefore called the "preservice" stage. The main process that occurs during this stage is an expansion of view: Prospective principals begin to broaden their perspective, learning to see the holistic systemic picture. Specifically, during this stage they mainly develop two of the holistic school leadership characteristics: leading wholes and using a multidimensional view. The significant development of systems thinking in this stage happens due to the multitude of available sources in this period of time—managerial experience gained due to holding a position at school, academic studies in the principal preparation program, and a role model when working alongside a skilled principal, without the stress of actually working

as a beginning principal. The notion of view expansion was expressed by 13 prospective principals, 6 novice principals, and 9 experienced principals.

In an interview held during her principal preparation program, Natalie, a prospective principal with 20 years of experience as a teacher, described the expanding systems thinking viewpoint that she gained when she began working as an assistant elementary school principal:

When I became an assistant school principal I began to see the whole school rather than only a single class. As long as I was a teacher in my class, I didn't understand how things look from the whole school's point of view, but since my appointment as the school's assistant principal I learned over time that there are many considerations to be taken into account, and it is not always possible to respond to individual teachers' requests.

Beginning “to see the whole school rather than only a single class” reflects the first characteristic of systems thinking, leading wholes, which means seeing the big picture and not only its separate parts. Natalie attributed the development of this holistic perspective to her managerial experience, which is one of the sources of holistic school leadership ability. This source was mentioned frequently in the context of the preservice stage, because in this stage aspiring principals often hold a school position like assistant principal, educational counselor, or grade-level coordinator.

Likewise, in an interview held during her principal preparation program, Miriam, a prospective principal with 8 years of teaching experience who was working as a mathematics coordinator in an elementary school, was asked about her systems thinking development. She described how she steadily developed systems thinking in parallel with the increasing preservice roles that she held at school:

The development of my systems thinking was gradual. Initially, as a teacher of mathematics, I can now say I did not really have systems thinking. All I cared about was that my students would succeed on a math exam. I did not take into consideration that the students were also studying other subjects, which had their own requirements. I gave my students assignments without any regard for the rest of their school subjects. Obviously, this caused grievances among my students and among other teachers. Later I was appointed to be the coordinator of mathematics, and then I was responsible for the success of all students in mathematics. I began to see a somewhat broader picture of the range of students and teaching staff. Later I was appointed to be a pedagogical coordinator, and then my view of the system became much broader. It's not just math, but also accountability for other subjects. I began to be exposed to interactions between different coordinators, different tests, internal and external tests, and more.

Like Natalie, Miriam also attributed her systems thinking development to the managerial experience source, which she gained as a position holder at school during the preservice stage. She said of herself that she not only developed a wide point of view, which reflects the characteristic of leading wholes, but also identified interactions within the system, an ability that underpins the characteristic of influencing indirectly.

Dinah, a prospective principal with 10 years of teaching experience, was exposed to her school's complexity when she became part of the school's management team. In an interview held during her principal preparation program, Dinah said:

I've been working at my school for ten years, but just three years ago, I joined the school's management team, and that was a turning point for me. Since being appointed as a management team member, I began to understand how the school works, because I became exposed to the uncertainty, deliberations, connections, and consequences of everything. I see a lot of things I didn't see before, and it gives me a new look at the whole picture. I learned how to think as a school principal, who takes a lot of considerations into account and combines them all to reach the optimal decision.

Based on her managerial experience, Dinah learned to “take a lot of considerations into account.” This strategy reflects the third characteristic, using a multidimensional view, which means seeing several aspects of a given issue simultaneously.

In an interview with Eva, an experienced principal holding this role for 12 years, she recalled how she skipped the important steps in her preservice stage, moving directly from a teaching role to the role of principal of a large school, without holding any managerial role during her years as a teacher (the managerial experience source) and without studying in a principal preparation program (the academic studies source). Thus, Eva encountered significant difficulties during her early years as school principal because she “didn't understand how the system works”:

When I moved to this school I had four years of experience as a principal in a previous school, and that's what enabled me to succeed here. At the previous school, I worked very hard because I didn't understand how the system works. I made a lot of mistakes there, and changing my workplace allowed me to start over – as smarter, more experienced, and better at understanding the school. I think that if I had carried a formal role at school while still working as a teacher I would have been much better prepared for school leadership. I learned to manage the school the hard way.

Eva was appointed as a school principal without sufficient understanding of “how the system works.” Put differently, she missed the preservice

stage of systems thinking development. Eventually, she gained an expanded systems view “the hard way.” According to Eva, a preservice managerial role could have facilitated her systems thinking development.

STAGE 2: THE SURVIVAL STAGE—SLOWDOWN

Analysis of the current findings suggests that the second stage in the process of developing systems thinking in school leadership—the survival stage—lasts several months. Participants reported that this stage ranged in duration from 4 to 10 months in their first year as in-service principal. During this time, a slowdown seems to occur in the development of systems thinking, because the principal must urgently deal with the demanding tasks of acclimatization and socialization in order to survive entry into the new position. The notion of survival was expressed by 9 prospective principals, 9 novice principals, and 11 experienced principals. During this stage, principals are engaged in steps that are more technical, such as learning the required paperwork management and reporting methods, or more immediate needs, such as becoming acquainted with the school and gaining the trust of staff and parents.

In an interview with Michal, a prospective principal with 22 years of experience teaching and working as an educational counselor, she described this “survival” phenomenon with regard to a new principal who had arrived at her middle school. Michal claimed that the new principal could not discuss holistic subjects like school policies or goals that are part and parcel of systems thinking, reflecting the characteristic of leading wholes, because “she simply can’t stop fiddling with current operations”:

Our school got a new principal this year, and for me it was a real change. I was used to discussing essential issues with the previous school principal. He was a really clever person, who really understood educational systems, and I often held in-depth conversations with him about the school’s policy, goals, and issues like that. With the current school principal, on the other hand, I can’t discuss such topics. I don’t think that she lacks the ability to participate in such discussions; she simply can’t stop fiddling with current events. I hope later she will be able to work at a higher level, and in the meantime I’m doing my work in another way.

When Michal was asked why the new principal “can’t stop fiddling with current events”, she explained:

In my opinion, she spends a lot of time worrying about small things. She can’t leave anything untreated, and it is important to her that there should be no tiny mistakes in her work, and therefore she has no time for strategic thinking. She needs to tackle each and every event in school in order to know the system, as well as to feel in control.

A similar phenomenon was described by Wafa, an experienced principal serving in this role for 18 years, who was appointed as a mentor to a new principal. She described her novice mentee's feeling that she could not afford to dedicate time "to developing an extensive view" because of the heavy burden of the new daily routine:

I was asked to be a "principal's personal guide." I received the name of a beginning principal, and we began to meet. The first meetings were very successful; she raised all kinds of issues, the conversation flowed, we spoke for hours, and I felt that she was getting a lot from the meetings. My main goal was to help her to look extensively at her work, to develop an extensive view. But after a few meetings something went wrong. She canceled our meetings several times, in some cases at the last minute. When we finally met, I asked her why it happened. I wasn't angry about it and I didn't blame her, I just spoke with her about it openly. It was the right move; she answered honestly that she was struggling with the daily routine, and the meetings with me seemed to her a luxury that she couldn't afford.

This example conveys that during the survival stage, Wafa could act as a role model, one of the holistic school leadership sources, for her mentee. Nevertheless, the mentee could not develop "an extensive view" of holistic school leadership because of her pressures while acclimatizing and socializing into the new position. Thus, the difficulty in developing systems thinking during the survival stage, described by Michal and Wafa, may be related to principals' increased pressure to understand and control their new school environment, focusing on the routine managerial tasks.

During a focus group, Shoshana, a novice principal with 25 years of teaching experience, said that during her first months on the job she was constantly chasing managerial tasks and hence could not take time out to step back and take a broader look at long-term rather than urgent issues:

As I said, it took me a while to learn the everyday practice of my work, and I am still learning. During the first months of this year, I couldn't think about anything but routine work. Many times I found I was not ready for events and meetings, preparing needed reports and letters at the last minute. I was working around the clock. Sometimes I woke up remembering things I needed to do, and I sat down in the middle of the night to prepare documents and send emails. Now it is a little bit better, but I still feel overloaded. I believe it won't always be like this, and when that happens then I will be able to think not only about what I need for tomorrow but also what I need for the next month and the next year.

Rising above the day-to-day tasks to think about the long term reflects the characteristic of leading wholes, which Shoshana failed to achieve while

trying to survive her first hectic months as a school principal. Benjamin, a novice principal with 25 years of teaching experience, also described his inability to think about the whole year but attributed it not to his workload but rather to feelings of inadequacy and anxiety:

During the first year here, there were significant gaps between expected successes and school reality, and therefore I had intense feelings of inadequacy and even anxiety. Thus, I didn't think about the whole year, but cut it into pieces. I asked myself: "Can I survive this day? Can I survive until the end of the week? Until the end of the month? Until the end of the semester?" Several times I wanted to run away, but by thinking in the short term I was able to remain.

Benjamin's feeling of inadequacy may be related to the pressure that characterizes the work of a beginning principal who is continuously trying to narrow the gap between the expected state of affairs and the actual school situation. This pressure, with the subsequent feeling of inadequacy, prevents him from inspecting the picture holistically and gaining a broader perspective of the school processes as they unfold along the year.

Layla, an experienced principal in the position for 18 years, also described this survival stage in the context of her role as a mentor to a new principal, like Wafa above. Layla described her mentee novice principal's inability to rise above one individual case and see the wider picture:

The subjects of our meetings are determined by her [the novice principal's] preferences; I let her raise any issue she wants, and we follow whatever matters to her. In the last three sessions we talked about one of her teachers; she doesn't get along with her. I tried several times to open her eyes to see that there are additional teachers at school and also other subjects worthy of our attention. I thought that we should not spend so much time on one problematic teacher, but she is so overwhelmed with the bad relationship with this teacher so that she can't think about any other topic or relationship.

Layla's attempt to provide her mentee with a broader view—"to open her eyes to see that there are additional teachers at school and also other subjects worthy of our attention"—reflects the characteristic of using a multidimensional view. However, the mentee could not put aside the single case of the teacher with whom she had a conflict. In this case, the novice principal's unavailability to engage in systems thinking stemmed not from overburdening management tasks or personal insecurities but from interpersonal tensions. Tensions like these could happen at any stage, but it may be speculated that during the survival stage, the beginning school principal may be particularly vulnerable to them. At this survival stage, new principals may focus on establishing a good foundation of interpersonal relationships

with their staff rather than on addressing a systemic problem. Thus, newly appointed principals engage more than veteran ones in steps that are pragmatic, such as learning the required reporting methods, managing paperwork, and gaining the trust of staff and parents, hindering the ability to consider elements of school life according to their relative significance in terms of the entire system.

STAGE 3: THE CONSOLIDATION STAGE—GRADUAL DEVELOPMENT

According to data analysis, the third stage in the process of developing systems thinking in school leadership—the consolidation stage—lasts several years (as reported by the participants, about 3 years after the slowdown months during the first year in office). This stage is characterized by a growing capacity of systems thinking alongside a gradual consolidation of the principals' standing. Systems thinking develops as the principals become more established in their job, being acquainted with the overall structure and operations of the school. Developing a broader view of school operations and their interconnectedness was described by 7 prospective principals, 5 novice principals, and 12 experienced principals. In this period of time, participants described school principals as becoming gradually less unsettled and more comfortable in their role; accordingly, their systems thinking also gradually evolves. For instance, during a focus group, Aaron, an experienced principal serving in this role for 8 years, described his first years as a school principal:

When I became a school principal, I didn't even guess that it would take me such a long time to become acquainted with my new job. I thought I knew well how the school worked, and thus I assumed that in a few weeks or at most few months I would learn the principal's work. In fact, it took me two or three years to shift my perspective from a limited one to a far-reaching, all-embracing one.

This “far-reaching, all-embracing” perspective, which Aaron developed over time during the consolidation stage, reflects seeing the whole beyond the parts. Nur, an experienced principal serving in this role for 6 years, who also participated in Aaron's focus group, spoke in a similar vein while explicitly using the term “consolidation”:

The process Aaron went through is very similar to the process I went through. You know, when speaking about a lesson, consolidation is the stage that normally occurs at the end of the lesson, where new material is reviewed, and hopefully learning is reinforced. I felt that I reached this stage after about three years, when I finally realized what it means to navigate a whole school. I felt that I was just then really beginning to do what was required of me as a skipper of this ship.

Afi, an experienced principal serving in this role for 6 years, also identified the first years of school leadership as the phase for consolidating learning of the system as a whole, which reflects leading wholes.

I became a principal after 15 years as a teacher, coordinator, and assistant principal, so I was supposedly ready to be a school principal. In fact, during my first years on the job I tried to look like I knew what I was doing, but deep down I felt I was guessing at every decision. It was only after a few years as principal that I felt I had more than superficial knowledge about many different areas, that I also had courses of action for the school as a whole. Only then did my confidence and my sense of autonomy increase.

As illustrated, experienced principals looked back retrospectively, underscoring the importance of the consolidation period in the principal's professional growth. The consolidation process, which requires several years of active work as a new principal, apparently cannot be gained from other managerial roles. Thus, in order to achieve high level of holistic school leadership, the managerial experience source must include not only experience in the preservice stage, as a position holder at school, but also extended work as an active school principal.

Regression and progression processes are a natural part of systems thinking development. Thus, principals sometimes deal with survival challenges also during the consolidation stage. Sharon, an experienced principal serving in this role for 5 years, described the nonlinear nature of systems thinking development:

I have the ability to think systemically. I understand how things at school are interconnected. However, there are ups and downs. Most of the time I feel skillful, but sometimes I feel like I'm on the first day in the role. I think that over time this feeling decreases. However, although I have quite a bit of experience, I do not always see the whole picture.

STAGE 4: LATER YEARS—ROLE MATURITY

The stabilization that is reached during the first years on the job appears to provide the foundation that later allows principals to apply the systems view. Thus, the fourth stage in the development of systems thinking in school leadership may be termed "role maturity." The notion of role maturity was expressed by 8 prospective principals, 5 novice principals, and 17 experienced principals. Although the stabilization process is still dynamic and principals naturally continue to experience moments of insecurity and frustration, in later years experienced principals more often demonstrate systems thinking, seeing the whole beyond the parts and seeing the

parts in the context of the whole. Jacqueline, an experienced principal serving in this role for 9 years, said she would have preferred to start her job in the fourth year:

Over the years, I've learned to think systemically. Currently I make quicker decisions with less information, understand the personal motivation and behavior of others, can see the big picture without losing sight of the details. For this reason, if I could turn back the clock, I'd rather have started my principalship career from the fourth or fifth year, or even from the seventh. I've learned to understand the school over the years, and I've improved over time. It was only after several years as a school principal that I learned to see the entire system; during my first years I made a lot of mistakes.

Jacqueline believes that the role maturity stage after several years on the job allows her to perform at the systems level. In her interview, she used the holistic school leadership approach, such as the characteristic of influencing indirectly concerning complaints that came to her:

I believe that I don't have to respond directly to teachers' complaints. Teachers' complaints and requests are very important to me, and I'm very attentive to them; but sometimes the correct answer is not to deal with them directly. Instead, I bring more lofty topics for discussion among the staff. This brings the teachers to another place, thus the problems resolve themselves.

Similarly, Joshua, an experienced principal serving in this role for 5 years, stated:

Work experience helps you develop an understanding of the world of your work and an awareness of your own skills and abilities. I feel that just now, in my fifth year on the job, I have gained the systemic view, understanding how one's own organization works with others in the same field and across disciplines. Maybe if you interview me in my tenth year I'll say that in my fifth year I didn't understand anything yet; however, currently I feel that it took me about four years to understand the entire school, my job, and my own traits.

According to Joshua, the role maturity stage may be the most likely time for performing at the systems level. He attributed this capacity mainly to the source of managerial experience gained while serving as principal.

Indeed, many experienced principals expressed high levels of systems thinking during the role maturity stage. For example, Tammi, an experienced principal serving in this role for 9 years, said she could “filter out” the less essential elements of the school’s complex and dynamic reality in order to analyze the most important management issues that needed 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, that consists of many parts and components, and also of many issues requiring my attention. My job is to highlight and deal with the essential ones.

The ability of Tammi to “point to the most important issues” in her school reflects the characteristic of evaluating significance—considering elements of school life according to their significance for the entire system.

Layla, an experienced principal serving in this role for 18 years, expressed her belief 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 school as a whole:

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 a 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. This reflects the characteristic of leading wholes.

In her discussion of classroom characteristics, Sarah, an experienced principal serving in this role for 12 years, 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 the third grade. We invest a lot of time and thought in this division, because it's very important to us that the classes be equal with regard to 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 claimed that a class's characteristics depend not only on the individual pupils' previously known personalities, but mainly on their interaction. Thus, a class's nature cannot be predicted by examining individual pupils' characteristics alone. Put differently, Sarah understood how a class's properties emerge; this happens through a process whereby larger entities with certain characteristics arise through interactions among smaller entities that do not exhibit the larger entity's characteristics. Sarah's claim, therefore, who is in the role maturity stage, and her generalization of this claim to other contexts, all reflect systems thinking—an orientation toward seeing the emerging properties of the whole due to the dynamic interactions among the parts.

STAGE 5: POSSIBLE DECLINE

Role maturity may be seen as the peak period of the principalship career. Participants also underscored that in some of these mature principals, a phenomenon of decline in the ability of holistic school leadership may occur, which may be termed the fifth stage. The notion of possible decline was expressed by 5 prospective principals, 4 novice principals, and 11 experienced principals. These participants pointed out that sometimes overconfidence and abundant years of experience mislead veteran principals into thinking that they see the whole picture when they no longer do because of dynamic changes occurring in the system. During a focus group, Eric, an experienced principal serving in this role for 11 years, stated:

We're in an era when almost every facet of our work requires ongoing changes, and principals who get used to the traditional ways of running schools often don't look at doing things in new and creative ways. As I said, I agree with Aaron that you can't develop your systems thinking without experience, but at some point principals can't see the system clearly anymore, because they're locked into the old paradigms. That kind of experience doesn't contribute to their performance; it blocks them.

According to Eric, managerial experience is not always a source of holistic school leadership. Too much experience can be an obstacle, because it may lock one into old paradigms. Eleanor, an experienced principal serving in this role for 7 years, who also attended the focus group, supported Eric:

Although innovative, dynamic, and creative qualities may be associated with beginning school principals, I don't think that we need just new school principals. However, at some point the veteran principals lose the flexibility that is required for a broad view that sees the whole picture, and remain fixed in antiquated mindsets.

Adina, a novice principal with 13 years of teaching experience, said in a focus group during her first year that she did not want to be like the veteran school principals she knew, who considered just their own point of view:

At our local school principals' meetings I see some dinosaurs who don't realize how they are no longer relevant. They don't think they have to consult with their team, because in their opinion they have already seen and heard everything and they now see the whole picture on their own.

According to Adina, the “dinosaur” principals do not listen to their teachers’ suggestions because they feel they had already “seen and heard everything.” Refusing to examine different perspectives about school life is the opposite of *using a multidimensional view*.

Carolyn, an experienced principal with 12 years of experience, who is about to retire, noted that in the past she had a systemic perspective, which probably diminished over time:

Not long ago, in one of the principals' meetings which I attended, participants were asked to choose a time in their lives, to which they aspire to return. I said that I would like to be back in my best principalship years. I wouldn't want to be again a new principal, who still can't do her job properly; I would like to be back a principal who already gained several years of experience, and therefore possesses a meta-view of school. I currently feel that I'm not as sharp as in the past. I used to thoroughly understand the needs of the school and how everything is interconnected.

Carolyn feels that her administrative capacity for a “meta-view” is not as it used to be. It may be the case that veteran principals (i.e., with years of experience as principals) are more likely to rely primarily on their own perspective and on existing knowledge gained from past experiences as a lens through which they analyze school processes.

DISCUSSION

The current study's qualitative analysis of the rich data based on interviews, focus groups, and observations of principals characterized by different levels of professional experience captured five stages for the development of systems thinking over school leaders' careers. These five stages are summarized in Table 3: the preservice stage, the survival stage, the consolidation stage, the role maturity stage, and the possible decline stage. In line with the systems approach that conceptualizes processes as usually nonlinear, these stages should be considered as a general outline only.

Over the years, several models have been suggested in the literature for describing the stages of school leaders' development (e.g., Berry, 2014; Earley & Weindling, 2004). Although these models differ in their number of stages, names, and duration, all of the models' fundamental structure is similar, beginning with the preservice preparation stage, continuing to the entry stage, and ending with the stability stage. According to these models, new school principals place prime importance in learning the day-to-day technical aspects of their jobs. Once the technical aspects are mastered, the principal shifts from viewing things through a narrow perspective to considering them through a broader one. When a principal has a thorough understanding of the intricacies of the lower positions, that person will begin to act as a mentor to the teachers and concentrate the work efforts on providing direction at an organizational level. Thus our findings, which indicate that the developmental process of systems thinking among school principals is similar to the structure of educational leadership development described by prior models, are important. Systems thinking is not equally applicable to

Table 3. Career Stages for Development of Systems-Thinking by School Leaders

	Stage	Systems-thinking processes	Timing
1	Preservice	Expansion of systems view	Before appointment as school principal
2	Survival	Slowdown in the development of systems-thinking due to focus on acclimatization and socialization	First several months as novice principal (approx. 4 to 10 months)
3	Consolidation	Gradually beginning to see the whole beyond the parts and the parts in the context of the whole	First several years as principal (approx. 3 years)
4	Role maturity	Typified by a systemic view	Middle years as experienced principal
5	Possible decline	<i>Decline sub-stage:</i> Sometimes occurs, lowering systems-thinking level	Late in career as principal

novice, midcareer, and veteran principals; each of these should employ systems thinking in a way that is compatible with the unique features and context of his or her specific developmental stage. Nevertheless, a sharp distinction between the different stages without taking into account the possibility of switching back and forth between them is not compatible with the complicated nature of systems-thinking development.

As aforementioned, debate continues as to whether systems thinking is a natural talent or an acquired ability (Zonnenshain, 2012). The findings here support both ideas: principals' natural tendency is one source of systems thinking, but managerial experience, role models, and academic study also contribute to its development. Thus, dichotomy between natural talent and acquired ability is incompatible the concept of systems thinking, and when looking for the origins of individual differences, the focus should be on developmental processes rather than on the separation between natural talent and acquired ability. Instead of dichotomizing behavioral capacities into those that are innate and those that are learned, personal development through the influence of one factor in the context of other factors should be emphasized.

The current study's focus on systems thinking contributes uniquely to existing knowledge about the processes of school leaders' career development stages. The first stage of principals' systems thinking development is the preservice stage, during which future principals begin to expand their systems view. This expansion may be attributed to the sources available in this period of time—managerial experience gained due to holding a position at school (e.g., assistant principal, grade-level coordinator), academic studies in a principal preparation program, and a role model when working alongside a principal who leads a school through a systemic approach. In this stage, prospective principals develop mainly two characteristics of holistic school leadership: leading wholes and using a multidimensional view. These two characteristics reflect systems thinking as seeing the whole beyond the parts.

It is important to raise the question of whether there are certain vital steps (e.g., managerial experience) that are basic and must first be achieved for systems thinking to develop throughout the next stages. The present findings indicate that the development of systems thinking may be hindered in school principals who lacked the preservice stage, which could adversely affect their performance as principals. The most important source in this stage was found to be managerial experience. Thus, a teacher who did not accrue sufficient managerial experience holding a school position like grade-level coordinator, educational counselor, or deputy principal probably may not develop a high ability for systems thinking in school leadership. Although managerial experience was perceived as important in the preservice stage, we still need to explore the question of whether systems thinking

is predominantly developed by assuming a leadership position. Even more important is the question if systems thinking can be developed merely by observing role models, or if it must be practiced by actually holding a school position in order to develop significantly.

The variety of the managerial experience during this stage seemed to be also significant, not only the length or the type of experience. This can be explained by the fact that schools do not consist of hierarchical units as in other bureaucracies, but are characterized by structural looseness (Owens & Valesky, 2007). This structural looseness of schools precludes faculty members from integrating meaningful feedback about core instructional processes across classrooms (Halverson, Grigg, Prichett, & Thomas, 2005). Similarly, position holders are connected to each other but still function independently. For this reason, it is difficult to know the entire system well when serving in one position at a school. Therefore, varied managerial school experiences are valuable, since the acquisition of different viewpoints concerning school practices expands one's ability to perform at the systemic level. Nevertheless, another way of thinking about the value of management experience is that one develops contacts with others engaged in leadership or management activity, those whose view encompasses more than one classroom. Particularly, if one moves into principalship in the same school where one has previously worked, he/she brings those contacts along. Thus, networks of acquaintance may serve to create a better framework for systemic development.

The second stage, transpiring during the initial period of working in the school principal role, involves a slowdown in the development of systems thinking. During this stage, principals are engaged in acclimatization and socialization in order to survive entry into the new position. What we termed the "survival stage" is compatible with the highly "foundational" stage pinpointed by the International Study of Principal Preparation (ISPP), which described Canadian novice principals as concerned with "survival elements" and "operational elements" (Webber, Scott, & Scott, 2012, p. 13). Survival elements include achieving a work-life balance, addressing poorly performing staff, organizing time, and managing the school budget and paperwork. Failure with some of these aspects may result in removal from the position (Scott & Scott, 2013). Dealing with survival challenges limits novice principals' ability to develop their systemic view. Thus, school principals are sometimes less emotionally and cognitively available for learning about systems thinking, which appears to hold implications for tailoring the types of in-service supports that novice and early principals should receive (e.g., mentoring, coaching).

Beginning principals have to balance using the knowledge they have already acquired with attempting to take new actions to further increase

their knowledge. In such a situation, an agent attempts to acquire new knowledge, which is called “exploration,” and simultaneously optimize the decisions based on existing knowledge, which is called “exploitation.” The agent attempts to balance these competing tasks in order to maximize the total value over a limited period of time (Press, 2009). However, dealing with survival challenges, beginning principals’ sense-making tends to lean towards exploiting their own existing knowledge and relying on their paradigmatic beliefs, limiting their ability to develop a systemic view. This unbalanced tendency towards exploitation at the early stages of principalship calls for quality mentoring as discussed below.

The third stage—consolidation—involves the gradual development of systems thinking. Novice principals often initially experience a sense of surprise or reality shock, along with high levels of stress and a sense of loneliness in their first years (Oplatka, 2012). However, after the survival stage, which involves a slowdown in the development of systems thinking, the consolidation enables principals to gradually develop a systemic view, especially developing the capacity of leading wholes and using a multidimensional view. Systems thinking grows as principals become more established, being acquainted with the overall structure and operations of the school, thus developing a broader view of school operations and their interconnectedness. Nevertheless, because of the nonlinear nature of systems thinking development, principals sometimes struggle to survive also during this stage. Support provided during this stage should consider regression and progression processes as a natural part of systems thinking development.

The transition from the survival stage to the consolidation stage can be explained by the psychological development that results from the process of making sense of experiences in order to solve problems. Newly placed principals are just surviving. They are faced with problems that they need to solve and are often overwhelmed to the point of neglecting other issues. Cognitively demanding, sense making at the surviving-induction stage threatens a person’s identity and has social costs, as it requires public admission of uncertainty (Blatt, Christianson, Sutcliffe, & Rosenthal, 2006). In Kegan and Lahey’s (2009) words, newly appointed principals are “subject” to a situation—as if the situation rules them. The next developmental stage is the self-authoring mind, where the principal turns from “subject” to “object.” In other words, the opinions and desires of others, which novice principals have internalized and which had great control over them when they were making sense of their situation during the survival stage, gradually become objects to them. Thus, the principal is no longer only “in” the situation, but can also stand back and examine it—a developmental stage likely to develop further in the active leadership phase.

The fourth stage depicted in the current study is characterized by principals' high proficiency in systems thinking, which unsurprisingly should be facilitated by the prior stage of stabilization and consolidation. This stage may be the most likely time for performing at the highest level of systems thinking. From the systems thinking perspective, principals in the role-maturity stage can better acknowledge how variables existing in any system are causally related in feedback loops, thus understanding that interactions constitute the structure of the system and determine its behavior. At this point in their career, principals can better conceptualize time as an essential component of feedback loops (e.g., short- and long-term consequences) in school decision-making processes. However, as mentioned above, the development of holistic school leadership is not linear. Principals may move back and forth between the stages, shift from consolidation back to slowdown at times of ongoing stress, such as decline in student registration to the school or budget crisis.

The fifth stage, transpiring in later years on the job, involves a possible process of decline in school principals' systems thinking abilities. This possible decline is not due to old age, but rather to excessive exploitation of existing knowledge; it may be seen as "the expert's blind spot" (Nathan & Petrosino, 2003), where professionals with more experience are more likely to consider just their own perspective. The research on late-career principals is limited and inconclusive (Oplatka, 2010). However, recent studies not only found no significant differences between the job performance of older and younger school principals but even accentuated a high capacity for adaptation, participative leadership style, and professional competence in late career (Mulford et al., 2009; Oplatka, 2007; Woods, 2002). The current sample's recurring mention of declining veteran principals in terms of their ability to perform at a high systemic level thus calls for further research. Such empirical study should explore not only whether any decline occurs in veteran principals but also what needs to be done to ensure systemic development throughout school leaders' career span (Earley, 2007). Systems thinking training at this stage may be based on principals' rich experience while at the same time emphasizing the particular need for renewed openness to experimentation and attentiveness to others' input instead of falling into inertia or becoming overconfident in routines that were proven successful in the past (Ellis & Davidi, 2005; Gino & Pisano, 2011; Schechter, 2011; Weick et al., 2005).

The view of systems thinking in school leadership as a continuous developmental process is consistent with the conception of systems thinking as "a framework for seeing patterns of change rather than static 'snapshots'" (Senge, 2006, p. 68). This holistic view of systems thinking development envisions ongoing long-term processes of progress and

regression in professional growth over time, rather than focusing on separate unconnected events. Thus, systems thinking development should be seen as lifelong learning, an unending pursuit of knowledge taking place on an ongoing basis (Field, 2006; Hargreaves, 2004). Lifelong learning as a suggested framework for leadership development programs (Drago-Severson, 2009; Scott & Webber, 2008) has begun to be implemented worldwide (European Federation of Educational Employers, 2012).

IMPLICATIONS, LIMITATIONS, AND FURTHER RESEARCH

Several implications of the current study have been included in the Discussion section, such as the recommendation to appoint as school principals teachers who have accrued sufficient managerial experience holding a school position, which can assist in developing holistic school leadership; or the recommendation to keep in mind that the development of holistic school leadership is not linear, as regression and progression processes are a natural part of systems thinking development. However, the most important conclusion of this study is that holistic school leadership evolves through a long process. Therefore, teaching of and experiencing with this approach more than once at several stages along the school principal's career may enable spiraling holistic school leadership development throughout the educational career. Moreover, imparting the basics of holistic school leadership to school principals cannot be done in a standardized way across all stages of their careers, but rather should be tailored to the specific character of each stage.

Seeing school position holders as potential future principals increases the importance of their professional development. Collaborative analysis (e.g., case-based analysis) of school practices and processes through the prism of holistic school leadership may enable them to expand their systemic view in their current position as well as when they will become school leaders in the future. Moreover, the first stage in the professional training of school principals is preparatory training. Hence, it is advisable that preparation programs explicitly incorporate into their curriculum the study of systems thinking. Developing holistic school leadership should include opportunities to contextualize prospective school principals' learning in school leadership. For example, preservice principals may analyze conflicts, decisions, or dilemmas taken from their daily lives through the prism of holistic school leadership. They may be asked to apply holistic school leadership to their own school reality. In addition to direct teaching of holistic school leadership, it may be worthwhile to integrate this perspective into other subjects that are studied in preparatory programs, such as school decision making, instructional leadership, and school-community relationships.

In addition to highlighting the importance of academic study to the development of holistic school leadership, it may be beneficial to add a work experience internship requirement to principal preparation programs, aiming to provide on-the-job managerial training. During this internship, aspiring principals will be expected to put into practice the holistic school leadership approach that they have learned, while being guided by an experienced principal mentor.

Once appointed, the novice principals deal with survival challenges. In this situation, novice school principals should be provided with an experienced guide and role model (Wallace Foundation, 2007). Holistic school leadership may furnish a valuable conceptual framework for the mentoring of new principals, providing them with a perspective through which they can better understand their everyday reality. Holistic school leadership as a conceptual framework for the mentoring process requires willingness on the part of both mentors and mentees to engage in a continuous teaching and learning process. The mentor-mentee interaction should be a two-way relationship that defies the rigid vertical top-to-bottom pattern of management, expanding into a lateral supportive one (Waters, Marazano, & McNulty 2003). Perceiving a mentor as a master craftsman who supports, guides, listens, provides different perspectives, and asks reflective questions, should serve as a scaffold for a joint learning process (P. Hall, 2008).

Helping principals learn about holistic school leadership may be timely even after the first few years on the job because school leaders face changes in perceptions of and expectations from their role. Even among highly experienced school leaders, holistic school leadership training may be significant, in order to renew openness to experimentation and attentiveness to others' input instead of falling into inertia or becoming overconfident in routines that proved to be successful in the past. In other words, we consider the development of holistic school leadership as a lifelong learning process. Since holistic school leadership evolves through a long path of progression and regression, ongoing professional development through the holistic school leadership perspective is advisable.

Specifically, developing leaders' systems thinking should be accompanied by developing a school-wide systemic approach. For this end, principals need to design a practice field, i.e., a field of play. It is advisable for principals to construct school practice fields, or virtual worlds, for the sole use of experimentation. Although this communal deliberative practice field resembles the real action domain, it facilitates considering how variables existing in the system are causally related in feedback loops, as part of a circuit of cause-and-effect processes. This "reflective practicum" (Bannink & Van Dam, 2007) provides a safe arena for administrators (e.g., grade-level coordinators, subject-matter coordinators) to gain insights into the

underlying structures from which the system's behavior-changes stem over time. Expanding administrators' prism of only performing—overcoming daily (“real”) school problems—into a process of rehearsing, experimenting, and simulating can nurture a systemic outlook by future school leaders.

The current study is, to the best of our knowledge, the first empirical research exploring career development of systems thinking in school leaders. Inasmuch as the findings were collected among a limited sample and within a particular context, their cross-cultural validity is not proven. This study should be replicated in various sociocultural contexts, enabling generalization of the findings to a broader population and substantiating their international validity. Moreover, the experienced principals participated in this study were selected on the basis of their superintendents' recommendations and their schools' achievements. These principals' perceptions of themselves and others may not represent the experiences of typical experienced principals. Thus, replication of this study should include various “typical” participants, to avoid a biased view. In this study, we qualitatively examined the developmental stages of systems thinking in school leadership in a diverse sample of school principals (prospective, novice, experienced). Nevertheless, a comparison of this study's conceptual framework among different demographic groups (e.g., elementary vs. middle vs. high school, state vs. state religious schools, males vs. females) was beyond the scope of the current study, requiring further research. In addition, development pertains to the same group of individuals and how they change over time. Thus longitudinal studies, including repeated data collection among the same school principals in order to explore their systems-thinking development, would also be useful.

Given the variety of teaching and administrative experiences before participants moved into principalship role, we need to explore whether the duration of experience influences systems thinking development. Does it matter where the experience was gained (in or out of school)? Does it matter what the context of the experience was (e.g., concerning curriculum vs. budget)? Does it matter whether the principal was a teacher in the same school or in a different one? Moreover, to expand on the current outcomes regarding developmental processes, researchers should undertake additional longitudinal studies. Although we did trace some prospective principals longitudinally after they became novice principals on the job, further research should include repeated interviews and observations of the same school principals over time, tracking their development of systems thinking within each stage and between stages. In addition, an exploration of the development of systems thinking in relation to other leadership characteristics and capabilities, such as principals' sense of self-efficacy and decision making, merit investigation.

REFERENCES

- Andrew, T. N., & Petkov, D. (2003). The need for a systems thinking approach to the planning of rural telecommunications infrastructure. *Telecommunications Policy*, 27(1-2), 75–93.
- Arnold, R. D., & Wade, J. P. (2015). A definition of systems thinking: A systems approach. *Procedia Computer Science*, 44, 669–678.
- Åström, K. J., & Murray, R. M. (2008). *Feedback systems: An introduction for scientists and engineers*. Princeton, NJ: Princeton University Press.
- Bannink, A., & Van Dam, J. (2007). Bootstrapping reflection on classroom interactions: Discourse contexts of novice teachers' thinking. *Evaluation & Research in Education*, 20(2), 81–99.
- BenDavid-Hadar, I. (2016). School finance policy and social justice. *International Journal of Educational Development*, 46, 166–174.
- Bentley, Y., Cao, G., & Lehaney, B. (2013). The application of critical systems thinking to enhance the effectiveness of a university information system. *Systemic Practice & Action Research*, 26(5), 451–465.
- Berry, J. C. (2014). *Career developmental stages of secondary school administrators: Questions, challenges, and implications for professional development* (Doctoral dissertation). Retrieved from http://acumen.lib.ua.edu/content/u0015/0000001/0001639/u0015_0000001_0001639.pdf
- Blatt, R., Christianson, M. K., Sutcliffe, K., & Rosenthal, M. M. (2006). A sensemaking lens on reliability. *Journal of Organizational Behavior*, 27(7), 897–917.
- Brown, J. (2012). *Systems thinking strategy: The new way to understand your business and drive performance*. Bloomington, IN: iUniverse.
- Cabrera, D., & Cabrera, L. (2015). *Systems thinking made simple: New hope for solving wicked problems*. Ithaca, NY: Odyssean.
- Capstones – The Israel Institute for School Leadership. (2008). *Perception of the principal's role in the state of Israel: Report by the professional committee to formulate policy recommendations for the Ministry of Education*. Jerusalem, Israel: Avney Rosha.
- Chance, P. L. (2005). Engaging communities through vision development: A systems approach to public relations. *Journal of School Public Relations*, 26(2), 139–155.
- Checkland, P. (1999). *Systems thinking, systems practice; Soft systems methodology: A 30 year retrospective*. Chichester, UK: John Wiley.
- Cohen, L., Manion, L., & Morison, K. (2007). *Research methods in education* (6th ed.). London, UK: Routledge.
- Darling-Hammond, L., LaPointe, M., Meyerson, D., Orr, M. T., & Cohen, C. (2007). *Preparing school leaders for a changing world: Lessons from exemplary leadership development programs*. Stanford, CA: Stanford Educational Leadership Institute.
- Datnow, A., & Park, V. (2014). *Data-driven leadership*. San Francisco, CA: Jossey-Bass.
- Davidz, H. L. (2006). *Enabling systems thinking to accelerate the development of senior systems engineers* (Doctoral dissertation). Boston, MA: Massachusetts Institute of Technology.
- Drago-Severson, E. (2009). *Leading adult learning: Supporting adult development in our schools*. Thousand Oaks, CA: Corwin.
- Drago-Severson, E., Maslin-Ostrowski, P., Hoffman, A. M., & Barbaro, A. (2014). Managing adaptive challenges: Learning with principals in Bermuda and Florida. *Journal of Research on Leadership Education*, 9(1), 6–33.
- Dyehouse, M., Bennett, D., Harbor, J., Childress, A., & Dark, M. (2009). A comparison of linear and systems thinking approaches for program evaluation, illustrated using the Indiana interdisciplinary GK-12. *Evaluation and Program Planning*, 32(3), 187–196.
- Earley, P. (2007). Do school leaders have a shelf life? Career stages and headteacher performance. *Educational Management Administration Leadership*, 35(1), 73–88.

- Earley, P., & Weindling, D. (2004). *Understanding school leadership*. London, UK: Paul Chapman.
- Ellis, S., & Davidi, I. (2005). After-event reviews: Drawing lessons from successful and failed experiences. *Journal of Applied Psychology, 90*(5), 857–871.
- Elm, J. P., & Goldenson, D. R. (2012). *The business case for systems engineering study: Results of the systems engineering effectiveness survey*. Pittsburgh, PA: Carnegie Mellon University.
- Etherington, K. (2004). *Becoming reflexive researchers: Using ourselves in research*. London, UK: Jessica Kingley.
- European Federation of Educational Employers. (2012). *School leadership and governance: Lifelong learning*. Retrieved from http://www.schoolleadership.eu/sites/default/files/efee_report-school_leadership-final_7.pdf
- Field, J. (2006). *Lifelong learning and the new educational order*. Stoke on Trent, UK: Trentham Press.
- Flick, U. (2009). *An introduction to qualitative research* (4th ed.). Thousand Oaks, CA: Sage.
- Ford, A. (2009). *Modeling the environment* (2nd ed.). Washington, DC: Island Press.
- Frank, M. (2006). Knowledge, abilities, cognitive characteristics and behavioral competences of engineers with high capacity for engineering systems thinking. *Systems Engineering, 9*(2), 91–103.
- Frank, M. (2012). Engineering systems thinking: Cognitive competencies of successful systems engineers. *Procedia Computer Science, 8*, 273–278.
- Fullan, M. (2005). *Leadership and sustainability: System thinkers in action*. Thousand Oaks, CA: Corwin.
- Fullan, M. (2014). *The principal: Three keys to maximizing impact*. San Francisco, CA: Jossey-Bass.
- Gharajedaghi, J. (2011). *Systems thinking, managing chaos and complexity: A platform for designing business architecture* (3rd ed.). Burlington, MA: Morgan Kaufmann.
- Gibbs, G. R. (2007). *Analyzing qualitative data*. London, UK: Sage.
- Gino, F., & Pisano, G. (2011). Why leaders don't learn from success. *Harvard Business Review, April*, 2–8.
- Hall, D. T. (2002). *Careers in and out of organizations*. Thousand Oaks, CA: Sage.
- Hall, P. (2008). Building bridges: Strengthening the principal induction process through intentional mentoring. *Phi Delta Kappan, 89*(6), 449–452.
- Halverson, R., Grigg, J., Prichett, R., & Thomas, C. (2005, July). *The new instructional leadership: Creating data-driven instructional systems in schools*. Paper presented at the annual meeting of the National Council of Professors of Educational Administration, Washington, DC.
- Hammond, D. (2005). Philosophical and ethical foundations of systems thinking. *Triple C, 3*(2), 20–27.
- Hargreaves, D. H. (2004). *Learning for life: The foundations of lifelong learning*. Bristol, UK: Policy Press.
- Hess, F. M., & McShane, M. Q. (2014). *Common Core meets education reform: What it all means for politics, policy, and the future of schooling*. New York, NY: Teachers College Press.
- Hieronymi, A. (2013). Understanding systems science: A visual and integrative approach. *Systems Research and Behavioral Science, 30*(5), 580–595.
- Hitchins, D. K. (2003). *Advanced systems thinking, engineering, and management*. Norwood, MA: Artech House.
- Hoban, D. F. (2002). *Teacher learning for education change: A systems thinking approach*. Maidenhead, UK: Open University Press.
- Holmes, B. J., Finegood, D. T., Riley, B. L., & Best, A. (2012). Systems thinking in dissemination and implementation research. In R. C. Brownson, G. A. Colditz, & E. K. Proctor (Eds.), *Dissemination and implementation research in health: Translating science to practice* (pp. 175–191). New York, NY: Oxford.

- Hung, W. (2008). Enhancing systems thinking skills with modelling. *British Journal of Educational Technology*, 39(6), 1099–1120.
- Jaaron, A. A. M., & Backhouse, C. J. (2014). Service organisations resilience through the application of the vanguard method of systems thinking: A case study approach. *International Journal of Production Research*, 52(7), 2026–2041.
- Jolly, R. (2015). *Systems thinking for business: Capitalize on structures hidden in plain sight*. Portland, OR: Systems Solutions.
- Kasser, J. E. (2013). *Holistic thinking: Creating innovative solutions to complex problems*. Cranfield, UK: The Right Requirement.
- Kegan, R. (1994). *In over our heads: The mental demands of modern life*. Cambridge, MA: Harvard University Press.
- Kegan, R., & Lahey, L. L. (2009). *Immunity to change*. Boston, MA: Harvard Business School Press.
- Kensler, L. A. W., Reames, E., Murray, J., & Patrick, L. (2011). Systems thinking tools for improving evidence-based practice: A cross-case analysis of two high school leadership teams. *High School Journal*, 95(2), 32–53.
- Klein, G., Moon, B., & Hoffman, R. (2006). Making sense of sensemaking: Alternative perspectives. *Intelligent Systems*, 21(4), 70–73.
- Kolko, J. (2010). Sensemaking and framing: A theoretical reflection on perspective in design synthesis. *2010 Design Research Society conference proceedings*. Retrieved from <http://www.jonkolko.com/writingSensemaking.php>
- Leischow, S. J., Best, A., Trochim, W. M., Clark, P. I., Gallagher, R. S., Marcus, S. E., & Matthews, E. (2008). Systems thinking to improve the public's health. *American Journal of Preventive Medicine*, 35(2S), S196–S203.
- Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks, CA: Sage.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.
- Miles, M. B., Huberman, M. A., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: Sage.
- Mulford, B., Edmunds, B., Ewington, J., Kendall, L., Kendall, D., & Silins, H. (2009). Successful school principalship in late-career. *Journal of Educational Administration*, 47(1), 36–49.
- Nathan, M. J., & Petrosino, A. J. (2003). Expert blind spot among preservice teachers. *American Educational Research Journal*, 40(4), 905–928.
- National College for School Leadership. (2001). *Leadership development framework*. Nottingham, UK: Author.
- O'Kane, B. (2015). Advancing the creative development process with systems thinking and a developmental model for designers. *Computer-Aided Design & Applications*, 11(S1), S44–S53.
- Oplatka, I. (2004). The principal's career stage: An absent element in leadership perspectives. *International Journal of Leadership in Education*, 7(1), 43–55.
- Oplatka, I. (2007). The school principal in late career: An explorative inquiry into career issues and experiences in the pre-retirement working years. *Leadership and Policy in Schools*, 6(4), 345–369.
- Oplatka, I. (2010). Principals in late career: Toward a conceptualization of principals' tasks and experiences in the pre-retirement period. *Educational Administration Quarterly*, 46(5), 776–815.
- Oplatka, I. (2012). Towards a conceptualization of the early career stage of principalship: Current research, idiosyncrasies and future directions. *International Journal of Leadership in Education*, 15(2), 129–151.

- Organisation for Economic Co-operation and Development. (2011). *Society at glance 2011 – OECD social indicators*. Retrieved from <http://www.oecd.org/els/social/indicators/SAG>
- Organisation for Economic Co-operation and Development. (2016). *OECD economic surveys–Israel*. Retrieved from <http://www.oecd.org/eco/surveys/Israel-Overview-OECD-Economic-Survey-2016.pdf>
- Ortlipp, M. (2008). Keeping and using reflective journals in the qualitative research process. *The Qualitative Report*, 13(4), 695–705.
- Owens, R. G., & Valesky, T. H. (2007). *Organizational behavior in education: Adaptive leadership and reform* (9th ed.). Toronto, Canada: Pearson Education.
- Pang, N. S., & Pisapia, J. (2012a). The strategic thinking skills of Hong Kong school leaders: Usage and effectiveness. *Educational Management Administration and Leadership*, 40(3), 343–361.
- Pang, N. S., & Pisapia, J. (2012b, January). *Strategic leadership for school change*. Paper presented at the 25th International Congress for School Effectiveness and Improvement, Malmö, Sweden.
- Parylo, O., Zepeda, S. J., & Bengtson, E. (2012). Career paths in educational leadership: Examining principals' narratives. *Alberta Journal of Educational Research*, 58(4), 565–599.
- Patton, M. Q. (2002). *Qualitative research and evaluating methods*. Thousand Oaks, CA: Sage.
- Peterson, K. D. (2002). The professional development of principals: Innovations and opportunities. *Educational Administration Quarterly*, 38(2), 213–232.
- Petzko, V. N. (2004). Tailoring professional development for a better fit. *Principal Leadership*, 5(3), 16–21.
- Press, W. H. (2009). Bandit solutions provide unified ethical models for randomized clinical trials and comparative effectiveness research. *Proceedings of the National Academy of Sciences*, 106(52), 22387–22392.
- Pryor, F. L. (2008). System as a causal force. *Journal of Economic Behavior & Organization*, 67(3-4), 545–559.
- Richards, L., & Morse, J. M. (2013). *Readme first for a user's guide to qualitative methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Rosenberg, A. (2006). *Darwinian reductionism: How to stop worrying and love molecular biology*. Chicago, IL: University of Chicago Press.
- Rossmann, G. B., & Rallis, S. F. (2012). *Learning in the field: An introduction to qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- Schechter, C. (2011). Switching cognitive gears: Problem-based learning and success-based learning as an instructional framework in leadership education. *Journal of Educational Administration*, 49(2), 143–165.
- Schleicher, A. (2012). *Preparing teachers and developing school leaders for the 21st century: Lessons from around the world*. Retrieved from <http://www.oecd.org/site/eduistp2012/49850576.pdf>
- Schwartz-Shea, P. (2006). Judging quality: Evaluative criteria and epistemic communities. In D. Yanow, & P. Schwartz-Shea (Eds.), *Interpretation and method: Empirical research methods and the interpretive turn* (pp. 89–113). New York: M. E. Sharpe.
- Scott, S., & Scott, D. E. (2013). Principal preparation experiences. In C. L. Slater, & S. W. Nelson (Eds.), *Understanding the principalship: An international guide to principal preparation* (pp. 45–70). Bingley, UK: Emerald Group.
- Scott, S., & Webber, C. F. (2008). Evidence-based leadership development: The 4L framework. *Journal of Educational Administration*, 46(6), 762–776.
- Senge, P. (2006). *The fifth discipline: The art and practice of the learning organization* (2nd ed.). New York: Currency, Doubleday.

- Senge, P. M., Cambron-McCabe, N., Lucas, T., Smith, B., Dutton, J., & Kleiner, A. (2012). *Schools that learn: A fifth discipline fieldbook for educators, parents and everyone who cares about education*. New York: Crown.
- Shaked, H., & Schechter, C. (2016). Sources of systems thinking in school leadership. *Journal of School Leadership, 26*(3), 468–494.
- Shaked, H., & Schechter, C. (2014). Systems school leadership: Exploring an emerging construct. *Journal of Educational Administration, 52*(6), 792–811.
- Sterman, J. D. (2000). *Business dynamics: Systems thinking and modeling for a complex world*. Boston, MA: McGraw-Hill.
- Taber, T. D. (2007). Using metaphors to teach organization theory. *Journal of Management Education, 31*(4), 541–554.
- Tejeda, J., & Ferreira, S. (2014). Applying systems thinking to analyze wind energy sustainability. *Procedia Computer Science, 28*, 213–220.
- Van Mai, T., & Bosch O. J. H. (2010). *Systems thinking approach as a unique tool for sustainable tourism development: A case study in the cat ba biosphere reserve of Vietnam*. Retrieved from <http://journals.issn.org/index.php/proceedings54th/article/viewFile/1457/509>
- Von Bertalanffy, L. (1933). *Modern theories of development: An introduction to theoretical biology*. (J. H. Woodger, Trans.). Oxford, UK: Oxford University Press.
- Von Bertalanffy, L. (1960). *Modern theories of development: An introduction to theoretical biology*. (J. H. Woodger, Trans.). Oxford, UK: Oxford University Press
- Wallace Foundation (2007). *Getting principals mentoring right: Lessons from the field*. Retrieved from <http://www.wallacefoundation.org/knowledge-center/Pages/Getting-Principal-Mentoring-Right.aspx>
- Waters, T., Marazano, R. J., & McNulty, B. (2003). *Balanced leadership: What 30 years of research tells us about the effect of leadership on student achievement*. Aurora, CO: Mid-Continent Research for Education and Learning.
- Webber, C. F., Scott, S., & Scott, D. E. (2012, April). *Stages of leadership development: Foundational to transitional to entrepreneurial*. Paper presented at the annual meeting of the American Educational Research Association, Vancouver, British Columbia, Canada.
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science, 16*(4), 409–421.
- Wells, C., & Keane, W. G. (2008). Building capacity for professional learning communities through a systems approach: A toolbox for superintendents. *AASA Journal of Scholarship & Practice, 4*(4), 24–32.
- Wilson, B., & Van Haperen, K. (2015). *Soft systems thinking, methodology and the management of change*. London, UK: Palgrave.
- Woods, R. (2002). *Enchanted headteachers: Sustainability in primary school headship*. Nottingham, UK: National College for School Leadership.
- Zmuda, A., Kuklis, R., & Kline, E. (2004). *Transforming schools: Creating a culture of continuous improvement*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Zonnenshain, A. (2012, July). *Can we train for systems thinking?* The 22nd Annual International Symposium of INCOSE–International Council of Systems Thinking, Rome, Italy.
- Zulauf, C. A. (2007). Learning to think systemically: What does it take? *Learning Organization, 14*(6), 489–498.

HAIM SHAKED is a lecturer at the graduate program of the Department of Educational Leadership and Policy, School of Education, Bar-Ilan University, as well as at several colleges of education in Israel. He was a school principal for 17 years. His research areas include systems thinking in school leadership, education reform, instructional leadership, and educational policy. His book *Holistic School Leadership: Systems Thinking for Educational Leaders* (coauthor: Prof. Chen Schechter) will be published this year by Springer.

CHEN SCHECHTER, Ph.D. is an associate professor in the Department of Educational Leadership and Policy, School of Education, Bar-Ilan University, Israel. His research areas include education reform, organizational learning, educational leadership, system thinking, and qualitative research methods. His book *Holistic School Leadership: Systems Thinking for Educational Leaders* (coauthor: Dr. Haim Shaked) will be published this year by Springer.