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THE CONCEPT OF DOMAIN IN DEVELOPMENTAL ANALYSES OF HIERARCHICAL COMPLEXITY

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Individuals do not operate "at a stage of development." They operate at a range of different levels of hierarchical complexity depending on skill area, task, context, degree of support, and other variables. It is thus necessary to postulate the concept of *domain* to refer to the particular conceptual, behavioral, or affective area within which activity operates. The concept raises questions and implications for theory building and application. Such issues are elaborated by discussing a variety of domains and social contexts. A postformal case example of leadership in higher education illuminates the concept of domains and the interrelationships among domains.

KEYWORDS: Development, domain, hierarchical complexity, higher education, leadership, skill theory.

It is tempting to think of development as a process that involves the transformation of a single, broad set of competencies in an organism, human or animal. In the realm of psychological development of people, it seems intuitive to ask, "At what level of conceptual development does this *person* function?" This question cannot be answered. This is because individuals do not function at any one level of development at any particular time of life. Instead, at any given time, individuals operate at a *range* of different developmental levels depending on the particular skill area, task, context, degree of support, and a suite of other variables. It is thus necessary to postulate the concept of *domain*. The concept of *domain* refers to the particular conceptual, behavioral, or affective area within which skilled activity operates. The concept of domain raises several fundamental questions. What constitutes a domain? How do domains come into being? How do skills to perform increasingly complex tasks develop within particular domains? Can development generalize from one domain to another? What are the implications of the localized notion of domain for theory building and application? These and related issues are elaborated with reference to conceptual development in a variety of different domains and social contexts. A postformal case example of leadership at the Metasystematic stage in higher education is used to illuminate the concept of domains and the interrelationships among domains. Drawing from insights

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suggested by the case, the article concludes with discussing the implications for higher education and its leadership.

Models of the development of hierarchical complexity have their intellectual origins in Piaget's theory of cognitive development (Piaget, 1970). As is well known, Piaget suggested that the structure of thinking undergoes a series of qualitative transformations in development (Piaget, 1971, 1983). The idea of *structures d'ensemble*—structures of the whole—was an important part of this theory of development. The concept of "structures of the whole" refers to the idea that, within any given stage of development, thinking forms a more or less singular system that has broad application to many different tasks or task areas. From this view, an individual's thinking could not operate in two different stages at the same time. For example, when an adolescent passes from the abstract to the formal operational stage, he or she becomes capable of manipulating abstract ideas in a variety of different areas in logical and systematic ways. If the structure of thinking forms a single integrated holistic system as Piaget assumed, one would expect different formal operational skills to emerge in development at around the same age in any given individual. However, decades of research and hundreds of studies have demonstrated that variation rather than synchrony is the rule rather than the exception in the emergence of cognitive abilities—even for closely related skills judged to be of the same level of complexity (Fischer, Bullock, Rotenberg, and Raya, 1993).

The concept of *domain* is defined in contradistinction to the Piagetian concept of *structures d'ensemble*. Rather than developing as a single, homogeneous series of stages, thinking develops within particular cognitive, behavioral or socioemotional *domains* (Fischer, Bullock, Rotenberg, and Raya, 1993; Turiel, 1983)—particular areas of thinking, feeling, or acting that develop relatively independent of one another. This conception is common to a variety of models of development that have been postulated over recent decades (Case, 1992; Case et al., 1996; Commons, Trudeau, Stein, Richards, and Krause, 1998; Demetriou and Efklides, 1994; Halford, 1999; Fischer and Bidell, 2006; Mascolo and Fischer, 1998, 2005). Theorists and researchers have proposed and tested sequences of development in a wide variety of psychological, social, and academic domains in childhood and adulthood, including moral reasoning (Dawson, 2004; Kohlberg, 1984), social reasoning (Lamborn, Fischer, and Pipp, 1994), reflective reasoning (Kitchener, King, and DeLuca, 2005), number sense (Griffin, 2005) narrative knowing (McKeough and Genereaux, 2003), ethical reasoning (Perry, 1970), faith (Fowler, 1981), conceptions of authority and contract (Dawson and Gabrielian, 2003), the development of self-evaluative emotions (Mascolo, Fischer, and Li, 2003) and many others The concept of skill provides a useful way to think about the nature of psychological development as it occurs within specific domains of thinking, feeling, and acting (Fischer and Bidell, 2006). A *skill* refers to an individual's capacity to control elements of acting, thinking, and feeling within specified contexts and within particular tasks or task domains. As such, a skill is a type of control structure for performing particular tasks within particular psychological areas. Skills are not general structures. There are no general, de-contextualized, or all-purpose skills; skills are tied to specific tasks and task domains. Skills in different conceptual

domains (e.g., reading, mathematics, musical appreciation, social interaction, athletic ability) develop relatively independently of each other at different rates and toward different developmental endpoints. Assessments of the developmental level of one skill in one conceptual domain (e.g., logical reasoning) will not necessarily predict the developmental level of skills in a different domain (e.g., classification) or even in conceptually similar tasks (e.g., classification of familiar versus unfamiliar objects). One can chart developmental sequences only for skills within particular tasks, domains, and within particular social contexts and assessment conditions (Dawson, Xie, and Wilson, 2003; Fischer et al., 1993; see Table 3 in "Introduction to the Model of Hierarchical Complexity," this issue).

The concepts of *domain* and *hierarchical complexity* are applicable to humans and animals alike (Commons, 2006). A wide literature addresses the issue of the similarities and differences between human and animal capacities (Bekoff, Allen, and Burghhardt, 2002; Savage-Rumbaugh, Shank, and Taylor, 2001; Tomasello, Carpenter, and Call, 2005). Much of this work is aimed toward identifying whether or not higher-level animals exhibit cognitive capacities normally associated with humans. The question of whether or not animal cognition is best regarded as qualitatively or quantitatively different from human cognition is an important issue. The Model of Hierarchical Complexity provides a set of tools for understanding and studying comparative cognition. First, as is the case in humans, animal behavior operates within particular domains. These domains reflect the organism's need to adapt to particular classes of selection pressures in its environment. Commons (2006) described a variety of different domains of animal action, each of which is likely to exhibit its own trajectory of development. These include mate selection, attachment, pecking order, prey defense, predator actions, migration and way finding, food sharing, communication, food selection, and other domains of adaptive action. Second, within these domains, rather than attempting to inquire about whether any given species of animal has or does not have any particular capacity (e.g., symbolic function, use of imagery, capacity for emotion), one instead asks, what *form* and *developmental level* does an animal's acting, thinking, and feeling take in particular contexts and as a result of particular experiential histories. Careful examination of the specific structure of tasks that any given animal performs allows specification of the developmental level of the animal's performance, thus allowing precise comparison of human and animal capacities.

CAN THE CONCEPT OF DOMAIN BE PRECISELY DEFINED?

In all of the foregoing, the concept of domain-specificity is defined negatively, that is, in contrast to the idea of broad-based abilities. This, however, begs the question of the precise meaning of the concept of domain. Although we know that development does not move in broad across-the-board stages, we are nonetheless left with the question: What defines the boundaries of a domain? Is it possible to identify domains precisely? If so, how many domains of thinking and acting are there? How do they develop in relation to each other? Different researchers answer these questions in different ways.

Domain-Specific Development

Some theorists suggest that the concept of domain can be defined in relatively precise terms. For example, Case and his colleagues (Case, 1992; Case et al., 1996) have identified what they call a series of *central conceptual structures* that begin to emerge and develop in childhood. Building on this framework, Griffin (2005) describes a series of central conceptual structures that structure the development of knowledge about number, narrative, and space (drawing) in children. Table 1 provides an adaptation and extension of her analysis of developmental changes in each of these domains from early childhood through adulthood. As indicated in Table 1, it is possible to view mathematical, narrative, and visual representation (drawing) skills as three distinct conceptual domains, each of which develops along a distinct pathway. The ages specified for each developmental level reflect the earliest ages at which skills at the level in question can begin to emerge given appropriate experience, neurological development, and social support. Although the complexity of skills at each developmental level is comparable across the domains, it is clear that the level of skill that any given individual achieves in one domain does not ordinarily predict the level of skills achieved in other domains. For example, a person who has achieved a relatively high level of skill in fashioning complex narratives may easily function at a much lower level of skill in mathematical or drawing tasks. Indeed, in the absence of experience and focused effort over long periods of time, most individuals will not attain the highest levels of functioning in any particular conceptual domain.

Relations among Domains of Developing Skills

Although some tasks draw on skills that fall within particular domains, many, if not most tasks and activities involve the coordination of different conceptual domains in development. One particularly good example of the coordination of multiple domains involves the development of moral judgment. Turiel and his colleagues (Turiel, 1983, 2002) have elaborated a domain theory of moral and social development. Turiel's approach builds on, yet departs from, Kohlberg's (1984) seminal theory of stages of moral reasoning. Kohlberg (1963, 1984) suggested that moral reasoning develops through pre-conventional, conventional, and post-conventional stages. In this way, moral reasoning *develops out of* social reasoning. From this view, genuinely moral reasoning can only emerge in the postformal stage (also called post-conventional). At this level, adolescents and adults gain the capacity to differentiate consistently between *social conventions*—which can take different forms in different social contexts—to genuinely *moral* concerns that transcend social convention.

In contrast to Kohlberg's approach, Turiel (1983, 2002) has suggested that moral reasoning does not have its developmental origins in social conventions. Turiel and his colleagues have suggested that reasoning about *morality*, *social conventions*, and *personal* issues constitute distinct (albeit connected) domains of reasoning. They have shown that children as young as 5 years of age are able to differentiate moral and social conventional issues in structured interview contexts. For example, when asked if it would be right to hurt another child if a person in

Table 1
Developmental Transformations in Hierarchical Complexity for Three Cognitive Domains

Developmental Level	Number	Narrative	Drawing (Arts)
Metasystematic (Principles) (25 years +)	**Manipulations of Higher-Order Mathematical Structures and Objects.** Study of relations among abstract structures of mathematical operations (e.g., detecting structural isomorphisms between groups of mathematical operations in seemingly disparate areas).	**Principled Integration of Literary Forms and Genres.** Principled articulation and integration of relations among multiple literary genres, methods, styles, etc. into a stable and consolidated style or narrative system that organizes a given narrative.	**Principled Consolidation of Style.** Visual expression organized in terms of systematic principles that organize multiple dimensions of visual, expressive, methodological, conventional forms and content.
Systematic (Abstract Systems) (18–21 years+)	**Higher-Order Mathematical Relations.** Capacity to manipulate abstract relations involving change over time (e.g., calculus as an integration of algebra, geometry, and arithmetic); capacity to solve two simultaneous abstract relations; abstract algebraic proofs.	**Narratives Structured by Integrative Relations.** Complex or interweaving narratives organized by relations among multiple qualities of characters and events; integrative use of higher-order literary devices (e.g., anachrony, embedded narrative, higher-order tropes); violation of standard forms to produce novel effects.	**Higher-Order Visual-Conceptual Integrations.** Manipulation of multiple visual, conventional and/or methodological means to represent intangible, emotional, or abstract content. Modification of convention or introduction of novel means to express abstract, emotional, and other visual content.
Formal (Abstract Mappings) (14–15 years+)	**Transformation of Algebraic Relationships.** Able to coordinate relations between two abstract variables (e.g., $f = m * a$; $a^2+b^2=c^2$)	**Dialectic Relations among Stable Characters.** Complex narratives involving characters with inner states exhibiting continuity over time. Conflicts derive from relations among characters or events.	**Visual-Conceptual Integration.** Intentional use of variation in visual form, content and/or technique in the service of a conceptual goal or outcome (e.g., use of distortion, variations in color to represent emotional themes); use of visual means that suggest abstract or themes.

(Continued on next page)

Table 1
Developmental Transformations in Hierarchical Complexity for Three Cognitive Domains *(Continued)*

Developmental Level	Number	Narrative	Drawing (Arts)
Abstractions (10 years)	**Simple Algebraic Representations.** Incipient representation of single abstract variables representing quantity (e.g., $2x = 4$)	**Conflict-Driven Multi-Lined Narrative.** Complex stories involving characters with mental states and motives, organized plots and subplots driven by conflicts and attempts to resolve conflicts.	**Three-Dimensional Scenes.** Draws scenes exhibiting fore-, middle-, and background within an integrated continuous space. Fills in details in realistic ways. Use of visual metaphor (e.g., drawing a teacher as a "witch").
Primary/Concrete (Representational Systems) (6–7 years)	**Mental Number Line.** Understanding relations between numbers on a "mental" number line; capacity for addition and subtraction. By 8–9 years, multiplication and division.	**Intentional Story Lines.** Temporal–causal plot lines involving characters with mental states and motives (e.g., "We went to the zoo, *but then* I got hungry *so* we took train *to go* buy some yummy hot dogs. . . ")	**Mental Reference Line.** Child can draw identifiable persons and objects placed within a particular location or scene (e.g., person and a house; flower under the sun), often with lines indicating ground or sky.
Sentential/Preoperational (Representational Mappings) ($3^{1/2}$–4 years)	**Mental Counting Line.** Representation of relations between numbers; comparison of more vs. less.	**Causal-Temporal Action Sequences.** Child relates multiple actions or events in time or in cause-effect relation (e.g., "We went to the zoo *and then* we got a hot dog")	**Identifiable Objects and Figures.** Capacity to draw a recognizable yet barely articulated figure or object (e.g., person), often depicted as hovering on the page.

authority said it was right to do so, most children indicated that the act would not be right (Kim and Turiel, 1996; Laupa and Turiel, 1986). The differentiation between the moral and conventional appears to be a ubiquitous one and arises in a variety of contexts. For example, in highly religious populations, when asked if stealing or the infliction of pain onto others could be moral if it were God's will that it be done, most respondents indicate that God would never will such acts (Turiel, 2002). Further, Arab women living within the Druze community in

Northern Israel were asked whether it is appropriate for men, but not women, to work outside the home. Most women affirmed the prevailing social conventions and indicated that it would not be appropriate to do so. However, when asked, most women also indicated that while the prescription against working outside the home should be followed, the rule itself was also *unfair* (Wainryb, 1995; Wainryb and Turiel, 1994).

Turiel (2002) argues that social and cultural differences in moral rules often arise not as a result of differences in beliefs about the moral aspects of an action, but instead as a result of social beliefs and background knowledge about the nature of the issues at hand. For example, Americans differ in their judgments about the morality of abortion, although most Americans would maintain that the killing of an innocent child is immoral. One source of differences in moral judgments about abortion involves different assumptions about what it means to be a "fetus" or a "child." These findings, and scores of others, support the proposition that moral and conventional rules reflect distinct domains of thinking. In addition, the idea that ostensive differences in moral reasoning often reflect differences in assumptions about social and other domains of thought provides a framework for articulating a non-relativistic approach to moral judgment. (Also see Robinette on moral reasoning, this issue.)

Dynamic Webs of Skill Development

Although it is possible to identify particular tasks and activities that operate within particular domains of thinking, feeling, or acting in everyday life, most tasks involve an integration of multiple task domains. When working with relatively simple or bounded tasks, it is often a simple matter to identify the conceptual domain or domains on which a given task will draw. Over time, however, individuals construct higher-order skills for purposes of adapting to novel tasks, events, and problems. Higher-order skills reflect performances at higher stages of hierarchical complexity. In so doing, higher-order skills emerge from the constructive differentiation and inter-coordination of skill elements from diverse task domains. For example, the skills involved in composing an effective *Letter to the Editor* go beyond basic writing skills. They involve identifying the perspectives of the editors and potential readers; adjusting the language in order to be persuasive; ability to fashion narratives in ways that describe how a given issue affects people; the use of mathematics or statistics to support a point being made, and so on. Thus, in everyday social activity—particularly when performing higher-order activities—there are few if any "pure" conceptual domains of functioning. As a result, it is often useful to speak of *emergent* or *higher-order* domains of action. For example, consider the repertoire of skills required to function as a social activist or political lobbyist. A social activist operates in many spheres of action—organizing supporters, giving speeches, making contacts with influential people, writing letters, and composing persuasive documents. Although actions in each of these areas results from the coordination of skills from more "basic" domains, when dealing with higher-order skills, it is not ordinarily practical or useful to analyze such skills in terms of basic elements or domains. When attempting to understand the

domains of functioning relevant to the everyday operation of a social activist or lobbyist, each of these broad categories of activity could be viewed as an *emergent* higher-order domain. In this way, when understanding the nature of complex psychological activity, that which may be considered to be a higher-order *domain* must often be defined by the particularities of the context, task demands, and by one's analytic purposes.

From this view, when analyzing the development of any particular skill or capacity, rather than attempting to identify one or more distinct domains into which a task falls, it is often preferable to work backwards by performing a *task analysis* (Commons, 2006; Commons, Miller, Goodheart, Danaher-Gilpin, Locicero, and Ross, 2007; Fischer, 1980). A task analysis provides a specification of the skill elements (i.e., the structure of what a person must do) that must be brought together in performing any given task. In performing a task analysis, one breaks a task into its basic elements and relations. In so doing, one "works backwards" in order to identify the particular skill elements that task performance requires, regardless of what domains these elements ultimately derive. Over time, one can trace the pathways through which particular skills emerge and develop as products of a person's ongoing attempts to adapt to local tasks, demands, contexts, and social goals.

Viewed in this way, it becomes clear that development takes place in a multidirectional *web* of pathways (Fischer and Bidell, 2006) rather than a unidirectional ladder—a metaphor depicted in Figure 1. Developing skills do not move in a fixed order of steps in a single direction, but they develop in multiple directions along multiple strands that weave in and out of each other in ontogenesis, the developmental history of the person (or other organism). The developmental web portrays variability in developing skills within individuals, not only between them. For development in an individual person, different strands represent divergent pathways in the development of skills for different tasks or conceptual domains. For example, the development of addition and subtraction skills might occupy one strand, skills for producing stories another, and skills for reading words still another. As such, the developmental web provides a metaphor for understanding how different skills develop through diverging and converging pathways toward or away from different endpoints.

THE COORDINATION OF DOMAIN KNOWLEDGE IN ADULT DEVELOPMENT: A POSTFORMAL CASE ILLUSTRATION

These principles will be illustrated with a case analysis of "Dr. K," a highly accomplished adult currently serving as the provost of a small Catholic college. In what follows, I will examine the ways in which (a) "Dr. K's" academic leadership skills emerge and operate as a high-level inter-coordination of multiple conceptual and behavioral domains; (b) the college capitalized on his particular skill sets by reorganizing the position of Provost; and (c) how Dr. K's talents functioned to support the college's issues at a particular time in its history and development. In so doing, I will argue that the domains of knowledge that are required to fulfill the post of Provost are relationally rather than

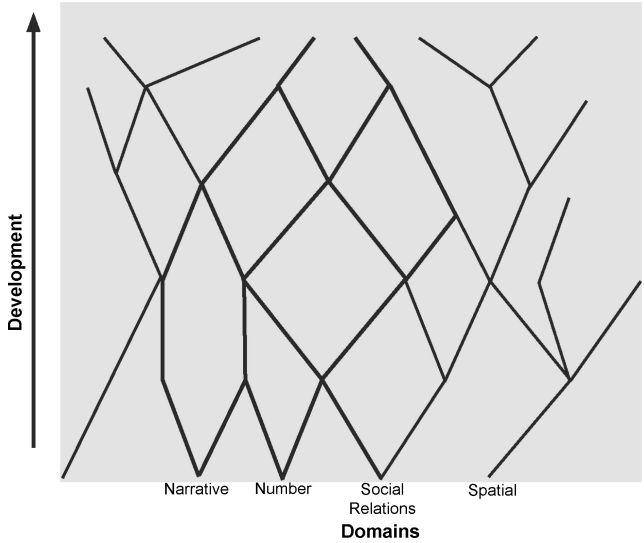

Figure 1. Development as a constructive web.

individually defined. That is, at very high levels of functioning, what constitutes a "domain" of thinking, feeling, or acting is dependent not only on the individual actor, but on the relation of the individual to the needs of the sociocultural context.

"Dr. K," a 59-year-old male, began his career as a priest in a Catholic order. After several years, Dr. K left the priesthood, eventually married, and had two children. Dr. K received a doctorate in ministry (D.Min.) and taught classes in the Department of Religious Studies at the college at which he is currently provost. Thereafter, Dr. K returned to graduate school and obtained a second doctorate (Ph.D.), this time in counseling psychology. Prior to being appointed provost, Dr. K published a well acclaimed book and a series of scholarly articles. He was appointed the vice president of "Spiritual Legacy and Mission Advancement"[1] —a position designed to forge links between the school's spiritual heritage and its academic mission. After serving in that post successfully for several years, Dr. K was appointed provost of the college. Dr. K's appointment as provost of the college was predicated on a variety of considerations; however, his exceptional interpersonal skills and capacity to "bring people together" were paramount. This was judged necessary because of the historically tumultuous relations between faculty and administration at the college.

I interviewed Dr. K about his sense of the qualities that he brings to his office. In so doing, I indicated that "I am interested in the structure and content of your 'personal job description'—especially with reference to addressing the college's most pressing needs. I'm not so much interested in the 'formal' job description, but instead your personal sense of the different areas of responsibility that you have and how they are related." I also asked Dr. K to describe areas in which he felt

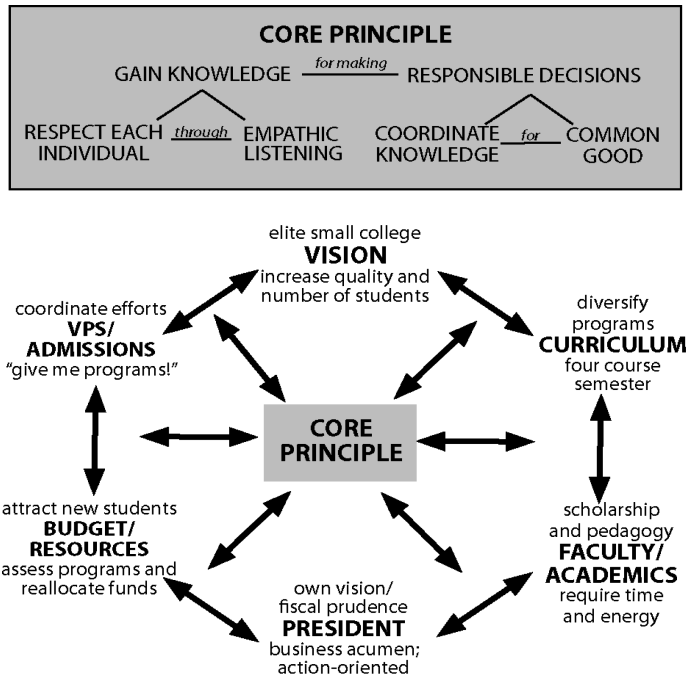

Figure 2. The hierarchic coordination of domain-specific skills: The structure of Dr. K's representation of academic leadership.

he had great expertise as well as areas in which he felt he exhibited weaknesses. Finally, at the end of the interview, I asked Dr. K to describe a principle that would "tie all of this together."

As expected, Dr. K's "personal job description" operates at an extremely high level of complexity. In terms of the Model of Hierarchical Complexity and Fischer's (1980; Fischer and Bidell, 2006) skill theory, his articulation of his duties functions at the respective levels of Metasystematic stage 12, or abstract *principles,* which is the highest level in Fischer's developmental system. Figure 2 provides a representation of the structure of Dr. K's academic leadership skills. As indicated there, Dr. K described his personal commitments in terms of a series of interrelated abstract systems, each of which is related to his singular guiding principle. Dr. K's conception of his duties represents an *integration* of multiple higher-order *domains* of cognitive, affective and behavioral functioning. Dr. K identified six major themes—each of which can be considered a domain of thought and action—organized in terms of a core principle. Dr. K's articulates his core principle in terms of the maxim "through knowledge to wisdom," which, to Dr. K, means:

> through knowledge to wisdom . . . you have to get the knowledge, the information, the data . . . listen, listen, listen . . . you have to learn constantly . . . so [that]

> you can . . . decide. Maybe they are big decisions, little ones, or just directions . . . based on the knowledge that you have gained. . . . The many ways as you can integrate [knowledge] and exercise will . . . that is what I mean by wisdom. . . . [Wise] decisions . . . have to always be with respect to the dignity of each person and for the common good; or for the good of the common enterprise.

At another point in the interview, Dr. K elaborated on the ways in which "respect for individuals" is informed by the need for deep empathy and active listening. "The virtue of empathy is really really important for me. [Empathy means that we] don't just tolerate the other, but actively enter into the world of their frustrations . . . it's a big help."

This principle weaves its way through the various domains of operation in which Dr. K participates. The six basic domains of thinking include the need to (a) actualize a *vision* for the college that will attract high quality students and faculty. Toward this end, he described the need to (b) develop an innovative curriculum; in order to develop such curriculum, there is a need to (c) reallocate faculty workload in order to make faculty scholarship and curriculum development possible. Curriculum and faculty workload revision requires (d) extensive assessment of existing programs, which requires effective interpersonal interaction and collaboration between the provost and the faculty on the one hand, as well as with (e) the admissions officer who requires innovative programs to market the college, and (f) the president of the college whose imprimatur is necessary to effect change in the existing system.

Each of these six themes articulated by Dr. K requires different yet overlapping systems of skill and knowledge. It is not possible, on the basis of a reflective interview, to assess the degree of development of Dr. K's skills in each domain. For the present purposes, it is important to note Dr. K's "personal job description" is (a) *embodied by the inter-coordination of multiple particular domains of knowledge and action*, organized in terms of integrative abstract principles. One might suggest that Dr. K's effectiveness in his post—like that of any high-level administrator or manager—relies on (b) the extent to which *this particular configuration of dynamically executed skills fits the unique needs of the institution* at this phase in its history, and (c) the ways in which the skills and proclivities of *other key actors* (e.g., the president, faculty leaders) *complement or conflict with* Dr. K's initiatives and actions. For example, when Dr. K was appointed provost, the former position of academic vice president was divided into two positions—provost and dean of the college. The provost was charged with the running the everyday academic affairs of the college; the dean of the college assumed different responsibilities. This unusual action not only made it possible to render the massive workload of the former position more manageable, but it also provided flexibility in defining the duties of each position so that they fit the skills and proclivities of the two incumbents.

Although it is likely that one could identify seeds of Dr. K's leadership skills earlier in his career, like all skills and abilities, Dr. K's academic leadership skills developed over a long period of time through the successive inter-coordination of lower-level skills within different conceptual domains. Figure 3 provides a

developmental web describing some of the strands that contributed to the development of Dr. K's academic leadership skills. As indicated in Figure 3, Dr. K's leadership skills built upon the development and integration of at least four broad domains of knowledge and action: academics, spirituality, social interaction, and technical/business skills. Although each of these domains develops along partially separate pathways, new skills emerge as novel paths split off from existing ones, or when skills from multiple paths come together in multiple acts of integration. Dr. K's "knowledge about academic life" (an important knowledge domain given that the current president and other vice presidents do not have academic backgrounds) developed through graduate training, as well as the normal duties of an academic (i.e., teaching, scholarship, and community service). Dr. K's interpersonal skills and commitment to "respect for others" emerged early from his activity in the priesthood, and continued to develop over his career, including in his capacity as a teacher, administrator, and counseling psychologist. Dr. K's academic leadership skills, as exemplified in Figures 2 and 3, result from the coordination of these multiple paths over time. Nonetheless, Dr. K attests to several domains in which he feels challenged as provost. These include aspects of his position that require technical knowledge of a legal or fiscal kind, as well as skills for forging connections with wealthy individuals and business leaders outside of the college. These less developed skill domains are represented toward the bottom of Figure 3 in terms of unelaborated "legal" and "corporate" pathways.

POSTFORMAL THINKING AND THE FUTURE OF LEADERSHIP IN HIGHER EDUCATION: COORDINATING DIVERSE DOMAINS

The concept of domain is a *relational* and *dynamic* concept. Any domain of knowledge or action is defined with reference to an organism's need to adapt to shifting ecological demands. In modern human cultures, such demands shift continuously with changes in technology, the global economy, demographics, and a variety of other socioeconomic processes. In the past half-century, such changes have spawned the production of *novel domains* of knowledge and action (Collis, 2001). The proliferation of novel domains poses special challenges for individuals and groups in positions of leadership—especially leaders in the field of higher education. Consider the following statement by the president of Pennsylvania State University:

> Institutions of higher learning, like business and government, cannot be complacent about the future. There was a time when universities were content to adopt a "Field of Dreams" approach—if we build it, they will come. For most of our history, we were omniscient elders who told our students what they needed, when they could get it, and what they would pay for it. But those days are rapidly becoming a distant memory. Changes in technology, demographics, competition, and for public institutions, legislative expectations, are all coming together to alter the way we operate. (Spanier, 2000, p. 19)

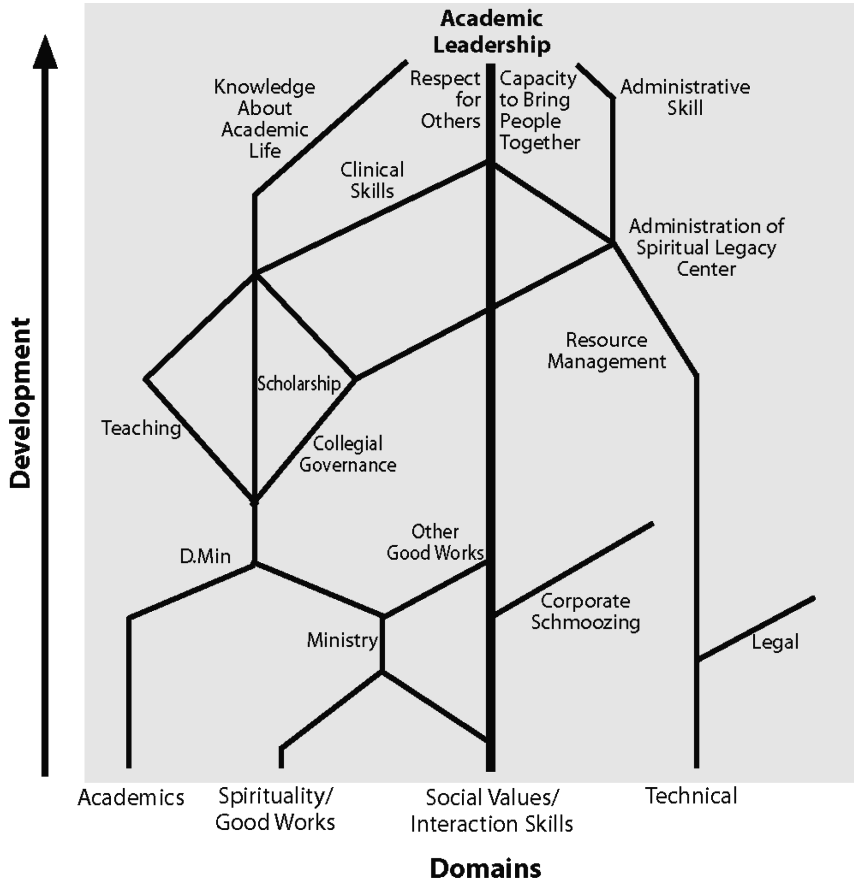

Figure 3. Pathways in the development of Dr. K's academic leadership skills.

As a result of cultural shifts like those identified by Dr. Spanier, new *domains* of knowledge and action have emerged. To adapt to these changes, educational leaders face the tasks of *recognizing* shifts in sociocultural demands when they occur; *identifying* novel domains of expertise that have evolved to meet those demands, and, perhaps most importantly, finding ways of *coordinating* novel domains of knowledge into the integrated fabric of the college or university. Such acts of coordination become increasingly difficult in an age of increasing specialization, fragmentation, and decentralization of intellectual and economic activity like our own. Integrative multiple domains of knowledge in the service of a common goal requires leadership skills that operate at postformal levels of development.

In these concluding remarks, I will illustrate the ways in which societal shifts have spawned the production of novel domains of knowledge and action in the field of higher education as well as the need to coordinate across novel domains

of knowledge and expertise in order to ensure the continued productivity of the academy. Toward this end, I will touch briefly upon three basic challenges that face higher education. These include changes in shifting demographics, the revolution of information technology, and the explosion of knowledge.

First, educational demographics have changed significantly in the past half century. Whereas 25 percent of all high school graduates went on to college at the midpoint of the 20th century, today in the United States, 75 percent of graduates attend some form of higher education within two years of graduation (Caboni and Adisu, 2004). This shift has produced unprecedented diversity in higher education; what was once seen as the purview of the well-to-do has now become a virtual necessity for entry into the workforce. Such diversity has placed novel demands on higher education that have motivated novel domains of expertise. The rising number of students has brought with it a heightened need for remedial education (Caboni and Adisu, 2004). Most schools have racial and ethnic diversity offices to address the needs of minority students (Gose, 2006). Social and legislative changes have mandated resources for students with learning disabilities and other special needs (Hadley, 2007). Each of these needs has engendered a new domain of knowledge and expertise within the educational environment. While most colleges and universities have established programs built around these domains of action, it has proved more difficult to coordinate these novel programs into the cultural fabric of the educational institution.

Second, the centrality of information technology in cultural and economic life has spawned an explosion of academic departments needed to meet increasing demands for workers trained in the many facets of information technology (Lagenberg and Spicer, 2001; Van Ginkel, 2003). Information technology, including the Internet, continues to motivate dramatic changes in the delivery of education (Maughan, 2001; Williams, 2007). Information technology evolves faster than the academy's capacity to master effective ways to use it. With the Internet, we have witnessed a surge in distance learning, online classes, and computer-mediated instructed within classrooms (Guri-Rosenblit, 2005). However, as with any technology, information technology is a tool; as a tool, its merits are to be found in the ways in which it is used. As with many technologies, one runs the risk that the tool may come to control the user. While Web-based technologies can support teaching and learning in many ways—convenience; ease of access to multimedia information; use of education-related software, and so on—more efficient delivery of information is not the same as genuine learning. Some modes of learning are well suited for information technology; others may continue to require face-to-face interaction and the formation of student—teacher relationships (Reinsmith, 2006). The economic incentives for use of Web-based technologies are legion; the challenge to educational leaders is to find novel ways to integrate the various domains of information technology with the best of traditional education, as well as with the core values that sustain higher education (Barnett, 2000).

A final issue concerns the explosion of knowledge (Adair and Vohra, 2003; Barnett, 2000). With the passing of each decade, the quantity of knowledge grows exponentially. Academic disciplines and areas of expertise are becoming increasingly specialized over time. In this way, in addition to the production of novel

disciplines (e.g., such as information technology), novel academic domains are emerging through a process of increasing specialization, resulting in increasingly narrow domains of expertise. From an educational standpoint, what intellectual values should prevail when confronting the explosion of knowledge (Rhinesmith, 2006)? Is more knowledge better knowledge? Or should colleges and universities seek ways to empower students with conceptual tools for organizing relations among fields and subfields of knowledge (Barnett, 2000; Boulton and Panizzon, 1998)? How should specialization of knowledge affect disciplinary structures? As academics become increasingly specialized, what should be the fate of traditional liberal arts curricula?

The task of leading an educational institution through cultural shifts is no easy matter. Educational leadership—like leadership in any complex institution—will require the capacity to coordinate multiple domains of knowledge and expertise within a shifting sociocultural-economic climate. In the present context, the goal of *inter-coordination* of emergent domain-specific activity functions as a key leadership principle (Blackmore and Blackwell, 2006; Blaisdell, 1993; Lucas, 2007). Educational leadership will require more than capacity simply to juggle competing interests; genuine leadership will require *teams* of postformal leaders working together to *inter-coordinate* multiple domains of knowledge for purposes of pursuing common educational goals.

NOTE

1. This title is an alias that preserves the original meaning of the position in question.

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