Whither thee, Educational Technology?

Suggesting a Critical Expansion of Our Epistemology for Emerging Leaders

Eugene G. Kowch, Ph.D.

University of Calgary

Correspondence concerning this article should be addressed to Eugene G. Kowch, Learning Sciences,
University of Calgary Faculty of Education, Education Tower, 2500 University Drive NW, Calgary,
Alberta T2N 1NZ. E-mail: ekowch@ucalgary.ca

Abstract

It is possible that some outdated ideas about 'management' in our field are constraining our preparation of new educational technologists to lead education organizations in the Knowledge Age? This paper takes an interdisciplinary stance to examine educational administration, education technology and complexivist thinking about leadership in our field. It begins with a critical analysis using one of six educational leadership/administration knowledge "contexts" - *leadership vs. management* - to unpack our field's existing position on the topic (English, 2011). For parsimony, the other five contexts are mentioned briefly throughout this paper: (2) organizing and institutions and (3) Policy and governance. (4) Finance and Human Resources; (5) Change and Innovation and (6) Learning and technology. Other articles in this Special Edition of Tech Trends testify that outstanding, effective leadership exists in small, medium and large organizations every day around the world because of educational technologists doing amazing work in various contexts. This article suggests a frame for expanding our field's epistemology for in-program and emerging educational technologists to build their capability to lead organizations that learn in a Knowledge Age.

Keywords: *Educational technology epistemology, complex adaptive leadership, management, educational administration, emerging leaders*

Expanding the Study of Leading Educational Technology

A funny thing happened on our way to the systems approach and instructional development. We stumbled over the rigidity of educational governance and the craft structure of education institutions. We completely misread the institutional framework of which we are a part (Heinich, 1984, p.74).

Are we still stumbling in the greater context of research and practice in the context of educational systems? The graduate educational technologist today will practice within a more interconnected, more turbulent world than the world of 1984 yet as a field we hold some old, rather static ways of knowing the institutional, governance and leadership contexts embedding what we do. We leave that "admin stuff" to another academic specialization – at our peril. Are we managers, leaders or neither? Do we integrate policy, finance, governance and organization knowledge with our innovation work or do we leave that "house" to shape our work? Not often. Perhaps this is why so many educational technologists are not found in executive leadership positions – even in organizations that educate society (Kowch, 2003; 2013). It is stunning to realize this at a moment in time when technologies are found to be *the most crucial resource* leading to transformative organizational innovation in *any* high-capacity 21st century learning organization (Goldstein, Hazy & Lichtenstein, 2010).

Nearly thirty years ago Robert Heinich wrote an important and deeply reflective paper in TechTrends (1984) summarizing years of work concentrating on the greater context of the nascent educational technology field. In *The Proper Study of Educational Technology* (1984), he presented a series of challenges and insights about our field at a time when the field was, arguably, at the cusp of change. Thirty years seems an eternity in terms of technology tools but our knowledge base is over 100 years old. In this paper we cite Heinich to offer reflective touchstones for further examining education technology leadership epistemology then and now. From his visions we ponder here how educational technology scholars and practitioners understood (and should understand) management and leadership.

In 1984 the personal computer was emerging as less expensive, more accessible ubiquitous machine affording learners, teachers, practitioners and scholars alternatives to

expensive, rare mainframe machine tools for designing and developing learning environments. Then, the seeds of constructivist learning theory were growing in our field to eventually replace instructivism and traditional instructional design thinking. While instructional design (ISD) is still going strong today, new frameworks in our field emerged variously across education systems resulting, for example, in inquiry based teaching and group learning ideas challenge earlier ideas about lone learners in a structured journey to gather expertise (Anderson & Dron, 2010). Readers must remember also that Heinich wrote this article ten years before the Internet would emerge to eventually connect desktop machines, providing learning and leader affordances with instant world-wide communication capacity for shared (connected) learning and leading experiences. Indeed, Heinich's original ideas on *management* and *organizations*, for example remain in the 2007 definitions of our field (Januszewski & Molenda, 2007).

Understanding the Difference between Management and Leadership Thinking
Managing Complication – A Concept from the Industrial Age

<u>Management</u> involves the *application of proven solutions to known problems* in organizations (Cuban, 2011; Levin, 2010; Uhl-Bein et al., 2007; Willower & Forsythe, 1999). Management works with *<u>complicated</u>* processes as if "organizations are machines that can be analyzed, dissected, or broken down into parts…if you fix the parts, then reassemble and lubricate, you'll get the whole system running" (Goldstein et al., 2010, p. 3). That is an industrial age concept compared to a newer conceptualization of organization where we understand leaders interacting with constantly changing multitudes of others through networks of relations resulting in new, changing processes and purposes (p. 3; Kowch, 2013 in press). In complicated organizations we add "parts" or structural functions to 'fill gaps' to "fix" unexpected outcomes whereas in *<u>complex</u>* systems these changes emerge as part of a networked, relational organization structure. The *management* idea presumes a complicated mindset on organizing, policy and leadership whereas new leadership ideas presume a complex mindset (Table 1).

Table 1

Complicated vs. Complex Systems (Kowch after Davis, Sumara & Kapler, 2008).

Complicated	Complex

(Mechanical/Functional)	*(Learning or Organizing)*
Physics (Newton)	Biology (Darwin)
Machine metaphors	Ecosystem metaphors
Linear imagery	Cyclical, recursive imagery
Input/output flows	Feedback loops/regulation
Efficiency-oriented	Sufficiency-oriented
Goal-oriented	Growth-minded
Reducible to parts	Incompressible networks

For a more complete conceptualization of complex organizations see Table 2 and
Conceptualizing the Essential Qualities of Complex Adaptive Leadership: Networks that learn
(Kowch, 2013 in press).

Table 2:

The Features of Complex Adaptive Organizations (Kowch after Cilliers, 1998; Goldstein et al.,
2011). Source: Kowch (2013 in press).

10 Features of Complex Systems (Cilliers, 1998)	**General Features of Organizations as Ecologies of Innovation** (Goldstein et al, 2011).	**General features of Organizations as Complex Adaptive Systems** (Goldstein et al, 2010).
1. A large number of elements		
2. Elements interact	Intricate *networks* connect *interdependent* nested subsystems	
3. All elements influence, and are influenced by others	Experiments move parts of the systems away from others	
4. A number of connected elements can perform the same function as one (redundancy)	Micro Level *diversity* supplies seeds of *novelty*	Semi-autonomous agents are *diverse* in form, capability and the information they hold

5. Interactions are non-linear	Innovations conferring new functionalities enhance adaptability to "jolts"	System *adapts* by agents gathering information, learning and changing mental models
6. Interactions have a short range		
7. Feedback can be positive or negative		
8. Open systems		
9. Far-from-equilibrium	Critical periods of *instability* allow for substantive transformations of behaviors and dynamics	
10. Have a history		Semi-autonomous agents gather information (work rules, history) according to certain *rules*

AECT (the Association of Educational Communication and Technology) has evolved a definition and a conception of Educational Technology as a field. It explicitly mentions *management*:

> Educational Technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources (Januszewski & Molenda, 2007, p. 1).

The educational technology field began when we were operating audiovisual centers within institutions (organizations). As media and instructional development scaled up, we had to master project management skills and when distance education came along we also had to master managing delivery systems along with the work of managing formation, personnel and resources "planning and controlling the storage and processing of information in the course of managing projects or organizations" (p. 9). AECT's derivation of the management element in the definition of our field was grounded in four *objects* of management: (1) managing *projects*; (2) managing *resources*; (3) managing the *performance* of people and (4) managing the performance of people (Donaldson, Smaldino & Pearson, 2007). Today, relatively few of our graduate or undergraduate education technologist preparation programs offer a specialization in technology

management encompassing all four *objects* of management. Only project management has become part of graduate education in educational technology programs. All four management objects listed in the definition point to the educational technologist's *appropriate application* of specific "*technological processes* and *resources*" (p. 176), an idea that fits well with all divisions of our epistemology in the field.

Managers, though important in organizations everywhere possess a narrow, sharp focus on processes and in our field, they must focus too on technological processes first (by definition). Manager models incorporate predominantly linear thinking for 'handling' complex processes, most often involving design and development teams/organizational units at a micro level. They are less focused on meso (institutional: i.e.: school, university) and macro (sectorial, cultural, economic) efforts compared to education technology leaders, as we see later. Over time in educational technology our intellectual gaze shifted over time from serving individuals to serving many learners at once and more recently to a considering learners as more self-managing entities (Reigeluth and Duffy, 2007). Heinich (1984) warned that the inevitable scaling-up of our scope of service turned educational technologists into both managers and the instruments of (other?) management:

> But make no mistake about it, when we moved as a field from "a device to support a lesson" to the design of instructional systems, we also moved from the side of labor to that of management… the very nature of our capabilities makes us an instrument of management (p. 78).

Heinich's comment reveals what my doctoral students and I find consistently as we research education technology leadership across post-secondary, school and industrial organizational settings. First, we find a distinct *separation* between educational technologists and management in organizations. Next, we almost always find that educational technologists (among others) have a distinct cultural distain for "education administration" (Warren, 2013; Mayson, 2011; Krause, 2009; Humby, 2009). We *separate* our educational technology knowledge from our knowledge about management and leadership (Kowch, 2009). But when we ask any technology leader who has "managed" top-down budget cuts, who has suddenly had to implement cloud server technology, or someone who has turned their organization process to blended learning from face-to-face processes – we'll likely find that they do not understand managing according to the four

objects of management and they don't really *like* the idea of management, let alone the idea of leadership as much as they like and know learning, design and performance improvement. We don't research management or leadership a lot in our field, nor do we use interdisciplinary thinking to extend our management, leadership or organization knowledge context (Kowch, 2009).

Our field and our technologies *have* contributed significantly to human learning and globalization. But recently high level global policy advisory bodies are expressing doubts about the true value flowing from billions spent each year on educational technology (OECD, 2010) and our field is silent instead of providing a policy response to the criticism. Yet we are perfectly contextualized to lead and represent our complex systems in education. Our educational technologist programs prepare our graduate students for managing micro (team, class) at best, oft ignoring managing more macro contextual factors. Is it any wonder that educational technologists are most often found missing in influential policy making networks (Kowch, 2003; 2007)? Too often "instruction" and its design and development work are considered by educational technologists from a distance as a soft form of implicit learning "management" done at a micro level:

> Hoban (1965) once commented that "the central problem of education is not learning but the management of learning, and that the teaching-learning relationship is subsumed under the management of learning" (p. 124). Instruction is the management of learning, and instructional management, like engineering, is a class of its own made up of a complex organization of men, machines, and processes (Heinich, 1984, p. 83).

This amounts to separating the potter from her art. Heinich's words hold true in many (but not all) contemporary education technologist minds. His perspective (from 1984) is a troubling touchstone because it in effect *separates* learning from management and instruction. The idea of separating people from processes fits with a complicated management epistemology about institutions but it fits poorly with a complex organization epistemology where we consider a complex network of relations structuring how we get things done (Kowch, 2013 in press). Heinich's idea here means that by executing a good flight plan a Boeing 777 pilot can manage flying - and that flight plan "management" performance makes a pretty good pilot. I don't want to fly in a jet where the pilot believes his plans for flight are a measure of the quality and safety

of the trip. Any Boeing 777 pilot will quickly tell you that a flight plan is in actuality a framework and that the real "plan" is lived out each in flight (with varying changes). Real "piloting" happens via some planning and a deep knowledge and praxis base where recursive, emerging interactions between onboard intelligent computers are networked with ground and cloud computing, semi-autonomous flight deck staff with on-board crews and ground crews informed with integrated weather systems and airports. Even part manufacturers like GE get real-time diagnostic data on engines as they fly. These processes are complicated and manageable. But the pilot's relationship with his environment is complex – she leads flight.

The very aerodynamics of the machine (aircraft) itself occurs in an unsteady-state where computers constantly adjust aircraft mechanics for flight. Learning to pilot in that kind of system means piloting with principled knowledge of connected supra and sub systems, flight plans, people and technologies. Pilots are leaders with a knowledge base inclusive of professional values, customer service visions and systemic change knowledge to negotiate praxis in the context of a heavily negotiated AI/cyber space integrated leadership event. A technical-rational management of processes just isn't enough for them. Airport and airline leaders will tell you the same thing if you call them "managers" today. Good flight planning is done by technicians with computers. While many critical managers exist to run airline operations and even on-board flight crews, pilots *lead* flight by thinking and acting well beyond the "application of proven principles" found in planning and operations logic. They are not managers. They are leaders *and* practitioners in a complex system. The same is true for contemporary education leaders (Levin, 2010) and professionals in engineering, architecture, medicine and law disciplines. Separating management from learning today is just a bad idea. *Leading learning* is a good one.

The definitions of our field (2007) use semantics to explain management as an equivalent to leadership, informing an epistemology where we learn managers must learn to organize "objects" as parts of a *technical-rational processes* under the *right (technological) conditions* by applying appropriate *applications* of *proven solutions* to *known problems* –with the overall assumption that this effort happens in organizational equilibrium (or at least in working towards that ideal) (Uhl-Bein et al., 2007). Yet we have learned from other science and humanities disciplines and professions that the only systems on earth found in equilibrium are *dead systems* (Capra, 2002). We need new ideas about managing in the connected Knowledge Age.

Why Expand "Management" Thinking?

If education organizations are complex systems (and they are, according to Davis, Sumara & D 'Amour, 2012), then management thinking offers a *bounded mindset* for preparing people who know best the unlimited possibilities for deep learning when adaptive leadership in adaptive organizations coexist. Faculty of Education Dean Kay Persichitte (Wyoming) comments in this special edition of TechTrends that we should avoid *"wrestling with pigs"* but this is an excellent metaphor for our familiar "managing" experiences in far-from-steady-state organizational contexts. She offers a lifetime of leader experience suggesting that we must evolve our leadership thinking for difficult, complex contexts. When managing means applying appropriate models for problems in contexts where there is *no existing solution* (or the problem changes), we can not manage. We "muddle through" and tend to overcomplicate processes and add functions as managers (Lindblom, 1959). We also do research. In fact, we could do more research on how effective management is in these contexts to inform our praxis but we leave that to the education leadership/administration or to business management schools who barely understand learning and its context with the knowledge, research and domain of the educational technology field. The epistemology of educational technology must change from an understanding that good "managers" should apply proven solutions and models to known problems without being isolated from the greater context of learning and living across organizations and communities.

No system (epistemology, field, discipline, unit, department, university or government, for example) survives as an island separated from its sub or super systems in an ecosystem (Banathy, 1981). Ironically, few fields of study in the education domain know this better than a field whose epistemological roots run deeply into systems thinking!

Learning to "manage" complexity is no longer possible or appropriate in the Knowledge Age. We need a wider concept to co-exist as a more integrated part of the ecosystems in which we practice. We need to shed that tiring Industrial age mantle of sophists or technocrats who own specialized knowledge as means to ends because we are architects of both when we design learning environments (Postman, 1992 ; Drucker, 1997; Spector & Anderson, 2000). We could borrow a page from organization and leadership scholars in the education administration field who were forced to respond responded decades ago to the "management" challenge when research justified practitioner criticisms that "management models" could no longer describe, predict or model education leaders because the fluxes in power, organizational change, demographics and a "public" that never was, and never will be steady-state or static in nature

(Uhl-Bein et al., 2007; Stacey, 2009). I am not suggesting that we need to complicate our field by layering on another epistemological (leadership) because that could continue to reduce how "smart" and adaptable our field needs to be (Kowch, 2013). We should consider the problem from a complexivist, interdisciplinary positionality instead (Thompson-Klein, 2009).

Why We Should Integrate Management and Leadership Epistemology

Leadership refers to *situations in which groups need to learn their way out of problems that could not have been predicted* (e.g., the disintegration of top down, structural-functional organizations for networked, relational structures) (Uhl-Bein et al., 2007). Leadership considers values, visions and politics (Hallinger & Heck,2005). Generative or distributed leadership theory considers the complex nature of power, policy, organization and the emergence of organizations as their people organize novelties and experiments leading to completely new purposes and processes for organizations in unsteady states (Goldstein et al., 2010; McKelvey & Lichtenstein, 2007). Generative *leadership* is complex epistemology.

The (very) large education leadership/administration field is in a state of flux too, particularly since the financial crisis created long-term resource restrictions (OECD, 2010). Perhaps this befits our complex world today. Yet after 20 years of hot arguments and researching education administration over the last two decades (Kowch, 2013) we know that our complementary sister education leadership / administration field has reached majority consensus that *managing* is different from *leading* in the public sector. This difference has deeper meaning than semantics alone may imply (Bush, Bell & Middlewood, 2012, p. 4). Managing really *is* an acute focus on complicated processes that happen in organization and not so much on processes, relationships and power relationships spanning units, departments, institutions and communities. Managing works at a certain level of discourse in organizations where processes are predictable. Leading goes beyond that.

> The necessity to change from a nurturing to a commanding role (and from a support to a design role)… is a particularly important problem that may solve itself in the long run but causes difficulties in the short run. It is a problem that plagues any profession or trade in transition. (Heinich, 1984).

Considering Web 3.0, globalization phenomena, participative pedagogy, the cloud, BYOD, brain based learning and ubiquitous technologies in learning we know that leading education technology for learning as unpredictable as it is critical to learner well-being in the new century (Kim et al., 2007). As a field in education, our ontology and epistemology currently leans toward learning design sensibilities that have evolved from technical-rational instructivism to include social learning and complex designs for learning (p. 815). So a core of our field (design and development) is changing to consider complexity (Ni and Branch, 2007) along with the education administration field. Similar changes are occurring in AECT's training and performance, distance learning, systemic change, research and development, multimedia production, teacher education and international divisions. However evolved these specialized silos have become across the most prestigious educational technology professional society (AECT), they do not focus specifically on turning participants into brilliant future leaders who can imagine, vision, lead and architect the organizations we serve with great theory, research and praxis. Yet our people lead the most expensive elements of futuristic education. We leave our best and brightest to forage for this knowledge after they leave university. It is possible that our field has overspecialized to the point where the field itself is less able to adapt in the knowledge era (Kowch, 2013).

So we know that the *context* for "management" knowledge in educational technology is complicated, complex and ever-changing. We also know that leading technology is too complex for the application of management/process models with a purely objective focus stemming from industrial age thinking (as Reigeluth and Aslan point out in this special Tech Trends edition) blocks our emergence. When we manage complex situations with complicated mindsets we "muddle through", doing great service to the world (Lindblom, 1959) while perhaps doing a disservice to our leaders-in-training. All this occurs against a larger backdrop where a profound shift in focus from management to leadership thinking in the public education sphere emerged decades ago. Still, some of us hold to some old ideas from our roots in managing media centers at a rather micro level.

The greater shift from management to leadership thinking in education, business and public administration epistemology reflects a deep-rooted and significant evolution of educational policy, organization and administration research in response to the shortcomings found from mechanistic and technical-rational process-oriented approaches in the field over the

past five decades (Kowch, 2013; Bush, Bell & Middlewood, 2012). Emerging and graduate student leaders in our field should "know" the space of our possibilities as future architects, managers and leaders in a knowledge era.

> A company is not a living machine…its people get better by learning, evolution and flexible adaptation" (Capra, 2002, p. 114).

Leading Complexity – A Hybrid of Industrial Age and the Knowledge Age

There is no consensus leading to one definition for leadership (Gronn, 2002), but we explored a good definition for leadership in the previous section as *efforts by both followers and leaders in semi-structured situations where groups need to learn their way out of problems that could not have been predicted.* Hazy (2011) extends upon Barnard (1938) and Katz and Khan (1966) to formulate a post-structural or post-industrial (complexivist) working definition of leadership as a *process* with a *purpose* (p. 167) where "the notions of leadership and effective leadership apply to the individual, the group, the organization and society… (2011, p. 167). This thinking is at the cutting edge of a leadership theory continuum that began in education in the 1920s. Kowch (2013 in press) traced the arc of the education leadership/administration field theory since 1925 to find a sequence of critical responses by scholars who have always moved the field forward by reacting to the mismatches between theory and practice (Willower & Forsythe, 1999; Hallinger, 2002; Gronn, 2002). In sum, that field has moved from scientific management (1950) to human relations (1960) and critical social theory (1970) as we learned that diverse people make up very diverse organizations. Finding little impact from these approaches on learning attainment, the field moved to effective schooling and instructional leadership with similarly disappointing outcomes (Cuban, 2011). So community and transformative leadership ideas emerged but the field saw little real change from this. Today the field contemplates a wider, open systems approach conceptualizing organizations as networks that co-evolve in patterns depending upon people, contexts and connectivity beyond comfortable metaphors for community and distributed leadership (Kowch, 2013 in press).

The most recent comprehensive *Study of Educational Leadership and Management* (Heck and Hallinger, 2005) states that the field of educational leadership is changing its scholarly direct as "an increasing number of scholars are approaching educational leadership and management as a humanistic and moral endeavor rather than a scientific one" and that "a lack of

empirical rigor in the field continues to impact the development of a future generation of researchers" (p. 229). Like many fields of study in the education domain, the leadership / administration field thinking has moved from technical-rational thinking to post – structural thought simply because practitioners remain quite separate and insufficiently informed by leadership theory to respond to changes within and around education systems (p. 241). A contemporary problem for educational leadership/administration as a field is that is must be able to separate what moves the field intellectually from what continues to spin it in ideological or methodological circles (p. 239). This is a familiar refrain.

Leading Complex Organization

Both educational technology educational technology and educational leadership/administration fields are emerging within a context of highly contested, diverse ideas, approaches and tensions among interconnected, global networks of academics and practitioners. Tension can be good. Within organizations understood as ecologies of innovation, tension in an organization is the fuel moving codependent networks of people from chaotic disequilibrium to the very cusp of change and beyond – where people innovate with an aim to decrease the differences between organization ideals and realities they can transform the purpose and processes of the organization (Kowch & Gereluk, 2013a). Technological change is the number one tension-generator in contemporary organizations, causing large resource transfers (Goldstein et al., 2010). Educational technology is a high-input resource for education systems. Educational technologist leaders should be central in leading such transformative organizational phenomenon, but we are not. Why is this, when visionaries in our field like Heinich (1984) commented on our unique leadership positionality when it comes to organizing? Even more startling is the realization that Heinich was then drawing on Finn's research from 1959. That means *we have known our unique centrality and power in the context of significant organization emergence for over 50 years*:

> Finn later borrowed a principle of thermodynamics, negative entropy, to explain a phenomenon he observed in using technology in education. He maintained that injecting technology into an instructional system has the same organizing effect as introducing additional energy into a thermodynamic system (Finn 1959) (p. 76).

Technology in an education organization has the same effect as adding additional resources or energy to the system. It drives emergence (not just change) forward. Educational technologists should be leading this emergence in a knowledge age! Both educational administration/leadership fields and educational technology fields are emerging along similar paths to realize that our knowledge sets require a new paradigm - as argued by many authors in this special edition of TechTrends (Reigeluth & Duffy, 2007). What's holding us back?

Parallel Trajectories: Education Technology and Education Administration Fields

Educational technology and educational leadership/administration have developed with parallel "ontological innovations" over the last century (diSessa and Cobb, 2004). For example, our learning environment *design grammars* have evolved (Dai, 2012, p. 13). They indicate a shifted gaze from technical rational, closed environment thinking toward more open, subjectivist, participative and dynamic (complex) design environments.

The shift is from technical-rational ISD principles for providing learners with expertise (Merrill, 2002) to "smart design" integrating research (p. 33) and "complex design" frames for using a more integrated knowledge and contextual analysis with emergent design principles (van Merrienboer & Kirschner, 2007.). Our ontology and epistemology toward learning design has essentially evolved from instructivism toward complex design (Kim et al.,2007) where new ideas about distributed objects for learning complement disaggregated organization design theories (Wiley and Hill, 2009). As well, distributed intelligence matter more for organizations that learn (Kasparov, 2007; Kowch, 2013 in press). We seem to be connecting learning with design along with an expanded sensibility about integrating what we do in a more interdisciplinary, participative and less institutionally-bound (ecosystem) mindset (Kowch, 2008). This should empower educational technologists to lead the complex education in the 21st century. The characteristics of such leadership are explored in other works (Kowch, 2009; 2013 in press).

Power, Policy & Governance Leadership Knowledge

Unhampered by educationists, the programed instruction enthusiasts quickly saw the revolutionary nature of what they wrought. The realities of institutional restraints brought them crashing back to earth… (Heinich, 1984, p.71)

Analysis and recognition of the differential effects of technology on power relationships can lead us away from butting our heads against a stone wall toward gaining an understanding of why the system reacts the way it does and what needs to happen to change the performance of the cast of characters. It follows that the same holds true for our research efforts. (p. 70).

The education system Heinich describes in 1984 was not appreciating the affordances offered by an emerging educational technology field in 1984. This idea resonates in 2013. Repeatedly, Heinich shows us this enduring idea in our field that power, institutions and their leadership are somehow *separate* from our research, design and development epistemology and praxis as educational technologists. This perceived disconnection from organizations and institutions may be impacting our understanding about leading educational technology today. It reflects a very outdated rational or public choice policy frame where governments provide benevolent resources for which public systems compete. That idea fell apart in the 1980s when governments and policy analysts realized that bureaucrats, expertise and mostly partnered, shared government power in the Knowledge era meant organizations had a strong hand in developing resources (and their fuures) Pal, 2010).

But this separation idea could be the reason why educational technologists who are influential leaders in system-wide innovation projects don't see themselves as influential (Kowch, 2003) and it could be part of the reason why educational technology leaders just aren't in power and leadership positions (despite titles and job descriptions) in large organizational innovations (Kowch, 2007; Kowch, 2003). Perhaps this distance, with some exceptions arises from our knowledge about leadership as management, or by virtue of some disciplinary overspecialization amongst an education domain crowded with knowledge silos (Kowch, 2013). In any event, educational technology leaders need to know how to work within, among and between disciplinary silos as leaders – our design and development work tells us that too.

A bounded "rationality for separation" bothers leader development theorists today who understand leadership as an essential exchange or negotiation of distributed power among influential leaders *and* followers who can exchange roles depending on the demands of

suprasystems and subsystems - quickly (Harris, 2008). A perceived separation by any group or leader that is not grounded by participative, emergent research can also limit our ability to conceptualize, design or develop less structured, "smart" learning contexts (Surry et al., 2011; Barab and Plucker, 2002; Kowch, 2013). Heinich nudged us 30 years ago to develop organization and policy leadership knowledge in our field, marking a stall in educational technology leadership epistemological development since. We need to recover that ground by considering ourselves as integral part of distributed leadership in co-connected network organizations.

> We act as though Faculty are the clients of our research when, in reality, inquiry into most of the systemic aspects of instructional technology is most pertinent to clients other than faculty: Administrators, school boards, boards of trustees, legislators, etc. It is up to us to demonstrate to those clients the policy issues implicit in technology. (1984, p. 70).

Conclusion

When we review Heinich's 1984 "prophecies" on educational technology epistemology, in particular his perspectives on the attributes of organizing and management in our field we see trace perspectives of our field's trajectory toward ignoring our important leadership role in Knowledge Age organizations and institutions. This paper touches upon Heinich's implicit understandings of leadership, management and institutions (organizations) to frame an expanded epistemology for educational technology theory, practice and research. It suggests that our educational technology preparation (graduate) programs should consider expanding our knowledge base to include complex adaptive leadership and organization concepts and competencies so that our learning architects emerge not as construction foreman, managers or technicians – but rather as well connected, well prepared knowledge age leaders.

Dr. Kowch holds a Ph.D. in Education Administration as a professor in the new Learning Sciences study area in the Faculty of Education at the University of Calgary. His professional experience includes large organization design and development as an energy sector leader and large school and higher education system research, design and development as a professor, teacher, principal, and deputy superintendent of schools. His interdisciplinary graduate students research organizations that learn. These are emerging leaders who conceptualize and lead more adaptive

organization ecosystems in sync with advanced, technology integrated learning environments. Dr. Kowch is Director for AECT Board and serves many international organization Boards.

References

Anderson, T., & Dron, J. (2010). Three generations of distance education pedagogy. *The International Review of Research in Open and Distance Learning, 12*(3), 80-97. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/890/1663

Barab, S., & Plucker, J. (2002). Smart people or smart context? Cognition, ability and talent development in an age of situated approaches to knowing and learning. *Educational Psychologist, 117,* 288-318.

Bush, T., Bell, L., & Middlewood, D. (Eds.). (2010*). The principles of educational leadership and management.* London: Sage Publications Limited.

Capra, F. (1997). *The web of life.* New York, NY: Anchor Books.

Cuban, L. (2011). Teacher, superintendent, scholar: The gift of multiple careers. *Leaders in Educational Studies, (3).* 45-54.

Davis, B., Sumara, D., & D 'Amour, L. (2012). Understanding school districts as learning systems: Some lessons from three cases of complex transformation. *Journal of Educational Change, 13*, 373-399.

DiSessa, A.A., & Cobb, P. (2004). Ontological innovation and the role of theory in design experiments. *The Journal of the Learning Sciences, 13*, 77-103.

Donaldson, J.A., Smaldino, S., & Pearson, R. (2007). Managing. In Alan Januszewski and Michel Molenda (Eds), *Educational Technology: A definition with commentary* (pp. 175-191). New York: Lawrence Erlbaum**.**

Drucker, P. (1996). *The leader of the future.* San Francisco, CA: Jossey-Bass.

English, F. W. (Ed.). (2011). *The SAGE handbook of educational leadership: Advances in Theory, Research, and Practice.* (2nd ed.). Thousand Oaks, CA: SAGE Publications

Gronn, P. (2002). Distributed Leadership. In K. Leithwood and P. Hallinger (Eds.), *Second International Handbook of Educational Leadership Administration, Part 2.* (pp. 653-697). Boston, MA: Kluwer.

Hallinger, P. (2002) (Ed.). *Second international handbook of educational leadership and administration*. London, UK: Kluwer.

Harris, A. (2008). *Distributed school leadership*. London, UK: Routledge.

Hazy, J. K. (2011). Parsing the 'influential increment' in the language of complexity: uncovering systemic mechanisms of leadership influence. *Journal of Complexity in Leadership and Management, 1*, (2), 116-132.

Heck, R., & Hallinger, P. (2005). The study of educational leadership and management: Where does the field stand today? *Educational Management Administration & Leadership, 33*, 229-244.

Humby, R. (2009). *Leading decision making and planning for online HRD in a national health and wellness NGO*. Unpublished Masters Thesis Dissertation. University of Calgary.

Januszewski, A., & Molenda, M. (2007). *Educational Technology: A definition with commentary*. New York: Lawrence Erlbaum**.**

Kasparov, G. (2007). *How life imitates chess*. New York: Bloomsbury.

Kim, C, Lee, J., Merrill, D., Spector J., & van Merrienboer, J. (2007). Foundations for the future. In J. Spector, D. Merrill, J. van Merrienboer and Driscoll, P (Eds.), *Handbook of research on Educational Communications and Technology* (3rd ed., pp. 807-815). New York: Routledge.

Kowch, E. (2007). *Alberta shared services/ thin client innovation. System leadership study #2.* Alberta Education Publication. Edmonton, Alberta: Author. 212 pages.

Kowch, E. (2009). New capabilities for cyber charter school leadership: An emerging imperative for integrating Educational Technology and Educational Leadership knowledge. *Tech Trends Special Edition, 53* (1), 40-49.

Kowch, E. (2013 in press). Conceptualizing the essential qualities of complex adaptive leadership: Networks that organize. *International Journal of Complexity in Leadership and Management, 3,* 4, 114-132. Cambridge, MA: Inderscience Publishers).

Kowch, E. G. (2003). *Policy networks and policy communities in three western Canadian universities and two provinces: A Neo-Institutional approach to a pan-institutional issue*. Unpublished Doctoral Dissertation. University of Saskatchewan, Saskatoon, Saskatchewan.

Kowch, E. G. (2008, November). *Characteristics of high capacity, semi-autonomous teams – are you ready for this?* Paper presented at the meeting of the Association of Education Communications and Technology Annual Conference, Orlando, FL.

Kowch, E., & Gereluk, D. (2013a). *Conceptualizing education organizations as innovation ecologies: A case study of a state-wide charter school leader network.* Paper presented at the meeting of the American Association for Education Research, San Francisco, CA.

Kowch, E.G. (2013)**.** Towards leading diverse, adaptable and "smarter" organizations that learn. In J. Lewis, A. Green & D. Surry (Eds.), *Technology as a tool for diversity leadership: Implementation and future implications* (pp. 1-34). New York: IGI Global.

Krause, F. (2009). *Designer decision-making for newcomer orientation training and onboarding programs.* Unpublished Doctoral Dissertation, University of Calgary.

Levin, B. (2010). *How to change 5000 schools: A practical approach for leading change at every level.* Cambridge, MA: Harvard Education Press.

Levin, B., & Fullan, M. (2008). Learning about system renewal. *Educational Management and Leadership, 36,* 289-304.

Lindblom, C. (1959). The science of "muddling through". *Public Administration Review, 19,* 2 (Spring), 79-88.

Mayson, N. P. (2011). *Front-end instructional design practices for training within three large telecommunications organizations.* (Order No. MR75444, University of Calgary (Canada)). *ProQuest Dissertations and Theses,* 188. Retrieved from http://ezproxy.lib.ucalgary.ca/login?url=http://search.proquest.com/docview/878555466?accountid=9838. (prod.academic_MSTAR_878555466).

McKelvey, B., & Lichtenstein, B. (2007). Leadership in the four stages of emergence. In J. Hazy, J. Goldstein and B. Lichtenstein (Eds.) *Complex Systems Leadership Theory.* Mansfield, MA: ISCE Publishing.

Merrill, D. M. (2002). First principles of instruction. *Educational Technology Research and Development, 50,* 3. 43-59

Ni, Xaiopeng & Branch, R. M. (2007). In J. Spector, D. Merrill, J. van Merrienboer and Driscoll, P (Eds.), *Handbook of research on Educational Communications and Technology* (3rd ed., pp. 29-32). New York: Routledge.

OECD. (2010). The policy debate about technology in education: Are the New Millennium
    Learners Making the Grade? *Technology Use and Educational Performance in PISA 2006*,
    OECD Publishing. http://dx.doi.org/10.1787/9789264076044-4-en

Postman, N. (1992). *Technopoly*. New York: Knopf.

Reigeluth, C. M. & Duffy, F. M. (2007). *Trends and issues in P–12 educational change.* in R. A.
    Reiser & J. V. Dempsey (Eds) *In Trends and Issues in Instructional Design and
    Technology*, 2nd ed., pp. 209–220. Upper Saddle River, NJ: Prentice Hall.

Shirky, C. (2008). *Here comes everybody: The power of organizing without organizations.* New
    York: Penguin.

Spector, J. M., & Anderson, T. M. (Eds.). (2000). *Integrated and holistic perspectives on
    learning, instruction and technology: Understanding complexity.* Dordrecht: Kluwer
    Academic Press.

Stacey, R. (2009). *Complexity and organizational reality: Uncertainty and the need to rethink
    management after the collapse of investment capitalism.* London, UK: Routledge

Surry, D., Stefurak, J., & Kowch, E. (2011). Technology in Higher Education: Asking the right
    questions. In D. Surry, R. Gray Jr., & J. Stefurak (Eds.), *Technology Integration in
    Higher Education: Social and Organizational Aspects* (pp. 1-12). Hershey, PA:
    Information Science Reference. doi:10.4018/978-1-60960-147-8.ch001

Thompson-Klein, J. (2009*). Creating interdisciplinary campus cultures*. San Francisco: Jossey-
    Bass.

Uhl-Bein article 2007 complexity leadership theory.

van Merriënboer, J. & Kirschner, P. A. (2007). *Ten steps to complex learning.* Mahwah, NJ:
    Lawrence Erlbaum Associates.

Warren, W. (2013). *Networked Decision Making across a Newfoundland School District.*
    Unpublished Doctoral Thesis. University of Calgary.

Willower, D. J. & Forsythe, B. (1999). A brief history of scholarship on educational
    administration. In J. Murphy & K. Louis (Eds.), *Handbook of research on educational
    administration* (pp. 1-25). San Francisco, CA: Jossey-Bass.