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Acting, Knowing, Learning, Simulating, Gaming

Classrooms symbolize knowledge; professions represent action. The distance between knowledge and action can be seen in various ways: as a gap to fill, as corridors to move between, or as intertwined processes that are mutually supportive. Arthur Koestler's (1945) dichotomous characterization of the Yogi (seeker of truth) and Commissar (action and adventure) nicely captures the tension between action and knowledge. Koestler himself was a man of immense knowledge and effective action. Following Koestler, our job as educators, trainers, researchers, and practitioners is to understand the complex relationship between action and knowledge.

The distinction between knowledge and action has long been studied by epistemologists and sociologists, but more from an academic angle, less from the perspective of improving human performance in action. Some early work (e.g., Polanyi, 1958; Ryle, 1949) looked at the distinction between knowledge *that* (declarative, propositional) and knowledge *how* (procedural, skill). Since then, the knowledge-action distinction has become a prominent part of education and of industry, and their separation can lead to dysfunction and even to tragedy.

This symposium examines the ways in which learners and trainees can be encouraged to use their knowledge to become more effective actors, and to generate knowledge from their action. It is a two-way interaction.

In some countries—France is a prime example—one widespread method, sometimes imposed by law, that aims to bring knowledge and action closer together for students, is to require them to spend time on the other side of the "gap." The various systems are known by several terms: on-the-job training, internship, work placement, and others.

Simulation/games and internships share a number of features. Both provide experience that can be processed through reflection (debriefing). Both are relatively inexpensive, compared to the 'real' thing, especially in terms of error consequence, often inappropriately termed *low risk*; it is not so much the level of risk that changes but the severity of the impact on the non-simulation world (see, e.g., discussions in this journal; Brougère, 1999; Crookall, Oxford, & Saunder, 1987; Garris, Ahlers, &

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Driskell, 2002). Indeed, one might stretch the notion of simulation and consider internships as a form of simulation.

Which Predominates?

A quick search in Google returns about 87,000 hits for "knowledge into action" and a mere 38 for "action into knowledge." It is interesting that the phrase *knowledge into action* seems to trip off the tongue more easily than does the phrase *action into knowledge*. Is this just poetic or habit (as reflected in the above figures) or is it because of some taken-for-granted notion that somehow knowledge precedes action?

The phrase *knowledge into action* implies that the knowledge-action connection is a one-way street. It manifestly is not; it is a two-way highway, with equivalent traffic in both directions; indeed, without action, knowledge would not be possible. This is so in education (universities, schools), in training (companies), and in development (agencies, countries). The phrase may also imply that the prime objective of knowledge is action.

Perhaps, culture underlies this directional preference. The culture of Western education is dominated by knowledge, and industry spends time and effort redressing the balance. National culture may play a role; for example, British culture tends to prefer doing before conceptualizing, but France tends to prefer theory before action. Western cultures may have industrialized partly because of their emphasis on knowledge; the "knowledge society" is a fashionable term. Eastern cultures, with greater emphasis on social harmony, require everyday, jointly conducted action (Chia, 2003):

> The idea of knowledge-creation and knowledge management has become an important area of research in management studies. This preoccupation with the creation and accumulation of knowledge in its explicit representational form is underpinned by the epistemological priorities of an alphabetic-literate culture that takes written knowledge as the only reliable basis for effective action. Documented knowledge necessarily precedes and hence determines action and performance. Such a metaphysical orientation precludes the possibility of attaining a form of *direct* unmediated knowing through the relentless perfecting of action. In traditionally based oral-aural communities or in non-alphabetic East Asian cultures knowing is more often achieved directly through the immediate engagement of tasks rather than through the acquisition of abstract written signs and symbols: learning by direct observation and doing is the order of the day. Consequently, there is little systematic documenting and recording of knowledge in the written form that one finds in abundance in contemporary western cultures. Yet this apparent lack has not prevented such predominantly non-alphabetic eastern cultures from achieving outstanding levels of performance in the arts, sport and in business. This would suggest that the current obsession with knowledge-creation and the presumed route of knowledge-creation-application-performance is a peculiarly western preoccupation and that it represents only one avenue of possibility for achieving effective action. This has significant implications for our understanding of the relationship among knowledge, action and performance.

Our personal view is that action ultimately precedes knowledge, that knowledge depends more on action than the other way around. It is action that is the more significant vector in life, not knowledge. Several famous people seem to think so too:

- *I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do.* —Leonardo da Vinci (1452-1519)
- *Knowing is not enough; we must apply!* —Johann Wolfgang von Goethe (1749-1832)
- *An ounce of action is worth a ton of theory.* —Friedrich Engels (1820-1895)
- *The great end of life is not knowledge, but action.* —Thomas H. Huxley (1825-1895)
- *Knowledge is of no value unless you put it into practice.* —Anton Chekhov (1860-1904)

Has knowledge-action become a bandwagon? The following two examples relate to health. In an article (Revkin, 2008) about the mayor of New York, we read,

> Mr. Bloomberg framed his speech around "the tragic lag between what we know and what we do." He focused on smoking, reviewing how the tobacco industry spent. . . .

A government web site proudly announces,

> **Closing the Gap—Knowledge to Action in Global Health** . . . Leading Swedish and American researchers showcase evidence-based initiatives designed to close the knowledge-action gap in global health. Their presentations focus. . . . (Retrieved August 2008, from http://www.swedenabroad.com/Page____69280.aspx)

It is interesting to examine the action-knowledge gap in various domains—education, industry, organizations, teacher education—and then to see how simulation/gaming has been used to bring the two closer together.

In Education

During secondary school and in universities, knowledge is presented as primordial (lectures, tests, reading, essays) and action is mostly seen as undesirable (students sit quietly behind desks, instead of moving around the room and making a noise). What academia seems to have done is to hive off knowledge and theory as some kind of object of worship, and as if action and practice were unworthy of research or effort—a sort of ivory tower syndrome. It is perfectly possible to follow an educational path today with little concerted action, save perhaps that of doing internships. Although things appear to be changing, the belief appears to be that internships will somehow provide an easy bridge and that, internally, education can continue its focus (exclusively) on knowledge.

The following quote highlights the tensions in education between those who think that they are in the knowledge game and those who understand the need to bring action and knowledge together (often through the use of simulation/gaming methods) (Whitehead, 1992):

> There still exists a division between academics who believe that educational knowledge is to be studied through subjects such as philosophy, psychology, history and sociology, and teachers who believe that educational knowledge is embedded in their competent practice. . . .
>
> We must find a way of bridging the traditional divide between educational theory and professional practice. My own view is that academics have been guilty of sustaining an inappropriate way of thinking about education, a way of thinking which is deeply embedded in an educational theory which is divorced from practice.

Several well-known people see action as the prime goal of education:

- "The great aim of education is not knowledge but action." —Herbert Spencer (1820-1903)
- "Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results." —John Dewey (1859-1952)

In Industry and Organizations

In industry and professional life, knowledge and action tend to be more closely linked. However, the gap established by school and university lingers on. Some authors see a clear knowledge-action gap within companies. For example, Pfeffer and Sutton (2000) provide compelling research figures regarding "differences between knowing and doing" (p. 11). The authors argue that large organizational performance variation among companies "stems from the ability to turn knowledge into action" (p. 12). The book considers that it is not knowledge but action that is the key to individual and organizational success:

> We found no simple answers to the knowing-doing dilemma. Given the importance of the knowing-doing problem, if such simple answers existed, they would already have been widely implemented.

Large organizations, such as the World Health Organization (WHO), have been working on reducing the perceived gap (e.g., Pang, Pablos-Mendez, & IJsselmuiden, 2004).

Planning is a pursuit that attempts to link technical and scientific knowledge to public domain actions: "Focusing on the problem of how knowledge might be linked to action, planning shares in the tradition of both academic scholarship and political practice. Yet it is fully at home in neither" (Friedman, 1987, p. 11). This might also

be said of simulation/gaming, which may be why planning and simulation/gaming have been happy partners for decades.

The well-known management consultant Peter Drucker saw action as the prime objective:

- *The knowledge that we consider knowledge proves itself in action. What we now mean by knowledge is information in action, information focused on results.* —Peter Drucker (1909-2005), in *Getting Things Done*
- *Knowledge is information that changes something or somebody—either by becoming grounds for actions, or by making an individual (or an institution) capable of different or more effective action.* —Peter Drucker

In Healthcare

In healthcare and in technology, the gap is obvious for those who choose to open their eyes and look. A few examples will provide insight into the problem: "There exist substantial bodies of work bearing on the knowledge-action "gap": R&D policy; Innovation systems; Technology transfer; Use of indigenous knowledge" (Clark, 2005).

In medical institutions, preventable health accidents and hazards abound (Nobel, 2006):

> The gap between current medical knowledge and its application in chronic disease management is especially apparent in diabetes care. Although research over the last decade has shown that adherence to standards of care can prevent or delay the onset of devastating diabetic complications, little more than one-third of patients achieve adequate glycaemic control.

This is worrying. A knowledge-action gap in schools does not kill anyone. The gap in U.S. hospitals (i.e., medical errors) routinely results in 98,000 patient deaths every year (Eder-Van Hook, 2004), more than twice as many as road deaths, and the equivalent of over 200 jumbo jet crashes. That is why David Gaba and others are making efforts to get simulation/gaming made obligatory in medical training, just as it is in aviation. (For more details, see Gaba, 2007, forthcoming) The difference in aviation is that, when the plane crashes, the pilot usually dies too; not so in medicine. The other difference is that in hospitals, the deaths happen silently, invisibly. Just a few jumbo jets crashing would ground the entire fleet.

We find a similar story in HIV/AIDS and nutrition:

> While it appears that school-based health education programs have been successful in increasing young people's knowledge about the transmission of HIV/AIDS, it is still apparent that there is a knowledge-action gap. In other words, although young people have developed knowledge of transmission, they are still engaging in risk behaviors. (Rosenthal & Glascodine, 1999)

> Food and nutrition issues get little policy attention from decision-makers. The lack of action is not due to a lack of knowledge by the latter. Other gaps are at the root—gaps that denote a deliberate choice of not attending to food and nutrition matters. . . . They think that if decision-makers have more and better knowledge they will indeed take urgently needed decisions. . . . What is missing . . . is the need for structural changes that address the basic causes. (Schuftan, 2006)

Simulation/gaming may help. For example, with cystic fibrosis patients, "we have found significant results in using the game to change their attitudes so that they are more willing to comply with therapy" (R. Williams, 2008, personal communication).

In War and Poverty

Just as urgent as are the ravages of war and poverty, the two are often closely related:

> After an extensive literature review and interviews with over 20 authorities in the field of conflict resolution and peacebuilding, Hoffman has identified a Knowledge-Action gap. Technical knowledge and good intentions are insufficient. Action to prevent political violence, to stop the killing, . . . is not taken often enough . . . to achieve the changes being sought. Political actors responsible for authorizing these activities are not sufficiently seized of the need to act. This gap between knowledge and action must be bridged. (Hoffman, 2004)

> There was a significant "knowledge-action gap," between what is known about poverty and health and what is being done about it. One primary example of this cited by Satia is that . . . it is widely known that 1/3 of the world suffers nearly 2/3 of the world's reproductive health problems. . . . To reconcile this knowledge with action, he implored the audience to focus more attention on how their efforts directly affect the poor. (Keesbury, 2003)

In Environment, Natural Disasters, Climate Change

How often do we hear (or pronounce) the phrase, "That was an accident waiting to happen"? How often do we hear of incidents in which it is clear that people knew, but did nothing to prevent? This is a recurring theme in natural disasters.

> Before Hurricane Katrina, you could walk along a street in New Orleans and look up to see a ship glide by—with an ocean of water held in check by just one dike. That casual glance foresaw a future in which one catastrophic storm could knock out the dike and fill the Big Easy like a bathtub. "Everyone knew it would happen, and it could happen, . . . And yet no one took action to prevent it." (Ireland, 2007)

> There is [in Asia and the Pacific] undoubtedly a broader and deeper understanding of the state of the environment, socio-economic development, and their respective interactions. On the other hand, there is a persistent feeling that the level of actions taken to address these problems has lagged behind the progress in scientific knowledge of their underlying causes, effects, and possible means of solution. The gap between knowledge and action keeps affecting progress towards sustainable development. (Morishima, 2004)

> The will is there, but we do not yet have sufficient programmes and agreements between the many actors involved in generating knowledge and practicing disaster risk reduction. There is in effect a learning-action gap which reduces academic work and practice alike. (Pelling, 2007)

The most pressing gap is probably that between what we know about climate change and what governments are doing (or not doing) to slow down global warming and the ensuing catastrophes:

> Government leaders are still behind on responding to the world's looming crises, including climate change, said Christopher Stone [Kennedy School of Government, Harvard University]. . . . "It's not that we don't know what to do," said Stone about acting in time. "It's that we don't do it." (Ireland, 2007)

An interesting study examines the difference between the public's understanding of, and their response to, climate change:

> There is clear evidence of a "knowledge-behavior gap" from both the climate change and broader environmental psychology literatures (Kollmuss & Agyeman, 2002). **Clearly, neither concern nor knowledge of climate change necessarily translates into personal action to mitigate it**. The knowledge-action gap is well-established in environmental psychology (Whitmarsh, 2005; emphasis in the original).

Explanations

It would seem that many problems in this world are in some way related to a gap between action and knowledge:

> I do not wish to claim that the rupture between knowledge and action is responsible for the crisis of the world system as a whole. But there must be a connection. Action divorced from knowledge does not know where to turn next. (Friedman, 1987, p. 311)

Thus, a fundamentally important question remains. Why is it that relatively little potentially useful knowledge has been translated into action/practice? Why is action so dangerously lagging behind knowledge? Why is it that humans, collectively and

individually, find it so difficult to act on what they know? Answers to such questions could be a key to designing better simulation/games and making them work more effectively. However, if it were so simple and humans immediately put into action their knowledge, then perhaps we would not need simulation (so much).

If we could fathom the reasons for this seemingly difficult-to-bridge gap, then perhaps the world would generate fewer tragedies. Here is one targeted explanation:

> There is in effect a learning-action gap, which reduces both academic work and practice. This gap is a product of the institutions that shape incentives for researchers and practitioners. . . . Bridging the learning-action gap requires innovative programming, external recognition and financial investment (Pelling, 2007).

We may speculate on other possible causes including the following: transfer of training (most professional violinists have trouble playing the guitar and vice versa, even though they are both stringed instruments), interests in the status quo (knowledge of environmental problems should lead us to change our ways, but that threatens many entrenched habits, traditions, and profits), and motivation (sloth and other deadly Christian sins). We could also mention cultural values and taboos, unawareness of context, unclear locus of control, socio-cognitive immaturity, lack of responsibility, an inability to project the consequences of actions, blaming others, short-term gratification, and—of course—human greed. Other dimensions include the following:

> I think motivation plays a large part as a mediator between knowing-to-action and action-to-learn more. I think reflecting on knowledge and reflecting on action is an important action. I think knowledge turned into influence is action of a different sort (e.g., knowledge is power). I think "right" knowledge is more likely to lead to "right" action than is either no knowledge or wrong knowledge. . . . Somewhere in the mix is a requirement for commitment and discipline. . . . Self-efficacy can mediate the knowledge-to-action and action-to-knowledge relationships (R. Garris, 2008, personal communication).

The gap may also be related to what Arthur Koestler (1967, 1978) identified as a fundamental flaw in the connections and control among two of the three brains—a reptilian one, inherited from the lower mammals, and a third, from late mammalian development. The result is a split between the rational and emotional. It is emotions, not knowledge, that generally govern our actions. Perhaps that is why the emotional elements of simulation/gaming events give them such power and make them memorable long after the information has been forgotten.

The socio-affective argument finds support in recent efforts to get people to act in their own self interest. It takes massive effort and large budgets to change the health habits of large proportions of people by the use of knowledge alone, but when a socio-affective element is added, the task appears to be easier. Anti-smoking

campaigns did poorly until they emphasized social disapproval of smokers rather than health benefits of not smoking. The practical knowledge in this case did not come from medicine, but from social psychology. This insight could be put to good use in simulation/gaming, and even in the evaluation of learning.

It is likely that several elements conspire, according to circumstance, to form multiple and shifting origins of an inability to act on knowledge. This is not the place to debate at length the possible and multiple origins of the 'gap,' although such knowledge would enable us to act better in designing and using simulation/games to address the gap. It would, moreover, be interesting to use simulation/gaming methods to conduct research into why knowledge does not lead to action even when people know that inaction will have dangerous or disastrous consequences.

- *The difference between what we do and what we are capable of doing would suffice to solve most of the world's problems.* —Mohandas Karamchand Gandhi (1869-1948)

Action-Knowledge Nexus With Simulation/Gaming

Geurts, Duke, and Vermeulen (2007) emphasize that "a game is a communication mode capable of linking tacit to formal knowledge by provoking action and stimulating experience." Of central concern here is how simulation/gaming can contribute to a greater articulation (or even harmony) between action and knowledge. That is what Willy Kriz and his authors do in this symposium. You are, therefore, holding a document that can provide some important keys to bridging this gap. It is, however, worth casting the net wide and surveying a broad spectrum of simulation/gaming methods. We will, therefore, touch on some ideas and examples from the simulation/gaming literature.

Experiential Learning

Dave Kolb's (1984) widely cited and ground-breaking book on experiential learning demonstrates the cyclical nature of learning from experience: concrete experience—reflective observation—abstract conceptualization (building working models and hypotheses)—active experimentation (new learning tried out in practice). This starts a new cycle. This cycle implies a two-way process: action (experience) leading to knowledge (conceptualization), and knowledge enabling and enhancing action. Experience and thought both result from and generate more learning and knowledge. Of course, things are more complex than that (see Kolb & Kolb, forthcoming).

Don Thatcher's (1990) insightful article shows the relationship between Dave Kolb's experiential learning cycle and learning from simulation/games. The ideas

expressed there are important keys to understanding how simulation/gaming provides a bridge between knowledge and action, between theory and practice. Other forms of education attempt to bring together knowledge and action. They include action learning, problem-based learning, project work, and cooperative learning.

Praxis

Some years ago, Fred Goodman also expounded this idea of a two-way relationship, especially with simulation/gaming. His ideas are just as valid today as they were when they were first written. Some intriguing discussion will be found in his article on the connections between "theory in practice" and "practice in theory." He concludes with this (Goodman, 1995):

> Gamers love to claim that they are promoting learning by doing. But it is quite reasonable to ask, "just what is it that players are doing?" Are gamers asking people to practice something in a theoretical fashion? Are they asking them to practice theorizing? Are they asking them to practice something that is, in fact, practical? (pp. 188-189)

Knowledge and action are closely intertwined. Rather than talking about moving from one to the other, it may be more educationally relevant to see the two as developing together and, thus, talk more about "knowledge in action" and "action in knowledge."

Thus, simulation/gaming would appear to provide a channel through which people may pass from knowledge to action and back again, to develop the two together hand in hand, to make action-knowledge one. This is captured by the word *praxis*, made known to educators by Paolo Freire (1970), in his quest to empower the downtrodden by action through education. It is surprising that the term *praxis* is not more used in the context of simulation/gaming.

Simulation/Game Design, Debriefing, and Evaluation

Education talks about transforming 'knowledge into action,' as if knowledge preceded action. Both ontogenetically and phylogenetically, it may be more accurate to say that action precedes knowledge. In its first weeks and months, the young child builds knowledge from his or her actions and from observations of the consequences of those actions. The early days of flight depended essentially on action (trial and error), which often failed (and still sometimes does).

This is not the place to argue heavily for this or that fundamental order. However, our belief in one order or the other is likely to influence the way we design, conduct,

and debrief simulation/games. If we believe that the primary 'transformation' is knowledge into action, then we are likely first to teach content and then run a simulation/game to demonstrate how students can apply that knowledge to some practical situation, followed by a light verification debriefing. On the other hand, if we see the essential thrust of knowledge as flowing from action, then we are more likely to plunge students into a simulation with little pre-teaching, and then ask them to relate their experience to real-world situations in a variety of debriefing tasks—talk, essays, research.

Knowledge-action simulation/games are used more as a way of checking to see if theory has been learned. However, theory in itself, as we have seen above, does not necessarily translate into action. This may be one reason that simulation/gaming research has found it so difficult to demonstrate certain types of learning. We teach knowledge K, measure action A, and find that A does not reflect K.

In action-knowledge simulation/games, we ask people to participate in the simulation action and then generate knowledge (learning) through debriefing. Games are sometimes used to pique students' interest in a topic, before the knowledge-bearing lectures. However, knowledge generation does not happen just because there has been action. As Kolb and others have shown, getting from action A to knowledge K (or rather using A to move from K^1 to K^2) involves a series of processes, of interactions among learners, their experience, the information (out there), the learner's psychology and style.

In many cases, simulation/gaming operates as a two-way bridge. Sometimes participants are guided across smoothly, at times they get lost, and occasionally they never reach the other side. Once participants learn about crossing, the bridge gets shorter and they move across with greater ease, and enjoy the trip. Some people run two simulation/games (either the same one or a similar one), the aim being that, in the second round, participants are able to apply and recognize their first-round learning and further learn. This is also motivating as they can then see that their second-round action has improved. Practice makes perfect; action makes knowledge.

It may be that if we are more explicit about the action-knowledge weighting in our simulation endeavors, then the interaction and balance will be clearer, and we will be able to make better decisions about designing, running, and debriefing these events (Ken Jones's [1998] term). For example, is the event designed, run, and debriefed

- mostly for knowledge, facts?
- mostly for action, skills?
- to encourage action in the future?
- to bring knowledge and action closer?
- to help participants understand the action-knowledge connection?
- to . . .?

One might define three broad types of simulation/game:

1. **Knowledge-to-Action (K-A):** Events that are designed, run, and debriefed primarily to enable or encourage participants to apply previous knowledge to some practical situation.
2. **Action-to-Knowledge (A-K):** Events that are designed, run, and debriefed primarily to enable or encourage participants to generate understanding, learn new skills, and gain new knowledge from a concrete experience.
3. **Integrating-Action-Knowledge (I-A-K):** Events that are designed, run, and debriefed primarily to enable or encourage participants to make connections between their actions and the related knowledge.

Of course, other terms might be suitable, depending on circumstance, such as knowledge-in-action, action-in-knowledge, action-knowledge nexus, and so on.

The basic qualitative difference between action and knowledge and the difficulty that humans have in acting on knowledge may also be two reasons that it is so difficult to prove that simulation/gaming is effective. We can make pre- and post-measures of certain types of factual knowledge or attitudes. However, what if the thrust of the simulation/game is to encourage action, even if it is knowledge-informed action? We can observe actions, but it is difficult to determine what they mean or relate them to specific knowledge, even when they result in a clear achievement (such as winning a race). We must inevitably interpolate, as must all those who engage in action.

We have seen that humans seem to find it particularly hard to act even if they know. Why should we then expect them, suddenly, to do this in a simulation?

Measures of action are unlikely to be good indicators of knowledge. It is easier to 'see' participants progress than to measure it; we intuitively sense that simulation/games help people to learn, even if it is difficult to 'prove.' If using increased knowledge as a measure of simulation/gaming effectiveness is a form of reification, then we will inevitably encounter problems, and the anti-gamers will continue to pick holes easily in our claims. The above-documented hiatus between action and knowledge may, thus, be one reason that it is notoriously difficult to prove that simulations work. The reason lies not in simulation but in humans; not in the supposed (by-some) ineffectiveness of simulation but in the failings of humans.

This leads to a quandary. If humans were more inclined to act on their knowledge, then it might be easier to measure the effects of simulation. This prompts the question, Can simulations be constructed that would teach or motivate people to use their knowledge for action? That might be tantamount to asking whether simulation can change the nature of human beings. If that really is the case, then we may not in the end need simulation—at least with the aim of helping people bridge action and knowledge. However, various simulation scholars provide evidence and arguments that simulation does indeed help to strengthen the action and knowledge nexus.

Reducing the Gap

Probably almost all simulation/games implicitly build some kind of link between action and knowledge, but let us look briefly at a few cases, outside this symposium, in which simulation/gaming has been used explicitly to address the knowledge-action connection.

Jac Geurts and Dick Duke (2004) put it well:

> The power of games is that they organize and convey a holistic perspective on a given problem in a format that allows the direct translation of these holistic insights into orchestrated strategic action. At the same time, games help to develop new knowledge because they allow participants to experiment with behavior and strategies never tested before. . . . Policy exercises translate existing knowledge into action and potential action into knowledge.

An ethnomethodological analysis of game play highlights the action-knowledge link in simulation/games (Francis, 1989):

> Social actors routinely have to conduct real-world interaction under circumstances in which they know neither what will happen next nor how a course of action will ultimately turn out. As involved participants, social actors cannot wait until they possess "perfect knowledge" of relevant circumstances before acting, even assuming that such knowledge might in principle be attainable.

One could not imagine a trainee pilot in a simulator operating the machine without some considerable knowledge. If the debriefing is done well, then probably the (trainee) pilots will gain new knowledge from their actions. (For further discussion, see Jarvis, 1995.)

Several simulation/games and training programs aim to address explicitly the need to reduce the action-knowledge gap. For example, in the British National Health Service (NHS),

> many training courses are based on extending participants knowledge or helping develop a skill/ability relevant to a business need. However, in order to achieve a successful outcome such learning needs to transfer into practice. Simulation exercises place emphasis on the practical application of knowledge/skills and changing behaviour and therefore potentially deliver the . . . benefits over other methods for acquiring knowledge/skills such as those required to work cooperatively and constructively with NHS customers . . . and facilitate[s] transfer of learning into practice. (http://www.north-51.com/apps/content/HTML/ViewContent.aspx?id=205)

In 1999, the Institute for Global Environmental Strategies (IGES) in Japan established a Capacity Building Programme (CBP; Deri, Sato, & Koyama, 2004):

> The strategic research activities of the CBP are not policy but implementation-oriented; they focus on the development of innovative learning and training tools to support IGES' efforts in closing the knowledge-action gap. . . . In the second phase . . . the CBP started developing scenario-based eCourses and simulations with higher levels of interactivity, where users were engaged more in critical thinking, making judgments, and eventually making decisions (higher-order thinking skills).

Here is a description of one of their online simulations, called FRESHWATER ACTIONS (Deri et al., 2004):

> This 15-minute simulation supports the users' decision-making on fresh water issues by introducing 21 priority actions for fresh water. . . . The user, either as policy-maker, educator, or others, will have an opportunity to review the priority actions and consider which one would be the most important action for their own community/region.

Simulation/Gaming as Action-Knowledge

At the heart of the knowledge-action equation is experience (see Kolb & Kolb, forthcoming). Action-knowledge is articulated through experience, learning, thinking, and reflection. This is one strong reason that simulation/gaming is such a powerful method for bringing the two together. In talking about simulation/gaming, Brent D. Ruben (1999) reminds us that "the ultimate test of the knowledge and skills gained is usually not in the knowing but in the ability to use knowledge and skill sets appropriately—in the translation of knowledge into behavior" (p. 502). In a more recent publication (Ruben, 2006), Brent "talks about the need for leadership *competency*, which I define in terms of 'understanding of' **plus** 'effectiveness at' 35 leadership areas. I make the point that neither alone is sufficient for leadership effectiveness in the long run" (B. D. Ruben, 2008, personal communication).

Simulation/gaming is itself a mix of knowledge and action. Perhaps the action part of simulation is something that knowledge-oriented people find hard to deal with. It takes knowledge (and action) to design and build a simulation, and it takes action (and knowledge) to implement it. Participants need both knowledge and action, both theory and practice, to learn optimally from an experience in simulation/gaming. It is not always easy in facilitating a simulation/game to bring the two together harmoniously. Participants bring to simulation/games their own views of action-knowledge and, thus, influence outcomes and the benefits they may derive from them. It is in the crucial action of debriefing that these two strands can be woven in a more balanced way, in preparation for the next round of participation.

We are grateful to Willy Kriz for his initiative and work in bringing together some important articles in a symposium that addresses many of these issues. This symposium is a milestone in our knowledge of the way simulation/gaming helps the

action-knowledge process, and in our action to make simulation/gaming more effective in that process. Willy's symposium is indeed putting action into knowledge as well as knowledge into action.

To Act Is To Know—Is Not To Act

In a sense, action-knowledge (action more than knowledge) is as old as the hills. It is curious that only relatively recently have educators and social commentators homed in on the knowledge-action equation. It seems to have arisen somewhat akin to a fashion, except that this is one of the few educational fashions worth dwelling on.

The action-knowledge anvil outside education goes back several thousand years, as the quotes below will attest. Perhaps, simulation/gaming can help bring us 'back' to what we have known and practiced for thousands of years—that action and knowledge are intimately intertwined, or perhaps it is more accurate to say that action is the kingpin around which knowledge rolls in uneven ways.

The knowledge-into-action perspective is more engrained in our traditional academic practices. The action-into-knowledge view is grounded more in experiential learning perspectives.

"I must try it out." The most casual of everyday pursuits suggests this. We have to try on a scarf or a shirt to *know* (in practice) if it will fit, even though we *know* (intellectually) that it is the right size and color. We like to see for ourselves, even if we believe the figures on the label or what our friend or the salesperson says. We need the action to confirm our knowledge.

In many aspects of our everyday life, we hardly distinguish between action and knowledge; we proceed as if they were one. However, Western education has distorted life. Several scholars have studied this and put it eloquently (Frisina, 2002):

> Knowledge is best understood as a form of action. Many of the puzzling philosophical problems in the modern era can be traced to our tendency to assume that knowledge is separate from action. . . .
>
> Most of us continue to use language that makes it seem as if knowledge and action are clearly separable. . . . Letting go of the sharp knowledge-action distinction will make possible a more coherent theory of knowledge that is more adaptive to the way we experience one another and the world. . . . When we treat knowledge as a form of action, knowing turns out to have less to do with an "inner" representation of immaterial ideas and more to do with refinements in the way we behave. . . .
>
> By taking seriously the notion that knowledge and action are really one thing, we will improve . . . our understanding of the self.

To act may be to know, but the converse is patently not so easy. The problem of learning from simulation/gaming lies not in simulation/gaming methods, nor in the

difficulty of measuring change (i.e., learning), but simply in the inability of humans to translate their knowledge into positive and beneficial action, whether it be in simulation or in ordinary reality.

A Noble Past

To end this editorial, we shall quote from thinkers of a few thousand years ago, as well as some more recent ones. Readers of this symposium and simulation/game enthusiasts may find reassurance in these words—reassurance that all this is not a new fashion and that it is indeed a long journey to uniting knowledge and action in education settings. Here, we enter the realm, less of knowledge and action, and more that of wisdom.

The first two quotes are from our old and oft' quoted experiential learning friend, Confucius (551-479 B.C.). Note the action-knowledge order in the first quote:

- *I do and I understand.*
- *The essence of knowledge is, having it, to apply it; not having it, to confess your ignorance*.

The Bhagavad Gita (sometime between the 5th and 2nd centuries, B.C.) provided valuable insight:

- *Knowledge, the object of knowledge and the knower are the three factors which motivate action; the senses, the work and the doer comprise the threefold basis of action.*
- *The wise sees knowledge and action as one; they see truly.*

Several have dwelled on the dangers of one without the other:

- *Without knowledge action is useless and knowledge without action is futile.* —Abu Bakr (573-634)
- *A little knowledge that acts is worth infinitely more than much knowledge that is idle.* —Kahlil Gibran (1883-1931)
- *Experience without theory is blind, but theory without experience is mere intellectual play.* —Immanuel Kant (1724-1804)

It seems that Sophocles knew about all this some 2,500 years ago; that is, knowledge from action, through trial (simulation/gaming?):

- *Knowledge must come through action; you can have no test which is not fanciful, save by trial.* —Sophocles (496-406 B.C.)

Finally, we offer three quotes that illustrate the urgency of uniting action and knowledge in three interrelated areas critical to the survival of this planet and the humans that it carries. The areas are the mad rush for global economic growth, the impending disaster of climate change, and the folly of conflict and war. These are prime examples, on a grand scale, of people and their governments knowing what to do, but simply not taking the necessary action. Is it conceivable that simulation/gaming can make an impact in these areas sufficient for more effective action to be undertaken?

> Consumption of resources is rising rapidly, biodiversity is plummeting and just about every measure shows humans affecting Earth on a vast scale. . . . A growing band of experts are looking at figures like these and arguing that personal carbon virtue and collective environmentalism are futile as long as our economic system is built on the assumption of growth. The science tells us that if we are serious about saving Earth, we must reshape our economy. . . . It has taken all of human history for the economy to reach its current size. On current form it will take just two decades to double. (New Scientist, 2008)

> From the early Club of Rome report on *The Limits to Growth* (Meadows, Randers, & Meadows, 1972) to its sequels *Beyond the Limits* (Meadows, Meadows, & Randers, 1992) and the thirty year update (Meadows, Randers, & Meadows, 2004) the message has become ever more pressing and the impact on political and economic processes just as marginal. Only recently has the recent evidence of accelerating climate change, and the imminent threats of energy, health, water and food crises begun to produce significant reactions, at least in some forward-looking countries. However the major centres of power and population have perspectives that are too short term to take any notice. Public education on these issues has either fallen behind, or never begun. (Dahl, 2006)

> The most persistent sound which reverberates through man's history is the beating of war drums. . . . Man can leave the earth and land on the moon, but cannot cross from East to West Berlin. Prometheus reaches for the stars with an insane grin on his face and a totem-symbol in his hand. (Koestler, 1978)

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—Warren Thorngate
Associate Editor

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