

THE ROLE OF SIMULATIONS IN ORGANIZATIONAL LEARNING: BUILDING INDIVIDUAL ABSORPTIVE CAPACITY

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ABSTRACT

Simulation and experiential learning research lie at the theoretical nexus of educational research on learning objectives and management research on organizational learning. Historically, scholarly research in simulation and gaming has tended to focus on the educational literature. This paper builds a bridge to the relatively neglected management literature on organizational learning, specifically addressing the problem of absorptive capacity. We argue that the literature on absorptive capacity provides a fresh look at the problem of individual knowledge, and one that should prove very useful in formulating learning objectives for management education.

INTRODUCTION

In their 2009 paper, "The Simplicity Paradox," Cannon, Friesen, Lawrence, and Feinstein grappled with the problem of complexity in simulated organizations. Building on an earlier paper by Cannon (1995) on how simulations deal with complexity, they note that Cannon defined complexity in terms of *information load*, or the amount of information decision-making units have to process. Cannon, Friesen, Lawrence, & Feinstein (2009) posit a second dimension, *uncertainty*. They argue that one of the major informational problems faced by organizations is not to absorb and process information, but to determine how to decide what information to absorb and process. Addressing *uncertainty* is often more difficult than dealing with *information load*. Indeed, the simplifying mechanisms designed to reduce information load often increase uncertainty, in many cases, adding to overall complexity -- hence, the *simplicity paradox*.

While the *complexity paradox* and the *simplicity paradox* were addressing principles that govern the design of simulation games, the purpose of the games is to prepare students for issues they will face in actual organizations. This paper will also focus on simulations as a method of preparing students for organizational competence. However, it will link the principles of *individual learning* and the associated methodology of *experiential learning* to *organizational learning* and *absorptive capacity*, suggesting how to use these principles as a guide for simulation design. The task of the resulting simulations would be to prepare students for organizational competence in the area of absorptive capacity, or

"... a firm's ability to utilize externally held knowledge through three sequential processes: (1) recognizing and understanding potentially valuable new knowledge outside the firm through exploratory learning, (2) assimilating valuable new knowledge through transformative learning, and (3) using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning." (Lane, Koka, & Pathak 2006, p. 856).

One of the reasons for the apparent disconnect between the work on individual learning through business simulations and organizational learning is the fact that the organizational learning literature, and specifically absorptive capacity, has focused on technology transfer (Lane, et al., 2006), while business simulations have focused on the development of managerial expertise. However, the technological focus is historical, not inherent in the concept of absorptive capacity itself (Cohen & Leventhal, 1990; Lane, et al., 2006).

Our objectives in this paper are fourfold: First, we review some of the basic concepts of individual learning as utilized in the business simulation literature, drawing on the concepts of cognitive (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956; Anderson & Krathwohl, 2001), affective (Krathwohl, Bloom, Bertram, & Masius, 1964), and psychomotor (Simpson, 1974) learning taxonomies, linking them to the work of experiential learning theorists (Lewin, 1935, 1951; Kolb, 1984). Second, we draw on Lane, et al.'s (2006) process model as the basis for a corresponding review of the basic concepts of absorptive capacity. Third, we analyze the linkage between individual learning, experiential learning, and illustrative elements of the absorptive capacity model in an effort to identify the key implicit individual learning, or knowledge, components. Finally, we draw on our analysis to identify critical areas for future research as we seek to bridge the two literatures.

CONCEPTUALIZING KNOWLEDGE: THE LEARNING TAXONOMIES

The individual learning tradition grew out of the advent of business schools in the early 1900s, and the corresponding need to define the content of the curriculum. One response was to focus on content by teaching the results of research regarding business processes and their underlying theories. This parallels the tradition of basic research in other fields in both the physical and social sciences.

The second response was to focus on pedagogy and the learning process required for students to become effective managers. The most common method was the traditional lecture and reading approach, where students were exposed to the concepts underlying business processes and their corresponding theories. However, many business school educators argued that management was a practitioner's art, requiring a more "hands-on" educational approach. For instance, the Harvard Business School has championed use of the case method since the School's founding in 1908 (Corey, 1998). The case method placed students in the role of managers and gave them an opportunity to analyze actual business problems and explore various alternative solutions.

In the 1950s, business schools began experimenting with the use of business simulation games as a means of creating a laboratory in which students could again take the role of managers, but wrestle with a more dynamic set of problems. Rather than presenting a static case, a simulation would allow students to actually implement decisions, often competing against fellow students, and receive feedback regarding the results of their decisions (Wolfe, 1993).

The advent of alternative pedagogical approaches begged the question of which of the alternatives was most effective. This, in turn, led naturally to an investigation of what business schools should be teaching and how effective the different methods were in achieving the resulting learning objectives.

The distinction between traditional lecture and reading approaches versus more experiential approaches corresponds roughly with a long-standing controversy

between the importance of *content* versus *process* in learning objectives. A recent manifestation of this is Hirsch's (1996) advocacy of a common core curriculum, focusing on "verbal instruction (lecture) focused upon transmission of a body of coherent, discipline-based and factual content (dominant knowledge) reinforced by distributed practice (drill, repetition, and memorization)" versus "process-driven, and thinking-skills-oriented schooling" (Buras 1999, p. 71).

The argument for a content-driven curriculum is twofold: First, the basis for our communication and interaction as humans is oriented around common experience, or content. Effective education must tie new knowledge to this, linking ideas to the problems and situations people already understand. Teaching "process" independent of common experience leaves students without an anchor to reality. Second, people naturally process content in a process-oriented framework. People naturally to organize their experience in ways that help them achieve goals, and by extension, to learn the processes by which they can use experience to support goal-seeking behavior.

Proponents of a process-driven curriculum argue that the best problem-solving processes are not necessarily intuitive and should be taught (Smith, 2003). Furthermore, they should be practiced over a broad range of situations to help students generalize their applicability. In the management literature, this is best illustrated by what Fox (1997) terms traditional cognitive theory. According to this approach, we conduct research to identify different patterns of strategic thinking, or generalizable principles that would guide strategic thinking in different types of situations, and then teach them in the classroom.

The literature on learning taxonomies can be seen as a framework for integrating these two perspectives. For instance, Bloom's classic taxonomy of educational objectives (Bloom, et al., 1956) posits a hierarchy of learning, beginning with facts, progressing to concepts, and on to application, analysis, synthesis, and evaluation. The lower-level objectives (the *knowledge* end of the hierarchy) involve the common body of knowledge relating to any given field, while the higher-level objectives involve the intellectual processes by which this knowledge is created and organized to solve problems.

In its most recent incarnation, Bloom's revised taxonomy (Anderson & Krathwohl, 2001) makes an explicit distinction between process (remembering, understanding, applying, evaluating, and creating) and content (factual knowledge, conceptual knowledge, procedural knowledge, and meta-cognitive knowledge) dimensions, resulting in the matrix of potential educational objectives portrayed in Exhibit 1. Using an advertising problem as an example, learning facts about advertising-to-sales ratios for different companies would constitute a 1A-type objective, remembering factual knowledge. Organizing a new, more effective type of budgeting process in an organization would constitute a 6D-type objective, creating meta-cognitive knowledge. Meta-cognition is thinking about the process of thinking. In this case, the objective would involve a creative method for thinking about how an organization might decide the best strategy and supporting activities for establishing advertising budgets in different types of campaign situations.

The two-dimensional revised taxonomy provides a much stronger framework for describing cognitive objectives, but it does not address the non-cognitive aspects of education, as conceptualized in the original project from which Bloom's taxonomy emerged. It was actually the product of a committee of educational psychologists chaired by Benjamin Bloom. The original cognitive taxonomy was published in 1956, followed up in 1964 by an affective taxonomy (Krathwohl et al. 1964). The taxonomy addresses learning that involves the inclination to engage in various types of mental and physical activity. A later set of taxonomies sought to address learning that involves physical movement, coordination, and the use of motor skills, again arranged in a hierarchy from simple to more complex. Exhibit 2 summarizes Bloom et al.'s (1956) cognitive taxonomy, Krathwohl et al.'s (1964) affective taxonomy and Simpson's (1974) psychomotor taxonomy.

The conceptualization of learning objectives portrayed in the literature on educational taxonomies, or what we characterize as the *individual learning* perspective, provides a powerful tool for conceptualizing the types of teachable characteristics organizations might value in the people they hire to carry out their missions. They are sufficiently differentiated (according to the three domains, and by knowledge and cognitive process) to distinguish among the relative strengths and weaknesses of potential

candidates for employment in a particular position. We will now turn our attention to conceptualizing organizational needs.

CONCEPTUALIZING ABSORPTIVE CAPACITY AND THE ASSOCIATED INDIVIDUAL LEARNING REQUIREMENTS

The key difference between the individual learning perspective and that of absorptive capacity is that discussions of absorptive capacity are centered on the key organizational tasks involved in absorbing and utilizing new knowledge. As we have seen, the individual learning perspective focuses on the mental processes that actually define the knowledge to be absorbed and how it will be utilized by individuals within the organization. In order to illustrate the difference, we will draw upon the work of Lane, et al. (2006), as summarized in their model of absorptive capacity shown in Exhibit 3.

In many ways, characterizing the material covered in the preceding section as *individual learning* is misleading, since it implies that other approaches are not individually based. Exhibit 3 is clearly anchored in individual processes. This is explicit in the box labeled "characteristics of firm

Exhibit 1
The Structure of Bloom's Revised Educational Taxonomy

THE KNOW- LEDGE DIMENSION	THE COGNITIVE PROCESS DIMENSION					
	1 Re- member	2 Under- stand	3 Apply	4 Analyze	5 Evaluate	6 Create
A. Factual						
B. Conceptual						
C. Procedural						
D. Meta- cognitive						

Source: Lorin W. Anderson and David R. Krathwohl. *ATaxonomy for Learning, Teaching, and Assessing*. New York: Longman, 2001, p. 28.

members' mental models" and implicit in the boxes "characteristics of internal and external knowledge," "characteristics of learning relationships," "recognize and understand new external knowledge," "assimilate valuable external knowledge," and "apply assimilated external knowledge," all of which relate directly to some kind of individual mental activity, such as "understanding" or "learning." Furthermore, the foundations of organizational development change as a discipline grows out of an individual learning and experiential learning tradition, as illustrated in the pioneering work of Argyris & Schön (1978).

Kim (1993) describes individual learning in terms of the acquisition of knowledge and/or skill. Skill implies the *know-how* required to do something. Knowledge, he argues, describes *know-why*, "...which implies the ability to articulate a conceptual understanding of an experience" (Kim 1993, p. 38). Kim works with Argyris & Schön's (1978) argument that a combination of both knowing and doing is necessary to demonstrate that learning has occurred. He defines learning on the individual level as "increasing one's capacity to take effective action" (Kim, 1993, p. 38).

The capacity to act is driven by mental models is what we have characterized as *meta-cognitive knowledge* in

Exhibit 3. This knowledge guides a person towards what actions to take and why to take them in various types of situations. Individuals' learning is encoded as changes in their mental models. They observe what's going on around them and reflect on its meaning. They use their high-level *cognitive* and *affective* processes to develop the abstract concepts and generalized principles from which the models are constructed. These lead to the formulation of general patterns of action (a type of *conceptual* knowledge, again drawing on Exhibit 1) and specific behavioral plans (*procedural* knowledge) leading to actual behavior. Aside from addressing any specific objective for which the behavior was planned, the behavior also provides a kind of test, resulting concrete experience, or feedback, regarding the efficacy of the plan. This feedback provides additional material for observation and reflection, creating an on-going cycle of learning.

Organizations follow the same pattern, except that the various stages of the cycle involve the thinking and activities of individuals within the organization. An organization may be said to have learned when the shared mental models of its individual members have changed in response to new knowledge, evidenced by behavioral changes. Huber (1991) describes organizational learning as having four key components: *knowledge acquisition*,

Exhibit 2: The Three Domains of Educational Taxonomies

<i>Cognitive Domain</i>	<i>Affective Domain</i>	<i>Psychomotor Domain</i>
<i>Knowledge</i> , or the ability to recall ideas such as facts, concepts and theories	<i>Receiving</i> , or the tendency to recognize and pay attention to important stimuli	<i>Perception</i> , or the ability to sense objects, qualities and relationships via sensory organs
<i>Comprehension</i> , or the ability to understand and make intellectual use of knowledge	<i>Responding</i> , or the tendency to act in appropriate ways as a result of a stimulus	<i>Guided response</i> , or the ability to perform a specific act under the guidance of a teacher
<i>Application</i> , or the ability to map concepts onto actual objects, events or phenomena encountered in the real world	<i>Organization</i> , or the arrangement of values into a coherent, stable system	<i>Complex overt response</i> , or the ability to perform a complex pattern of acts
<i>Analysis</i> , or the ability to break ideas down into their parts and logical premises	<i>Characterization by a value</i> , or the use of values to control one's behavior	<i>Adaptation</i> , or the ability to alter an act to meet the demands of a new situation
<i>Synthesis</i> , or the ability to develop new ideas from apparently unrelated parts		<i>Origination</i> , or the ability to develop new acts through the application of unrelated skills
<i>Evaluation</i> , or the ability to judge the merit of ideas for given purposes		

Source: Hugh M. Cannon, Andrew H. Feinstein, and Daniel P. Friesen. "Managing Complexity: Applying the Conscious-Competence Model to Experiential Learning," *Developments in Business Simulations and Experiential Learning*, Volume 37, 2010, p. 179.

information distribution, information interpretation, and organizational memory. These activities depend, in large part, on the absorptive capacity of the organization, as portrayed in Exhibit 3.

From the perspective of our paper, the key to this discussion is the fact that both organizational learning, and particularly, absorptive capacity are ultimately dependent on individuals. While the ability of individuals to contribute effectively clearly depends on organizational factors, such as structure, procedures, incentive programs, social and cultural norms within the organization, and so forth, we argue that individuals can be taught much of what they need to know before they join an organization.

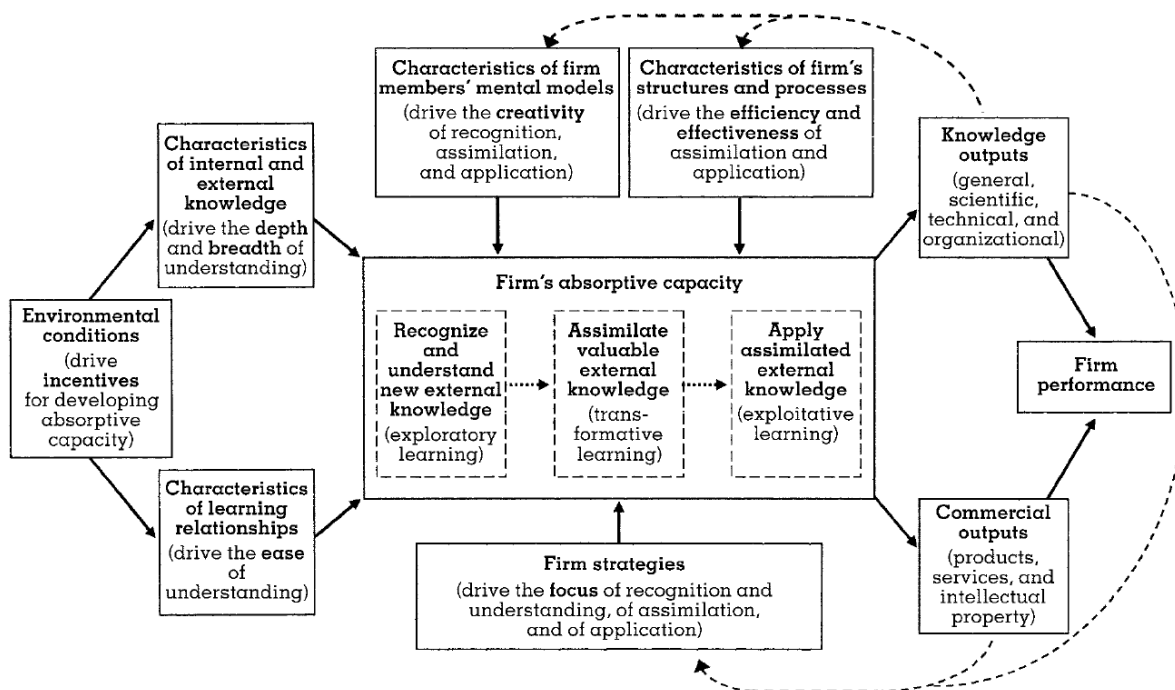
The question we pose is how to conceptualize the individual learning tasks so we can structure both the content and the process of an effective educational program. In answer to the first part of the question, we have presented the general framework, embodied in the literature on educational taxonomies, or what we have characterized as the *individual learning* perspective. In answer to the second, there is no “magic bullet.” However, the multi-dimensional nature of the task (involving *cognitive*, *affective*, and *psychomotor* learning) suggests that some form of experiential learning process will likely be central to the solution (Feinstein, Mann, & Corsun 2002). We suggest that business simulations will be particularly appropriate, given their ability to simulate the kind of information rich, yet unstructured, environment that has given rise to the need for absorptive capacity, as well as the

kind of player involvement and performance pressures that are useful in affective and psychomotor learning.

BUILDING THE BRIDGE: CONNECTING KNOWLEDGE DEVELOPMENT WITH ABSORPTIVE CAPACITY THROUGH THE USE OF BUSINESS SIMULATION GAMES

In many ways, the gap between our *individual learning* perspective and absorptive capacity is captured in the notion of the *conscious-competence* model of learning (Cannon, Feinstein, & Friesen, 2010). The model posits that learners begin at a stage of *unconscious incompetence*, not realizing that what they think they know is wrong. With the introduction of feedback, they come to see their errors, entering a stage of *conscious incompetence*. Given this level of consciousness, they are prepared to accept new perspectives and tools of understanding. This leads to a state of *conscious competence*, where they can solve problems, but in a very mechanical way, often failing to recognize conceptual nuances and certainly not with the speed and intuitive comfort needed to act in real business situations. Finally, through guided practice, students eventually enter a state of *unconscious competence*, where they make good decisions relatively quickly, because they “feel right.” Business people often refer to those who possess *unconscious competence* as “having good instincts.”

Exhibit 3
Lane, Koka, and Pathak’s Process Model of Absorptive Capacity



Note: Bold text indicates the name of the construct or construct dimension; (parenthetic text) indicates the construct's (dimension's) relationship with absorptive capacity.

Source: Peter J. Lane, Balaji R. Koka, and Seemantini Pathak. “The Reification of Absorptive Capacity: A Critical Review and Rejuvenation of the Construct.” *Academy of Management Review* 31:4, (October, 2006), 833-862.

We would argue that “good instincts” are not things people are born with, but things that can be developed. This is the concept underlying the label, *conscious-competence* model. The premise is that practicing good (consciously competent) decision making leads to unconscious patterns of thoughts, feelings, and actions that people can instinctively adapt to real world problems. The principle holds true across disciplines, from sports to music to human interactions to business strategy and tactics.

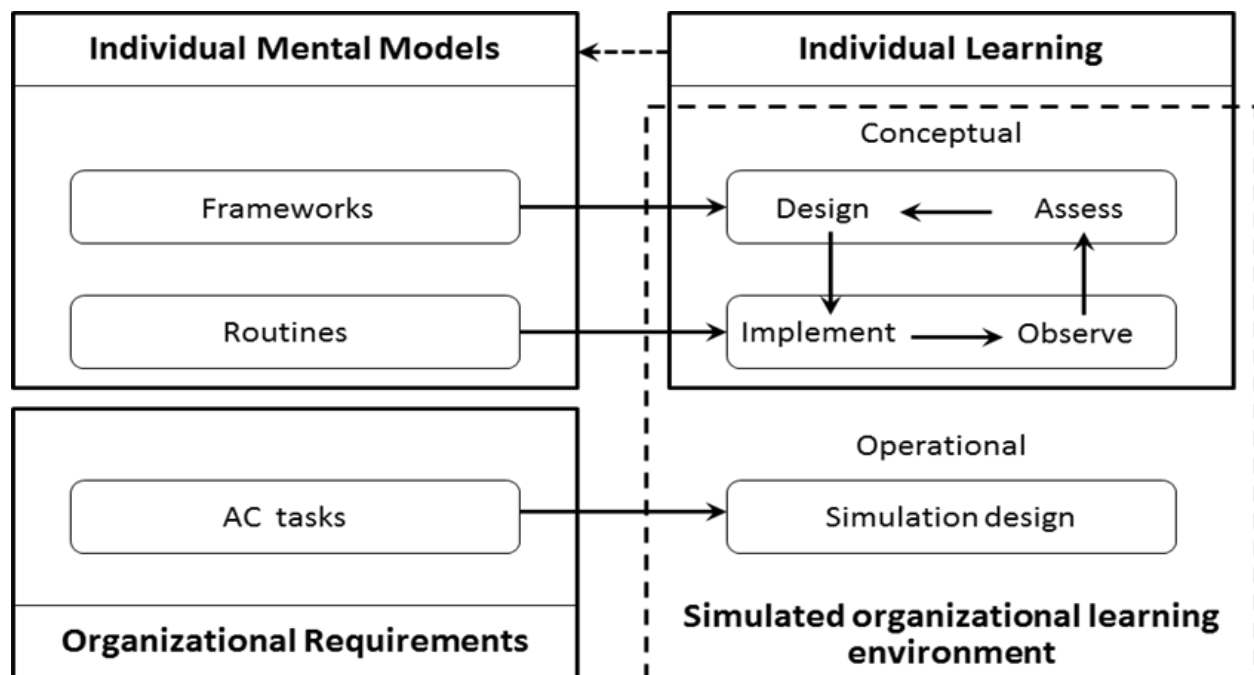
Implicit in the notion of good instincts is the fact that many business people, and to some extent, absorptive capacity theorists tend to take *unconscious competence* for granted. That is, they identify a general task, but they don’t elaborate on what kind of thinking is actually necessary to accomplish it. Consider Exhibit 3. We have already noted the implicit tasks relating to the boxes, “Characteristics of internal and external knowledge” and “Characteristics of learning relationships,” “Characteristics of internal and external knowledge” involves grasping the proper breadth and depth of understanding required to address a particular environmental situation. “Characteristics of learning relationships” involves establishing the kinds of relationships required to facilitate knowledge transfer.

Before we are able to undertake a program of guided practice to develop *unconscious competence*, we must first conceptualize the thinking we would like students to practice. From an individual learning perspective, this calls on some mix of the intellectual skills captured primarily in the cognitive taxonomy portrayed in Exhibit 1.

“Characteristics of learning relationships” require an even broader range of skills; drawing heavily on all three taxonomies (see Exhibit 2). The relationship component involves a potentially complex set of symbolic exchanges addressing norms and expectations, information channels, and social norms (Coleman, 1988). The individual learning processes underlying the development of useful relationships are particularly demanding, because they involve high levels of *cognitive* skill to conceptualize the thoughts inside the minds of other people; high levels of *affective* skill to reconcile the disparate value sets driving the various parties involved in relationships; and high levels of *psychomotor* skill to formulate interactive communicative behaviors in real time (Exhibit 2).

Our premise is that business simulation games provide a particularly useful method for addressing the guided practice required to build the individual skills required to create absorptive capacity in organizations. Again referring to Exhibit 3, if we move to the actual essence of a firm’s absorptive capacity, it ultimately depends on individual-level learning. To help bridge the gap between the individual and organizational level, Exhibit 4 draws on Kim’s (1993) model of individual experiential learning, integrating it with organizational absorptive capacity tasks and a business simulation to provide a laboratory in which the learning can take place. The learning model posits a process in which individuals *design* behaviors through the use of abstract concepts. They then *implement* the designs, performing a kind of action research, providing feedback

Exhibit 4 Using Simulation Games to Facilitate Experiential Learning of Absorptive Capacity Knowledge and Skills



Adapted from Daniel H. Kim. “The Link between Individual and Organizational Learning.” *Sloan Management Review* 35:1 (Fall 1993), p. 40.

that they *observe* from their own concrete experience. Finally, they *assess* the results in light of the objectives for which they developed their initial design in the simulation environment. The cycle repeats itself in a continual learning process. The individual learning box labeled “conceptual” represents the conceptual learning process, while the “operational” box represents the specific features of the simulation designed to provide a learning context that will facilitate the development of the targeted absorptive capacity skills.

The design-implement-observe-assess cycle on the right-hand side of the model represents what Argyris & Schon (1978) refer to as “single-loop learning,” where learners compare results against objectives and take corrective action, as appropriate. However, the right-hand side of the model also informs the left-hand side, where learners adjust their meta-cognitive mental models that determine what knowledge and procedures should be applied in what kinds of situations. Argyris & Schon refer to this as “double-loop learning,” where learners come to question the values, assumptions, and decision rules that govern the single-loop learning experience.

Double-loop learning is essential to our argument for the use of simulations in developing absorptive capacity. The primary driver of absorptive capacity is the organizational need to absorb and utilize new information, often in contradiction to long-established organizational knowledge and traditions. Preparing individuals to facilitate this function in organizations requires simulations whose design incorporates the kinds of absorptive capacity tasks that will stimulate double-loop learning, priming simulation participants to develop the meta-cognitive knowledge and

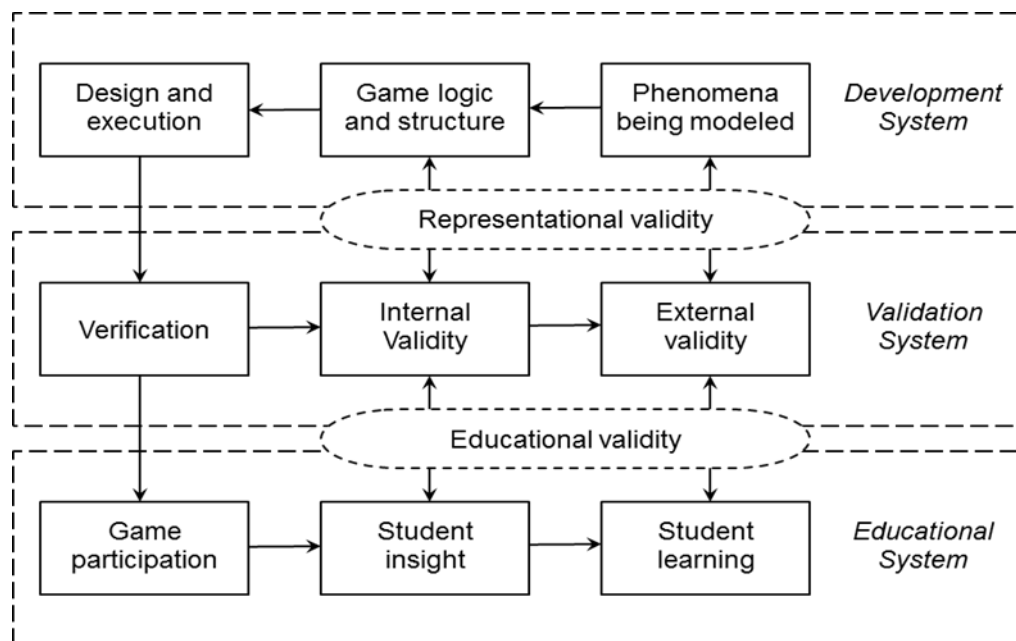
higher-order thinking skills needed to recognize and grapple with relevant new knowledge when they encounter it. Equally important, the simulation must prime them to develop and use the higher-order affective and psychomotor (in the sense of oratory, comportment, and interpersonal action) skills that they will need to play the role of organizational change agents.

CONCEPTUAL VALIDATION

As Exhibit 4 suggests, the effectiveness of the simulation approach depends on three critical assumptions: First, the simulation design must indeed provide a learning context that captures the essence of the relevant absorptive capacity tasks which students must be prepared to address. Second, the repetitive design-implementation-observation-assessment experiential learning cycle must provide an effective single- and double-loop method for developing the knowledge and skills needed to address these tasks. And finally, the resulting knowledge and skills must be transferrable to an actual organizational context.

Feinstein and Cannon (2002) provide a useful framework for evaluating these issues. They suggest that simulation validation might take several different forms, as portrayed in Exhibit 5. Rather than focusing solely on the final result, their model provides intermediate steps that can be used to guide our evaluation of a simulation’s development process. We will use their model to guide our discussion of the three assumptions behind Exhibit 4.

Exhibit 5
Validating Simulations for Use in Preparing Students for Specific Types of Business Activities



Source: Andrew Hale Feinstein and Hugh M. Cannon. “Constructs of Simulation Evaluation.” *Simulation & Gaming* 33:4 (December 2002), p. 433.

Validity of the Learning Context

The validity of the learning context is determined by the actual design and execution of the simulation. The validation stage most closely associated from Exhibit 5 is *verification*. Does the simulation deliver the experience it purports to deliver? This is typically addressed by alpha and beta testing (Feinstein and Cannon, 2002). Alpha testing is usually laboratory testing conducted or sponsored by the simulation developers to ensure that the responses allowed when addressing various simulated tasks produce realistic and intended results. Beta testing involves test groups of actual end users, again to ensure that the simulation functions as intended. To illustrate the general concept, Hall (2009) describes a simulation that was designed to train electrical equipment distributors, functioning in a business with very low margins where managers have great difficulty making a profit. The objectives of the simulation were to help players to both understand (a high-level *cognitive* objective in our *individual learning* framework) and appreciate (a high-level *affective* objective) the difficulties of the business and the importance of astute management. The alpha test showed that the margins and profits functioned as intended. However, when the simulation was tested with actual users, the players' affective response was one of discouragement and loss of motivation rather than characterizing distributorship management as a motivating challenge. Given that the simulation was designed, in part, to prepare distributors to absorb new knowledge that might overcome the problem of low margins, the simulation failed in its absorptive objectives.

We have not proposed a specific absorptive capacity simulation to evaluate, but if we extend the principle of alpha and beta testing to absorptive capacity simulations in general, we can suggest procedures that would help verify the propriety of a simulation's design. An alpha test would determine whether the simulation's algorithms made relevant information available to players in a realistic manner and enabled them to recognize, assimilate, and apply it realistically, given the decisions available in the simulation. The beta test would measure the *cognitive*, *affective*, and *psychomotor* learning achieved against the specific knowledge and skill objectives the simulation was designed to address. While our discussion of Exhibits 1 and 2 has summarized the general concepts around which these objectives would be organized, a detailed discussion of how to formulate specific statements of objectives for a particular absorptive capacity simulation is beyond the scope of this paper. Nevertheless, the literature to which we have alluded provides considerable detail regarding how these objectives might be written. The critical point for this discussion is that we have access to detailed guidance for formulating, and hence, measuring meaningful learning objectives. This provides the key to the *verification* process.

Validity of the Experiential Learning Process

Validation of the experiential learning process is most closely associated with the *internal validity* of the game's logic and how it stimulates student insight, again, as portrayed in Exhibit 5. Here the argument follows the logic

propounded by Feinstein and Cannon (2003), in their argument for the use of hermeneutics as a basis for simulation design and evaluation. Although their discussion addresses external validity, we can apply it to internal validity as well. In its most general sense, hermeneutics is the study of meaning, or interpretation of human experience. Gadamer (1975, 1976) argues that the meaning is a product of both the immediate situational context and a person's historical experience. Bernstein (1983) offers this as an alternative to the two extremes of objectivism and relativism, where objectivism posits an absolute and universally discoverable reality and relativism posits a reality that is necessarily unique to each actor and situation. Hermeneutics posits a tension between the two – a person's need to relate a situation to things one has already experienced and understood while recognizing that the situation is also different. The tension creates a new experience that then becomes part of a person's historical understanding and informs the interpretation of new situations.

Addressing management education specifically, Fox (1997) addresses a similar tension between what he calls *traditional cognitive theory* and *situated learning theory*. Traditional cognitive learning would represent Bernstein's "objectivism," a meta-theory that encompasses the theories developed and promulgated by educational and management researchers, such as those we have cited in conjunction with our discussion of the individual learning perspective and absorptive capacity. These are general concepts and principles that are held to be valid across a broad range of situations.

SLT corresponds roughly with Bernstein's concept of relativism. It looks at knowledge as being contextually anchored, calling for learning environments that mimic the actual organizational settings in which the knowledge will be needed. Thus, situated learning theory would suggest that an absorptive capacity simulation addressing technological change in the cell phone industry should feature both the same technology and industry, whereas traditional cognitive learning would suggest that a simulation addressing the general process of absorptive capacity, perhaps involving organizational change in a different industry might serve equally well. The two perspectives have become a source of considerable controversy in the educational literature, as illustrated by the dialog between Anderson, Reder, & Simon (1996, 1997) supporting traditional cognitive theory and Greeno (1997) supporting situational learning theory.

Fox (1997) argues in favor of traditional cognitive theory, suggesting that, "For situated learning theory and management learning, *theory becomes practice...*" and that "In the process ... the formal classification system, the 'disciplinary matrix' ... which maintains the de-contextualized boundaries between disciplines and professional territories, becomes open to critique" (p. 743). Responding to the controversy between Anderson, et al. (1996, 1997) and Greeno (1997), Cobb & Bowers (1998) take a less partisan view, reminiscent of the hermeneutical approach. They argue that both theories play a role in the learning process. Instructors develop activities that will call for the application of established cognitive processes; they

then interact with the students to provide feedback and discuss students' actual reasoning. This is directly analogous to the experiential learning cycle portrayed in Exhibit 4, with the addition of instructor guidance in the process of assessment. This instructor guidance corresponds to the debriefing process in experiential learning (Dennehy, Sims, & Collins, 1998). Consistent with our expectations regarding both the experiential learning cycle and the conscious-competence model of tacit learning, both conceptual and situational experience interact to develop tacit knowledge (Polyani, 1966; Armstrong & Mahmud, 2008), or *unconscious competence*. Also consistent with our expectations is Nonaka's (1994) argument that the amount of knowledge an individual accumulates depends on the variety of experiences, the student's involvement in the context of these experiences, and the store of knowledge already accumulated, with which new experience can interact.

Translating these findings into simple terms, individuals will draw on their knowledge and experience to find an analogous situation in which to frame a current problem. Using this as a model, they will formulate a plan of action, implement it, observe how it works, and make such adjustments to their model as seem appropriate. These adjustments are cumulative, so the more experience people have, the more easily they adapt to new variations in the situations they face. Simulations can provide these variations. The key is to develop a way of classifying situations according to the kinds of learning students need to experience. Aside from guiding simulation development and selection, this also provides a template for guiding the debriefing process that helps give them meaning to the students.

Generalizability of the Learning Experience

Addressing the generalizability of student learning in actual organizational settings (what Exhibit 5 characterizes as *external validity*), we face a paradoxical tension between *fidelity* and of *educational* validity. Fidelity is "... the degree of similarity between the training situation and the operational situation which is simulated" (Hays & Singer, 1989). Feinstein and Cannon (2003) note that, while fidelity is one of the three major constructs underlying the validity of simulations (along with *verification* and *validation*), it can actually get in the way of educational validity. They address the tension by focusing on *representational validity*. Representational validity can be seen as the degree to which a simulation is able to capture the underlying concepts that drive the situation being modeled – the concepts that are most important for a student to address, in this case, to nurture an organization's absorptive capacity.

The argument for generalizability is simple: No task is identical from one company to another or from one situation to another within a company. Notwithstanding the importance of situated learning, managers must be able to generalize to new situations or their cumulative experience would have no value. This is clearly not the case. Experiential learning can be done on a very operational level, where the changes from one situation to the next are very subtle, and perhaps not even consciously observed by

the manager, or strategic, where changes involve a major shift in one's mental and the resulting way managers conduct their business. In either case, fidelity is not the key. The simulation must be representational, and this depends of the simulation designer's ability to formulate appropriate learning objectives and design the simulation to address them.

THE PROCESS OF UNLEARNING

As a final comment about the experiential learning cycle and absorptive capacity, one of the important outcomes is the process of *unlearning* in the face of new experience. Implicit in the concept of absorptive capacity is the ability and willingness to absorb information that runs contrary to the current views of the firm (McGill & Slocum, 1993). Nystom and Starbuck (1984) offer organizational unlearning as a survival strategy for top management. They conceptualize unlearning as a process of changing cognitive structures, clearly an individual phenomenon. However, just as organizational learning ultimately involves some kind of institutional memory and translation of knowledge into operating procedures, so unlearning requires an alteration of institutional memory and a modification of the procedures through which it is instantiated (Akgün, Byrne, Lynn, & Keskin, 2007; Tsang & Zahra, 2008). This does not necessarily imply organizational "forgetting." It can be a form of learning, in that the organization acquires additional knowledge regarding how it should respond to a changing environment, developing new meta-cognitive rules regarding what procedures to evoke under what circumstances. This is the result of what Argyris and Schön (1978) call *double-loop learning*.

Our position is that absorptive capacity is the same for both organizational learning and unlearning. In either case, the task is to absorb knowledge from outside the firm that by its very nature is different from what the organizational already holds to be true. It assimilates the knowledge into the organization's memory and procedures, and applies it to solve the firm's problems in ways that prior knowledge was not able to do. The firm's problems grow out of the fact that companies would like to establish sustainable competitive advantage (Barney 1991).

Unfortunately, virtually any advantage withers with time and competitive innovation. This suggests that any truly sustainable advantage must reflect dynamic capabilities – "the distinct skills, processes, procedures, organizational structures, decision rules, and disciplines which undergird enterprise-level sensing, seizing, and reconfiguring capacities" (Teece, 2007, p. 1319). The concept of sensing, seizing, and reconfiguring capacities is equivalent to the recognizing, assimilating, and applying of new knowledge that forms the heart of absorptive capacity, as portrayed in Exhibit 3. While Teece is clearly discussing organizational capabilities, our thesis is that these are heavily dependent on individual knowledge, attitudes, and skills, all of which can be developed independently of the host organizations through guided participation in carefully selected business simulation games. Returning to Hall's (2009) electrical contractor simulation, the game needed to

incorporate non-traditional options for addressing margins in this mature industry, thus priming participants to recognize, assimilate, and apply one or more of these options in the face of strong organizational cues suggesting that such behavior was naïve and inappropriate.

SUMMARY AND CONCLUSIONS

Business simulations have been a standard tool of experiential learning for more than half a century. Experiential learning, for its part, has roots as far back as the work of Dewey (1938) in the first half of the 20th century. Dewey argued for the importance of linking education with actual experience. Piaget's (1952) work in cognitive development also emphasized the role of experience in the learning process. Theorists such as Lewin (1935, 1951) and Kolb (1984) took a socio-psychological approach to studying the experiential learning process, focusing primarily on the use of group dynamics. Other theorists, such as Bloom and his colleagues (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956; Anderson & Krathwohl, 2001; Krathwohl, Bloom, Bertram, & Masius 1964; Simpson, 1974) took a psychological approach to studying the outcomes of the learning process, independent of any particular pedagogical approach, but heavily utilized by students of business simulations (Cannon and Smith, 2004). Yet a third group of theorists, growing out of the organizational theory tradition, addressed organizational learning. While initial work was closely linked with individual experiential learning (Argyris & Schön, 1978; Kim 1993), other work explored strictly organizational processes (Hedberg, 1981; Shrivastava, 1983; Fiol & Lyles, 1985; Levitt & March, 1988). The literature on absorptive capacity grew out of this tradition.

The purpose of this paper is to explore the link between individual and organizational learning, focusing specifically on the propriety of using simulation games as a method of developing individuals' ability to bring greater absorptive capacity to their organizations. Given that our arguments have been conceptual, there is a clear need for empirical studies to test the hypotheses growing out of our discussion. We have proposed a general framework for conducting such studies, addressing the validity of the learning context, the validity of the learning process, and the generalizability of the learning experience.

Notwithstanding the conceptual nature of the arguments we have presented, we believe that they are sufficiently persuasive to justify a second stream of research supporting the development of specific simulation games and/or their design components to address the knowledge and skills attendant to absorptive capacity. Such research will have a dual benefit: First is the obvious benefit of providing practical tools for transferring critical knowledge and skills to students. The second is more subtle. The discipline of modeling critical elements of absorptive capacity should give rise to issues that might otherwise fly under the radar of a less demanding analysis. This, of course, is the traditional argument for mathematical modeling as an approach to research.

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