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The Knowledge Lens: Equipping Information Professionals to Spark Innovation within Organizations and Society

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This article outlines the Knowledge Lens—a way of seeing more clearly the opportunities for knowledge creation within organizations and society. It is proposed as a model for schools of Library and Information Science (LIS) to follow when considering curriculum changes. Instead of producing two sets of graduates—those in information and those in knowledge, each lacking the insight of the other—this model provides a foundation for embedding knowledge throughout the curriculum to equip information professionals with the requisite skills and understanding to lead innovative knowledge work in whatever organization they join. It includes three groupings and six elements. The groupings bring into focus the complexity of organizational life, the power of conversation in knowledge creation, and barriers to the integration of information and the application of knowledge. The elements within these groups control for aberrations in the image of an organization due to a fuzzy view of human potential and agency, an illusion of perfection, a distorted view of power, excessive homogeneity, and barriers that limits the power of an organization's information and knowledge. This article does not contain a set of specific classes or learning outcomes; rather, it outlines a flexible model that can be used to contextually embed knowledge within the curriculum of schools of LIS and information. The librarians, data scientists, project managers, information architects, and others who graduate from these schools are uniquely positioned to lead this work; a curriculum based on the Knowledge Lens equips them to do so.

Keywords: complexity, conversation, knowledge management, knowing, LIS curriculum

It is no secret that the world is constantly changing, requiring that organizations and societies innovate—not just to prosper, but also to survive. This article suggests that information professionals¹ are uniquely positioned to lead this innovation. Yet this will happen only insofar as they take on and see organizations through the *Knowledge Lens*. This lens is proposed as a model for schools of Library and Information Science (LIS) to follow when considering curriculum changes. The lens draws heavily from concepts in Knowledge Management (KM), so most points will be in the language of traditional organizations. However, these principles apply equally to informal community groups, libraries, and other similar organizations. This broad applicability is what makes KM relevant to LIS. Yet, instead of separating these knowledge components into separate courses on KM,

schools can embed the Knowledge Lens throughout their curriculum. Bedford (2013) outlines the challenges for the development of a standalone Knowledge Management degree program, one difficulty being the lack of a standard curriculum for KM. Instead of producing two sets of graduates—those in information and those in knowledge, each lacking the insight of the other—the Knowledge Lens model provides a foundation for equipping information professionals with the requisite skills and understandings to lead innovative knowledge work in whatever organization they join. Rather than assuring that “Knowledge Management education address[es] the . . . competencies students need to succeed in knowledge organizations” (Bedford, p. 201), this current approach is designed to ensure all LIS students can succeed in these same organizations. This includes an awareness of complexity, an appreciation for conversation, and an understanding of the dangers of overemphasizing information and knowledge at the expense of action. The librarians, data scientists, project managers, information architects, and others who graduate from schools of LIS are uniquely positioned to lead this work. This is partly because the associations that support them have already incorporated many of these elements into their missions, but it is also because of the nature of these professions. The flood of information with which they are intimately familiar gives them a unique insight into the complexity of social systems. They already deal with issues of access, making it a logical next step to deal with what people do as a result of this access. They already deal with the products of human conversation, making it a logical next step to deal with the process that generates those products. And a curriculum based on the Knowledge Lens equips them to fulfill these logical next steps and objectives.

This continues the momentum toward an emphasis on knowledge among information professionals. The first generation of KM outlined the need to find and codify existing information (McElroy, 2000). The role of the traditional information professional—in storage, access, and reuse—was clear. Yet subsequent generations of KM (McElroy, 2000; Snowden, 2002) have shown that it is no longer sufficient for organizations to rely

KEY POINTS

- Knowledge Management principles provide a foundation for a unique approach to Library and Information Science curriculum development that emphasizes innovation.
- Suggestions for curriculum change come after first shifting the instructor’s view of the classroom. By seeing the classroom as a Complex Adaptive System, instructors can recognize new opportunities previously hidden.
- The Knowledge Lens reveals complexity, room for conversation, and the need for action—all with significant impacts on what a student learns in the classroom and is able to do in a profession.

on existing information in the form of past solutions and best practices to solve problems, make decisions, and maintain forward momentum. It is necessary to engage in knowledge creation. More recently, [Lankes \(2011\)](#) argued that the facilitation of knowledge creation is essential to the mission of New Librarianship. [Bedford, Donley, and Lensenmayer \(2015, p. 83\)](#) call for a shift in librarianship away from collections and toward knowledge assets: “The primary value of a library in the knowledge society will shift from the library’s resource collections to librarians’ intellectual capital assets.” The Knowledge Lens equips information professionals to spark the creation of *non-canonical* solutions that go beyond what is already codified in manuals and white papers: “[a] communal understanding ... that is wholly unavailable from the canonical documents” ([Brown & Duguid, 1991, p. 44](#)).

The model is based on typical photographic lenses, which are made up of individual elements fixed together in groups. These various elements minimize inconsistencies in the image, with the goal being a photograph that captures the reality of the scene. For instance, Canon introduced a fluorite lens element in 1969 to help eliminate chromatic aberration ([Canon, 2017a](#)); aspherical lens elements help eliminate spherical aberrations. The Canon EF 200mm f/2.8L II USM is composed of nine elements in seven groups ([Canon, 2017b](#)); the Knowledge Lens is made up of six elements in three groups. Each grouping reveals important aspects of the true picture of organizational life, and they include complexity, conversation, and magnification. Within these groups are individual elements that counter aberrations in the picture of the organization. Within the complexity group are the elements of human agency and unpredictability, within the conversation group are the elements of power and diversity, while within the magnification group are the elements of integration and knowing.

Definitions

LIS literature is full of references to data, information, knowledge, wisdom, and knowing. However, these are not always clearly conceptualized, and when they are, there is very little agreement. For instance, [Zins \(2007\)](#) found 130 definitions of the terms “data,” “information,” and “knowledge” from just 45 scholars. Because the current article makes use of these terms in intentional ways, it is necessary to clearly define them. [Wilson’s \(2002\)](#) widely cited criticism of KM was directed, primarily, at a seemingly intentional lack of clarity in conceptualizations of information and knowledge—what he labeled “search and replace marketing” (p. 9). He argued that not distinguishing between information and knowledge “results in one or other of these terms standing as a synonym for the other, thereby confusing anyone who wishes to understand what each term signifies” (p. 2). One need not agree with the definitions in the following paragraphs to understand and use the Knowledge Lens. Rather, this section

acts as a sort of glossary in the user manual of the Knowledge Lens, allowing for more effective use.

The terms “data” and “wisdom” are notably absent from what follows in this article. Wisdom is absent because it remains rather ambiguous and abstract, and consequently there has been little effort to conceptualize its meaning. In Rowley’s (2007) comprehensive review, she found only three books that discussed wisdom when utilizing what has traditionally been termed the data, information, knowledge, and wisdom (DIKW) pyramid. The term “data” is absent due to conceptual problems in its use. Data are “discrete, objective facts or observations, which are unorganized and unprocessed, and do not convey any specific meaning” (Rowley, p. 170). Data themselves, then, are of little use. And in any attempts to work with data, humans make subjective decisions about what data to use, how they should be collected and synthesized, and how to interpret them. What is left is no longer objective data. Assuming objectivity in subjectively processed data is dangerous, as it gives these data outputs a truth-like status.

The three most important terms in this glossary, then, are information, knowledge, and knowing. “Information” is narrowly defined following Buckland’s (1991, p. 351) information-as-thing model: “Objects, such as data and documents, that are referred to as ‘information’ because they are regarded as being informative.” Information can be seen either as the output of “processing [data] directed at increasing its usefulness” (Ackoff, 1999, p. 170) or as the documentation of the results of knowing.² “Knowledge” is defined as information that has been intentionally integrated into one’s existing cognitive structure. It is “information combined with experience, context, interpretation, and reflection” (Davenport, De Long, & Beers, 1998, p. 43). Another related term is “understanding,” which occurs as “informational items are pieced together” (Kvanvig, 2003, p. 192). Bawden (2012) notes that this is similar in definition to knowledge, and I contend that only humans can piece these together in meaningful ways. Understanding is thus similar to the buildup of knowledge. Finally, “knowing” is the use of knowledge to do something: “We use the term ‘knowing’ to refer to the epistemological dimension of action itself” (Cook & Brown, 1999, p. 387).

I therefore agree with Wilson (2002, p. 2) that knowledge is “only in the mind” and that “messages do not carry knowledge” as they are outside the mind. Still, it is difficult to argue against the notion that there is a difference between a formalized and documented information thing stored in a database and the metaphors expressed in a brainstorming session. So, while calling these metaphors “knowledge” is, indeed, inaccurate, it is useful to have some other word by which to distinguish what happens here. In the Knowledge Lens, this word is knowing.

These definitions align the use of KM in the Knowledge Lens with Karl-Erik Sveiby’s suggestion that *knowledge management* is actually a poor term, because “it suggests that knowledge is an object that can be

managed. This is fundamentally wrong and it has led companies to sink billions of dollars into more or less useless IT systems” (Craven, n.d., p. 1). Sveiby prefers the terms “knowledge-based approach” or “knowledge enabling,” as they “describe a human vision, not a technological one.” The Knowledge Lens embeds this human vision in the training of information professionals in areas relating to information, knowledge, and knowing.

Groups and elements

As noted, the Knowledge Lens includes three groupings of six elements, as shown in [Figure 1](#). These groupings include complexity, conversation, and magnification without action. As the light from organizational life enters the Knowledge Lens, the elements process and correct it to produce the image seen by the information professional. The arrow indicates the direction of that light. Note, however, that there is no inherent order in these elements, such that one needs training in one element to move on to the next. An overview of each element and what it corrects in this image is provided in [Table 1](#). There is built-in flexibility in this model, such that a given element could have application in other groupings. For instance, agency is an outgrowth of conversation, yet it is also an integral and sustaining element of complexity. One’s approach to the agency lens, then, should match one’s context. This is not a rigidly prescriptive model.

Although not a comprehensive list of the seminal ideas in KM and related fields, these elements are derived through an analysis of those seminal ideas that uniquely fit existing goals and objectives in LIS associations. This ensures that the Knowledge Lens is not a proposal for changes in overall mission, but rather one that helps LIS institutions achieve their existing missions. A full-scale analysis of LIS institutional missions is beyond the scope of the current paper, but the Association for Library and Information Science Education (ALISE), the American Library Association (ALA), and the iSchools Organization provide examples of the fit of the Knowledge Lens with existing LIS goals. The three groupings of the Knowledge Lens complement these goals, missions, and objectives and push them forward and provide new opportunities to fulfill them.

First, a fuller comprehension of complexity is a goal of all three groupings. ALISE recognizes that the world is in “an era of rapid change”

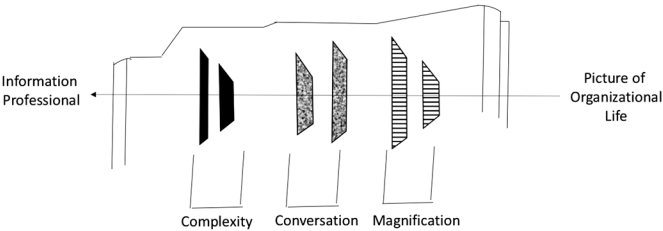


Figure 1: The Knowledge Lens.

Table 1: The elements of the Knowledge Lens

Group	Element	Image aberration controlled for
Complexity	Agency	Lack of clarity into potential of human creativity due to pessimistic theories of humanity
	Unpredictability	The illusion of perfection that blinds organizations to the necessity of risk and failure
Conversation	Rebellion	A distorted image of a power scheme in the hands of a select few that limits questioning and group creative potential
	Diversity	A blurring of the potential of unique experiences and expertise to create new discourses that redefine entire professions
Magnification	Integration	Over-magnification of innate power of information, failing to see barriers to integration into existing cognitive structures
	Knowing	Over-magnification of the innate power of knowledge, failing to see barriers to knowledge-based action.

(ALISE, n.d. b). The [ALA \(2017\)](#) recognizes that that libraries operate in a “dynamic and increasingly global” environment, while iSchools want to be places where students “confront the issues the issues, opportunities, and challenges of an information society in the 21st century, in all their richness, controversy, and ambiguity” ([Larsen, 2008](#)).

Second, increasing conversation and the diversity of that dialogue is another goal of all three groupings. ALISE (n.d. a) recognizes that “diversity and inclusion are core elements of the LIS curriculum,” while [ALA \(2017\)](#) wants to “increase and retain diverse library personnel who are reflective of the society we serve.” The iSchools organization itself wants to be a place for conversation to “provide one another with mutual support and a collective identity” ([iSchools, 2014](#)).

The third goal of all three groupings is increasing reflection and moving toward action rather than merely access. [ALISE \(1990\)](#) recognizes that, although access is important, it should lead to “improving the quality of life of all people.” [ALA’s \(2017\)](#) goal is to move toward taking “action in addressing information policy issues,” and [iSchools \(2014\)](#) want to have “profound impacts on society and on the formulation of policy from local to international levels” ([iSchools, 2014](#)).

Group 1: Complexity

The first grouping of elements brings complexity into focus. Organizations are complex adaptive systems (CAS), which means that they are composed of “living, independent agents . . . [which] self-organize and continuously fit themselves, individually and collectively, to ever-changing conditions in their environment” ([McElroy, 2000](#), p. 48). While there are several

concepts to unwrap about CAS, two are outlined here as essential to the Knowledge Lens—agency and unpredictability. These represent the first two elements.

Human agency

Information professionals first see that individuals within the organizational system can consciously act and intervene in meaningful ways—a distinguishing feature of human systems. This agency allows individuals to *imagine*, which is “the driving force behind human creativity” (Davidson, 2010, p. 1144). Agency also means that systems can anticipate change (Davidson). This ability of organizational systems to anticipate problems and imagine creative solutions is key to the knowledge activities of these systems. It makes up the beginning stages in McElroy’s (2000) Knowledge Life Cycle, as individuals sense tensions between what they know and what is actually happening. They then create and refine knowledge in groups. Tapping into this agency and trusting it—utilizing the subsequent imagination, creativity, and collective action—is necessary for knowledge creation.

Yet this agency is a positive influence on knowledge creation only when it is equally distributed and the system is given freedom to truly self-organize. When a select few have greater control over decision making and allocation of resources, they “direct [these] limited resources to the enhancement of their own wealth and status” (Davidson, 2010, p. 1143). Societal collapses throughout history have been triggered by this “concentration of privilege” (p. 1143) because it limits the ability of others to lend their own creative input and respond to challenges. Organizational management structures typically follow this pattern, which McElroy (2000, p. 51) called “patently oligarchical.” Much of it stems from Frederick Taylor’s revolutionizing of industry in the early twentieth century with scientific management. He believed that all work in an organization should be divided into simple standardized tasks as outlined by management. Employees lost their agency in this international efficiency movement because it was assumed they could not be trusted to work hard: “If he [i.e., a worker] were to double his output, and if the rest of the men were to double their output . . . he can see no other outcome except that one-half of the workmen engaged with him would be thrown out of work” (Taylor, 2003).

This is related to a larger theory of human work and productivity—theory X—which assumes that humans must be forced to work because they do not inherently enjoy it. This requires precise direction for the average person who “wishes to avoid responsibility, has relatively little ambition, [and] wants security above all” (McGregor, 2006, p. 46). This is the opposite of theory Y, which assumes that work is natural to humans, and they exhibit self-direction to work that they are committed to. Rather than precise direction, humans thrive on the self-actualization of needs as they take responsibility for their own work.

Failing to tap into this collective human agency can result in monumental ethical failures. McElroy (2000) mentions the asbestos and tobacco industries, which continue to push their products while knowing their danger to human health, as well as Enron's use of questionable accounting practices: "Does anyone really think that left to their employees' devices, as opposed to only those of their management teams, any one of these companies or industries would have made the same mistakes or gotten as far as they did with them? I doubt it" (p. 103)

This element thus controls for aberrations in the organizational picture stemming from a lack of focus on human potential. Information professionals should tap into the natural creative tendencies of human agents within an organizational system, rather than attempt to force top-down ideas. They should introduce "*empowering leadership*," which includes sharing power and increasing an employee's intrinsic motivation. Srivastava, Bartol, & Locke (2006) looked at the hospitality industry and found that empowering leadership increased employee confidence and levels of knowledge sharing, leading to better overall organizational performance, for example, the price these hospitality organizations can charge per room compared to competitors. This requires that individuals within the system be seen as they truly are—self-directed, creative, and committed. The information professional is tasked with identifying, encouraging, and extracting this potential. Rather than a collection of books, the *stacks* for the information professional equipped with the Knowledge Lens is full of humans with creative potential. This potential needs to be cataloged, empowered, and widely distributed.

Unpredictable navigation

Next, information professionals see that unpredictability, rather than something to correct, is a sign of a successful system. Von Bertalanffy (1968, p. 39) noted that *living* systems are open, in that they operate in "a continuous inflow and outflow . . . never being, so long as [they are] alive, in a state of chemical and thermodynamic equilibrium." As information about the environment flows in, systems are forced to adapt—or increase their *fit* (Stacey, 1996). And because both the nature of these environmental changes and the rules the system will create to adapt to them are unknown, forecasting is extremely limited. Stacey argues that systems operate in a rugged landscape, made up of several peaks that indicate levels of fitness with the environment; the goal is to reach the highest levels of fit. The Knowledge Lens reveals three approaches to navigating this landscape, marked by the level of comfort with unpredictability.

Organization A wants a predictable, smooth operation. They program a set of coordinates into a GPS and then take only small incremental steps upward, as if on a slow mountain ascent, all the while staring at the GPS for direction. This becomes problematic when that peak turns out to be a mere foothill, hiding a mountain beyond. The organization will be stuck

in these foothills, because its *modus operandi* of continuous and predictable improvement refuses to allow it to embark on a downward descent that will likely involve some unpredictable “stumbles and rolls downhill” (Stacey, 1996, p. 83). It will adopt one of the various continuous improvement models that “focus so much on gaining efficiencies that they don’t challenge the basic assumptions of what’s being done” (Ashkenas, 2012). These models oversimplify the very nature of the organization. They assume complicated organizations, with cause-and-effect patterns that experts can identify (Snowden, 2002). The complicated domain is much simpler than the complex domain. The reality, however, is that human contexts are complex and lack patterns amenable to predictive modeling: “Components and their interactions are changing and can never be quite pinned down,” (Snowden, p. 105). Thus, Organization A embarks on a *vicious cycle* as it insists on predictability and keeps searching for this prepackaged mapping and other various “savior recipes” (Stacey, p. 3). The GPS represents *damping feedback* that works to keep the organization within narrow boundaries, resulting in a “loss of imagination and creative energy” (Pascale, 1999).

Organization B simply wants change. It jumps off the foothill, with little preparation, and begins running through the valley. The problem with venturing out without any preparation, however, is that the organization might completely fall off a ledge. The *“Edge of Chaos”* suggests that organizations are close to falling off, but don’t. Snowden (2002) suggests that organizations sometimes enter into chaos willingly in order to disrupt things, but they do it with a plan in a “controlled way” (p. 107). Chaos is a dangerous place to be, however. When things are complex, organizations can still “seed the emergence of patterns,” prodding the system to provide the solution (p. 106); when things are chaotic, “no such patterns are possible” (p. 106). The introduction of *amplifying* forces in Organization B without some *dampening* controls is akin to the “piercing shriek” of feedback when a microphone gets too close to a speaker (Pascale, 1999). Throwing the GPS away without any idea of where it is combines with this increased amplification to push the organization off a cliff.

Organization C exists in a landscape that is “neither too smooth nor too rugged” (Stacey, 1996, p. 85)—at the Edge of Chaos. Balanced at this edge, it is more innovative. A cell membrane, for instance, exists in a fragile state between a solid and a liquid—open to small changes that make impacts that are “biologically useful” (Lewin, 1999, p. 51). This edge is innovative and disruptive and has a higher change capacity because it is “where information gets its foot in the door, where it gets the upper hand over energy” (p. 51). Rather than act recklessly, the organization applies “mindfulness and intention” to this tension to allow it to *surf* near the edge (Pascale, 1999). This embrace of the anxiety of unpredictability is “essential to creativity and innovation” (Stacey, p. 17). Organization C engages the agents within the system as cartographers, mapping the situation through documentation and lessons learned as it moves along.

This element thus controls for aberrations in the organizational picture from the illusion of perfection. Information professionals equipped with the Knowledge Lens are comfortable with stumbling downhill in an effort to find the next mountain. Yet this stumbling cannot be forced, or it may lead to a chaotic fall. Instead, they engage [Stacey's \(1996\) *Control Parameters*](#) that drive complex adaptive systems: rate of information flow, diversity, and richness of connectivity. These act like faucets that can be turned up or down, allowing more or less information, diversity, or connectivity. They work as “sources of both stability and instability” (Stacey, p. 105), so turning the faucet down increases both stability and predictability in the system. Turning the faucet up increases instability and decreases predictability. This element helps the information professional see the value in turning up the faucet yet still regulating the flow so as not to drown the system. This is a turn away both from continuous improvement models and from efforts at prediction and forecasting. In its place are sense making and emergent behavior.

Group 2: Conversation

The next grouping of elements within the Knowledge Lens is conversation. This grouping reveals both the value of conversation and how information professionals can initiate and direct it to fulfill its innovative potential. [McElroy \(2000\)](#) suggests that knowledge creation begins with the individual, yet before an idea can be implemented, it is refined in groups as these individuals seek out like-minded others. [Lankes \(2011\)](#) devotes entire sections to conversation in his *Atlas of new librarianship*, summarizing the work of Gordan Pask: “Knowledge is created through conversation” (p. 31). This is essential to innovation: “The degree to which a culture values effective communications and connectivity between individuals and groups will materially affect the rate and quality of its innovation” ([McElroy, 2000](#), p. 55). Rebellion and diversity comprise the next two elements.

Rebellion

Information professionals first see that conversation is a powerful mode of rebelling against—and questioning—hierarchical structures. It repositions power in the hands of the larger group. Habermas's theory of communicative action outlines conversation as the means by which society questions power structures, as “mutual understanding [is the] mechanism for coordinating action” ([Habermas, 1987](#), p. 330). Conversation has the power to situate knowledge creation within a framework of what works best for all involved, free from “domination and strategic motivations on the part of any participant” ([Schlosberg, 1999](#), p. 85). Here, innovation is guided by local and emerging ideas. In this shift toward reason and action guided by conversation, “authority and tradition . . . lost their status as ultimate sources of legitimacy” ([Wellmer, 2014](#), p. 710). What distinguishes a good idea from a bad one is not a managerial dictate, but local negotiation: “Truth and values are the outcome of social interaction within specific contexts” ([Beukers, Bertolini, & Brommelstroet, 2014](#), p. 63).

Therefore, rather than look toward management or at the existing set of canonical practices, the information professional looks to conversation as the locus for knowledge creation. Innovation necessitates rebellion. It is in conversation that individuals are able to move beyond the mere robotic reception of—and adherence to—existing information. They engage in “double loop learning,” a “questioning [of] the underlying policies and goals” that led to the information (Argyris, 1977). They bring up views and positions that “invite confrontation” and can be challenged and publicly tested—opening the status quo up to questioning (Argyris). They engage in Dewey’s *productive inquiry*, where questions are asked deliberately and with discipline to initiate a search for answers. It is “actively pursuing a problem . . . to seek an answer” (Cook & Brown, 1999, p. 62), the result of which is “the production of knowledge” (p. 62).

This element thus controls for aberrations in the organizational picture from a distorted view of power. The information professional equipped with the Knowledge Lens relocates power to the conversing group, out of which truly innovative ideas emerge that question established practices. This requires providing space and time for conversation and encouraging an attitude rebellious toward existing ideas. The information professional both constantly reminds leadership of this and encourages rebellion when leadership forgets.

Diversity

Information professionals also see the ability of conversation to redefine existing practice through unique contributions. Conversation is its own form of literacy, in that it helps individuals acquire new discourses, or “identity kits” (Gee, 1989, p. 7). These discourses include ways of talking, acting, writing, and so on that mark an individual as being part of a particular group. This acquisition of secondary discourses outside of the primary discourse acquired early in life is central to Gee’s definition of literacy. Yet the Knowledge Lens reveals that acquisition—while it may be an indicator of both literacy and learning—is not innovative; learning how to talk, act, and write like a graphic designer within a graphic design firm is not innovative. The Knowledge Lens focuses, instead, on the *development* of new discourses as individuals contribute their unique experiences. In other words, learning how to talk, act, and write like a graphic designer within an *accounting* firm is innovative.

This innovative conversation requires the pooling of unique experiences and expertise. *Unique* information is held by only one member of the group; shared information is information with which most of the group is already familiar (Larson, Christensen, Franz, & Abbott, 1998; Hinsz, Tindale, & Vollrath, 1997). When conversation centers around shared information, it can inhibit knowledge creation, as it limits the potential of the group to make decisions and act based on a pooling of their unique information (Larson et al.).

This innovation also requires that the unique experience and expertise that are contributed are not limited to single discourses. Coming out of Pask's (1975) *conversation theory*, and central to Lankes's (2011) discussion of new librarianship, is the distinction between L0 and L1 language. When one conversant does not know the topic, the language exchanged tends to be simple and direct (L0). When conversants share knowledge of a topic, they engage in more complex language to expand and clarify what each person is saying (L1). It is through this interplay of speech, clarification, and seeking agreement that learning and knowledge creation occur. The Knowledge Lens reveals that, while groups tend to center conversation around familiar topics in order to more easily exchange L1 language, this is not necessary. Lankes argues that "good instruction attempts to raise the conversation from L0 to L1" (p. 221). This instruction can happen within conversation, as individuals within an existing discourse are encouraged to contribute L1 language from the various other unique discourses they have acquired. This will inevitably lead to times when certain language is not well understood by the entire group, but because this is done in the shared context of a conversation, other members are in a better position to learn and understand this L1. They engage in a pooling of unique L1 that—rather than merely cloning an existing discourse—creates an entirely new and unique language corpus out of which new knowledge emerges.

For instance, members of a software firm are discussing whether to move forward with a new feature for their news app that will allow users further filtering of their news feed. They begin initially by contributing shared information and L1 language about software-development life-cycle models. This keeps them in the same discourse and, although they are contributing L1 language that is higher in complexity, Larson et al.'s (1998) study suggests that this will be information that is already known by everyone else. Nothing innovative will come out of such a meeting. But as they continue talking, Individual A—director of a local environmental action group—notes that advocacy groups are in need of better ways to send out information about congressional earmarks for national parks without cluttering up the listserv with attachments. At another point, Individual B—a woodworking hobbyist—notes that woodworkers use a pocket hole jig to line up drill marks to adjoin several pieces of wood quickly and firmly. Out of context of the entire discussion, these may seem inappropriate, yet this is essential for innovation. Because no one else in the group knew about them, these remarks both represent unique information. Because they came from acquired secondary discourses—environmental policy and woodworking—they were at the L1 level, as they did not need to be dumbed down to L0, since the conversational context allowed for explanation and understanding of any unfamiliar terms or ideas.

They consequently decide to move away from the current efforts toward increased filtering and to implement a brand new feature. This

feature will allow users to highlight ideas from several different news articles and combine them together under a certain theme. The app will act as a jig to join these diverse sentences into a single, cohesive article, which can then be sent to others using the app, with embedded links to each contributing article. It was only as a result of the sharing of unique insights from unique discourses, without being forced to lower the complexity, that this innovation occurred.

This element thus controls for aberrations in the organizational picture from a focus away from diversity. Uniqueness in conversation is essential to knowledge creation and is a product of intentional diversity. Yet this is more than merely bringing together different types of people—it involves encouraging the contribution of the uniqueness present in this diversity. Information professionals facilitate conversation that incorporates unique L1 from a variety of discourses. This creates a new corpus of L1 language that provides the tools to create entirely new discourses and revamp existing ones. This is what occurred in the example of the news app, as the stories of jigs and advocacy created a new shared language among the group that led to an innovation idea.

Communities of Practice (CoPs) provide a framework for this facilitation, as they utilize conversation and productive inquiry as a “catalyst for generating and validating new knowledge” (Saint-Onge & Wallace, 2015, p. 84). Information professionals equipped with the Knowledge Lens design and moderate these CoPs with a semi-structured guidebook utilizing the traditional architectural elements of these groups: domain, community, and practice (Wenger, McDermott, & Snyder, 2002). First, groups are asked to share and document a profile of each member as it relates to the general topic or practice area for which they are meeting—the domain. Lankes (2011, p. 85) argues that “the ideal boundaries for a community would be set by conversations.” As they discuss how they can utilize various areas of expertise and experience, they are engaging in an initial synthesis of L1 in the context of a shared understanding of what matters and is relevant to them. This allows them to move beyond traditional discourses and into “similar problems that are not officially recognized as domains” (Wenger et al., p. 30). They are also asked to document existing assumptions about this domain as a means of guarding against an overreliance on shared information. This also jumpstarts productive inquiry, as these assumptions are questioned. This documentation is important, as it will be used as a reference in the future. Groups next identify conversational norms and how they will deal with uncomfortable situations. This community element is about “removing barriers to relationships” (Wenger et al., p. 34), as members need to feel safe to contribute unique insights and open their ideas up to confrontation. Finally, members will identify either an existing practice or a new practice that will be enhanced by the knowledge activities of the group. Attaching these knowledge-generating conversations to a practice increases its utility and relevance.

Group 3: Magnification

The next grouping of elements within the knowledge lens reveals problems in the over-magnification of information and knowledge, such that they are seen as ends in themselves. It is grounded in the recognition that information and knowledge are not innately powerful—in spite of common suggestions that they are, rooted in Francis Bacon's (1996, p. 71) assertion that "knowledge itself is power." This is because of complex barriers to the integration of information as knowledge, and because of the application of knowledge in knowing—both of which require change. Lewin (1947) noted that, although the driving forces of ambition, fear, and needs push individuals toward this change, there are restraining forces that oppose it. In addition, overcoming the barriers is more complex than merely adding forces: "To change the level of velocity of a river its bed has to be narrowed down or widened, rectified, cleared from rocks, etc." (Lewin, 1947, p. 32). Integration and knowing make up the last two elements.

Integration

Information professionals first see that, although the provision of access to information is essential, barriers to meaningful integration take much of the power away from this information. It loses power when it does not enter one's existing cognitive structure to be compared with—and influence—that structure (Brookes, 1980). Information is often little match for strongly held beliefs (Batson, 1975), pervasive organizational narcissism (Stein, 2003), social norms (Chatman, 1999), or intentional irrationality (Caplan, 2001).

The first set of river rocks comes from beliefs, which can develop individually and collectively and "signal who one is and what one stands for" (Abelson & Prentice, 1989 p. 373). Although beliefs can help develop a shared mission and sense of purpose, they have also been shown to be extremely resistant to disconfirming information. For instance, Batson (1975) found that individuals with strong religious beliefs intensified these beliefs after reading disconfirming information that they accepted as true. Caplan (2001) argues that individuals *choose* to be irrational about certain beliefs because they value the belief, and it costs them very little if they are wrong. These beliefs can "inhibit the reception and evaluation of new market and technology information, and reduce the value of perceived new information" (Akgün, Lynn, & Byrne, 2006, p. 795).

Another set of river rocks comes from social norms, which can block the very entrance of information into the organizational system. Chatman (1999, p. 213) notes that in order to give one's small world a "sense of balance" and order, individuals take on certain roles and worldviews that limit the information they receive. Insiders determine what information should be considered relevant, and those with the most command of these norms act as a "frame of reference for observing and controlling not only behavior, but also the information flow into a social world" (p. 212). They establish boundaries that "most members feel disinclined to cross" (Burnett, Besant, & Chatman,

2001). Similarly, Lewin (1947, p. 32) noted the powerful restraining forces of a historic constancy that “tends to keep up the present level.” These develop from the shared values of the group and the institutionalization of certain behaviors. In addition, Stein (2003) outlines the barrier of *organizational narcissism*, in which overwhelming hubris causes organizations to want to flaunt their omniscience while remaining “contemptuous of others’ views and the information they bear, even when they may shed light on the vulnerabilities or risks that the organization faces” (p. 530).

This element thus controls for aberrations in the organizational picture due to an over-magnification of information, that is, information access. Information must turn into knowledge in order to make any internal impact, as it is considered in light of existing experiences and expertise. It is here that information has the power to challenge improper beliefs and assumptions. To increase the degree to which this occurs, information professionals uncover and document as much as they can about the entirety of the social fields of individuals within an organizational system. This uncovers potential barriers. They then work with individuals to overcome these barriers, bringing mental models to the surface so they can be questioned (Senge, 1990). Working with barriers suggests that the information professional does not stop at providing access to information-as-thing but continues to work with the human factors associated with its meaningful integration. The removal of barriers also includes increasing the costs associated with being wrong (Caplan, 2001). For example, people with strong beliefs about immigration are introduced to a collection of immigrant stories. It is now more emotionally costly to be wrong about immigration issues. The removal of barriers also includes encouraging boundary crossing (Burnett et al., 2001) by showing individuals that existing information is insufficient and any perceived order is a façade. For example, an individual with well-established negative stereotypes of Muslims is put into a work group with someone who is Muslim. If they want to accomplish anything, they must reach out to understand more about this religion and culture. They could still choose to maintain the stereotype, but their quality of work would be negatively affected. Finally, the removal of barriers includes increasing humility to accept disconfirming information that reveals vulnerabilities. For example, when students are actually given poor grades when they perform poorly, this is perhaps the first poor grade they have ever received. With this taste of failure, they become less certain and more open to the possibility that they are wrong about other things.

Knowing

Information professionals next see that what someone knows—their knowledge—is of little value unless it is acted upon—knowing: “We must see knowledge as a tool at the service of knowing not as something that, once possessed, is all that is needed to enable action or practice” (Cook & Brown, 1999, p. 388). Yet additional barriers to knowing prove this

knowledge to be similarly limited in its power. It is no match for a lack of self-efficacy (Bandura, 1977), a belief that there is nothing to be gained from an action (Ajzen, 1985), or a culture unsupportive of a certain behavior (Lewin, 1947). This is a particular problem noted by Bedford (2013, p. 200), who reports business leaders suggesting that “most current education programs are designed to train knowledge management directors or executives who may ‘talk about’ but may not ‘do or practice’ knowledge management.”

The first set of *knowing* river rocks is outlined in Ajzen’s (1985) Theory of Planned Behavior (TPB), which outlines the factors considered in the development of an intention to *do* a certain thing, providing insight into potential barriers to knowing. Intentions are influenced by (a) the perceived likelihood of certain outcomes and the advantages or disadvantages of these outcomes; (b) the perception that important others expect conformity to the behavior; and (c) one’s perceived ability to control factors surrounding success. Each factor can increase or decrease one’s intention to complete a certain behavior. As long as one has control over the behavior—rather than merely perceiving that one has—these intentions provide the best insight into what someone will actually do. This model, along with others like it, has been used extensively in public health to ensure that what is known about healthy behaviors is not merely integrated but actually affects behavior. For instance, it means very little if people have the knowledge that smoking is unhealthy if they continue to smoke. Witte (1994) found that only when individuals perceive something to be a threat and believe they have the self-efficacy to do something about it will their actual behavior change. This is because they are dealing with the actual implications of that knowledge, instead of negative emotional reactions that can hide it.

A second set of *knowing* river rocks is found in the fear of failure. When an infatuation with precision and prediction is combined with an intense fear of failure, it paralyzes action. This is because it is more likely that individuals will perceive the disadvantages of failure to outweigh the advantages of success, thereby becoming a barrier to intention (Ajzen, 1985). This can be seen when an over-focus on evidence-based decision-making causes organizations to do nothing while they wait for evidence to pile up. Although there is certainly value in making decisions based on evidence, it is important to remember that it is impossible to have *all* the evidence to *ensure that* the best decision is made. Mistakes will still be made, and decisions will not get better by simply *thinking more* about them. This is what Dove (2003) refers to as a “catatonic state,” where individuals get stuck in planning and are unable to act.

This element thus controls for aberrations in the organizational picture due to an over-magnification of knowledge. Information professionals cannot be satisfied with the facilitation of information into knowledge, because it matters little what people are knowledgeable about unless it

affects behavior. They are responsible for this transition from knowledge to knowing, thus continuing their work with human factors. In addition to tapping into perceived threats and self-efficacy in a targeted message, individuals must be given the time to devote to action: “It takes little imagination to appreciate the importance of circumstantial factors or opportunity [on intention to behave]” (Ajzen, 1985, p. 28). This could include applying elements of game design to behavior change. Schoech, Boyas, Black, and Elias-Lambert (2013, pp. 212–213) found that gamification in youth drug-abuse prevention “fostered engagement, motivation, self-disclosure, colearning, and detailed delivery of a curriculum.”

The move toward turning knowledge into action could also include engagement with Lewin’s (1947) steps for *planned change*. Change first requires that one’s existing state be unfrozen. Looking at prejudice, for instance, Lewin (1947, p. 35) noted that “to break open the shell of complacency and self-righteousness it is sometimes necessary to bring about deliberately an emotional stir-up.” Having been broken, systems are in a place of movement; that is, they are engaged in knowing. Yet this change too often lacks sustaining power due to a lack of group support for the changed behavior. Lewin (1947) found that changes were sustained when they were the result of decisions rather than instruction, and when they were made in groups rather than in isolation. An information professional can facilitate this sustained change by increasing the amount of collaborative work that occurs. Here it is more likely that changes will be shared across the group. Also, by guiding the control parameters of the system rather than directing them, information professionals can create the information conditions that allow for the self-emergent ideas that are the result of actual local decisions.

Discussion

The Knowledge Lens is theoretically situated, yet it has clear, practical applications for LIS curriculum, as outlined in Table 2. These applications are examples and suggestions, requiring future research to fully establish the various contextual ways in which information professionals can use—and become competent with—the Knowledge Lens. This is because it is focused on making sense of the messiness of information and knowledge. It is important to note, too, that the learning outcomes in Table 2 require a slight shift in measurement: objective and simplified metrics do not correspond to how students develop complex and subjective insights. The learning outcomes can be measured through formal papers, reflective essays, and class discussions, which can be qualitatively coded for evidence of each outcome; then, rather than being deemed successful or unsuccessful, students are placed on a spectrum. The goal is movement on this spectrum toward more carefully constructed definitions, translations, demonstrations, criticisms, and formulations.

Table 2: Organizational examples and learning outcomes from the Knowledge Lens

Element	Organizational example	Possible learning outcomes
Agency	Zappos' <i>Holocracy</i> , "a flatter operating structure with no job titles or managers" (Wirthman, 2014).	<ul style="list-style-type: none">• Describe the problems that arise when control is in the hands of a few.• Appraise the creative potential of individuals in a given community.
Unpredictability	3M loosening <i>Six Sigma</i> "in order to increase the flow of innovation" (Ashkenas, 2012).	<ul style="list-style-type: none">• Evaluate the levels of complexity in an organization's needs.• Design environments with adequate information flow, diversity, and connectivity.
Rebellion	Google Cafes to "spark conversation" (He, 2013) and allow open discussion without managerial oversight.	<ul style="list-style-type: none">• Engage in a questioning of textbook answers, proposing alternative solutions and approaches.• Explain the disruptive power of conversation.
Diversity	An Islamic bank in Dubai engaging in creative abrasion to "amplify differences" and use "constructive arguments to create a portfolio of alternatives" (Hill, 2014).	<ul style="list-style-type: none">• Extract human metadata to synthesize the shared discourses of unique individuals to create a new discourse.• Direct groups of diverse people toward a common goal.
Integration	The biopharmaceutical company Intercept "invite[s] patients to share their stories with our employees so we all feel the same passion and commitment toward getting our therapies out into the world" (Intercept, 2017), thus increasing the cost of their not attending to information about proper procedures.	<ul style="list-style-type: none">• Document the psychological and social fields within organizations and communities that might reduce the effectiveness of information.• Experiment with strategies to overcome barriers to information.
Knowing	Walmart uses gamification to ensure application of safety information, applying the "emotional aspect [of games] to alter employee behavior" (Meister, 2015).	<ul style="list-style-type: none">• Document the psychological and social fields within organizations and communities that might decrease the motivation to act.• Design messages about desired behavior that considers self-efficacy and perceptions about the behavior.

The following are some examples of how these learning outcomes can be implemented in core LIS courses:

- A course on collection development adds the agency and unpredictability elements by introducing students to patron-driven acquisitions, where students are taught to tap into the creativity of individuals in the community—based on their interests and needs—to develop a collection that is richer than any collection the librarians themselves would have developed. The nature of collection development then becomes more unpredictable, yet more relevant.
- A course on classification adds the rebellion and diversity elements by introducing critical theory to help students question the standards of classification and how they overlook works by marginalized populations. Students are asked to identify prejudices in how works by certain authors are classified, and how this limits accessibility.
- A course on archiving adds the diversity element by engaging community members themselves in the development of classification schemes to archive their materials in ways that help them and others. This community archiving is accomplished through a deeper understanding of the complex needs of these communities, which also brings in the unpredictability element.
- A course on school librarianship adds the integration and knowing elements by having students practice strategies to enlist the cooperation of teachers in the planning of instruction. Students are asked to identify the barriers teachers might have to adding information skills standards to existing subject content standards. They then work with these teachers to develop effective instruction.
- A course on health information services adds the knowing element by teaching students about knowledge translation ([Sudsawad, 2007](#)), which is the move from evidence-based research in medical science to its synthesis and dissemination in a consumable format that can affect decision-making. Students learn to synthesize information in ways that match specific contexts. This increases the likelihood that this information will affect behavior.

In the end, a central question is this: “What do LIS institutions want their students to be able to do when they graduate?” To help illustrate the impact of a curriculum overlaid with the Knowledge Lens, the following fictional account is offered of Lisa, an information science undergraduate major, in her first few months of employment after graduation as a business analyst in an insurance company. A review of undergraduate programs in the United States suggests that many prepare their students for such a career.

In her first week, Lisa recognizes that the preparation of responses to requests for proposals (RFPs) does not follow the guidelines established by the existing manual. Rather than fix how these responses are created, she

fixes the manual. She recognizes *human agency* and the ability of people to anticipate changes and create innovative approaches to the RFP process that a manual simply cannot keep up with. The manual becomes a record of what has been done, rather than what should be done.

In her second week, she is tasked with rethinking how claims are processed. She calls a meeting to which one member of every department is invited. She ensures that traditionally underrepresented groups are not left out. She then asks each person to share their own experiences related to the claims process. Members are asked to think of each person's narrative as one piece of the puzzle for a new claims process. What worked? What did not work? They each have a different piece of this puzzle, and the true picture of what this process currently is—and could be—can be found only by piecing these together. She recognizes the innovative power of unique information pooling through *conversation* among diverse individuals.

After a very busy month, she attends the company's monthly community construction project. She is surprised to find only a handful of employees there. She decides to more strategically approach the dissemination of information about this volunteering opportunity. First, she finds out why people volunteer. The main benefit is a rejuvenated sense of purpose. She uses these responses to create a survey that asks employees how likely they would be to lose part of their sense of purpose if they did not volunteer for this cause. She also asks them how serious it would be if this happened. She finds that most employees perceive a lost sense of purpose to be serious, but they do not think that volunteering for this project has anything to do with that. She changes the information for the following month's volunteer effort to highlight known links between volunteering and sense of purpose. Many more people show up. She recognizes the over-magnification of access to information and awareness and emphasizes the need for information to spark *action*.

Given the logical progressions and missions of LIS-affiliated institutions, they are uniquely situated to prepare students to fill this knowledge-creation role in organizations. Yet the field has been struggling with how individuals actually *use* information (Kari, 2007; Savolainen, 2009) to make *sense* of life (Dervin & Foreman-Wernet, 2003), essentially asking Stacey's (1996, p. 20) question to escape the *vicious cycle's* need for predictable recipes for success: "How can we make sense of our experience of life in organizations?" Kari notes, "It is a paradox that the research area of information use seems to stagnate, even though it may be considered as the most essential one in information seeking studies" (n.p.). The Knowledge Lens helps reinvigorate this investigation by introducing LIS students to the need to move beyond access to use, with all the complexities and human elements involved.

Business schools, on the other hand, are still attempting to answer questions *within* the vicious cycle: "How can we design our organizations so that they will yield successful outcomes" (Stacey, 1996, p. 3). Snowden argues

that while “business schools and organizations equip leaders to operate in ordered domains,” the increased complexity of organizational life suggests that “leaders need tools and approaches to guide their firms through less familiar waters” (Snowden & Boone, 2007). Looking at more recent trends in business school education, Glen, Suciu, and Baughn (2014) noted that business schools overemphasize a rational-analytic approach, and this “analytic overreliance directs attention to more well-defined and constrained problems, rather than messy, ill-defined conditions” (p. 655).

This ability to graduate students with these skills and aptitudes requires a shift in LIS curriculum. Although a full-scale analysis of LIS curriculum and the embedding of these elements is beyond the scope of this paper, my own experience suggests that these elements are not often explicitly incorporated into LIS classrooms. Bedford et al. (2015) outline the competencies of librarians and information professionals according to standards and competencies of professional organizations in the field. Those learned on the job and not included in LIS education include self-motivation, communication, translation of complex ideas, and developing relationships. Those missing entirely from professional standards include knowledge creation, adaptability, self-reflection, and openness to experimentation: “The challenge for us in academia is to design curricula, and to develop courses and assignments that enable students to develop these behavioral competencies as part of their formal education” (Bedford et al., p. 106).

Although not explicitly stated, it is assumed that the information professionals equipped with the Knowledge Lens will be proficient in technology. In order to retain flexibility, however, this proficiency must extend beyond the use of specific technologies. Instead, these professionals must understand the underlying functions of technology. This ensures that the information professional is involved in the acquisition and implementation of new technologies, working with developers to ensure that these technologies match the needs and culture of the organization. They are aware of the “social consequences of the design, implementation, and use of [information and communication technologies] over a wide range of social and organizational settings” (Sawyer & Rosenbaum, 2000, p. 89).

Future research

Future research is needed both within schools of LIS and in organizations themselves. First, research should consider how these elements are used—and can be used—in various types of organizations. I have assumed in this article that complexity, conversation, and barriers will be present in every organizational system, yet the exact nature of what the lens *reveals* requires further research. Although suggestions are offered in Table 2, in-depth case studies and action research can identify both what these elements reveal in organizations and how they can be implemented. Second, research should consider the pedagogical items and techniques best suited

to equip students with the Knowledge Lens. Given this overview, how can LIS education shift to meet these needs of organizations? Some of these are suggested in Table 2, but this is by no means a comprehensive list.

Conclusion

This article has outlined the three groupings and six elements of the Knowledge Lens—a way of seeing more clearly the opportunities for knowledge creation within organizations. The three groupings include complexity, conversation, and barriers. The elements within these groups control for aberrations in the image of an organization due to a fuzzy view of human potential and agency, an illusion of perfection, a distorted view of power, excessive homogeneity, and barriers to the integration of information and the application of knowledge. They provide a flexible model for embedding instruction in knowledge through curriculum in schools of LIS and information. This is not a full-scale rejection of existing competencies; rather, it is a recognition of additional competencies uniquely situated for organizational knowledge creation. It is hoped that those faculty already incorporating these competencies can use this framework to bolster their efforts, and that those faculty not incorporating them can use this framework to initiate such efforts.

Darin Freeburg conducts his teaching and research at the intersections of knowledge management and information science. His work looks into how existing information can be both used and extended to meaningful and positive ends.

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Notes

1. A better term here is “*knowing professional*.” However, “*information professional*” is retained because it is more familiar and widely used.
2. This is not to conflate information with knowing, as Wilson (2002) warned against. Rather, this is to distinguish information that comes from the processing of data from information that comes from the capturing of a moment-in-time in the actionable knowing of a group.