"Second Generation" e-Learning:

Characteristics and Design Principles for Supporting Management Soft-Skills Development

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This paper develops the concept of “second generation” e-learning as a new paradigm for thinking about online learning. Whereas “first generation” approaches have been effective for developing technical skills, the same approach has not proven effective for developing management soft-skills (e.g. in the field of leadership education). The distinction between the two e-learning paradigms is examined through a comparison of six characteristics and design principles. These have emerged from an action-learning research project where an e-learning system has been built from the ground up and pilot tested in a variety of organizations. The paper presents a discussion of where and when each approach is most likely to be effective, how the different design characteristics are continua rather than a set of polarities, and a short case study of an application in the context of an executive development program to illustrate soft-skill development possibilities. Conclusions are drawn on the importance of taking a pedagogical, rather then a technology-driven approach for developing effective online programs for job-based learning and performance improvement. It is also argued that current technology standards seem to be locking the industry into a “first generation” mindset - at the expense of the pedagogical exploration and learning design innovation required for effective soft-skill development.

INTRODUCTION

The potential for e-learning to revolutionize the workplace by supporting management education through customizable just-in-time learning, delivered instantaneously across time and geographical boundaries, has been driving the industry since its early days. The promise has proven true for developing technical skills – especially when integrated with blended instruction (See, for example, the Thomson Job Impact Study, 2003). However, the use of e-learning for developing soft-skills (e.g. in the field of leadership education) has proved more difficult. This paper argues that one of the major reasons for this disappointment is that the methodology for creating e-learning for technical skills training has been carried over to programs for soft-skills development – an area requiring a very different pedagogical approach. Hence, success in the former has been accompanied by failure in the latter. The paper also argues that the premature drive to technology standards (such as SCORM, IEEE, ADL etc.) has resulted in a "tail wagging the dog" phenomenon where technology, not the purpose for which the technology is to be used, seems to be driving much of the industry.

The paper builds on the results of an action-based research project - the NewMindsets Project - which involved building and pilot testing an e-learning system from the ground up over a six year period. The work sought to build on theoretical and methodological concepts drawn from complexity science with the aim of tapping the self-organizing capacity of web-enabled, fractal-like content chunks for the purpose of soft-skill leadership development and job-based learning. More specifically, the research sought to operationalize the vision of creating holographic, distributed, organizational learning systems, as envisioned by Morgan (1997: 102-115). The "second generation" design that emerged from the project was tested in a variety of educational and corporate organizational contexts, and its effectiveness verified through study of

learning impact, return on investment, and independent third party validation. Several e-learning awards have been received for the system and the best practice applications developed in pilot projects[1].

The overall aim of the paper is to provoke the e-learning research and development community to re-think e-learning principles and e-learning standards in relation to soft-skill development, especially for applications where the aim is to integrate work and learning and deliver on the just-in-time learning promise that has created so much enthusiasm in the field. It is argued that more attention needs to be devoted to the requirements of learning impact and the ability to create true value for learners, especially in just-in-time learning contexts where work and job demands drive the learning and the value that is ultimately created. This requires that more emphasis be placed on underlying pedagogies and *technological designs that support these pedagogies appropriately*, rather than continuing along the present path where a technology mindset seems to be driving the research and practice of e-learning. This technology mindset may actually be closing down rather than opening up opportunities for innovation and advancement of the field.

[1] The following awards for use of the NewMindsets system were received within the research period:

- Best Practice award from Brandon-Hall.com / Online Learning Magazine in the 2002 Excellence in e-Learning Awards program - for the Schulich School of Business / NewMindsets "four-courses-in-one" blended learning approach
- Best Canadian eContent Award in the Education category from the eContent Institute / Information Highways, 2003
- A 2003 Excellence in Practice citation from the American Society for Training and Development (ASTD) - recognizing exemplary practice in workplace learning. Received in partnership with Tibbett & Britten Americas for "Using "second generation" e-learning to support results-focused top team development"
- International Best Practice award from Brandon-Hall.com in the 2004 Excellence in e-Learning Awards program - for the Tibbett & Britten Americas "rapid mentoring" blended approach
- Content and learning design certification (ECC Standards 1.1) granted by the American Society for Training and Development (ASTD), 2002

PROJECT EVOLUTION AND RESEARCH METHODOLOGY

The NewMindsets research project adopted an action learning – "learning by doing" – methodology (Lewin, 1947; Argyris and Schon, 1978; Susman and Evered, 1978; Revans, 1982; Morgan and Smircich, 1980; Morgan, 1983, 1997a; Pedler, 1983; Whyte, 1991; Eden and Huxham, 1996; Altrichter, Kemmis, McTaggart, Zuber-Skerritt, 2002; Pedler, Burgoyne and Brook, 2005) and evolved through several stages that can be summarized here as:

1. Conceptualization
2. Rapid prototyping
3. Pilot implementation, and
4. Continuing refinement and consolidation.

In line with the principles of action learning there was a constant attempt to link theory and practice, to learn by doing, refining one's emergent theory and approach on the basis of what was being learned at every stage. Hence, there was considerable overlap between the "stages" presented above as first thoughts on the design of the NewMindsets learning system were web-enabled, tested and refined to produce a series of evolving prototypes that could be tested in field settings and refined on the basis of the results. There was a constant feedback loop between thinking and doing, and a continuing attempt to surface, test and refine the assumptions guiding the research. Karl Popper's (1958) principle of making scientific progress through explicit attempts to refute, refine and thus improve the fundamental principles and theories guiding one's work was adopted as a primary methodology, and ran throughout all phases. The fully fledged NewMindsets e-learning system, and "second generation" e-learning design principles on which it was based, were the products of this evolutionary, emergent process and are presented in this

paper so that they can be further tested and refined as general principles for the design and development of other soft-skill e-learning applications.

To provide more detail, the initial *conceptualization* work on the project hinged primarily on developing the idea of creating distributed organizational learning systems that could have the self-organizing capacities of a brain (see Morgan 1997b:102-115 for more details on the idea of creating this kind of holographic learning system). The idea was to see if one could begin to operationalize the metaphor of "organizations as brains" using ideas from cybernetics and complexity theory - as presented in Morgan (1997b: 102-115, 261-274) and by organizational learning theorists such as Argyris and Schon (1974, 1978) - to create distributed learning systems that would help to deliver on the popular vision of creating learning organizations in practice. This phase of work focused primarily on experimentation and development aimed at creating an ecology of interconnected print-based learning materials that could (a) put learners in control of their learning and allow them to (b) create self-organizing learning paths that would facilitate job-based, applied learning in soft-skills areas such as leadership, creativity, innovation, managing change, and so on. This phase of the work was immersed in pedagogical issues relating to the fact that in the area of soft-skill development an implicit "learning triangle" seemed to come into play involving the LEARNER, the CONTENT of what was being learned, and the CONTEXT to which the learning was to be applied. The challenge was to design learning systems that would stimulate learners to think about what was being learned in a way that helped them to moderate or interpret the significance of their learning with specific context-based applications in mind. This is the essence of what Argyris and Schon (1974, 1978) call "double-loop learning," where learners are able to reflect on and challenge the assumptions underlying their practice, and was central to the NewMindsets project from the very beginning.

The learning materials created to advance this aim were also guided by the idea that deep, challenging learning - as opposed to compliant, rule-based learning - needed to provoke thinking rather than just instruct. Hence the concept of creating open-ended learning provocations that would deliver substantial content messages while raising questions and reflections that required learners to really *think*, and take an implicit "double look" at what was being learned (e.g. to judge relevance), became a central feature of NewMindsets project design.

When a satisfactory collection of interconnected content learning chunks had been created – about 140 in all – the project moved into a web-enablement *rapid prototyping* phase. Attempts were made to convert the learning materials into an online form that preserved the reflective soft-skills pedagogy described above. The process started with the production and several cycles of refinement of just two learning experiences - one on understanding how individuals and organizations get trapped by groupthink and conformity, and another on using multiple viewpoints to improve decision-making in practice. The aim was to create open-ended learning experiences on these topics that would put learners in control of their learning paths, provoked by information and ideas that would encourage them to "drill down" and gain further information and ideas on issues that seemed most relevant for their needs - while ensuring that they succeeded in getting an overall grasp of the topic being studied. To do this, considerable use was made of the idea of trying to create fractal-like "whole in the part" interconnected learning chunks that would allow coherent, yet undetermined, learning paths to emerge from the interests and decision making process of the learner. This was achieved through trial and error and trial and success, using a variety of visual prompts and messages that could bring a measure of coherence to what was essentially a non-linear, self-organizing learning process. A great deal was learned from the creation and refinement of the first two learning experiences which rapidly

got connected to another twelve, then to another forty-five, creating a learning system comprised of an ecology of interconnected learning experiences capable of developing leadership competencies in the field of creativity and innovation. As the project developed, dozens of other learning experiences were added to the online system, embracing a broader range of soft-skill leadership and management competencies.

Action-based learning was crucial for the whole rapid prototyping phase. Formal and informal feedback within a general cycle of planning, acting, observing and reflecting (similar to Kurt Lewin's action research model (Lewin, 1951)) was used to propel a process of *pilot implementation* and *continuing refinement and consolidation.* Popper's (1958) principle of creating progress through refutation and improvement was used throughout as a way of ensuring that members of the project team became their own best critics. As soon as the ecology of learning experiences acquired what was determined to be an adequate critical mass - initially about forty interconnected learning experiences - the project moved into a more formal pilot and implementation phase. This started with application in support of the core Leadership Skills course on the Schulich School of Business MBA program at York University, Toronto, and several corporate and not-for-profit sector blended learning applications, including the one presented in the case study in a later section of this paper. Learner use was observed and feedback solicited, the results being used to create further refinements in the overall design and approach. Throughout the project third party opinion (e.g. from corporate clients, accreditation agencies and e-learning best practice competitions) was used to gain independent feedback and verify effectiveness. While implementation problems were encountered in some of the pilot projects because of inadequate initial design or inadequate sponsorship and support, overall results were positive, as reflected in the best practice awards listed in an earlier footnote.

"FIRST GENERATION" AND "SECOND GENERATION" E-LEARNING

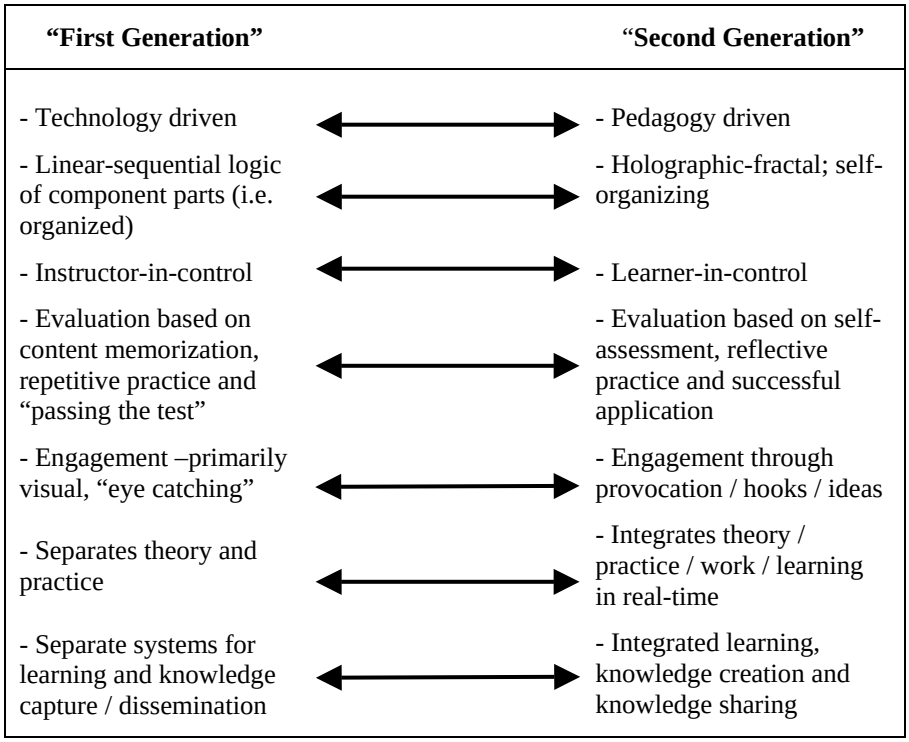
The NewMindsets learning system that emerged from the action learning research ended up being very different from virtually all of the e-learning systems being presented in support of soft-skill development during the period of the research (1999-2004). In particular, it was found that (a) by starting from the pedagogical principles required for soft-skill development, along with (b) the vision of creating a self-organizing ecology of learning experiences that would lend itself to a learner-in-control approach for just-in-time learning, a new paradigm for designing and implementing e-learning had begun to evolve. As the NewMindsets system was presented to initial users and potential clients the most typical response was along the lines of "Wow, this is really different. … Never seen anything like this before … It seems great … but, it is so, so different."

This proved to be as much a problem as the exciting, innovative opportunity that the authors thought it to be, because people often wanted to judge the nature, design and potential value of the system that had been developed in terms of traditional e-learning characteristics and technical standards - especially those that they had experienced in successful uses in the technical skills development field. People also wanted to judge the system's sophistication in terms of the presence or absence of "surface bells and whistles" that could bring a lot of pizzazz, flash, and dynamic on-screen animation, but did not necessarily improve the learning process or learning impacts in practice. The fundamental pedagogy and related design principles (e.g. those associated with the concept of the soft-skills "learning triangle" integrating the *needs of the learner* and his or her *context of application* with the *learning content* that was being presented) often went unnoticed or fully appreciated. As a result, it was found that the differences between the NewMindsets system and approach to e-learning and the dominant popular conception

needed to be clearly elaborated and explained, not just demonstrated in practice. This was the driving force that ultimately led to the conceptualization of the differences between what is being described in this paper as “first and second generation e-learning.”

The main points of distinction are presented in Figure 1 and discussed in subsequent sections of this paper with a view to clarifying key principles that need to be kept in mind in the design of different types of e-learning experiences, especially those required in soft-skills applications as opposed to those that have been successfully used in more technical, purely instructional applications. For the sake of convenience and ease of presentation, the distinctions are being presented in terms of polarities, recognizing that in actual practice each dimension may take the form of a continuum. In reality, mixed types blending various “first” and “second generation” characteristics may exist.

Figure 1. Key characteristics and design principles of "first" and "second generation" e-learning

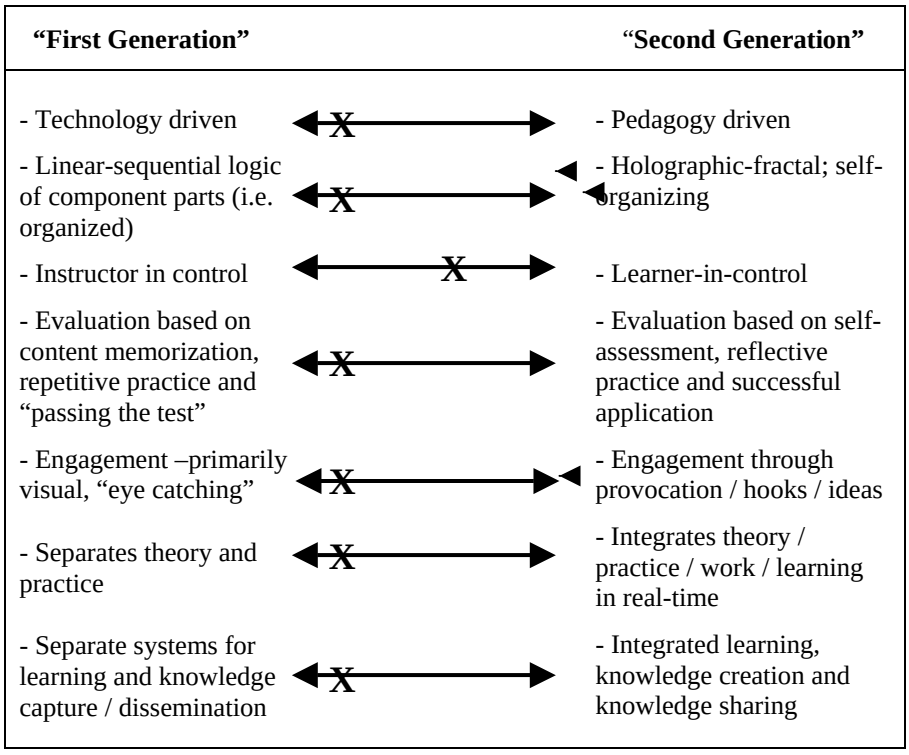


Note: The issue of online collaboration is not specifically addressed in this model as it is a dimension of e-learning that can be fully integrated with *both* "first" and "second generation" approaches.

This method of presentation helps to clarify the important paradigmatic differences between the two approaches, and gives a way of addressing some of the confusion that arises because of the existence of mixed types. For instance, some e-learning systems may have certain "second generation" features but be profoundly "first generation" in basic design because of the underlying pedagogy. For example, they may give the appearance of having a great amount of learner control because of the ability to click on a choice of learning paths at various stages in the learning process. But, if the ability to learn effectively is controlled by a strong underlying sequential logic in the way content has been designed, or contains numerous test-based hurdles that the learner must "pass" to move ahead, the learner control will tend to be superficial and the ability to adapt learning to specific learner contexts relatively constrained. This kind of "first

generation" system with surface "second generation" characteristics is illustrated schematically in Figure 2.

Figure 2. A sample profile of mixed "first" and "second generation" characteristics



It needs to be emphasized from the outset that the distinction between "first" and "second generation" systems builds on a temporal metaphor indicating that the former has tended to precede the latter. There is no intention to suggest in any way that "second generation" implies good or "first generation" bad. Indeed, one of the clear conclusions of our research is that both approaches are needed since, as illustrated in Tables 1 and 3, both are useful in different contexts and for achieving different instructional objectives. Similarly, talk of "second generation" e-learning also raises the question of possible third and fourth generations and what they look like. Indeed, some writers argue that a third generation has already arrived (Sant, 2003). This issue will not be pursued here as the main concern of this paper is to consolidate and clarify the

essential differences between "first" and "second generation." The absence of concepts and language to distinguish the important differences involved seem to be creating confusion in the discussion, evaluation and design of e-learning and e-learning effectiveness. (See for example, Driscoll, 1998; Carver, Hill & Pooch, 1999; Harrison, 1999; Rosenberg, 2001; Stanton, Albanese and Davidson, 2001; Schank, 2002; Dodds & Fletcher, 2004; Macpherson, Homan & Wilkinson, 2005). The view taken in this paper, for what it is worth, is that the "third generation" will likely enhance the learner-in-control, pedagogy-driven, work-based learning capacities of the "second generation" paradigm through inclusion of various forms of artificial intelligence that can operationalize the pedagogical requirements of the "learning triangle" in extremely powerful ways. (See NewMindsets, 2005a for further details)

Table 1. Both "first" and "second generation" approaches have a role to play in the design of effective e-learning

"First Generation" e-Learning	**"Second Generation" e-Learning**
Ideal for: • Technical skill development • Routinized learning for tasks where conformance is needed e.g. following a safety procedure, installing a piece of software, procedures where deviation can be illegal or lethal • Memory based learning / preparing to pass information-based tests	Ideal for: • Soft-skill development • Personal, reflective learning e.g. to do one's job more effectively, engage in critical thinking, cope with ambiguity, leadership development • Innovation and performance-based learning, addressing complex issues

A Brief History and Overview of the Two Models:

To cut to the heart of the distinction, "**first generation"** e-learning tends to be technology driven and based on an instructor-in-control, compliance learning model. It originated in Computer Based Training (CBT) applications where the need was to use new technology to provide timely and cost effective online instruction, and was effective for that purpose because

“instruction” (e.g. on how to use a particular piece of software, maintain a piece of equipment, or follow a safety compliance process), was exactly what was needed. In essence, the aim was to make the computer the instructor, resulting in an approach that took the traditional classroom instructional model into a virtual environment. Consequently, for the most part it resulted in putting text and courses online – delivering basically conventional educational products and services such as manuals, textbooks, papers, training courses, lessons and workshops in a new way. As technology has developed, especially in the context of the internet and a web-based world, the technical sophistication and methods of delivery have improved significantly. Hence there are “first generation” applications that are technically unsophisticated (i.e. presenting content messages online as vast scrolls of text or slide presentations that learners scroll or click to view), alongside other applications that are highly sophisticated (i.e. incorporating a high degree of interactivity, animation, streamed video, multiple choice learning assessment, and video-game-style simulations where learners are expected to progress through various lessons, or levels of learning, until they are able to demonstrate pre-defined competence according to the testing systems built into the learning modules). The common feature linking these low-tech and high-tech approaches rests in the underlying learning design, which basically puts the instructor-in-control of the whole learning process. Learners have to follow a predetermined learning path - usually linear, though technically sophisticated case studies and simulations may also allow “trial and error” learner decisions that permit detours until the “correct” or required path is discovered or until they fail and need to start again. The instructional model assumes that there are correct answers, and assessment systems record whether learners pass competence tests to demonstrate successful learning.

As already noted, this approach can be effective for delivering expert knowledge and technical training, especially when there ARE right or wrong answers which learners need to understand. It is not as effective for education, training and development in soft-skill areas where the answers to pre-determined questions depend on the detailed nature of the problems that have to be addressed, or the contexts in which the skill or lesson being learned is to be applied. This is why "first generation" applications - whatever the level of technical sophistication - are often disappointing outside the realm of purely technical training in terms of learner experience and the end results achieved. While it is possible to argue that the linearity and instructor-in-control method of presentation can be overcome by complementing the approach with a collaborative overlay (e.g. through blended learning synchronous or asynchronous virtual classrooms, online discussion forums, or instructor interaction), this solution is often ineffective because learners fail to complete or absorb the learning content required to make this interaction and associated learning collaboration effective. As the statistics routinely show, dropout rates and failure to complete the required work is a persistent problem (Arnett, 2001; Frankola, 2001; Bothams & Fordyce, 2002; Osburg, 2002; Wang, Foucar-Szocki & Griffin, 2003).

The "**second generation"** approach to e-learning, on the other hand, is based on a "learner-in-control" pedagogy that is primarily geared to achieving applied, performance-oriented learning. It is based on an adult, self-directed learning model where the aim is to put learners firmly in control of their own learning by configuring highly granular content for use in a *nonlinear* fashion - in whatever way the learner chooses to learn (For support of learner-controlled learning, see Knowles, 1970; Jones & Woodcock, 1984; Kolb, 1984; Vaill, 1996; Owen, 1997; Landis, Boire, Hanson, Niguidula, Tsikalas & VanderVeen, 2002; Keeton, Sheckley & Griggs, 2002; Kolb & Kolb, 2005). Think of a learning ecology as opposed to a

library. The “second-generation” approach has to be designed from the ground up to provide a network of interconnected learning opportunities rather than a library of separate online texts and courses. This allows learners to integrate all their learning around personal or organizational learning objectives – such as improved competence and job performance – by drilling down to exactly the kind of learning they need, when they need it. As with the “first generation” approach, “second generation” e-learning can be text based, consisting of granular messages that have been specially designed with non-linear learning and interconnectivity in mind. Or, they can be highly interactive in terms of animation and visual interface, with lots of technical bells and whistles.

The key difference between “first” and “second generation” systems rests in fundamental design. To create a “second generation” learner-in-control environment, all the content, learning experiences, and underlying technology - including the learning management system and methods of assessment - have to be configured to allow free-flow learning, driven by learner needs. The design has to allow and encourage learners to pursue multiple learning paths, while recognizing that many learners may also demand a lot of structure and support along the way. The detailed content and learning system must be configured for flexible, self-directed learning. Content must be capable of being combined and recombined in different formats to meet different learning objectives - not forced into a linear course-based model with predetermined structure. While it is possible to argue that “first generation” approaches can deliver this flexibility through use of learning object designs that allow learners to pull relevant learning nuggets from various sources according to interest (e.g. by using a search function geared to personal interests or learning objectives), there is a vast difference between using a search function that assembles snippets of information from diverse materials that have no intrinsic

connection with each other (e.g. paragraphs on the topic of interest drawn from different online books or articles) as opposed to following learning threads that have been designed to provide fractal-like interconnected learning experiences on a coherent topic at every stage (NewMindsets, 2005b).

The "second-generation" approach is also based on the premise that a vast amount of learning, especially that relating to soft-skill competence development, needs to be context-based. As is well known, the application of knowledge in soft-skill areas such as leadership and management usually needs to be modified according to the details of the actual situation being faced. The right advice in one situation may be the wrong advice in another. Since it is impossible to specify the details of every situation in which the learning is to be applied, *"second generation" systems encourage the learner to bring the context to the learning.* They tap the interactive power of web technology to help learners reflect on what is being learned and think about its relevance in terms of the situation to which it is to be applied. In line with this reflective learning philosophy, "second generation" learning systems favor performance-based approaches to assessment instead of trying to measure learning according to scores on predetermined tests. They adopt a "performance learning" principle focusing on practical impact (e.g. evidence of improved skill or work performance) as opposed to a "compliance learning" principle (e.g. fail or pass the test).

Many early soft-skill e-learning applications have proved disappointing, and in many respects have performed a disservice to development in this field, because in the rush to take advantage of web-based technology and delivery systems by "getting online," they have automatically fallen into a limited and inappropriate "first generation" approach that is unable to deliver on soft-skill learning requirements. The implicit assumption that what worked for

technical training would also work well for soft-skills development has proved extremely problematic. “First generation” approaches have a considerable role to play in lots of online instruction, but in many areas the “second generation” approach will prove far more effective – a point that will be discussed in the concluding section of the paper.

A Closer Look at Key Characteristics and Design Principles:

To aid a deeper understanding of the differences between “first” and “second generation” approaches and the strengths and limitations of each for soft-skill development, this section of the paper explores the distinctions presented in Figure 1 to gain a deeper awareness of their implications for learning and e-learning design:

Characteristic #1 - Technology-driven* versus *pedagogy-driven e-learning: As noted, the driving force behind the use of “first generation” e-learning for soft-skills development has been the use of web technology to deliver existing content in new ways and/or to replicate traditional classroom experiences online (e.g. e-readings, e-articles, e-books, webzines, e-classrooms). The focus has been predominantly on the “e” for electronic (e.g. infrastructure, hardware, software, e-products, etc.), not the “l” for learning. Limited attention has been given to the challenge of reinventing learning content or pedagogy to tap into the inherent self-organizing capacities of the web, hence, to actually improve the quality of learning and its direct application (e.g. to job-based performance improvement). From an early stage, the soft-skills online industry seems to have locked itself into a technology mindset that is now driving e-learning development and the market as a whole. “Interoperability,” “scalability,” “reliability,” “reusability,” “interactivity,” “compatibility,” “measurability,” “sharability,” “connectivity,” “re-purposing,” “repositories” and dozens of other such technical terms are widely used across the industry – a mechanistic language that both reflects and seems to be shaping the contemporary e-learning paradigm and

consumer expectations.

Most importantly, this technology mindset has created a momentum that is actually embedding “first generation” logic as a guiding principle for developing the infrastructure, protocol and standards for the future development of e-learning. For example, millions of dollars have been invested in what are, for the most part, “first generation” technology databases and learning management systems based on technology-in-control logic. While these are important for managing course registration, course completion, tests and evaluations, they do not always ensure effective learning. Sometimes so much has been spent on infrastructure it squeezes out funding to acquire or create new courseware, or to support learners. In extreme situations, technology investments often sit idle as organizational learning needs go unmet. For example, as a manager who coordinated knowledge services in a blue chip company explained, “We don’t know how learners respond to the online program yet. We can’t get it to them until budgets get approved and the infrastructure is in place.” In this case technology was actually getting in the way of end-users because providing the company-wide infrastructure and help desk services for the new learning technologies was simply too expensive to proceed. Similar stories are reported elsewhere: “…one company spent millions of dollars on software, consulting services and a large in-house staff to do nothing but “manage” all of the company's training activities. The result? Budget dollars were diverted from the training development department, which now has no funds to develop quality training content” (Leben, 2002).

In contrast, the “second generation” approach advocates putting pedagogy first, and using technology as an enabler – albeit one that can introduce huge new possibilities because of its ability to tap the amazing self-organizing capacities and potentials of the web. As indicated in previous sections of this paper, inspired by the concepts and insights from complexity science

(Morgan, 1997: 102-115, 261-274) it strives to create the potential for learning to become an inherently self-organizing process. Within the context of soft-skills development, it places emphasis on the need to recognize the following pedagogical drivers:

- *Learning styles – people learn in different ways*: By creating content in highly modular self-organizing formats where every screen has a stand-alone message that can be accessed randomly or sequentially, "second generation" systems can support a variety of learning preferences by tapping the non-linear open-endedness of the web medium.

- *Context-based learning*: Since soft-skill development is much more interpretative than technical, it requires an approach that encourages learners to exercise their abilities to judge the relevance of what they are learning, as opposed to complying with sets of predetermined instructions. This requires a flexible, learner-centered approach.

- *The importance of informal learning*: A significant amount of workplace learning occurs outside of formal courses (e.g. mentoring relationships, one-on-one performance coaching, experiential learning, informal sharing of personal knowledge between colleagues, etc.). "Second generation" systems strive to advance this context-specific, unplanned, just-in-time performance-based learning.

- *The importance of provoking new insights to open up possibilities*: The challenges facing managers in today's organizations are complex and interconnected. New approaches are needed to avoid repeating past problems. "Second generation" approaches use provocation-based content (as opposed to purely instructional content) to invite and engage learning by opening up thinking and enabling learners to decide for themselves what actions are most appropriate in their own situation.

- *The need for accelerated learning and performance improvement*: One of the major complaints in today's workplace is that there's never enough time to do everything. "Second generation" approaches tackle this issue head-on by putting learners in control of their own learning enabling them to save time by going directly to the content that is of interest, and applying what they are learning directly to their jobs, business issues or projects.

In summary: The distinction between technology and pedagogy as the primary influence on design is the key to understanding the distinction between "first" and "second generation" approaches to e-learning. Technology is simply a medium for learning, just as printing presses and paper are for books. It should not become an end in itself, and needs to follow the lead of pedagogical objectives. Unfortunately, this notion seems to have been lost in many contemporary approaches to e-learning that are overly enamored with technology for its own sake.

Characteristic #2 – A linear-sequential logic with the instructor-in-control* versus *learner-in-control: The logic that underpins "first generation" systems is based on a mechanistic model where learning is typically delivered using a linear/sequential approach with the instructor/expert in control. Learners typically start at a designated beginning and progress in an orderly manner from screen to screen and lesson to lesson until the material is covered. "Second generation" learning, in contrast, is non-linear, self-organizing, and open-ended. Using a holographic design (whole in the parts) principle, the aim is to create modular yet interconnected learning nuggets that allow the learner to "drill down" whenever he or she pleases, to create an unique, yet coherent learning path of his or her own. This learner-in-control approach reflects a key element of the "second generation" e-learning philosophy and leads to learning designs that seek *to empower learners to take ownership of the learning process itself*. For example, when learners "log on," in principle they have access to *everything*. They can go anywhere they choose and select the topics that are most relevant for them. There are *no* prerequisites, *no* tests, and *no* pre-set beginning and end.

"First generation" instructor-in-control systems are often ideal for delivering expert knowledge in a linear manner and may incorporate an element of learning-by-doing by using experiential or apprenticeship learning, or be delivered through classroom online lecture-based models. The instructor (expert) takes control of most aspects of the e-learning process from identifying learning needs, designing the learning experience to meet those needs, testing the learner's results for accuracy, and recommending next steps in the learning process. The learner studies the lessons to "pass the test" and demonstrate that the required knowledge has been learned before moving to the following lessons. Technology is used to streamline content delivery, enable anywhere anytime learning, monitor progress and record learners' results and

test scores. An instructor-in-control approach is appropriate when learners are required to demonstrate they can do or repeat what the instructor (expert) has taught (i.e. where compliance learning is appropriate). For example, as noted earlier, when the purpose is to help someone learn to install a piece of software, or operate a forklift truck, or develop other skills where compliance to very rigid procedures is required, a "first generation" approach can be very effective.

The "second generation" learner-in-control pedagogy flips the conventional paradigm, changing the way content is written, designed and presented (e.g. in terms of the holographic-fractal principle), and how learning is assessed and progress evaluated (see characteristic # 3 for more details). This highly learner-centered approach is particularly relevant when the aim is to develop soft-skills for critical thinking, innovation, teamwork, and other leadership competencies *where context-specific solutions requiring management judgment, as opposed to rote learning, are essential for high performance*. This approach does, however, raise difficult questions and surfaces deeply held values and beliefs about learning, particularly those that stem from a traditional expert-driven view of learning. For example, the belief that learners can self-identify learning needs, select their own learning path and self-evaluate progress can be worrisome from an instructor and learner perspective, and rightly so in many cases. The key to the dilemma rests in understanding that there can be a middle ground in terms of the role of expert dominance, and in creating appropriate room for learners to be involved with, and shape, their learning.

Characteristic #3 - Evaluation based on repetitive practice and "passing the test"* versus *self-assessment, reflective practice and successful application: In the typical "first generation" e-learning system, the implicit expert "instructor-in-control" model and sequential linear logic lead naturally to the design of evaluation strategies that score learners' learning (usually content retention) and/or their ability to replicate the processes or procedures that have been

communicated. In other words, learners are required to “pass the test.” Lessons are chunked into modular segments (e.g. on concepts and practices) that are presented in a step-like manner from beginning to end. Courses often start with basic materials (e.g. definitions of key concepts) and then proceed in an “A to Z” linear approach that layers new lessons on those covered earlier in the course. At appropriate points in the learning sequence, learners are presented with multiple choice questions or other simple quiz formats that reinforce the key content points and ensure the lessons have been learned. This repetition and practice may be essential, in a sequential/linear model if these points, or terminology, need to be fully understood or mastered as the basis for subsequent lessons. Correct responses enable learners to continue learning. Incorrect responses warn of potential learning problems and various forms of online help are usually offered. Sometimes advice and tips direct learners to the right answers. Other times, learners need to repeat the lesson and re-try the test before they can proceed. Evaluations at the end of content segments offer a cumulative assessment. If the score attained is adequate, the next lesson or module in the course will be recommended. When the last module gets completed, the system certifies the learner and registers the course as complete.

The integration of practice quizzes and tests are very effective tools for helping people learn specific content, processes or procedures. Learners can repeat them again and again (sometimes called “mastery”) until they are satisfied they know the content. These online tests can also be used for review or re-certification, if appropriate. The system can be designed to offer very specific advice or prompts for dealing with incorrect responses that help learners acknowledge their errors and learn the correct answer. Some systems also offer simulations where learners can practice time and again to improve personal skills before registering for the final online test. The critical assumption or element supporting this kind of “first generation”

approach to evaluation is that *there must be a correct answer* for the question presented to the learner. This is usually the case in most technical hard-skill instruction, but not always possible in soft-skill situations. For example, the approach constrains the kinds of questions that can be asked (i.e. closed versus open-ended questions). A "first generation" system can score answers to closed "true or false," or multiple choice, questions based on a list of options. It cannot score open-ended questions where personal judgment is required such as "Why is this concept important to *you*?" or "In what ways does this idea apply to *your* job?" or "How can *you* apply this concept given the special circumstances in *your* personal work situation?"

In contrast, evaluation in a "second generation" system is driven by the learner-in-control pedagogy discussed in the previous section, accompanied by a focus on practical application. The aim of evaluation shifts from testing for mastery of specific content-based knowledge to *encouraging learners to reflect on and apply what they are learning, and to demonstrate the effects of the learning, for example, in terms of improved job performance and learning by doing*. Consider the following example illustrating the difference between the two approaches:

- A "first generation" evaluation strategy for a learning module on "quality improvement" might include a mix and match test asking learners to "drag and drop" definitions from one column to a list of key terms (e.g. Best practice, Six sigma, ISO 2000, Quality metrics, etc.) in the opposite column. Learners might also be asked to sequentially order a complex list of procedures for ensuring quality in a specific case study, and be given feedback along the way. The case, however, would be abstract so that the test responses can be very specific (e.g. closed questions) and scored universally rather than including open-ended questions tailored to the learner's specific context that cannot be so easily evaluated.
- A "second generation" evaluation strategy on the same topic pushes learners to identify the key concepts that are important to them and the actions required for putting the learning into practice. In this way learners must self-assess and reflect on *what is important* to them, and capture their own ideas about the *actions that need to be taken* to apply the learning to their situation. Contextually oriented advice (e.g. generated through questions that encourage learners to think about key aspects of what "quality improvement" means in their situation), would be provided at every stage to support the learner in the reflection and application process. The key here is that the system is used as a vehicle for learner-driven learning designed to produce results in practice, *not* as a tool for scoring learners or evaluating

progress.

Since evaluation strategies differ greatly between “first” and “second generation” approaches, it is important to know what needs to be achieved. If evaluation is being used to reinforce instructor-expert knowledge, a “first generation” strategy based on repetition, practice and passing the test will be appropriate. If the evaluation strategy needs to be learner-driven and focused on context-specific learning, then a “second generation” approach that encourages learners to (a) self-assess what is important, (b) reflect on how to apply the new insights in their own context, (c) push to action and (d) report on job impacts, is more relevant.

Characteristic #4 - Engagement through visual animation* versus *engagement through provocation: Most people will agree that the level of engagement in online learning has certainly increased as the quality of interactivity and animation has improved through the use of multimedia technologies. Gameware is an excellent example of how technology has been used to create virtual realities that engage children and adults in highly entertaining contests and playful contexts. These games are played over and over again as players hone personal skills and become familiar with patterns of events that give them an advantage over the computer to win the game. As bandwidth issues get resolved, animation is also being used in e-learning designs to enrich learning experiences aesthetically and from a learning-styles perspective. For example, case studies and simulations often include audio-video segments where key players such as the CEO or Marketing VP describe critical business dilemmas; online coaches provide animated feedback to learners that have missed key points in a quiz or lesson; lectures are delivered using a “talking head” approach supported by PowerPoint slides, and so on. This can have a positive impact on learning effectiveness. When learners are directly involved in making decisions about the learning process, are completing assessments or worksheets, or have to answer questions

about how they can apply their learning in practice, the key lessons are more likely to take hold.

But, animation/interactivity in itself does not necessarily deliver great learning results. The use of multimedia can over-complicate the presentation of simple concepts, undermine the importance of a serious issue with frivolity, distract attention from core lessons, or leave learners feeling overly confident about their capacity to resolve "textbook" cases that can lead to performance problems in "real" contexts. For engagement to be effective there needs to be sound pedagogical principles underlying the technology design. Otherwise, the interactivity can end up as a time-consuming diversion, or a fun, entertaining process – like playing a video game – without real impact on the competence and development of the learner, or on job performance.

Both "first" and "second generation" e-learning can use interactive technologies positively. The key distinction is that in addition to using visual cues and refinements to increase engagement, the "second generation" approach also uses content-based *provocations* to generate deeply engaging learning that can provoke new insights and stimulate new knowledge sharing. This involves more than surface level design techniques and technology integration. The overall aim is to create "space" for learners to get involved. Instead of closing down inquiry by filling in all of the gaps with answers and authoritative expert advice, *provocation is used to open up inquiry through use of open-ended queries, paradox, presentation of multiple views, rich examples, thought-provoking images and reflective questions that encourage learners to take ownership of their own learning and meet context-specific learning needs.* Provocation is used as a technique to prompt learners to take control of their learning by getting inside problems and issues to find appropriate ways forward.

Characteristic #5 - Separation of theory and practice* versus *integration of theory and practice in real-time: **"**Second generation" systems are ideal for supporting just-in-time soft-skill

development because the integration of theory and practice is central to their design. Because of the learner-in-control approach to pedagogy, and recognition that contextually-based application of learning is key, they allow and encourage learners to use the system to get real-time help for resolving and dealing with job related issues *as they arise*. Since all content is designed to support non-linear learning – enabling learners to take control of what they need to learn when they need it – it is ideal for just-in-time learning. The use of "provocation" opens up possibilities and reflective questions prompt learners to apply the concepts to their own situations in meaningful ways, seamlessly integrating theory and application. (See characteristics #1, #2, #3, and #4 for details.)

It is difficult to achieve this degree of integration of theory and practice in "first generation" approaches because of the way many of these systems are content and instructionally driven. "Second generation" systems are "context-driven" as well. *Learners are constantly focused on integrating learning with practice by using work issues, or other potential applications, as the focus for their learning*. This makes the "second generation" approach ideally suited for support of action learning, as opposed to just conceptual learning.

Characteristic #6 - Separate systems for learning and knowledge capture and dissemination versus integrated learning, knowledge creation and knowledge sharing: The concept of learning as the flip side of knowledge creation is not new. However, responsibility and budgets for learning and knowledge programs often reside in separate parts of an organization. For example, learning programs are often the priority for Human Resource departments, and knowledge programs are typically delivered and managed by IT or IS, or under the domain of a Chief Knowledge Officer (CKO). As a result, people go to one place to learn and to completely different systems to deposit the new insights and knowledge they generate. This often creates a

disconnect, sometimes a chasm, that isolates learning from knowledge capture and knowledge sharing. Everyone may have good intentions about supporting knowledge programs. However, time or operational constraints often get in the way and either the knowledge never gets deposited in the database or it is outdated by the time the learner gets around to it. This disconnect gets reinforced in "first generation" e-learning systems because instruction tends to be separate from practice. "Second generation" systems, in contrast, merge learning and knowledge generating activities using practical online supports that encourage learners to capture and record their learning actions (e.g. in online notebooks or databases that are linked to, and support, their learning) making knowledge sharing a seamless process.

The principle of integrating learning with knowledge technologies is simple – yet it is difficult to implement if learning occupies a separate domain. "Second generation" approaches have a major role to play here, creating the potential for *integrating learning, knowledge capture and knowledge sharing without the need to contract with separate e-learning technology and content suppliers.* This is being reinforced by emerging collaborative desktop tools that can seamlessly integrate web-based learning programs and daily work. This integration of learning, knowledge creation, and knowledge sharing, promises to overcome the chasms and revolutionize the e-learning and knowledge management marketplace in ways we have probably not yet even imagined.

RESEARCH EVIDENCE OF IMPACT: A CASE STUDY

Does "second generation" e-learning work in practice? Developments are still in a very early stage, but a qualified "yes" seems to be the answer. There have been a wide range of results in the e-learning projects studied as part of this research – from projects that didn't make the progress expected, others that got off to a fast start and then fizzled because of a lack of support,

and those producing significant organizational impacts. Implementation strategy is a critical factor – a rich topic that cannot be fully covered in this paper. The key learning, however, is that the tighter "second generation" e-learning programs are integrated with daily work practice through an *accountability loop* strategy (i.e. making learners accountable for demonstrating what they are learning and tracking the outcome in quantifiable job impacts), the greater the impact on job results. The following case study, featuring the use of "second generation" e-learning in an internationally based logistics company, is offered both to illustrate how a "second generation" approach works and its impact on performance:

Business Problem / Priorities:

The scarcity of top talent was a major bottleneck to rapid business growth, and a major strategic imperative. There simply wasn't enough top talent to fill senior-level jobs at a point when the company was poised for an intense period of rapid business expansion – projected in terms of a five fold growth in revenues over ten years. Pressure was also created by a very competitive industry making it difficult and costly to recruit key talent from outside. Internal talent development offered enormous advantages from time and cost perspectives, leading the CEO and executive team to launch a program targeted at developing high-potential senior managers as rapidly as possible. This was not just a "nice to do" leadership development option. It was seen and approached as a "do or die" strategic imperative – but one facing great difficulties. Time and geographical constraints (the high potential managers were extremely busy and often separated by thousands of miles), other key resources already stretched to the limit, intense business pressures, and a culture of pragmatism combined to create an environment that was hostile to learning and development as an end in itself.

Program Design:

The leadership development program that emerged employed a blended "second generation" e-learning approach based on use of the NewMindsets system, supported by team-based mentoring to meet the strategic imperative of rapid talent development within the constraints mentioned above:

- High potential managers, identified through the annual succession planning process, were invited to join the leadership development program and to select a personal "stretch" project (something outside their normal job responsibilities) to create a breakthrough on a difficult problem or challenge facing the business. The project needed the approval of senior management and provided a focus for personal and business-oriented learning. Once admitted to the program, participants were assigned to cross-functional, geographically dispersed, learning teams mentored by a VP level executive.
- The leadership program was designed around nine key themes (e.g. critical thinking for business improvement, leading "out of the box" thinking, leadership and learning, team building, change management) that would provide a focus for key competency development - both in terms of personal leadership requirements and those identified by the senior executive team as being crucial for business success.
- Each of the nine topics included a cluster of five to eight NewMindsets learning resources that could be selected for study in whole or in part, in any order desired, according to personal interest, learning needs and "stretch project" demands. In accordance with the "second generation" design each learning resource was linked to several others which were, in turn, linked to several others, giving program participants access to the whole ecology of learning resources.

- All the learning resources on the NewMindsets system were also available at all times in other ways. For example, they could be accessed independently through various topic or competency development menus - so that program participants could engage in learning on a wide array of leadership and management topics. This capacity allowed each participant to pursue multiple learning paths as they mobilized the resources on the system, e.g. for use on their "stretch projects," for discussion with members of the mentoring team, and most importantly of all, as part of their daily work practice.
- While the program was constructed around their projects and specific learning themes, participants immediately realized that the online learning system also provided a tool for just-in-time work-based learning. Thus, it was common for program learning to cascade very quickly into other areas, e.g. as participants shared the ideas in the learning resources with workplace colleagues outside the program. Whereas in a traditional "first generation" program the linear sequencing of overall program design embedded in a typical "course" model would have made this "nugget-like" sharing difficult, the granular, fractal design of the NewMindsets system meant that almost any online element could itself provide a meaningful experience for someone outside the program - especially when framed and used with a specific job problem or application in mind.
- Throughout the whole process, further integration of theory and practice, work and learning, was achieved by the fact that when studying any concept on the NewMindsets system there was an opportunity to immediately apply the ideas to the "stretch project," or to a work situation, through use of the online worksheets and job supports embedded in each learning experience. These included tips and advice containing questions that required and motivated participants to reflect on the special characteristics of the problems and contexts with which

they were dealing (i.e. the “learning triangle” principle). The results of these reflections and applications could, in turn, be shared with team mentors and other program participants by sending relevant elements of one’s online notebook.

- In line with the applied, action-learning focus of the program, success was evaluated in terms of participants’ ability to demonstrate progress in “making a difference to the business” (e.g. by showing job impacts and contributions achieved through their stretch projects). Participants were encouraged to capture and report results in qualitative and quantitative terms and, where possible, identify specific return on investment in terms of time and effort. Sample impacts are presented in the following section on “Program Results.”
- Overall results and participant accomplishments were presented and celebrated at the annual “Operations Conference” in the presence of the CEO and full management team. Best practice experience and breakthroughs were in turn shared throughout the company across different business units.

In this way the program created a virtual learning experience, seamlessly integrated with work demands, that helped to overcome the operating constraints of wide geographical dispersion, time scarcity, and the aversion to taking time out for learning away from the job. A similar approach has been used in other NewMindsets projects geared to organization-wide competency development and MBA course-based education.

Program Results:

The action learning projects created a win-win for everyone. Participants resolved complex issues with the help of colleagues and mentors. The organization gained directly through the demonstrable return on investment (ROI) and through the “best practices” that

resulted from the projects which were, in turn, disseminated across business units. Some of the reported business impacts included those outlined in Table 2 below.

Table 2. Business impacts

Here are some specific examples of reported gains and benefits resulting from breakthroughs on the action-learning projects associated with the leadership development program:

- Revised loading procedures to increase fill rate and reduce damages due to load shift
  - Estimated freight savings of over $10M in one year
- Creative ratification of a highly volatile union contract without a labor disruption
  - Estimated savings of $10M - $11M over a five year period (securing major competitive advantage and client commitment for future contracts)
- Streamlined procedures for regular maintenance of specific equipment
  - Improved service quality cutting maintenance time by 65% from 1560 hours to 576
  - Labor costs saving of $22.5K on a pilot in 12 days – now being rolled out as a best practice across the organization with further gains
- Increased e-procurement usage rate from 48 to 75% - which doubles buying power ($200 - 400K/month), leverages volumes and drives down pricing (savings yet to be determined)
- Improved forecasting accuracy for inbound/receipt planning from 40% to 80% resulting in cost savings and improved client loyalty

Methodology Note: A three-prong approach was used to assess program impact that included:

- Participant's self-assessment of personal learning and performance e.g.Each person completed a written self-assessment that was forwarded to his or her mentor for review/validation.
- Direct-report assessment of performance e.g. Each of the participants' managers received a summary of accomplishments and project gains for review/validation ensuring overall credibility of the program without being administratively onerous.
- Mentor assessment of learning and commitment e.g. Mentors gave support and guidance during the program and feedback at the end. The HR Director sought their input on graduates' readiness for promotion for an annual Succession Planning meeting at VP level.

This application won a Brandon-Hall.com Gold Award for Excellence in e-Learning, 2004.

In summary, a lot of effort was given to creating an *accountability loop* for delivering concrete results supported by online and team learning. The organization provided these high potential senior level managers with the learning tools and support they needed to really make a difference in their work practice. In return, participants were expected to make the best of the opportunity and were held accountable for applying what they were learning *during* the six month program to deliver quantifiable value for their teams, business units, their own

organization and that of their clients. In this way the program not only provided opportunities for personal development, it became a "proving" ground where self-motivated individual and team accomplishments could be observed, acknowledged and rewarded.

DISCUSSION AND CONCLUSION:

This paper has sought to draw attention to two major issues that are paramount for the effective development and use of e-learning, especially for soft-skills development.

1. **A "first generation" approach to e-learning design and implementation has worked for technical training. But a "second generation" design and implementation, founded on completely different assumptions about learners and learning, is needed for developing management / leadership soft-skills.**

The paper aims to provoke a new way for thinking about e-learning design and implementation in terms of a "second generation" e-learning paradigm shift that can tap the self-organizing nature and potential of the web, especially by putting learners in control of the learning process. When tightly integrated with daily work practice, for example, as a just-in-time learning support targeting specific business problems, issues, or competence development, a "second generation" approach can deliver significant positive impacts on job performance and fulfill the promise of effective e-learning for soft-skill development.

Most importantly, "first" and "second generation" approaches work best under different circumstances in pursuit of different instructional objectives. The "first generation" approach works in contexts where linear/sequential learning is required, where instructors or experts need to be in control, and where repetitive practice and testing is essential. It has proven an effective tool for technical skill development, for improving routinized processes or tasks where conformance is required, and for rote learning where key materials need to be committed to memory or habit. In contrast, the "second generation" approach is emerging as an effective support for soft-skill development in management education, personal self-development and

improved work practice, for ongoing competence development (e.g. in producing self-motivated, empowered problem solvers), and for supporting innovation and performance improvement in addressing complex issues in new and thoughtful ways - as illustrated in the case study presented in the previous section. Therefore, *it is paramount that educators and managers who want to develop e-learning capacities and applications think about what they want to achieve and the kind of e-learning that is required for success*. More details on where each approach can be used effectively are offered in Table 3 below.

Table 3. Using "first" and "second generation" e-learning for developing management and leadership skills

Here are some suggestions for thinking about where and when to employ "first generation" and "second generation" e-learning approaches. As can be seen, the situations are polar opposites indicating that the use of one approach where the other is needed will likely result in poor learning impact results.	
Situations where a "first generation" approach is likely more appropriate for developing leadership / management skills:	*Situations where a "second generation" approach can be used for developing management / leadership skills:*
• Learners need specific technical training, guidance and monitoring to meet specific learning goals where a "right answer" or "right process/procedure" exists and deviation is problematic (e.g. operating machinery, installing equipment, doing mathematical / statistical operations).	• The priority for the organization is to benefit from empowered learners and the outcomes of action-oriented learning, (e.g. by entering new markets, innovating products, solving complex problems or undertaking emergent tasks where future learning requirements can't be predicted).
• The priority is to ensure compliance to specific standards by testing for specific *content knowledge* or where close monitoring of the learning process is required to ensure that legal, ethical and/or quality parameters are met.	• Learners need support in plotting and executing their own learning paths for developing personal competence, especially in soft-skill areas requiring judgment and subjective analysis (e.g. coaching, delegating, strategic thinking).
• Consistency across various contexts is absolutely critical and creative approaches are unwanted and undesired. (e.g. service situations where inconsistency or deviation from practice can result in harm, etc.).	• The status quo (i.e. doing what worked yesterday, or perhaps even what's working today) is, or will no longer be appropriate. New approaches need to emerge through innovative thinking.
• Rote learning through practice and the development of deeply ingrained habits is the primary goal (e.g. where the program designers want learners to act instinctively, arguably without reflection, emotion or conscious thinking to produce a specific action response).	• Talent development programs where it is important to see the impact and value created by self-motivated individual learning in a "proving ground" approach (e.g. for succession planning, action-oriented leadership programs, innovative products or ventures).
• There is an urgent need to get everyone "on the same page" (e.g. to brief people on specific action requirements to create a common front and take collective action in a unified manner)	• There is an urgent need for change at a group or organizational level to meet pressing demands (e.g. to improve results in a highly competitive environment, spur new thinking about complex problems).

2. The development and potential impact of "second generation" e-learning invites a re-thinking of technology standards that seem to be locking the e-learning industry into a "first generation" mindset and locking out required pedagogical exploration and innovation.

Technology standards and requirements seem to be in the driving seat as far as e-learning is concerned – despite the fact that there is a growing awareness that the quality of the e-learning

being delivered is not always meeting the expectations of learners and client organizations. It is important that the e-learning industry and e-learning professionals look at the problems and recognize that for successful e-learning, technology can only be an enabler. The requirements of learners and learning need to be given a more prominent, driving role. Consider, for example, how the issue of "standards compliance" is entrenching "first generation" design principles in areas where they don't really apply. As more and more companies acquire Learning Management Systems, priorities have been shifting to the development of industry-wide standards. Although high, consistent standards are crucial for achieving high quality e-learning applications, *it seems important to distinguish between technical standards and learning standards* and to ask whether they adhere to "first" or "second generation" design principles. One of the most important conclusions emerging from the research presented in this paper is that there is a major difference and, most importantly, the two types of standards are far from being compatible. Consider the following:

- Technical standards: At the present time, most of the attention in e-learning standards discussion is focused on the development of technical standards (e.g. SCORM, IEEE, etc.). Learning Management Systems and technology companies have taken the lead in trying to create consistency across the e-learning marketplace to facilitate administrative requirements for low cost delivery by standardizing "sharable content objects" (SCOs) that can be retrieved, reused and reassembled (Jonassen & Churchill, 2004). This drive to produce standardized, sharable content objects *by reducing them to the smallest possible, self-contained components* reduces the scope for including a significant learning dimension within the objects themselves. As far as learning is concerned, this is a serious problem! This push to develop industry-wide technical standards seems to put technology companies and IT

departments in control of e-learning developments, potentially at the expense of end-consumers of online learning and learning outcomes.

- Learning standards: The development of high, consistent learning standards has taken a back seat to the development of technical standards at this stage. However, in North America the American Society for Training and Development (ASTD) has been championing learning standards through its e-Learning Certification Institute to ensure that e-learning products are "learning friendly," not just "technology friendly." However, there is still a long way to go, since the focus in most learning certification processes seems to be on general "course quality" and content library certification rather than on individual learning object certification and the desirability of developing new learning standards for use within the new web-based technological environment. In many respects, the standard setting process has had a "first generation" flavor since standard-setting approaches have often just transferred principles that have applied under traditional instructional models to the new e-learning environment. For example, standards for promoting effective just-in-time open-ended learning outside formal course structures have been more or less ignored.

One of the strong themes emerging from the research reported in this paper is that the almost exclusive emphasis on technical standards that aim to standardize content production and delivery may be squeezing out opportunities for creating sophisticated "second generation" online learning ecologies of interconnected content. Producing standardized SCO's (sharable content objects) requires reducing content chunks to the smallest possible components, as well as *eliminating all of the finely tuned hyperlinking interconnections* – a critical design feature of "second generation" e-learning. As a result, learning designers struggling to achieve technical certification thus often face a direct trade-off between producing learning objects that deliver

superb performance from a learning point of view and the ability to get certified from a technology / sharability / administrative point of view. This creates a major dilemma for e-learning content producers and end-consumers. *There seems to be little benefit in having consistent, sharable learning objects that are guaranteed to work on any technology platform anywhere in the world (i.e. by meeting technical standards), if the final learning product is poor and delivers a disappointing return on investment.*

It's a paradox. The industry needs standards to ensure quality and consistency. But, the freedom to innovate and explore new methodologies from a pedagogical perspective is also important. The position taken in this paper is that it seems premature to lock into too many predetermined technical standards when the whole e-learning industry is in such a state of flux and infancy. To take the analogy of the automobile industry, the e-learning sector is still in the Ford "Model T" phase of development. Why, therefore, try to shape, and likely constrain future development with "Model T" standards in mind? Although these standards may work for certain types of e-learning content, they will undoubtedly cause problems elsewhere and overly constrain innovative development too early – especially in the "second generation" domain.

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